

# MINI-SAS HD NEXT GENERATION SAS STORAGE INTERFACE

## OVERVIEW

The Mini-SAS HD product is the next generation SAS storage interface addressing channel bandwidth requirements of 6Gb/s, 12Gb/s and 14Gb/s meeting or exceeding the respective SAS 2.1 and proposed SAS 3.0 specifications. The Mini-SAS HD product provides greater port density (11mm port-to-port) versus the existing Mini-SAS 2.0 product (19.01mm port-to-port).

FCI's Mini-SAS HD product is fully compliant to the SFF-8643 and SFF-8644 industry specifications. Internal and external connector configurations of the Mini-SAS HD product include 1X1 (4x), 1X2 (8x), and 1X4(16x) and enables 4x and 8x internal & external cable assembly solutions which include EEPROM communication.

The Mini-SAS HD profile design is PCI Express compatible and can be utilized in PCI Express architecture applications.



## FEATURES & BENEFITS

- IMLA based board connector insures compliance to the SAS 2.1 & proposed 3.0 electrical performance criteria
- Internal and external board connector and cable assemblies provide end-to-end application solutions
- 1X1, 1X2 and 1X4 connector/cage assemblies offer product family design flexibility
- All board connectors and configurations are fully 6G and 12G compliant allowing for use of same part numbers when system speeds increase from 6G to 12G
- Metal cages on the external connector and cables provide 360° EMI shielding and replaces problematic EMC elastomeric gaskets
- Cable assemblies offered in 4x and 8x configurations
- Eye-of-the-needle connector and cage single step termination yields consistent application to the PCB
- The external cable strain relief results in an axial pull force in excess of 20lbs
- Cable latch design reduces cable insertion force and un-mating issues
- Pull tabs are available in multiple lengths in Pantone 279 color to meet many application needs
- Positive stop feature on the casting prevents external cable assembly mating over-travel

- Hybrid external cables (mini-SAS HD to mini-SAS) allow for backwards compatible cabling with legacy system hardware

## TARGET MARKETS/APPLICATIONS

- Data
  - Servers
  - RAID systems
  - Storage racks
- External storage systems
  - SAS/SATA HBA interfaces
  - Direct-attached storage (DAS)
- Communications
  - Switches

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## TECHNICAL INFORMATION

### MATERIALS

- Board receptacle contact: Copper alloy
- Board receptacle housing: Thermoplastic high temperature UL94V-0
- Board receptacle plating: Gold over Nickel
- Plug paddle card: Copper/FR4 – Gold over Nickel plating

### ELECTRICAL PERFORMANCE

- Impedance: 100 +/- 15Ω
- Voltage rating: 30 V AC (RMS)/DC max.
- Current rating: 0.5A max.

### ENVIRONMENTAL

- Thermal shock (temperature cycling): conforms to EIA-364-32
- Temperature life (heat aging): conforms to EIA-364-17, 105°C for 500 hours
- Operating temperature range : -40°C to 80°C

### MECHANICAL PERFORMANCE

- Durability: 250 cycles

### SPECIFICATIONS

#### External Cable to Board Connector System

- Product Spec: GS-12-651
- Application Spec: GS-20-0327

#### Internal Cable to Board Connector System

- Product Spec: GS-12-650
- Application Spec: GS-20-0356

### APPROVALS AND CERTIFICATIONS

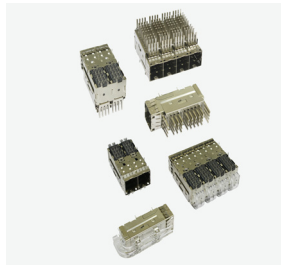
- RoHS conforms to EU directive 2002/95/EC
- UL Approval

