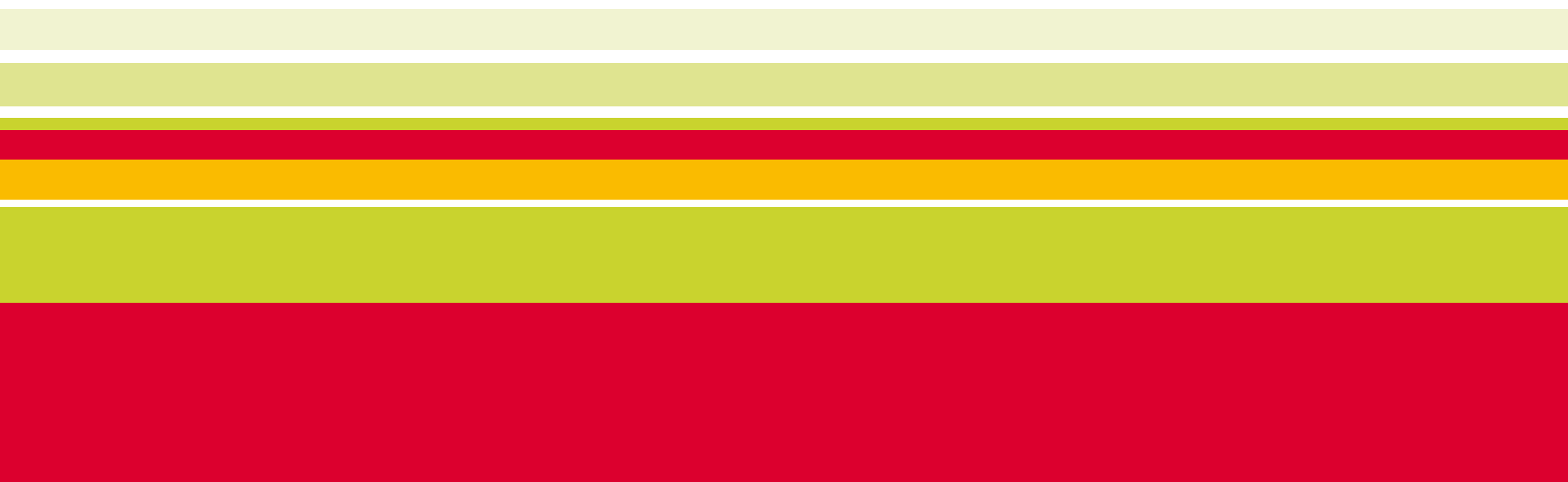




High Speed I/O & Cable Assemblies Overview



High Speed I/O Information

Web links to product info including performance parameters, drawings, 3D models, signal integrity test data and more...

- www.fci.com/highspeedio
- www.fci.com/eyemax
- www.fci.com/densishield
- www.fci.com/minisas

■ Catalogs & Brochures

- EyeMax: ELXEYEMAX0608ELT
- DensiShield: ELXDENSHLD0708ELT
- Mini-Multilane SAS/SATA:
- ELXMINSASAT0908ELT

EyeMax® High-Speed Copper Links

- CX4
- Infiniband
- SFF8470
- Fibre Channel



DensiShield™ I/O System

- CX4
- Infiniband®



Mini-Multilane SAS/SATA Assemblies

- SFF8086
- SFF8088



Primary Markets served

■ *Telecommunications*

- Base Stations
- Switching
- Transmission
- Routing
- Power Supplies

■ *Data*

- Servers
- Storage

■ *Industrial + Medical Instrumentation*

- POS Equipment
- Test Equipment
- Medical Instrumentation

Connector & Cable Assembly Offerings

High Speed - Eyemax[®]

EyeMax[®] Product Overview



- Use as a high-speed link between servers, storage enclosures, switches and other data networking or communication equipment
- External copper serial I/O link selected by various standards organizations
- Low-cost alternative to fiber optics
- Data rates – standards:
 - Infiniband - SDR – 2.5 GB/s per channel
 - Infiniband - DDR – 5.0 GB/s per channel
 - Infiniband - QDR – 10.0 GB/s per channel
 - 10G Ethernet CX4 – 3.125 GB/s per channel
- Receptacles, Plug Kits, Cable Assemblies
- Impedance-controlled paddle card with capability to upgrade for equalization
- Various high-speed raw cable sources
- Robust die-cast shells for EMI shielding

