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This specification was developed by the SFF Committee prior to it becoming the SFF TA (Technology Affiliate) TWG (Technical Working Group) of SNIA (Storage Networking Industry Association).

The information below should be used instead of the equivalent herein.

POINTS OF CONTACT:

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If you are interested in participating in the activities of the SFF TWG, the membership application can be found at:

<http://www.snia.org/sff/join>

The complete list of SFF Specifications which have been completed or are currently being worked on can be found at:

<http://www.snia.org/sff/specifications/SFF-8000.TXT>

The operations which complement the SNIA's TWG Policies & Procedures to guide the SFF TWG can be found at:

<http://www.snia.org/sff/specifications/SFF-8032.PDF>

Suggestions for improvement of this specification will be welcome, they should be submitted to:

<http://www.snia.org/feedback>

SFF Committee documentation may be purchased in electronic form.
SFF specifications are available at <ftp://ftp.seagate.com/sff>

SFF-8644 Specification

for

Mini Multilane 4/8X 12 Gb/s Shielded Cage/Connector (HD12sh)

Rev 3.5 May 9, 2016

Secretariat: SFF Committee

Abstract: This specification defines the physical interface and general performance requirements for the Mini Multilane connector, which is designed for use in high speed serial, interconnect applications at multi-gigabit speeds. This connector is popularly referred to as the Mini-SAS HD (High Density) Connector system.

This is the first generation of this connector.

This specification provides a common reference for systems manufacturers, system integrators, and suppliers. This is an internal working specification of the SFF Committee, an industry ad hoc group.

This specification is made available for public review, and written comments are solicited from readers. Comments received by the members will be considered for inclusion in future revisions of this specification.

The description of a connector in this specification does not assure that the specific component is actually available from connector suppliers. If such a connector is supplied it must comply with this specification to achieve interoperability between suppliers.

Support: This specification is supported by the identified member companies of the SFF Committee.

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EXPRESSION OF SUPPORT BY MANUFACTURERS

The following member companies of the SFF Committee voted in favor of this industry specification.

All Best	LSI
Amphenol	Luxshare-ICT
Avago	Luxtera
Cinch	Molex
Dell Computer	NetApp
Emulex	NetLogic uSyst
FCI	Panduit
GLGnet Electronics	Seagate
Hewlett Packard	Shinning Electronics
HGST	TE Connectivity
Jess-Link	Vollex

The following member companies of the SFF Committee voted against this industry specification.

Foxconn

The following member companies of the SFF Committee voted to abstain on this industry specification.

AMI	MGE
Applied Micro	Oclaro
Broadcom	Pioneer
EMC	QLogic
Finisar	Sandisk
JDS Uniphase	Sumitomo
Mellanox	Toshiba

The user's attention is called to the possibility that implementation to this Specification may require use of an invention covered by patent rights. By distribution of this Specification, no position is taken with respect to the validity of this claim or of any patent rights in connection therewith. Members of the SFF Committee, which advise that a patent exists, are required to provide a statement of willingness to grant a license under these rights on reasonable and non-discriminatory terms and conditions to applicants desiring to obtain such a license.

Update History:

Revision 3.4 September 22, 2014

- The connector content of this specification was used to create SFF-8614

Revision 3.5 May 9, 2016

- Added PCIe 3.0 to Figure 3-1

Foreword

The development work on this specification was done by the SFF Committee, an industry group. The membership of the committee since its formation in August 1990 has included a mix of companies which are leaders across the industry.

When 2 1/2" diameter disk drives were introduced, there was no commonality on external dimensions e.g. physical size, mounting locations, connector type, and connector location, between vendors.

The first use of these disk drives was in specific applications such as laptop portable computers and system integrators worked individually with vendors to develop the packaging. The result was wide diversity, and incompatibility.

The problems faced by integrators, device suppliers, and component suppliers led to the formation of the SFF Committee as an industry ad hoc group to address the marketing and engineering considerations of the emerging new technology.

During the development of the form factor definitions, other activities were suggested because participants in the SFF Committee faced more problems than the physical form factors of disk drives. In November 1992, the charter was expanded to address any issues of general interest and concern to the storage industry. The SFF Committee became a forum for resolving industry issues that are either not addressed by the standards process or need an immediate solution.

Those companies which have agreed to support a specification are identified in the first pages of each SFF Specification. Industry consensus is not an essential requirement to publish an SFF Specification because it is recognized that in an emerging product area, there is room for more than one approach. By making the documentation on competing proposals available, an integrator can examine the alternatives available and select the product that is felt to be most suitable.

SFF Committee meetings are held during T10 weeks (see www.t10.org), and Specific Subject Working Groups are held at the convenience of the participants. Material presented at SFF Committee meetings becomes public domain, and there are no restrictions on the open mailing of material presented at committee meetings.

