FCI

QSFP/QSFP+ COPPER CABLE ASSEMBLIES

40GB/S & 56GB/S & 112GB/S aggregate bandwidth applications
IEEE802.3 & Infiniband QDR & FDR & EDR (Proposed)

OVERVIEW

FCI's QSFP (Quad Small Form-factor Pluggable) connector, cage and cable assemblies are designed to meet emerging data center and high performance computing application needs for a high density cabling interconnect system capable of delivering aggregate data bandwidths of 40Gb/s & 56 Gb/s & 112 Gb/s. This interconnect system is fully compliant with existing industry standard specifications such as the QSFP MSA and IBTA (InfiniBand Trade Association). The QSFP cables support the bandwidth transmission requirements as defined by IEEE 802.3ba (40 Gb/s) and IEEE 802.3bj (100 Gb/s) and Infiniband QDR (4x10 Gb/s per channel) and FDR (4x14 Gb/s per channel) and proposed EDR (4x28 Gb/s per channel) specifications.

The 38 position SMT mounted edge card connector and the cable assembly's mating printed circuit card has been designed for the higher-bandwidth signal integrity requirements associated with 10Gb/s per channel transmission. The metal EMI cage along with the rugged diecast covers on the cable assembly assure proper EMI shielding effectiveness and termination. FCI offers passive cable assemblies that enable the use of a copper based interconnect system for applications with cable lengths up to 6 meters (10G) and 5 meters (14G) and 5 meters (28G). The cage offering also includes a heat sink and mounting clip to address applications where module heat dissipation is required.

FEATURES & BENEFITS

- Fully compatible with IEEE802.3ba, IEEE802.3bj and Infini band QDR & FDR & EDR specifications

- 100Ω differential impedance system

- Allows for 10Gb/s & 14Gb/s & 28Gb/s per channel transmission; aggregate of 40 Gb/s & 56 Gb/s & 112 Gb/s total bandwidth

- Optimized PCB interface board to minimize crosstalk and insertion loss

- Robust diecast covers for superior EMI shielding effectiveness

- EEPROM for cable signature & system communications

- 30 AWG to 24 AWG cable sizes available

- RoHS compliant

TARGET MARKETS/APPLICATIONS

- Data
  - Servers
  - Networked storage systems
  - Routers
  - External storage systems
  - High Performance Computing (HPC) applications
  - Data center networking

- Communications
  - Switches
  - Routers

- Industry Standards
  - InfiniBand Trade Association (IBTA)
  - IEEE802.3ba
  - IEEE802.3bj
  - 40 Gigabit Ethernet (40G BASE – CR4)
  - 100Gigabit Ethernet (100G BASE – CR4)

CABLE ASSEMBLIES

The cable assembly's 38 position printed circuit card has been designed for the higher-bandwidth signal integrity requirements associated with 10Gb/s & 14Gb/s & 28Gb/s per channel transmission. The printed circuit board has also been designed to accommodate the industry (SFF) defined EEPROM cable signature requirements. FCI offers Infiniband QDR and FDR and EDR passive cable assemblies. Rugged diecast covers assure proper EMI termination and shielding effectiveness. Cable assembly removal is enabled via a robust user friendly pull tab. In addition, FCI manufactures these cable assemblies using highly controlled and stable cable assembly manufacturing processes to minimize wire management and termination variations that impact the performance of the cable assembly. Robust final SI based testing and quality systems assure high quality cable assemblies conforming to the high-speed electrical performance requirements in industry specifications.

TECHNICAL INFORMATION

MATERIALS – CABLE ASSEMBLY

- Shells: Diecast zinc – Copper underplate with a nickel overplate
- PCB: High performance laminate with gold plated contact pads
- Raw cable: 8 individually shielded parallel pair cables with fully braided EMI shield with low smoke, zero halogen (LSZH) or PVC jacketing
- EMI girdle: Stainless steel
- Pull tab: Thermoplastic polymer
- Release plate: Stainless steel
- Drive screws: Stainless steel

ELECTRICAL PERFORMANCE

- Differential impedance: 100Ω Nominal
- Within pair skew: <10 ps/meter
- Pair-to-pair skew: <50 ps/meter
- Withstanding voltage: 300V DC
- Current rating: 0.5A max. per contact

ENVIRONMENTAL

- Operating temperature range: –20°C to 85°C
- RoHs compliant
- Thermal shock: EIA 364–32, condition1, 25 cycles, –55°C to 85°C
- Temperature life – EIA 364–17, Method A, Condition 2, Time Condition C, 500 hours, 70°C
- Mixed flowing gas – EIA 364–65, Class IIA – 7 days unmated and 7 days mated