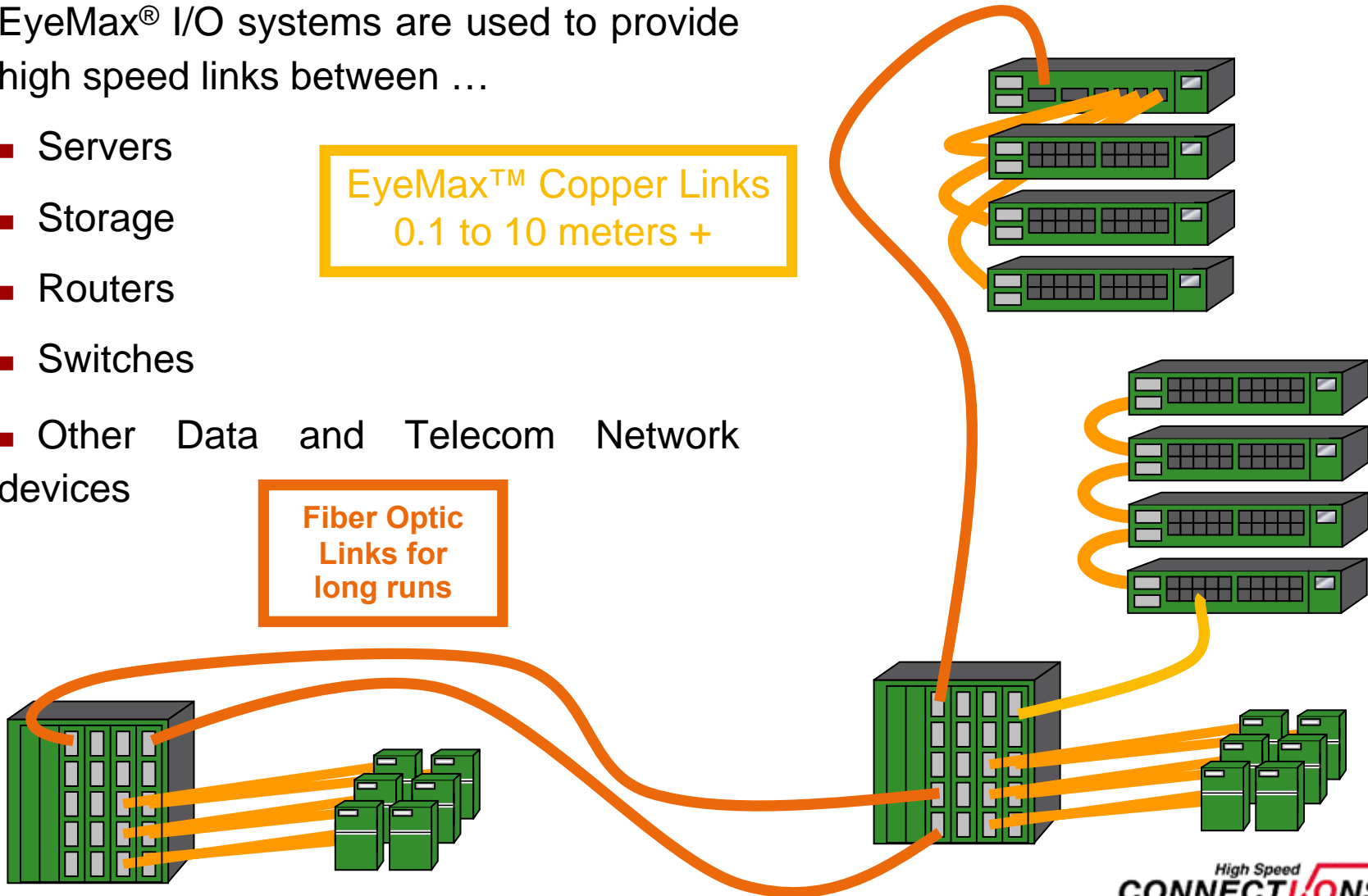


EyeMax[®] I/O systems are used to provide high speed links between ...

