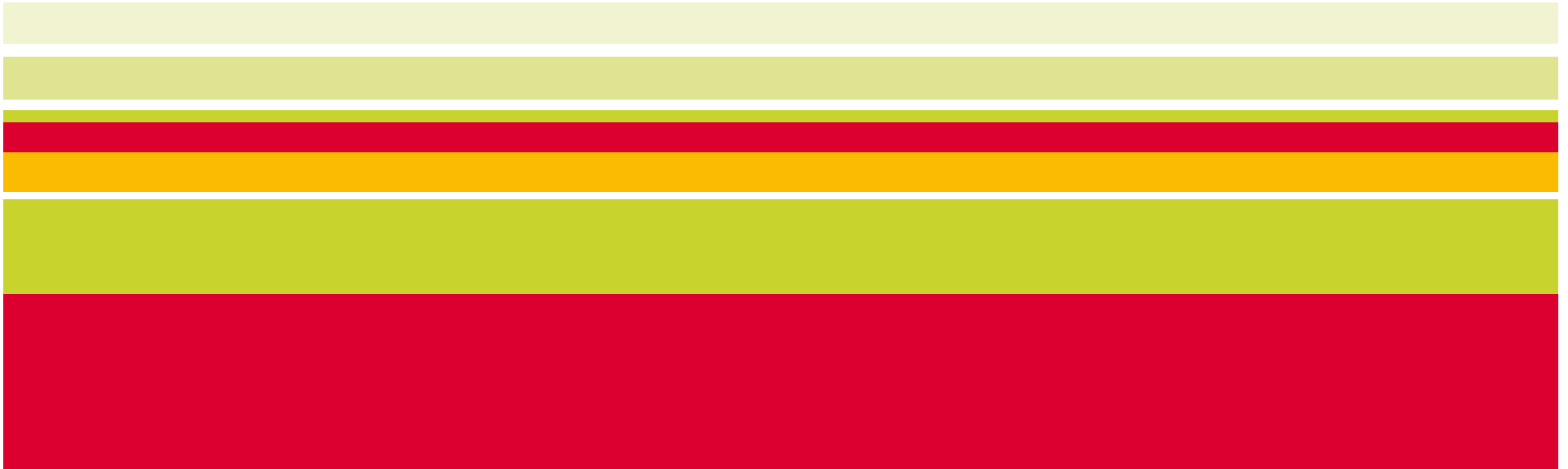




## ***Copper and Optical Infiniband Link Solutions from FCI***

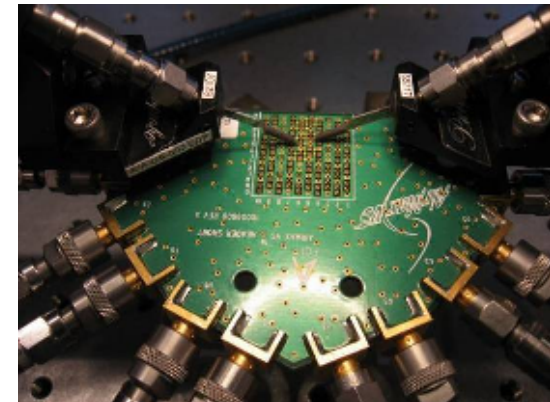
***Jim David – Global Product Director, HSIO products***



# Who is FCI?



- **Global manufacturer of connectors & interconnect systems**
  - Sales of € 935 million in 2009
  - 21 total manufacturing sites in the Americas, Europe and Asia
  - 12,000 employees in 30 countries
  - Serves the telecommunications, data storage, industrial, consumer & automotive markets
  - Technology driven
  - Three divisions: Electronics, Motorized Vehicles, Microconnections
  
- **Electronics division**
  - 4<sup>th</sup> or 5<sup>th</sup> largest connector supplier in the world
  - High speed backplane, mezzanine and board-to-board interconnect systems
  - High speed I/O systems ( connectors, EMI cages and cable assemblies)
  - Power interconnect and distribution solutions
  - Commercial, Storage and Miniature products
  
- **Technology**
  - Signal integrity modeling & simulation
  - Structured Product development process (PACE)
  - Globally deployed Quality system & Process control methodologies
  - Industry standards participation



