SFF specifications are available at http://www.snia.org/sff/specifications
or ftp://ftp.seagate.com/sff

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:

Chairman SFF TA TWG
Email: SFF-Chair@snia.org

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 Committee

SFF-8473 Specification for

Shielded Multilane Copper Connector Enhanced HS Signals

Rev 1.4 December 18, 2008

Secretariat: SFF Committee

Abstract: This document describes performance improvements that may be achieved by internal receptacle design enhancements and modified PWB footprint designs. These changes allow the mating interface described in SFF-8470 to remain unchanged while allowing enhanced Shielded High Speed Serial Copper connectors to operate at the speeds required by 10G Ethernet and 20G InfiniBand applications. Both applications continue to target the use of 2.5G, 5G per lane InfiniBand and 3.125G per lane Ethernet cable IO applications. This document preserves the SFF-8470 content while including informative enhancements that extend the high frequency electrical performance of the mated connector pair.

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.

POINTS OF CONTACT:

Edward Cady
Meritec
15005 NW Timmerman Road
Forest Grove OR 97116

Ph: 503.359.4556
ecady@meritec.com

I. Dal Allan
Chairman SFF Committee
14426 Black Walnut Court
Saratoga CA 95070

Ph: 408-867-6630
endlcom@acm.org

EXPRESSION OF SUPPORT BY MANUFACTURERS

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

AMCC
EMC
FCI
Foxconn
Fujitsu CPA
Hewlett Packard
Hitachi GST
LSI
Meritec
Molex
Sun Microsystems
Tyco
Vitesse Semiconductor

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

JDS Uniphase

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

Amphenol
Arastra
Cortina Systems
Emulex
ETRI
Finisar
ICT Solutions
Luxtera
OpNext
Panasonic
Panduit
Pioneer NewMedia
Seagate
Toshiba
W L Gore

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, 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:

www.sffcommittee.com/ie/join.html

The complete list of SFF Specifications which have been completed or are currently being worked on by the SFF Committee 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.

SFF Committee --

Shielded Multilane Copper Connector Enhanced HS Signals

1. Scope

The Shielded High Speed Serial Multilane Copper Connector system can be extended to HSS signaling rates by evaluating and, if necessary, modifying design details to improve the electrical performance at higher frequencies. This specification discusses and defines enhancements to the Fixed Board Right Angle Receptacle that can extend this standard to next generation applications.

This specification defines the recommendations on the termination side of the connector to enable functional multiple sourcing of the complete connector system. The terminology and physical requirement of the shielded High Speed Serial Multilane Copper Connector fixed board receptacle PCB footprint is defined. This specification includes a new dual row SMT footprint to support the objective of optimizing connector performance. The information described is for four-lane and twelve-lane connectors. This second generation Enhanced Shielded High Speed Serial Multilane Copper connector is designed for 10-20Gbaud per lane or per differential signal pair and is backward compatible mating to the first generation SFF-8470 plug connector.

The detailed construction of the connector design between the mating and the termination sides are not controlled by this document. This connector is suitable for high speed interfaces such as InfiniBand, Ethernet, SAS et al.

1.1 Description of Clauses

Clause 1 contains the Scope and Purpose.
Clause 2 contains Referenced and Related Standards and SFF Specifications.
Clause 3 contains the General Description.

2. References

The SFF Committee activities support the requirements of the storage industry, and it is involved with several standards.

2.1 Industry Documents

The following interface standards are relevant to many SFF Specifications.

- SFF-8470 Shielded High Speed Serial Multilane Copper 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 InterNational Committee for Information Technology Standards (http://tinyurl.com/c4psg).

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

2.4 Conventions

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

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

2.5 Definitions

For the purpose of SFF Specifications, the following definitions apply:

Advanced grounding contacts: Connector contacts that make first and break last and are capable of carrying power ground return currents and performing electrostatic discharge. Other terms sometimes used to describe these features are: grounding pins, ESD contacts, grounding contacts, static drain, and pre-grounding contacts.

Alignment guides: Connector features that preposition insulators prior to electrical contact. Other terms sometimes used to describe these features are: guide pins, guide posts, blind mating features, mating features, alignment features, and mating guides

Board Termination Technologies: Surface mount single row, surface mount dual row, through hole, hybrid, straddle mount, press fit.

Contact mating sequence: Order of electrical contact during mating/unmating process. Other terms sometimes used to describe this feature are: contact sequencing, contact positioning, make first/break last, EMLB (early make late break) staggered contacts, and long pin / short pin.

Fixed: Used to describe the gender of the mating side of the connector that accepts its mate upon mating. This gender is frequently, but not always, associated with the common terminology “receptacle”. Other terms commonly used are “female” and “socket connector”. The term “fixed” is adopted from EIA standard terminology as the gender that most commonly exists on the fixed end of a connection, for example, on the board or bulkhead side. In this specification “fixed” is specifically used to describe the mating side gender illustrated in Figure 2.

Frontshell: That metallic part of a connector body that directly contacts the backshell or other shielding material that provides mechanical and shielding continuity between the connector and the cable media. Other terms sometimes used to describe this part of a cable assembly are: housing, nosepiece, cowling, and metal shroud.

Fixed Board: A connector that uses a fixed gender mating side and a termination side suitable for any of the printed circuit board termination technologies

Height: Distance from board surface to farthest overall connector feature

Mating side: The side of the connector that joins and separates from the mating side of a connector of opposite gender. Other terms commonly used in the industry are mating interface, separable interface and mating face illustrated in Figure 2.

