

# MINI SAS / SATA CONNECTORS, CAGES & CABLE ASSEMBLIES

For High-Speed Serial Mini SAS or Mini SATA 4x Links

## OVERVIEW

FCI's external mini-SAS / SATA connector, cage and cable assembly system solution addresses the storage industry's demand for more compact, high-speed serial I/O interfaces that also support evolving signal speed requirements.

Increasing numbers of drives within a system demand additional I/O ports along a card edge, dictating more densely packaged serial I/O solutions. The mini-SAS / SATA I/O system provides a cost-effective, high-speed solution that meets the bandwidth requirements of current and future applications in servers and external storage systems. FCI's connectors and cable assemblies meet Serial Attached SCSI (SAS) or Serial ATA (SATA) requirements for mini-multilane external systems thus assuring inter-mateability with standardized port interfaces.

Specifically, FCI's mini-SAS / SATA solutions satisfy the applicable requirements of the INCITS T10 SAS 2.0 & SAS 2.1 specification or the SATA-IO Serial ATA specification and conform to the mechanical requirements described in the associated SFF-8086 and SFF-8088 documents. The availability of both mini-SAS and mini-SATA compatible connectors, cages and cable assemblies gives the user the option to choose the most appropriate and cost-effective link for their respective application.



## FEATURES & BENEFITS

- Ruggedized 26-position cabling interconnect system is SFF-8088 (shielded-external) and SFF-8086 compatible
- Available options support Mini SAS (SAS 2.0 & 2.1) and Mini SATA 4x external I/O requirements
- Cable assembly paddle card design is optimized for signal integrity and mechanical performance
- Low profile "pull-to-release" latching system provides secure connection and allows stacking
- Adaptive, robust EMI Gasket and die-cast backshell assure proper EMI shielding
- Robust cable strain relief system isolates cable termination from mechanical stress
- Reduced backshell protrusion provides short cable exit
- Fully compliant with all SAS and SATA defined keying options

- Controlled wire management and termination process assures consistent high-speed electrical performance
- RoHS compliant

## TARGET MARKETS/APPLICATIONS

- Data
  - Servers
  - RAID systems
  - Storage racks
  - External storage systems
  - SAS/SATA HBA interfaces
  - Direct-attached storage (DAS)
- Communications
  - Switches
- Industry Standards
  - SATA-IO Serial ATA (SATA) Specification
  - INCITS/ANSI Serial-Attached SCSI (SAS) specification
  - SFF-8088 and SFF-8086

## ▶ MINI-SAS / SATA CONNECTORS, CAGES & CABLE ASSEMBLIES

### CABLE ASSEMBLIES

FCI's external mini-SAS / SATA cable assemblies not only address the storage industry's present day need for high-speed serial-I/O interfaces (1.5 to 3.0 Gb/s) but they also support evolving higher speed signal speed requirements up to and including 6.0 Gb/s per channel. The cable assemblies use a highly engineered printed circuit board designed to address not only the stringent mechanical interface requirements but also the higher-bandwidth signal integrity thresholds for proper signal transmission as defined by the applicable industry standards. FCI's cable assemblies meet Serial Attached SCSI (SAS) or Serial ATA (SATA) requirements for mini-multilane external cables. Specifically, FCI's mini-multilane cables satisfy the applicable requirements of the INCITS T10 SAS 2.0 and 2.1 specification or the SATA-IO Serial ATA specification and conform to the mechanical requirements described in the associated SFF-8086 and SFF-8088 documents. A highly controlled and stable cable assembly manufacturing processes minimize wire management and termination variations that impact the performance of the cable assembly. Robust final test and quality systems assure high quality cable assemblies conforming to the high-speed electrical performance requirements in industry specifications.

### TECHNICAL INFORMATION

#### MATERIALS

- Shells: Diecast zinc – tin plated
- PCB: FR-4 laminate with gold plated contact pads
- Raw cable: 8 individually shielded differential pair cables with fully shielded EMI shield and PVC Jacket
- Pull tab: Nylon resin
- Latch: Stainless steel

#### ELECTRICAL PERFORMANCE

- Differential impedance:  $100\Omega \pm 10\Omega$  @ 70ps rise time (20–80%)
- Insertion Loss: < 8dB @ 12.5GHz (2.5Gb/s per channel) (24 AWG, 6m)
  - < 10dB @ 2.50GHz (5.0Gb/s per channel)
  - < 16dB @ 5.00GHz (10.0Gb/s per channel)
- Near end multi-line crosstalk: < 26dB from 10 MHz to 4.5 GHz
- Within pair skew: < 10ps/meter
- Pair-to-pair skew: < 50ps/meter
- Withstanding voltage: 300V DC
- Current rating: 0.5A max. per contact