To learn more: [www.fci.com](http://www.fci.com) or [www.fciconnect.com](http://www.fciconnect.com)

High Speed  
**CONNECT/ONS**

## ***FCI is an active IBTA member***



- **Participate in IBTA weekly meetings & conference calls**
- **Focus on connector & cabling committees**
  - EWG
  - Loss study group
  - 25G per channel development efforts
- **Participate at IBTA plug-fests**
  - October, 2009
  - April, 2010
  - September, 2010





- **FCI engineers qualified interconnect link solutions**
  - **From transmit chip (Tx) to receiver chip (Rx)**
  - **FCI defines & validates the functionality of the proposed solution**
    - SI validation
    - Mechanical validation
    - Thermal analysis / Heat dissipation capability
    - Connectors and cables – complete interconnect solution
- **Standard cable interfaces & custom solutions**
  - **Address customer needs for**
    - Specialized needs to fit specific system architectures
    - Copper & Optical Solutions
- **FCI offers complete link solutions- cables, connectors & cages**
  - **Copper – passive**
  - **Optical – Transceivers and AOC's**
  - **Complete solutions up to 100 meters**

# Infiniband 4x Connectors & Copper cables



## QSFP / QSFP+ (Quad Small form Factor Pluggable)

### ■ QSFP / QSFP+ I/O systems

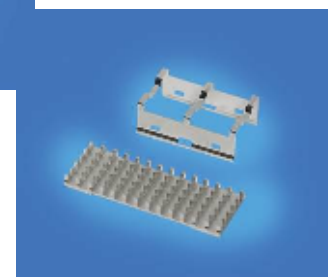
- 4 channels @ 5 Gb/s – 20 G aggregate bandwidth
- 4 channels @ 10 Gb/s – 40 G aggregate bandwidth
- SFF- 8436 compatible & IBTA compliant
- System management interface
  - EEPROM programming
- Support bandwidth requirements of:
  - InfiniBand SDR, DDR and QDR specifications

### ■ Mating connector & Cage FCI P/N's

- Standard QSFP+ connector - 10099113
- 1x1 QSFP+ cage – EMI fingers - 10099114
- QSFP+ cage heat sink - 10099115
- QSFP+ cage heat sink clip - 10099116

### ■ QSFP / QSFP+ cable assemblies

- QSFP+ Passive cable assemblies – P/N 10093084
- QSFP Passive cable assemblies – P/N 10115856
  - PVC or halogen free jacket
  - All FCI cables passed IBTA plug-fest compatibility



# QSFP+ Transceiver & AOC's - 40Gb/s



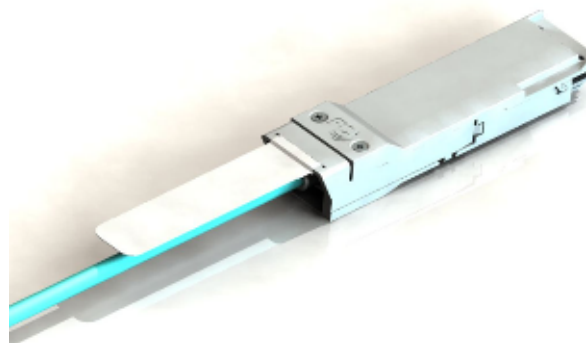
## Transceiver:

- QSFP+ MSA SFF-8436 compliant
- 4x10G duplex transmission
- Hot pluggable
- Infiniband 4xQDR compliant
- MPO connector interface
- Low power consumption, 1W (typ.)
- 0°C – 70°C
- RoHs 6/6 compliant
- Offered in 2011



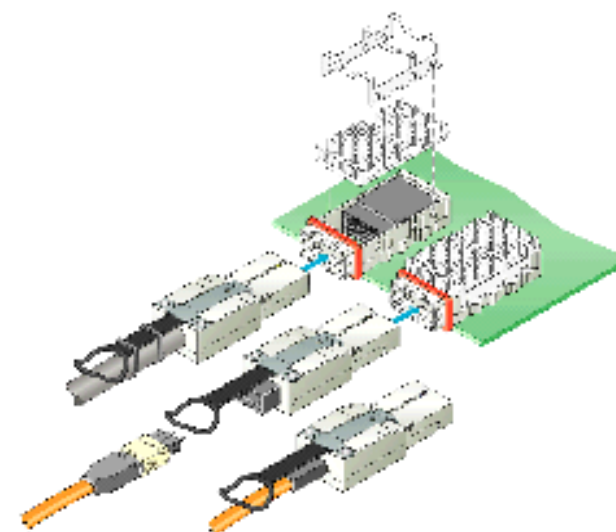
## Active Optical cables:

- QSFP+ MSA SFF-8436 compatible
- 4x10G duplex transmission
- Hot pluggable
- Infiniband 4xQDR compatible
- 0°C – 70°C
- Power consumption 0.9W typ. (Power Class 1)
- Cable lengths 5m to 100m supported
- RoHs 6/6 compliant
- Offered in 2011



High Speed  
**CONNECT/ONS**

- **CXP** (**C** = hex character for 12; **XP** = eXtended capability **P**luggable)
  - **12 x 10 Gb/s per channel**
    - Addresses industry's need for a 100 Gb/s total bandwidth interface
  - **FCI will offer :**
    - Passive copper based cable assemblies
    - Active optical cable assemblies
    - Board connector, cage and heat sink
  - **Infiniband 12x QDR interface**
  - **Highest channel density per linear board inch**





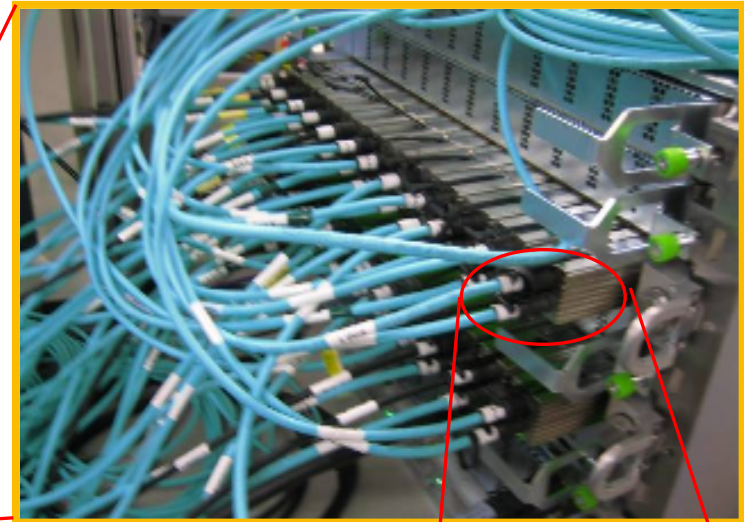
# FCI / MergeOptics in Juropa (#10 Super Computer)



## Supercomputer Juropa (Jülich) #10 worldwide



## 24 CXP Ports – Gen 1 version



120 Gb/s Active Optical Cable

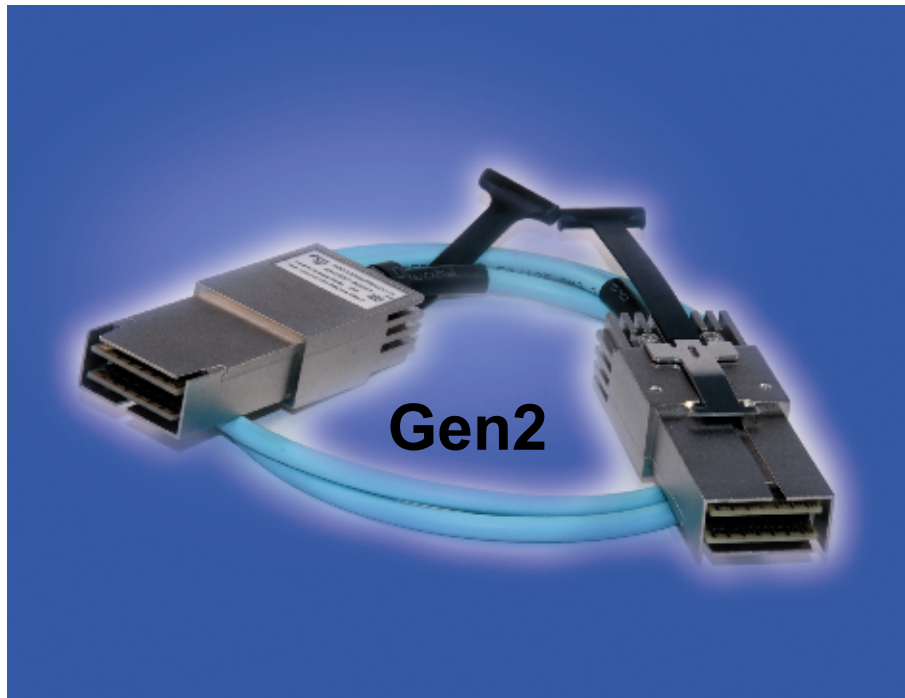
- **FCI CXP AOC's**
- Installed globally for almost 2 years
- No interoperability issues