- Servers
- Storage
- Routers
- Switches
- Other Data and Telecom Network devices

EyeMax[™] Copper Links
0.1 to 10 meters +

Fiber Optic
Links for
long runs



The mating interface in EyeMax products has been selected as the External High-Speed, Copper Serial I/O Link for:

4X
Latching
versions



InfiniBand™ & Infiniband DDR: Switched communications fabric that allows many devices to communicate concurrently rather than having to wait for other device pairs to complete their transmission.



10G Fibre Channel: Replace the direct attached storage (local to a single server) with a Storage Area Network (SAN) where all servers can access all storage units over a separate, point to point switched network.



SAS – 4X I/O (SFF-8470): Replace the parallel bus structure with high speed serial bus to facilitate higher speed SCSI data transfers.

4X
Thumb-
Screw
versions



SATA II – 4X I/O (SFF-8470): Storage system disk-interface technology developed by a group of the industry's leading vendors to replace parallel ATA.



10G Ethernet – CX4 Copper (IEEE 802.3ak): Add a copper alternative to the 10Gb Ethernet fiber link specification. Technology for networking applications in LANs, MANs, and WANs.

EyeMax cable assemblies

- 4X cable assemblies
 - SFF 8470 compliant
 - 24-30 AWG wire size options
 - FCI engineered connectors
 - Impedance controlled paddle card
 - Passive & active equalization capable
 - Mating header SI optimized
 - Latch or jackscrew mounting available
 - All cable 100 % tested for continuity & Hi-pot
-
- High speed signal integrity testing & verification
 - Impedance
 - Insertion loss
 - Cross talk
 - Skew
 - Jitter / Eye pattern



EyeMax Cable assembly (un-equalized) & EyeMax receptacle part numbers

4X cable assemblies

- 10007290 - latch style
- 10018960 - jackscrews

4x mating receptacles

- 58368 - latch style
- 58369 - jackscrew mounting
- 10009629 - w/ mounting hardware



The table below shows the length and wire gauge needed to meet each performance level

EyeMax	Unequalized cable length												
Performance Level	1m	2m	3m	4m	5m	6m	7m	8m	9m	10m	11m	12m	13m
Infiniband - SDR	30	30	30	28	26	24							
Infiniband - DDR	30	28	24										
10G - Ethernet - CX4	30	30	30	30	30	30	30	28	28	26	26	24	24

EyeMax cable assemblies & headers

- Documentation available on FCI web site
 - Product data sheet
 - ELXEYEMAX0608ELT
 - Product specification
 - GS-12-209 – receptacle & plug connectors
 - GS-12-216 – cable assemblies
 - Electrical models
 - Electrical test report
 - SI-2008-05-009 – un-equalized cables
 - Application specifications
 - GS-20-025 - receptacle
- Web links
 - www.fci.com/highspeedio
 - www.fci.com/eyemax
- Available upon request
 - Electrical test boards
 - Cable assembly samples

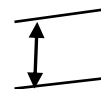
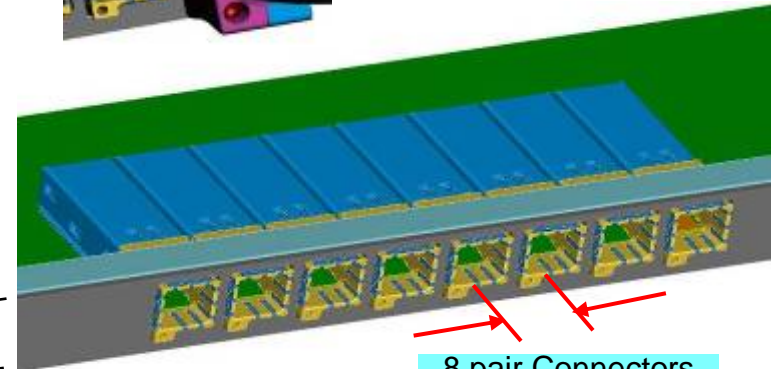
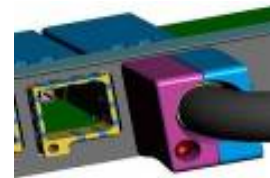