Right Angle: A connector design for use with printed circuit board assembly technology where the mating direction is parallel to the plane of the printed circuit board

Surface mount: A connector design and a printed circuit board design style where the connector termination points do not penetrate the printed circuit board and are subsequently soldered to the printed circuit board

THE FIXED GENDER IS USED ON THE DEVICE SIDE EXCEPT WHEN USED WITH WIRE TERMINATION

FIGURE 2 - MATING SIDE GENDER DEFINITION

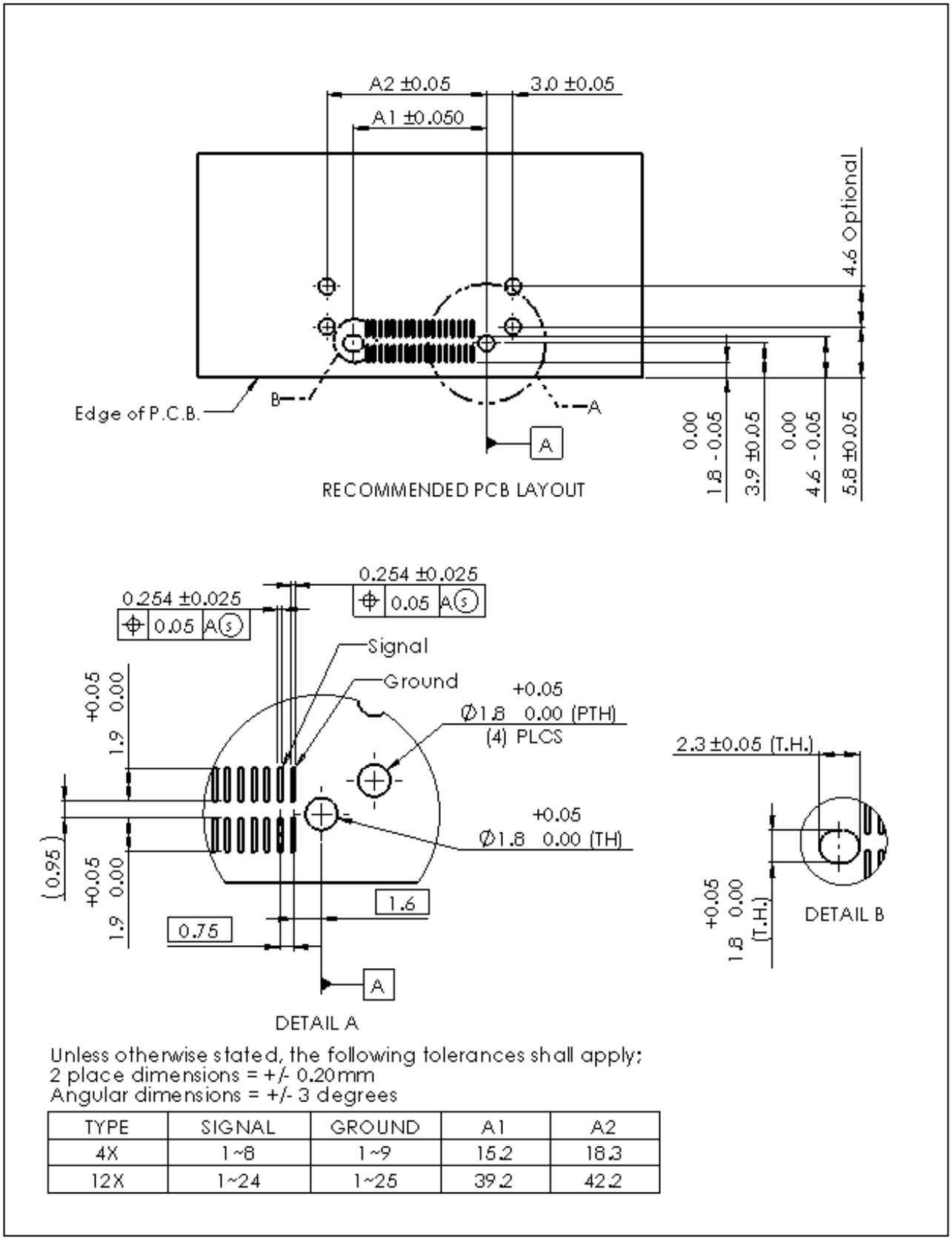
3. General Description

3.1 Enhanced Shielded High Speed Serial Copper Fixed Receptacle

This Enhanced Receptacle offers expanded pair to pair internal metal shield plates and Signal Integrity optimized contact termination pins and PCB SMT pads thus improving impedance matching and generating considerably lower electrical crosstalk compared to the original SFF-8470 receptacle.

This connector is suited to use in applications where electrical performance for signals having signaling rates in the 8.5, 10, 11, 12 and 17Gbaud range. This covers virtually all of the external inter-enclosure applications for high speed serial applications which use balanced copper media for transmission.

The use of this connector has no affect on the wiring rules, firmware, or system configuration rules for interfaces such as Fibre Channel, Ethernet, Serial Attach SCSI and other high speed interconnect. See Figure 3.



TYPE	SIGNAL	GROUND	A1	A2
4X	1~8	1~9	15.2	18.3
12X	1~24	1~25	39.2	42.2

Figure 3 – Fixed board 2 row ST footprint