
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.

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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 Committee

SFF-8433

Specification for

SFP+ Ganged Cage Footprints and Bezel Openings

Rev 0.7     June 5, 2009

Secretariat:  SFF Committee

Abstract: This specification defines the footprint holes in the PCB of the Host for the Cage mounting pins and also defines the size of the hole in the bezel for the Cage of the SFP+ Ganged Cage aka Improved Pluggable Formfactor (IPF) system.

Having a common set of footprints and hole dimensions ensures compatibility amongst all designs.

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.

AMCC
Broadcom
EMC
Emulex
ETRI
Finisar
Foxconn
Hewlett Packard
Hitachi GST
JDS Uniphase
Luxtera
Molex
NetLogic uSyst
OpNext
Panduit
Sun Microsystems
Tyco
Vitesse Semiconductor
W L Gore

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

Amphenol
Arista Networks
Clariphy
Cortina Systems
FCI
Fujitsu CPA
Panasonic
QLogic
Seagate
Sumitomo
Volex

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Change History
- Title changed to match current usage (7/07/2014)
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:

If you wish to know more about the SFF Committee, the principles which guide the activities can be found at:

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 PCB and mechanical requirements for a pluggable transceiver cage. This specification includes critical dimensions of the IPF cage footprint. This specification is also intended to facilitate the implementation of 1 x "n" ganged cage configurations, by showing hole dimensions in the bezel.

The need for this specification became evident when it was realized that some ganged configurations were incompatible amongst the industry.

2. References

2.1 Industry Documents

The following interface standards and specifications are relevant to this Specification.

- ASME Y14.5.1M-1994 Mathematical Definition of Dimensioning and Tolerance Principles
- INF-8074i SFP (Small Formfactor Pluggable) 1 Gb/s Transceiver
- SFF-8083 SFP+ 1X 10 Gb/s Pluggable Transceiver Solution (SFP10)
- SFF-8418 SFP+ 10 Gb/s Electrical Interface
- SFF-8432 SFP+ Module and Cage

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://www.techstreet.com/incitsgate.tmpl).

2.4 Conventions

The dimensioning conventions are described in ANSI-Y14.5M, Geometric Dimensioning and Tolerancing. All dimensions are in millimeters, which are the controlling dimensional units (if inches are supplied, they are for guidance only).

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.

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<th>American</th>
<th>French</th>
<th>ISO</th>
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<td>1 323 462,9</td>
<td>1 323 462.9</td>
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2.5 Definitions

Bezel: The front cover on the equipment where interconnects pass through. Other terms used to describe this feature are; panel, bulkhead, PCI bracket or host bus adapter (HBA) bracket.

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.

**Height:** Distance from board surface to farthest overall connector feature

**Through hole:** A connector design and a printed circuit board design style where the connector termination points penetrates the printed circuit board and are subsequently soldered to the printed circuit board.
3. General Description
This specification defines the cage PCB footprints through hole locations that allow for compatibility among the industry for 1 x "n" ganged cage configurations, and by showing bezel cutout dimensions for two versions of the cage assemblies: cage assemblies that contain external EMI springs and cage assemblies that contain an elastomeric EMI gasket.

FIGURE 3-1 GENERAL VIEW OF GANGED CONFIGURATIONS
4. PCB Footprints

FIGURE 4-1  1 X 2 CAGE FOOTPRINT

NOTES:
△ APPLIES TO ALL GANGED LAYOUTS.
△ PADS AND VIAS ARE CHASSIS GROUND.
△ EXPOSED CHASSIS GROUND.
△ HOLE PATTERN REPEATS FOR EACH PORT. SPACING BETWEEN PORTS IS 14.25mm.
△ APPLIES TO ALL GANGED LAYOUTS.

FIGURE 4-1  1 X 2 CAGE FOOTPRINT
Note: See Figure 4-1 for vertical dimensions and notes that apply to this Figure 4-2.