Connector & Cable Assembly Offerings

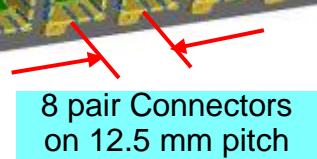
High Speed - DensiShield[®]

DensiShield I/O System

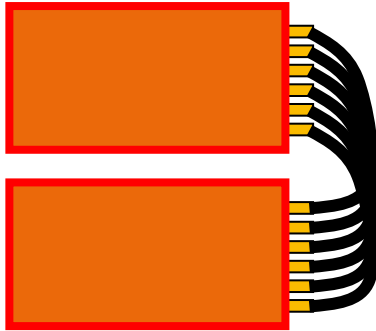
- ▲ I/O link targeting Rack in cabinet-based systems that require higher bandwidth and density
- ▲ ≥ 2.5 Gb/s per differential pair
- ▲ Matched 100 Ω interconnect system
- ▲ 12.5mm pitch enabling multiple I/O ports along a card edge
- ▲ 8 differential pair cable construction
- ▲ Jackscrew or Torx™ screw drive
- ▲ 26 & 30 AWG wire size options
- ▲ Long mating engagement
 - ▲ Guidance
 - ▲ Addresses cable weight or routing concerns
 - ▲ Tighter cable routing between chassis & cabinet door
- ▲ Robust EMC termination systems
 - ▲ Raw cable to cable assembly die cast cover via ferrule crimp
 - ▲ Die cast cover to chassis
 - ▲ Chassis & Cable assembly to internal PCB
 - ▲ Mating header to PCB
- ▲ Dual-beam contact system provides redundancy and long term reliability
- ▲ All cable 100 % tested for continuity & Hi-pot
- ▲ High speed signal integrity validation
 - ▲ Impedance
 - ▲ Insertion loss
 - ▲ Cross talk



Fits on plug-in units with 15mm pitch or higher

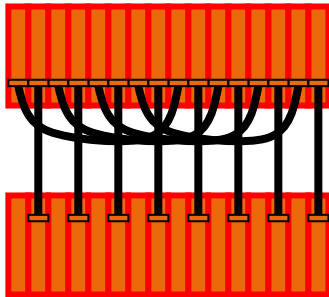


8 pair Connectors on 12.5 mm pitch



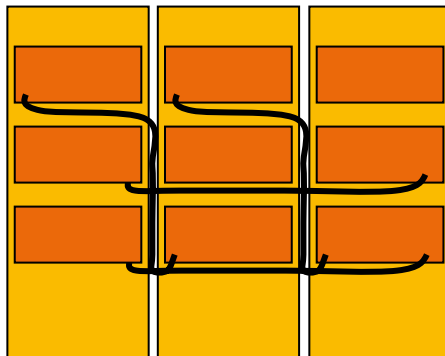
Between Plug-in units in same subrack / shelf

- “Cable Backplane” applications.
- Small PCB edge and panel length usage
- ✓ Allows Many Separate I/O’s from one panel
- Maintaining shielding on subrack level.