Most of the specifications developed by the SFF Committee have either been incorporated into standards or adopted as standards by EIA (Electronic Industries Association), ANSI (American National Standards Institute) and IEC (International Electrotechnical Commission).

If you are interested in participating or wish to follow the activities of the SFF Committee, the signup for membership and/or documentation can be found at <http://www.sffcommittee.com/ie/join.html>

The complete list of SFF Specifications which have been completed or are current projects can be found at <ftp://ftp.seagate.com/sff/SFF-8000.TXT>

If you wish to know more about the SFF Committee, the principles which guide the activities can be found at <ftp://ftp.seagate.com/sff/SFF-8032.TXT>

Suggestions for improvement of this specification will be welcome. They should be sent to the SFF Committee, 14426 Black Walnut Ct, Saratoga, CA 95070.

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1 Scope

This specification defines the performance requirements of the Mini Multilane shielded connector.

1.1 Application Specific Criteria

This connector is capable of meeting the interface requirements for the high density external I/O requirements of T10 SAS-3.

2 References

2.1 Industry Documents

- INCITS 519 SAS-3 (Serial Attached SCSI 3)
- PCI Express Generation 3.0
- SFF-8410 High Speed Serial Testing for Copper Links
- SFF-8449 Management Interface for SAS Shielded Cables
- SFF-8613 Mini Multilane 4/8X Unshielded Connector
- SFF-8614 Mini Multilane 4/8X Shielded Cage/Connector
- SFF-8636 Management Interface for Cabled Environments
- SFF-8643 Mini Multilane 4/8X 12 Gb/s Unshielded Connector

2.2 SFF Specifications

There are several projects active within the SFF Committee. The complete list of specifications which have been completed or are still being worked on are listed in the specification at <ftp://ftp.seagate.com/sff/SFF-8000.TXT>

2.3 Sources

Those who join the SFF Committee as an Observer or Member receive electronic copies of the minutes and SFF specifications (<http://www.sffcommittee.com/ie/join.html>).

Copies of ANSI standards may be purchased from the Inter-National Committee for Information Technology Standards (<http://tinyurl.com/c4psg>).

Copies of SFF, ASC T10 (SCSI), T11 (Fibre Channel) and T13 (ATA/SATA) standards and standards still in development are available on the HPE version of CD_Access (<http://tinyurl.com/85fts>).

2.4 Conventions

The dimensioning conventions are described in ANSI-Y14.5M, Geometric Dimensioning and Tolerancing. All dimensions are in millimeters.

The ISO convention of numbering is used i.e., the thousands and higher multiples are separated by a space and a period is used as the decimal point. This is equivalent to the English/American convention of a comma and a period.

American	French	ISO
0.6	0,6	0.6
1,000	1 000	1 000
1,323,462.9	1 323 462,9	1 323 462.9

3 Description

This specification identifies the documentation required to implement a 12 Gb/s shielded connector suitable to the using applications, as illustrated in the following pictorial representation.

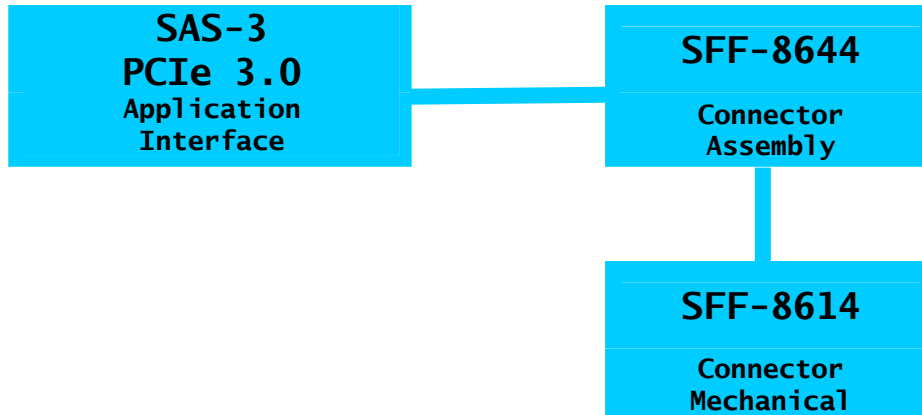


FIGURE 3-1 DOCUMENTATION TO IMPLEMENT A 12 GB/S CONNECTOR

4 Overview of Referenced Specifications

4.1 Application Requirements

The electrical and EMI considerations for the use of this connector are specified by the using standards listed in Section 1.1.