MECHANICAL PERFORMANCE

- Durability: 50 cycles
- Mating force: 40 N max.
- Latch strength; axial load: 180 N min.
- Cable axial strain relief: 90 N min.
- Cable flex: 180° flex; 15 cycles per EIA 364–41

SPECIFICATIONS

- GS–12–622 – Product specification – QSFP+ connectors, cages & cable assemblies

APPROVALS AND CERTIFICATIONS

- Infiniband Trade Association (IBTA) Integrators listing

APPLICABLE INDUSTRY STANDARDS

- SFF–8436 QSFP+ Copper and Optical Modules
- SFF–8074i SFP Small Form–Factor Pluggable Transceiver rev 1.0
- SFF–8431 Enhanced SFF Pluggable
- SFF–8661 QSFP+ 28 Gb/s 4X Pluggable Module (Style A)
- SFF–8662 QSFP+ 28 Gb/s 4X Connector (Style A)
- IEEE 802.3 Gigabit–Ethernet standard

PART NUMBERS

Description	Part Numbers
QSFP+ cable assembly – passive – 10G compatible	10093084
QSFP+ cable assembly – passive – 14G compatible	10119239
QSFP+ cable assembly – passive – 28G compatible	10121178

CABLE ASSEMBLY CAPABILITY MATRIX

- Refer to QSFP+ cable assembly drawing : 10093084, 10119239, 10121178

For more information, please contact: Communications@fci.com or visit us at **www.fci.com**

QSFP/QSFP+ COPPER CABLE ASSEMBLIES

CONNECTORS AND CAGES

FCI's QSFP / QSFP+ connector & cage product portfolio includes a 38 position, 0.8mm contact centerline spaced, SMT terminated card edge connector. Also offered is an accompanying single unit (1x1) EMI metal cage that includes a heat sink and associated heat sink mounting clip. The edge card connector and cage are designed to meet all signal integrity requirements and EMI requirements as defined by the SFF–8436 specification. Robust EMI fingers on the cage port assure a robust and reliable EMI shield & termination when placed through the chassis opening. All connector and cage offerings are fully RoHS compliant.

TECHNICAL INFORMATION

MATERIALS – CONNECTOR

- Housing: Black thermoplastic, UL94V–0 rated
- Spacer: Black thermoplastic, UL94V–0 rated
- Contact: Phosphor–bronze
- Contact plating : 30µin. min. gold plating on edge card interface with 50µin. nickel under–plate 150µin. min. tin plating on SMT leads with 50µin. nickel underplate

MATERIALS – CAGES

- Cage: Copper alloy
- EMI fingers: Copper alloy
- Heat sink: Aluminum alloy
- Heat sink mounting clip: Copper alloy
- Cage plating: 50µin min. nickel plating
- EMI finger plating: 50µin min. tin over 50µin min. nickel
- Heat sink plating: 50µin min. nickel plating
- Heat sink clip plating: 50µin min. nickel plating

ELECTRICAL PERFORMANCE

- Differential impedance: 100Ω +/– 10Ω @ 70ps rise time (20–80%)

ENVIRONMENTAL

- Operating temperature range: –20°C to 85°C
- RoHs compliant
- Thermal shock: EIA 364–32, Condition 1, 25 cycles, –55°C to 85°C
- Temperature life: EIA 364–17, Method A, Condition 2, Time Condition C, 500 hours, 70°C
- Mixed Flowing gas – EIA 364–65, Class IIA – 7 days unmated and 7 days mated

MECHANICAL PERFORMANCE

- Durability: Connectors – 100 cycles
- Connector mating force: 40 N max.
- Cage: Press fit tail termination – insertion force – 40 N per tail

SPECIFICATIONS

- GS–12–622 – Product specification
- GS–20–126 – Application specification

APPLICABLE INDUSTRY STANDARDS

- SFF–8436 QSFP+ Copper and Optical Modules
- SFF–8074i SFP Small Form–Factor Pluggable Transceiver rev 1.0
- SFF–8431 Enhanced SFF Pluggable
- SFF–8472 Diagnostic Monitoring Interface for Optical Transceivers
- IEEE 802.3 Gigabit–Ethernet standard
- Infiniband Trade Association (IBTA)

PART NUMBERS

Description	Part Numbers
QSFP/QSFP+ 38 position connector	10099113
QSFP/QSFP+ 1x1 cage with EMI fingers	10099114
QSFP/QSFP+ cage heat sink	10099115
QSFP/QSFP+ cage heat sink clip	10099116
Integrated cage kit – cage, heat sink and clip assembled	10116015

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