### PACKAGING

- Board receptacle: Tray
- Plug/Cable assembly: Bag



External Mini-SAS  
HD Cables



External Mini-SAS  
HD Connectors



Internal Mini-SAS  
HD Connectors



Internal Mini-SAS  
HD Cables



Internal Mini-SAS HD to  
mini-SAS Right Angle  
end Cables



Internal Mini-SAS HD to  
mini-SAS Straight End Cables

#### Disclaimer

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## **PART NUMBERS EXTERNAL AND INTERNAL BOARD CONNECTORS**

Product Description	Signal Pairs	Part Numbers
Mini-SAS HD 1 X 1 External Assembly (6 & 12Gb/s per channel)	8 Pairs	10112626
Mini-SAS HD 1 X 2 External Assembly (6 & 12Gb/s per channel)	16 Pairs	10112627
Mini-SAS HD 1 X 4 External Assembly (6 & 12Gb/s per channel)	32 Pairs	10112628
Mini-SAS HD 1 X 1 Internal Assembly (6 & 12Gb/s per channel)	8 Pairs	10112632
Mini-SAS HD 1 X 2 Internal Assembly (6 & 12Gb/s per channel)	16 Pairs	10112633
Mini-SAS HD 1 X 4 Internal Assembly (6 & 12Gb/s per channel)	32 Pairs	10112634
Mini-SAS HD 1 X 1 External Assembly with Light Pipe (6 & 12 Gb/s per channel)	8 Pairs	10120960
Mini-SAS HD 1 X 2 External Assembly with Light Pipe (6 & 12 Gb/s per channel)	16 Pairs	10120959
Mini-SAS HD 1 X 4 External Assembly with Light Pipe (6 & 12 Gb/s per channel)	32 Pairs	10120728
Mini-SAS HD 1 X 1 External Assembly with Heat Sink (6 & 12 Gb/s per channel)	8 Pairs	10112629
Mini-SAS HD 1 X 2 External Assembly with Heat Sink (6 & 12 Gb/s per channel)	16 Pairs	10112630
Mini-SAS HD 1 X 4 External Assembly with Heat Sink (6 & 12 Gb/s per channel)	32 Pairs	10112631
Mini-SAS HD 1 X 1 Internal V/T Assembly (6 & 12 Gb/s per channel)	8 Pairs	10120666
Mini-SAS HD 1 X 2 Internal V/T Assembly (6 & 12 Gb/s per channel)	16 Pairs	10120667

## **PART NUMBERS (EXTERNAL CABLE ASSEMBLIES)**

### **SAS 2.1 (6 Gb/s per channel) cable assemblies**

Product Description	Signal Pairs	Part Numbers
Mini-SAS HD to mini-SAS HD passive external cable assembly - 4x configuration - SAS 2.1 (6Gb/s) compatible	8 Pairs	10112041
Mini-SAS HD to mini-SAS passive external cable assembly - SAS 2.1 (6Gb/s) compatible - 4x configuration on mini-SAS HD end and universal keying on mini-SAS end	8 Pairs	10117771
Mini-SAS HD to mini-SAS HD passive external cable assembly - 8x configuration - SAS 2.1 (6Gb/s) compatible	16 Pairs	10112359
Mini-SAS HD to mini-SAS passive external cable assembly - SAS 2.1 (6Gb/s) compatible - 8x configuration on mini-SAS HD end and universal keying on mini-SAS end	16 Pairs	10117947

## MINI – SAS HD NEXT GENERATION SAS STORAGE INTERFACE

### Proposed SAS 3.0 (12 Gb/s per channel) cable assemblies

Product Description	Signal Pairs	Part Numbers
Mini-SAS HD to mini-SAS HD passive external cable assembly - 4x configuration – proposed SAS 3.0 (12Gb/s) compatible	8 Pairs	10117949
Mini-SAS HD to mini-SAS HD passive external cable assembly - 8x configuration – proposed SAS 3.0 (12Gb/s) compatible	16 Pairs	10117950

### Enhanced (14Gb/s per channel) cable assemblies

Product Description	Signal Pairs	Part Numbers
Mini-SAS HD to mini-SAS HD passive external cable assembly - 4x configuration – Enhanced (14Gb/s) compatible	8 Pairs	10120707

## PART NUMBERS (INTERNAL CABLE ASSEMBLIES) WITH STANDARD MINI-SAS HD CABLE HOUSING

### SAS 2.1 (6 Gb/s per channel) cable assemblies

Product Description	Signal Pairs	Part Numbers
4x Mini-SAS HD to 4x Mini-SAS HD passive internal cable assembly – Controller to Backplane – SAS2.1 (6Gb/s) compatible	8 Pairs	10119312
8x Mini-SAS HD to 8x Mini-SAS HD passive internal cable assembly – Controller to Backplane – SAS2.1 (6Gb/s) compatible	16 Pairs	10119577
4x Mini-SAS HD to 4x Mini-SAS HD passive internal cable assembly – Controller to Controller – SAS2.1 (6Gb/s) compatible	8 Pairs	10120086
8x Mini-SAS HD to 8x Mini-SAS HD passive internal cable assembly – Controller to Controller – SAS2.1 (6Gb/s) compatible	16 Pairs	10120088

### Proposed SAS 3.0 (12 Gb/s per channel) cable assemblies

Product Description	Signal Pairs	Part Numbers
4x Mini-SAS HD to 4x Mini-SAS HD passive internal cable assembly – Controller to Backplane – SAS3.0 (12Gb/s) compatible	8 Pairs	10119217
8x Mini-SAS HD to 8x Mini-SAS HD passive internal cable assembly – Controller to Backplane – SAS3.0 (12Gb/s) compatible	16 Pairs	10119576
4x Mini-SAS HD to 4x Mini-SAS HD passive internal cable assembly – Controller to Controller – SAS3.0 (12Gb/s) compatible	8 pairs	10120087
8x Mini-SAS HD to 8x Mini-SAS HD passive internal cable assembly – Controller to Controller – SAS3.0 (12Gb/s) compatible	16 pairs	10120089