The connector system is based upon an integrated right angle receptacle (fixed) connector and guide shell. The host board footprint positioning holes contain the critical dimensions for locating the integrated receptacle/guide shell. The receptacle guide shell functions as the guide and strain relief for the free (plug) connector interface and also provides the latching points for the plug connector. This connector system provides positive retention along with ease of insertion and removal.

4.2 SFF-8614

SFF-8614 provides for a 1x1, 1x2 and 1x4 integrated receptacle/cage (fixed side) as well as a 1x1 (4X) and a 1x2 (8X) mating cable plug (free side)

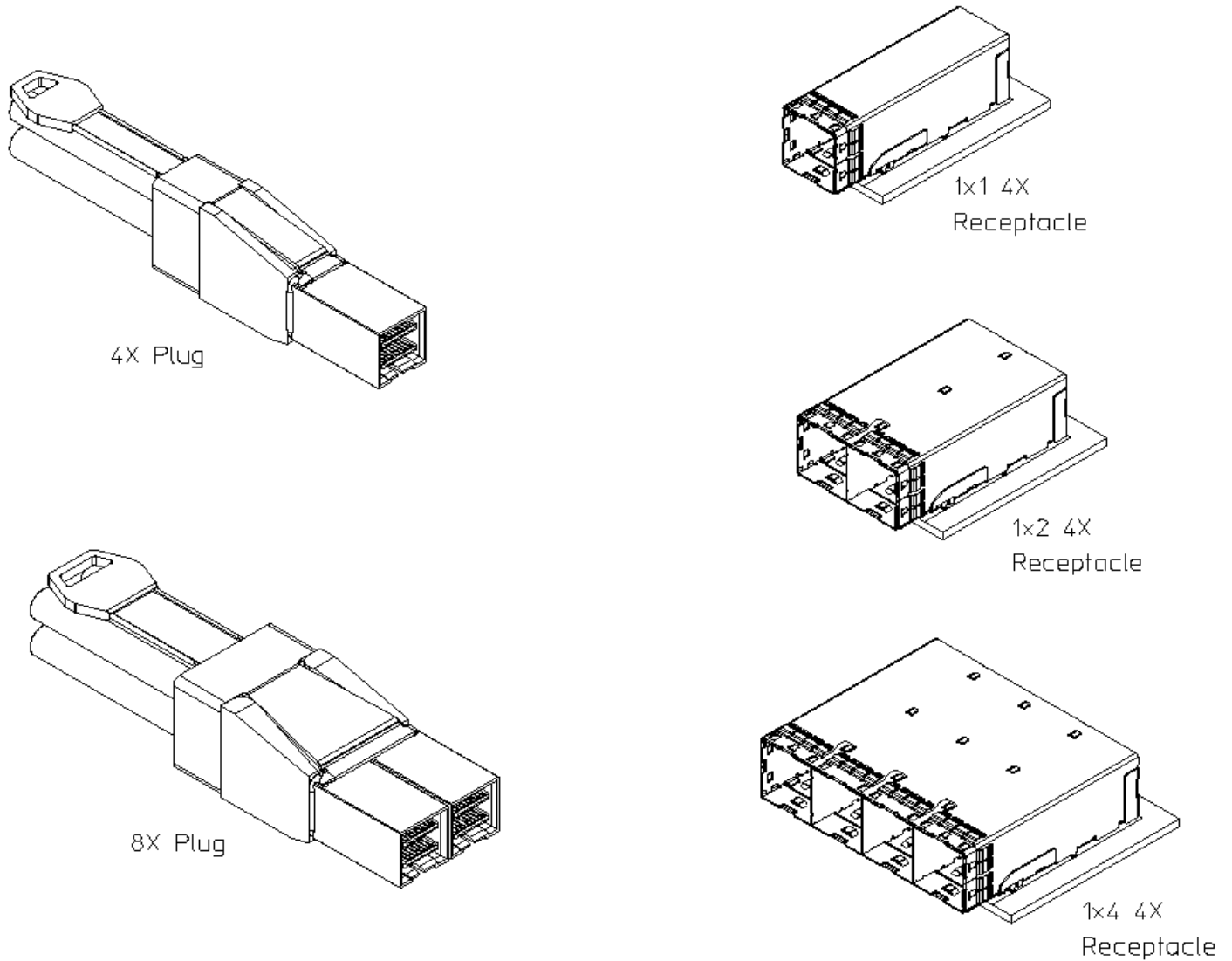


FIGURE 4-1 GENERAL VIEW OF CONFIGURATIONS

TABLE 4-1 CONFIGURATIONS SUPPORTED

Port	Positions	Host Connector Orientation	Plug
1x1	36	Right Angle	1x1
1x2	72	Right Angle	1x2
1x4	144	Right Angle	N/A