Jumpering between Subracks / Shelves

- From one interface board per subrack
- Example: For system upgrade capability



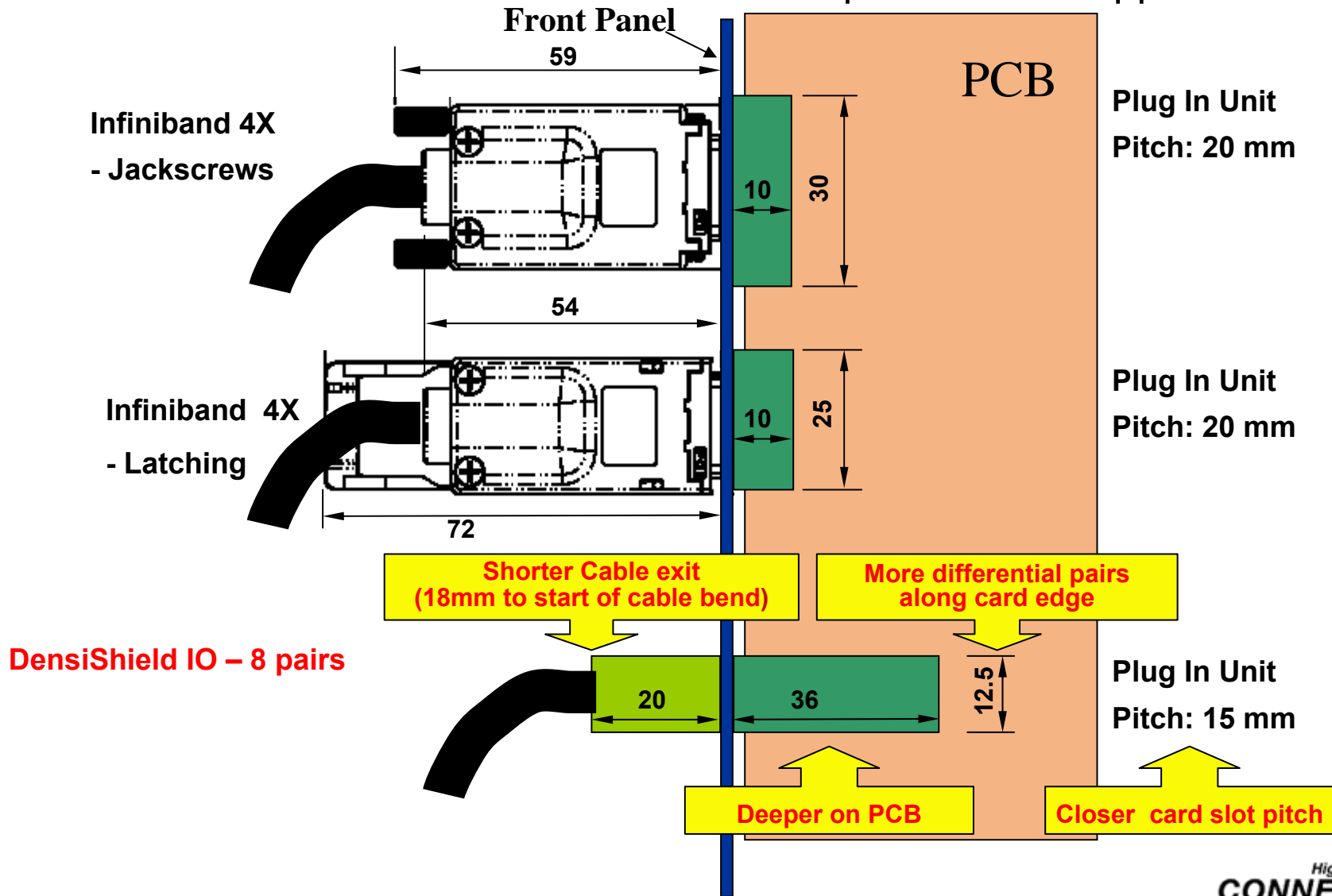
Between Cabinets

- High system flexibility / easy upgrade
- “EMC-proof”

DensiShield system I/O Density vs Eyemax



8 pair front I/O application



DensiShield IO - 8 pairs

DensiShield Header & Cable assembly part numbers

- Cable assembly P/N's
 - 10054999
 - See customer print for dash number definition
- Mating header P/N's
 - 10044471 – standard
 - 10076181 – uTCA compliant



- Capability matrix - Based on Infiniband defined acceptance thresholds

DensiShield	Unequalized cable length												
Performance Level	1m	2m	3m	4m	5m	6m	7m	8m	9m	10m	11m	12m	13m
Infiniband - SDR	30	30	30	26	26								
Infiniband - DDR	30	26	26										
Infiniband - QDR	26												
10G - Ethernet - CX4	30	30	30	30	30	30	30	26	26	26	26	26	