FIGURE 4-2 1 X 4 CAGE FOOTPRINT
Note: See Figure 4-1 for vertical dimensions and notes that apply to this Figure 4-3

FIGURE 4-3  1 X 6 CAGE FOOTPRINT
<table>
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<tr>
<th>Designator</th>
<th>Description</th>
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<th>1X4</th>
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<th>Tolerance</th>
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<td>Datum C Ground Row to Ground Row 2</td>
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<td>Basic</td>
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<td>A06</td>
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<td>A07</td>
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<td>Basic</td>
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<td>Basic</td>
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<td>30.9</td>
<td>=</td>
<td>=</td>
<td>Basic</td>
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<td>A10</td>
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<td>32.5</td>
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<td>A12</td>
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<td>=</td>
<td>=</td>
<td>Basic</td>
</tr>
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<td>Datum C Chassis Ground Pad</td>
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<td>Datum B Ground Column to Center Ground Column (Single Port Width)</td>
<td>14.25</td>
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<td>B05</td>
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<td>B07</td>
<td>Datum B Ground Column to Adjacent Cage Column, External EMI Springs</td>
<td>2.50</td>
<td>=</td>
<td>=</td>
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</tr>
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<td>B08</td>
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<td>=</td>
<td>=</td>
<td>Min</td>
</tr>
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<td>B10</td>
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<td>2.33</td>
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<td>=</td>
<td>Basic</td>
</tr>
<tr>
<td>B11</td>
<td>Datum B Ground Column to 0.95 dia hole</td>
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<td>=</td>
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<td>Basic</td>
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<td>B12</td>
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<td>Basic</td>
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<td>B17</td>
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<td>34</td>
<td>49</td>
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<td>B19</td>
<td>Size of square pad</td>
<td>2.0</td>
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<td>B20</td>
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<td>20</td>
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<td>B21</td>
<td>Diameter size</td>
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<td>Width of Chassis Ground Pad</td>
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<td>C01</td>
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<td>C02</td>
<td>Bezel cutout height</td>
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<tr>
<td>C04</td>
<td>Bezel cutout pitch, applies to External Spring EMI Gasket</td>
<td>31.00</td>
<td>59.50</td>
<td>88.00</td>
<td>min</td>
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<td>Bezel cutout pitch, applies to elastomeric EMI Gasket</td>
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<td>62.75</td>
<td>91.25</td>
<td>Min</td>
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<td>C06</td>
<td>Max radius on corners of cutout</td>
<td>0.03</td>
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<td></td>
<td>max</td>
</tr>
<tr>
<td>C07</td>
<td>Distance from Rear of bezel to centerline of connector guide pin through holes, applies to Elastomeric EMI Gasket version only</td>
<td>38.9</td>
<td></td>
<td></td>
<td>+/-0.30</td>
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<tr>
<td>C08</td>
<td>Distance from centerline of bezel to centerlines of connector guide pin through holes, applies to External Spring EMI Gasket only</td>
<td>39.4</td>
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<td>Tolerance for the C09 Dimension as calculated from the formula in Section 6.1</td>
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<td>N/A</td>
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<td>Distance from edge of pc board to centerlines of connector guide pin through holes.</td>
<td>35.4</td>
<td></td>
<td></td>
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</table>
5. Bezel Cutout Design

Bezel cutout dimensions for two versions of the cage assemblies are defined in Figure 6-1; cage assemblies that contain external EMI springs and cage assemblies that contain an elastomeric EMI gasket.

5.1 Calculating Connector Location for the External EMI Spring Version

The clearance between bezel and host PCB, and the bezel may be set by the customer, as long as the conditions in Figure 6-1 are met. The tolerance C09 on the bezel centerline position (nominal dimension C08) must be calculated as follows:

\[ A = 0.3\text{mm} + \frac{(\text{Bezel Thickness})}{2} \]

FIGURE 5-1  BEZEL CUTOUT DESIGN
6. Reference Material

This section contains referrals to SFF-8083 and INF-8074i that apply to this specification.

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**FIGURE 6-1** ILLUSTRATION FOR CONNECTOR PC BOARD LAYOUT, SFF-8083

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**FIGURE 6-2** SECTION VIEW OF CAGE ASSEMBLY, INF-8074I