## MINI – SAS HD NEXT GENERATION SAS STORAGE INTERFACE

### WITH SHORT MINI–SAS HD CABLE HOUSING

#### SAS 2.1 (6 Gb/s per channel) cable assemblies

Product Description	Signal Pairs	Part Numbers
Short 4x Mini-SAS HD to Short 4x Mini-SAS HD passive internal cable assembly – Controller to Backplane – SAS2.1 (6Gb/s) compatible	8 Pairs	10123417
Short 8x Mini-SAS HD to Short 8x Mini-SAS HD passive internal cable assembly – Controller to Backplane – SAS2.1 (6Gb/s) compatible	16 Pairs	10127771
Short 4x Mini-SAS HD to Short 4x Mini-SAS HD passive internal cable assembly – Controller to Controller – SAS2.1 (6Gb/s) compatible	8 pairs	10123416
Short 8x Mini-SAS HD to Short 8x Mini-SAS HD passive internal cable assembly – Controller to Controller – SAS2.1 (6Gb/s) compatible	16 pairs	10127773

#### Proposed SAS 3.0 (12 Gb/s per channel) cable assemblies

Product Description	Signal Pairs	Part Numbers
Short 4x Mini-SAS HD to Short 4x Mini-SAS HD passive internal cable assembly – Controller to Backplane – SAS3.0 (12Gb/s) compatible	8 Pairs	10122527
Short 8x Mini-SAS HD to Short 8x Mini-SAS HD passive internal cable assembly – Controller to Backplane – SAS3.0 (12Gb/s) compatible	16 Pairs	10126495
Short 4x Mini-SAS HD to Short 4x Mini-SAS HD passive internal cable assembly – Controller to Controller – SAS3.0 (12Gb/s) compatible	8 pairs	10122671
Short 8x Mini-SAS HD to Short 8x Mini-SAS HD passive internal cable assembly – Controller to Controller – SAS3.0 (12Gb/s) compatible	16 pairs	10127772

#### Disclaimer

## MINI – SAS HD NEXT GENERATION SAS STORAGE INTERFACE

### MINI-SAS HD TO MINI-SAS – WITH STANDARD HD CABLE HOUSING

#### Straight Cable exit on Mini-SAS end

Product Description	Signal Pairs	Part Numbers
4x Mini-SAS HD to Mini-SAS 36pin Straight type passive internal cable assembly – Controller to Backplane – SAS2.1 (6Gb/s) compatible	8 Pairs	10120612
4x Mini-SAS HD to Mini-SAS 36pin Straight type passive internal cable assembly – Controller to Controller – SAS2.1 (6Gb/s) compatible	8 Pairs	10124108

#### Right Angle Cable exit on Mini-SAS end

Product Description	Signal Pairs	Part Numbers
4x Mini-SAS HD to Mini-SAS 36pin Horizontal RA type passive internal cable assembly – Controller to Backplane – SAS2.1 (6Gb/s) compatible	8 Pairs	10123401
4x Mini-SAS HD to Mini-SAS 36pin Horizontal RA type passive internal cable assembly – Controller to Controller – SAS2.1 (6Gb/s) compatible	8 Pairs	10124110

### MINI-SAS HD TO MINI-SAS – WITH SHORT HD CABLE HOUSING

#### Straight Cable exit on Mini-SAS end

Product Description	Signal Pairs	Part Numbers
Short 4x Mini-SAS HD to Mini-SAS 36pin Straight type passive internal cable assembly – Controller to Backplane – SAS2.1 (6Gb/s) compatible	8 Pairs	10122526
Short 4x Mini-SAS HD to Mini-SAS 36pin Straight type passive internal cable assembly – Controller to Controller – SAS2.1 (6Gb/s) compatible	8 Pairs	10124109

#### Right Angle Cable exit on Mini-SAS end

Product Description	Signal Pairs	Part Numbers
Short 4x Mini-SAS HD to Mini-SAS 36pin Horizontal RA type passive internal cable assembly – Controller to Backplane – SAS2.1 (6Gb/s) compatible	8 Pairs	10123402
Short 4x Mini-SAS HD to Mini-SAS 36pin Horizontal RA type passive internal cable assembly – Controller to Controller – SAS2.1 (6Gb/s) compatible	8 Pairs	10124111

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