DensiShield Cable assembly & header documentation

Documentation available on FCI web site

Product data sheet

- ELXDENSHLD0708ELT

Product specification

- GS-12-314

Electrical models

Electrical test report

- SI- 2008-06-001

Application specifications

- Header – GS-20-048

Web links

- www.fci.com/highspeedio

- www.fci.com/densishield

Available upon request

- Electrical test boards

- Cable assembly samples

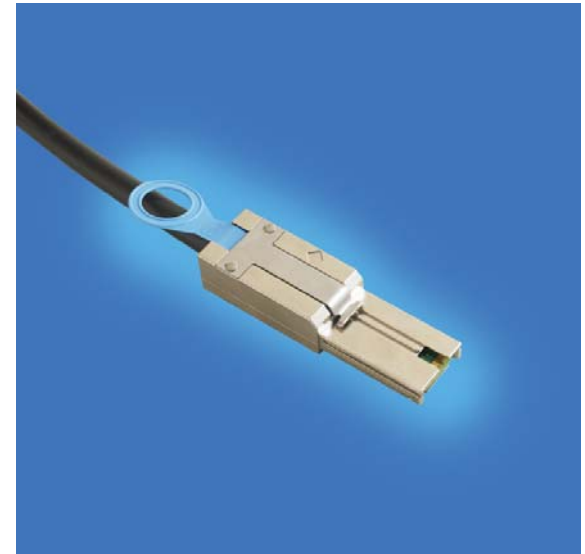


Cable Assembly Offerings

High Speed – mini-SAS / SATA

Mini-SAS / SATA Cable assembly

- I/O link targeting Network and mass storage applications
- Latest generation of Serial Attached SCSI / Serial ATA
 - SFF-8088 compliant
- 26 position cabling interconnect; 100 Ω cabling system
- Designed for 1.5GB/s to 6GB/s per channel transmission
 - Capable to 10 GB/s per channel performance
- 8 differential pair cable construction
- 24, 26 and 28 AWG wire size options
- Highly engineered mating PCB interface
 - Optimized SI performance
- Robust EMC termination systems
 - Ruggedized die cast covers
 - Adaptive EMI chassis gasket
- Lengths from 0.25m to 8m depending on SI performance
- All cable 100 % tested for continuity & Hi-pot
- High speed signal integrity validation
 - Impedance
 - Insertion loss
 - Cross talk
 - Jitter



Mini-SAS / SATA Cable assembly

P/N's

- Cable assembly P/N's – un-equalized
 - 10084749
 - See customer print for cable length, wire gage and keying definition

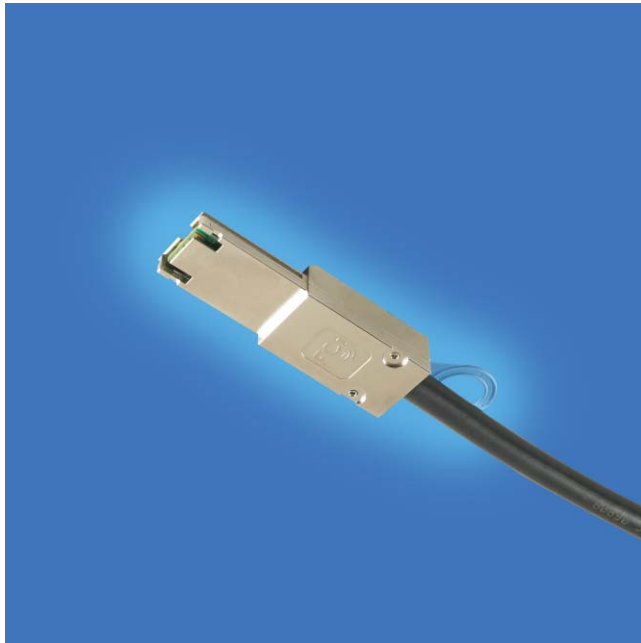
- Based on Serial ATA Revision 2.6 and T10/1760-D Revision 10 SAS-2 requirements & performance thresholds