#### ENVIRONMENTAL

- Operating temperature range:  $-20^{\circ}\text{C}$  to  $85^{\circ}\text{C}$
- RoHS compliant
- Thermal shock: EIA 364-32, Condition 1, 25 cycles,  $-55^{\circ}\text{C}$  to  $85^{\circ}\text{C}$
- Temperature life: EIA 364-17, Method A, Condition 2, Time Condition C, 500 hours,  $70^{\circ}\text{C}$



- Mixed flowing gas – EIA 364-65, Class IIA- 7 days unmated and 7 days mated

#### MECHANICAL PERFORMANCE

- Durability: 250 cycles
- Mating force: 85 N max.
- Cable axial pull force: 88 N min.
- Latch pull (axial load): 25 N min.

#### SPECIFICATIONS

- GS- 12-548 – Product specification  
Unequalizes Mini-Multilane SAS/SATA cable assemblies

### PART NUMBERS

Product Description	Part Number
Mini-SAS / SATA cable assembly – passive – SATA & SAS 2.0	10084749
Mini-SAS / SATA cable assembly – passive – SAS 2.1	10111837

# MINI SAS / SATA CONNECTORS, CAGES & CABLE ASSEMBLIES

## OVERVIEW

FCI's external I/O connector & cage product portfolio includes a 26 position, 0.8mm contact centerline spaced, SMT terminated card edge connector along with accompanying single unit (1x1) or 1x2 ganged EMI die cast cages. The edge card connector and cages are designed to meet all signal integrity requirements and EMI requirements as defined by the INCITS T10 SAS 2.0 and 2.1 specifications or the SATA-IO Serial ATA specification.

They also conform to the mechanical requirements as described in the Small Form Factor (SFF) 8086 and 8088 documents. Either cage configuration is offered with either a 0 degree or 1 Degree angle mounting style and with or without location pegs. A robust EMI gasket is included with each cage port in order to assure a robust and reliable EMI shield & termination when placed through the chassis opening. All connector and cage offerings are fully RoHS compliant.



## FEATURES & BENEFITS

- 26 position, 0.8mm centerline SMT terminated edge card connector
- Pick-and-place compatible
- Robust die cast cages offered in both 0 degree and 1 degree mounting styles
- Cages offered in single (1x1) and ganged (1x2) versions
- Compliant EMI gasket to assure cage to chassis shield termination
- Both 0 degree and 1 degree cage mounting angles offered for both the 1x1 and 1x2 cages
- RoHS compliant

## ▶ MINI-SAS / SATA CONNECTORS, CAGES & CABLE ASSEMBLIES



### CONNECTOR & CAGES

FCI's external I/O connector & cage product portfolio includes a 26 position, 0.8mm contact centerline spaced, SMT terminated card edge connector along with accompanying single unit (1X1) or 1X2 ganged EMI die cast cages. The edge card connector and cages are designed to meet all signal integrity requirements and EMI requirements as defined by the INCITS T10 SAS 2.0 and 2.1 specifications or the SATA-IO Serial ATA specification. They also conform to the documents. Either cage configuration is offered with either a 0 degree or 1 degree angle mounting style and with or without location pegs. A robust EMI gasket is included with each cage port in order to 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

##### Connectors

- Housing: Thermoplastic, black, UL94V-0
- Contact: Phosphor Bronze
- Housing color options:
  - 30µin. gold plating on edge card interface with nickel under-plate
  - 150µin. tin plating on SMT leads with nickel under-plate

##### Cages

- Cage: Copper alloy
- Cage plating: 150µin. nickel plating on cage with copper underplate

#### ELECTRICAL PERFORMANCE

- Differential impedance: 100Ω +/- 10 @ 70ps rise time (20-80%)
- Current rating: 0.5A max. per contact
- Signal Integrity – SI-2008-06-006 – mini-SAS / SATA – SATA & SAS 2.0 (available off FCI web site)

#### ENVIRONMENTAL

- Operating temperature: -40°C to 80°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 – 250 cycles
- Cage: M2 screw lock downs

#### SPECIFICATIONS

- GS-12-548 – Product specification – mini-SAS/SATA connectors, cages & cable assemblies
- GS-20-124 – Application specification – mini-SAS/SATA connectors & cages

### PART NUMBERS

Product Description	Part Number
Mini-SAS / SATA 26 position connector	10098870
Mini-SAS / SATA 1x1 cage	10098871
Mini-SAS / SATA 1x2 cage	10098872

INOMINSASAT0613EA4