High Speed  
**CONNECT/IONS**



# 120 Gb/s CXP Active Optical Cables



- IBTA CXP based
- Two paddle cards
  - 12 Tx
  - 12 Rx
- 24 fiber helix raw cable
  - Cable route independent
- Hot-Pluggable



- Generation 2
  - Reduced power per CXP end – 2.6 watts vs. 2.2 to 2.3 watts typical
  - Reduced size – Over 50% size reduction; tighter cable bend radius



- Using existing platforms a custom solutions can be deployed:
  - CXP to 3x QSFP+ Splitter
    - 10m Standard
    - 20m Standard
    - 5m – 50m Custom
  - Assemblies available upon request



## Other CXP I/O system components



- **CXP copper based cable assemblies – passive**

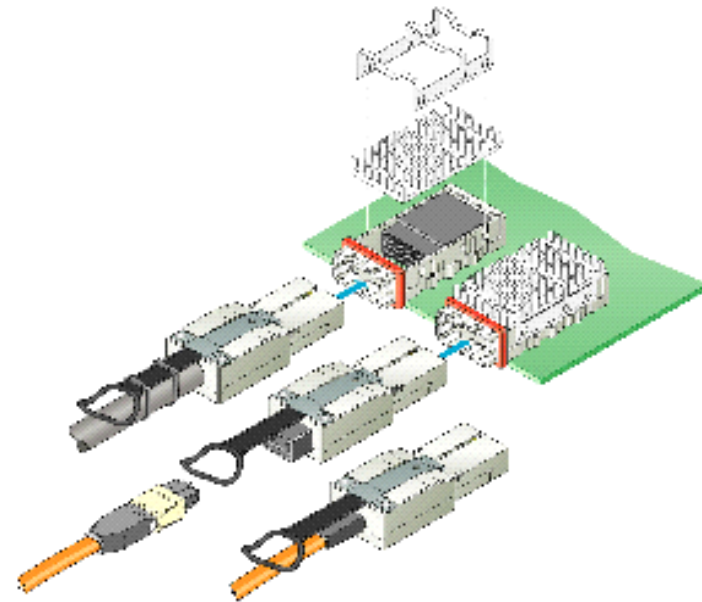
- Cable samples available upon request

- **CXP board connector and cage**

- Will be offered in 2011

- **In development**

- CXP transceiver



- **FCI IBTA activity**

- Copper based passive cables

- Submitted at IBTA plug-fest , April, 2010 – fully compliant

- **FCI has a complete HSIO offerings for Infiniband applications**
  - Board connector and EMI cage solutions
  - Passive and active copper cable assemblies
  - Active optical cables (AOC's) & transceivers
  - Customized I/O solutions using industry standard interfaces
  
- **FCI internal capabilities**
  - Connector design, definition, know-how, and experience
  - Copper cable assembly design, definition, and cable manufacturing
  - Optical cable & transceiver manufacturing
    - 3<sup>rd</sup> party final assembly suppliers are not part of FCI's process
    - Optical final assemblies and processes are internally controlled by FCI
  
- **FCI is a unique one-stop vendor for complete HSIO link solutions**
  - FCI supplies a qualified complete link to customers
  - Compatibility and Interoperability
  - Customers deal with one entity for their I/O solutions

Thank you for  
your time



To learn more:  
Visit with FCI at booth #4733 in Hall I1  
[www.fciconnect.com/hsio](http://www.fciconnect.com/hsio)