Mini-SAS / SATA	Unequalized cable length								
Performance Level	1m	2m	3m	4m	5m	6m	7m	8m	9m
SAS	28	28	28	26	26	24			
SATA	28	26	28	26	26	24			

26 Position External mini-SAS/SATA to SFF-8470 Cable Assembly

- Lengths from 0.25m to >10m (SI performance dependent)
- 24, 26, 28 AWG cables
- Use 8 shielded parallel pair high speed cable (same as Infiniband)



Mini-SAS / SATA cable assemblies

- Documentation available on FCI web site
 - Product data sheet
 - ELXMINSASAT0908ELT
 - Product specification
 - GS-12-548
 - Electrical models
 - Electrical test report
 - SI-2008-06-006 – un-equalized
 - Web links
 - www.fci.com/highspeedio
 - www.fci.com/minisas
 - Available upon request
 - Electrical test boards
 - Cable assembly samples



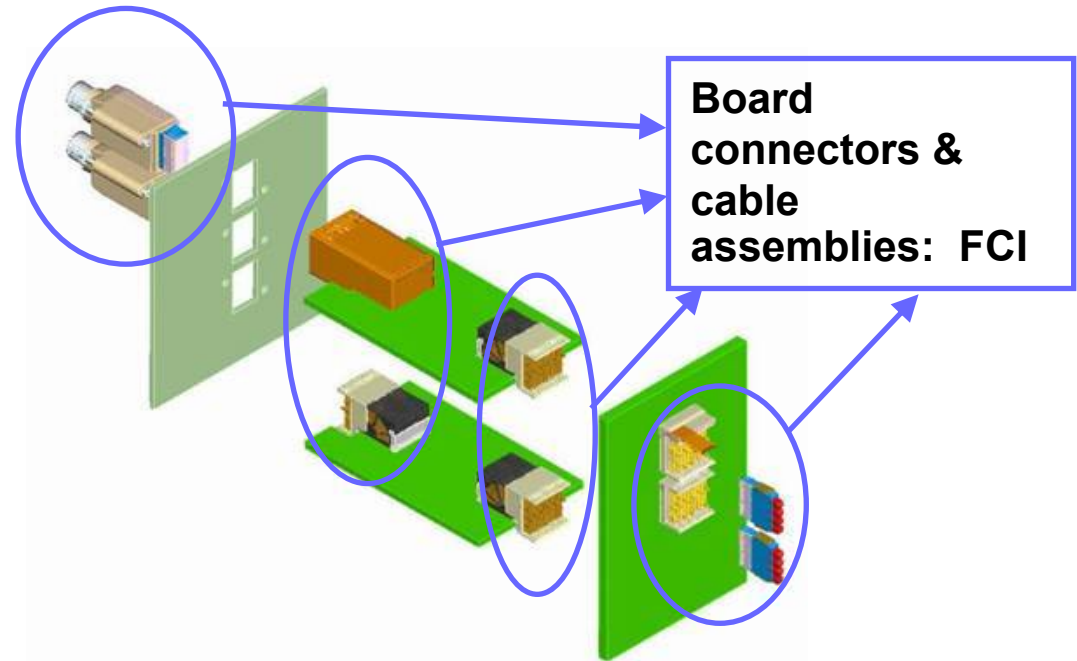
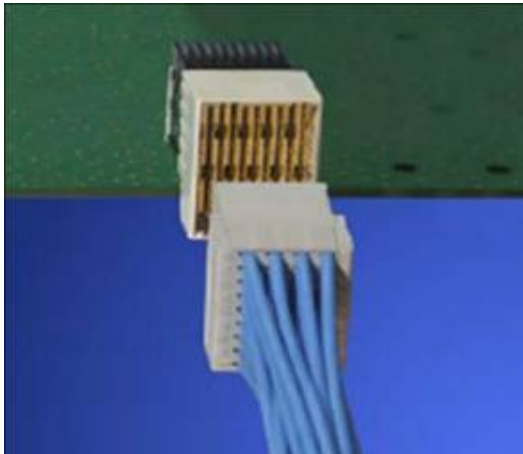
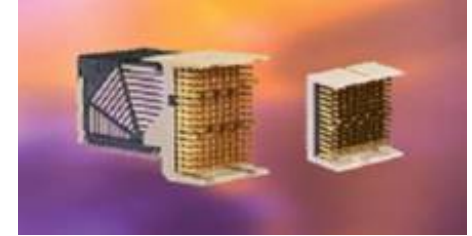
Connector & Cable assembly Development Backlog

High-Speed - AirMaxVS®

AirMaxVS[®] I/O signal connector configurations



- Internal I/O - vertical header & right-angle header
 - Vertical header - 4 pair, 10 column, on 2mm column pitch
 - Right-angle header
 - 4 pair, 8 column, on 2mm column pitch
 - 4 pair, 6 column, on 3mm column pitch
- AirMaxVS I/O second source to W.L. Gore
- 6.25 Gb/s performance over 3 meters w/o equalization

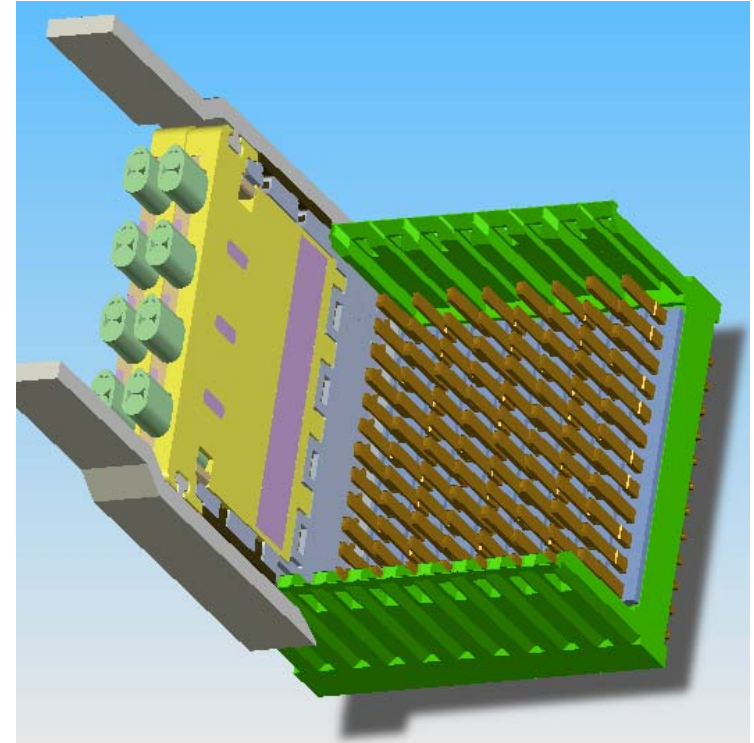


Features

- Use of AirMaxVS Technology
 - Air as dielectric;
 - NO interleaving shields;
 - Plug in compatible with all license suppliers of Airmax
- 12 contacts per terminal block
- Stackable at 2 mm column pitch
- Supports common wire sizes

Benefits

- Provides flexibility in design (terminal block count & pitch);
- Can be configured differential (4 pairs per column) and/ or single ended
- Available today through FCI / Gore*



High Speed I/O Information

Web links to product info including performance parameters, drawings, 3D models, signal integrity test data and more...

- www.fci.com/highspeedio
- www.fci.com/eyemax
- www.fci.com/densishield
- www.fci.com/minisas

■ Catalogs & Brochures

- EyeMax: ELXEYEMAX0608ELT
- DensiShield: ELXDENSHLD0708ELT
- Mini-Multilane SAS/SATA:
- ELXMINSASAT0908ELT

EyeMax® High-Speed Copper Links

- CX4
- Infiniband
- SFF8470
- Fibre Channel



DensiShield™ I/O System

- CX4
- Infiniband®



Mini-Multilane SAS/SATA Assemblies

- SFF8086
- SFF8088

