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-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

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.

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:
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.

CONTENTS

FIGURES

TABLES

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.

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

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

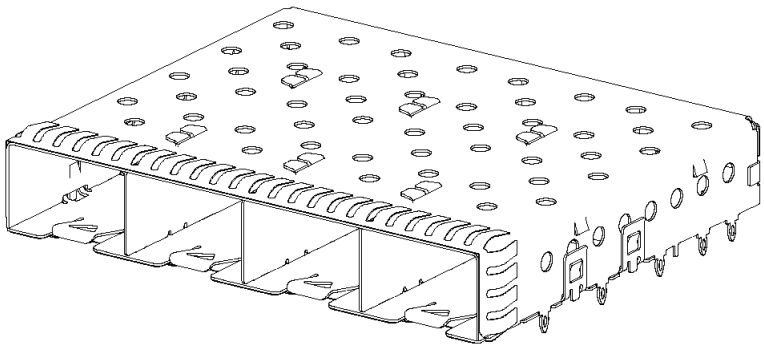
to describe this part of a cable assembly are: housing, nosepiece, cowling, and metal shroud.

Height: Distance from board surface to farthest overall connector feature

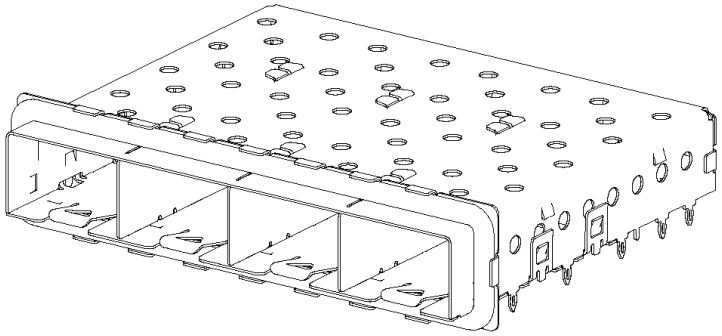
Through hole: A connector design and a printed circuit board design style where the connector termination points penetrates the printed circuit board and are subsequently soldered to the printed circuit board.

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.



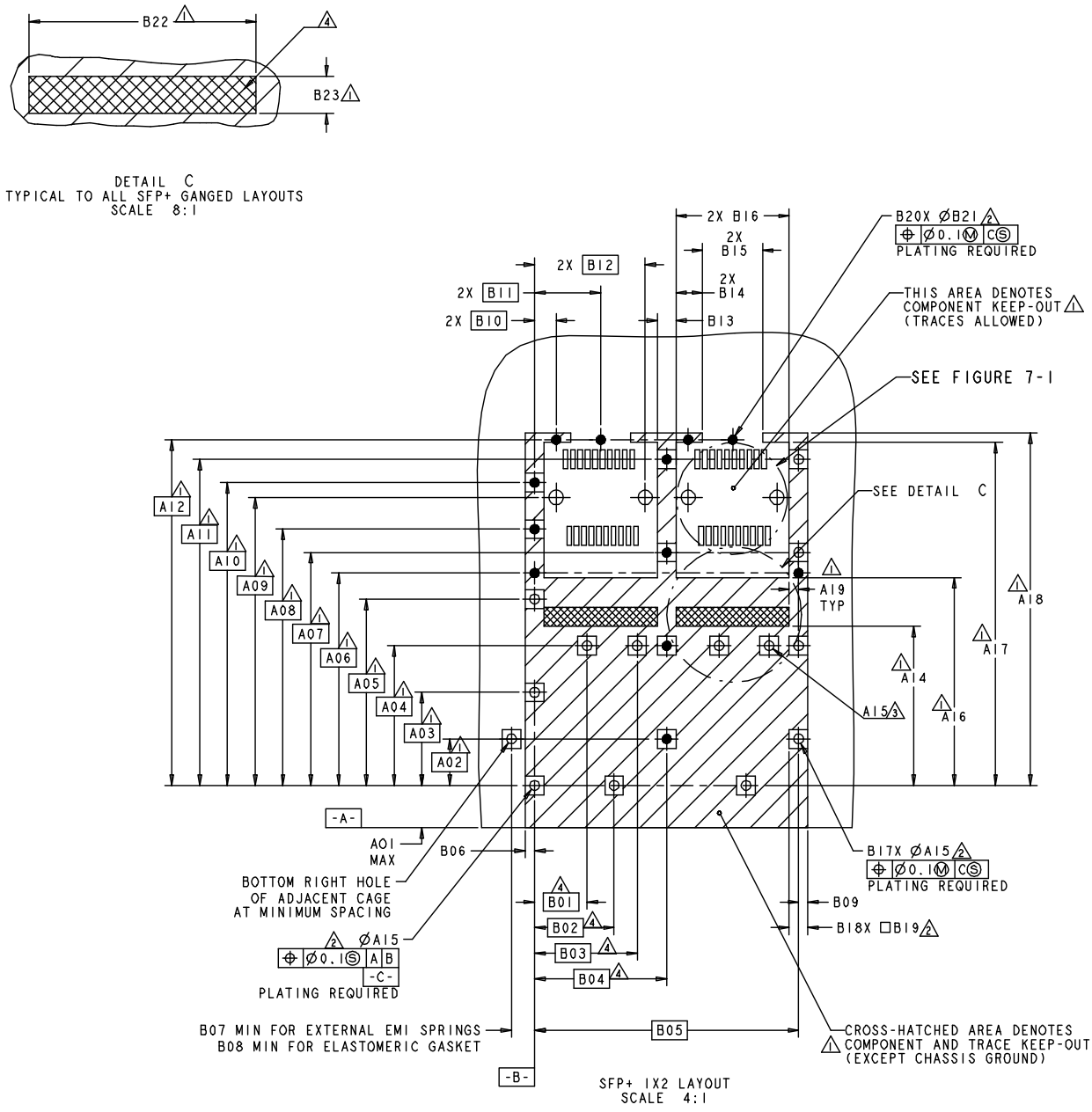
1x4 Ganged Cage Assembly with External EMI Springs



1x4 Ganged Cage Assembly with Elastomeric EMI Gasket

FIGURE 3-1 GENERAL VIEW OF GANGED CONFIGURATIONS

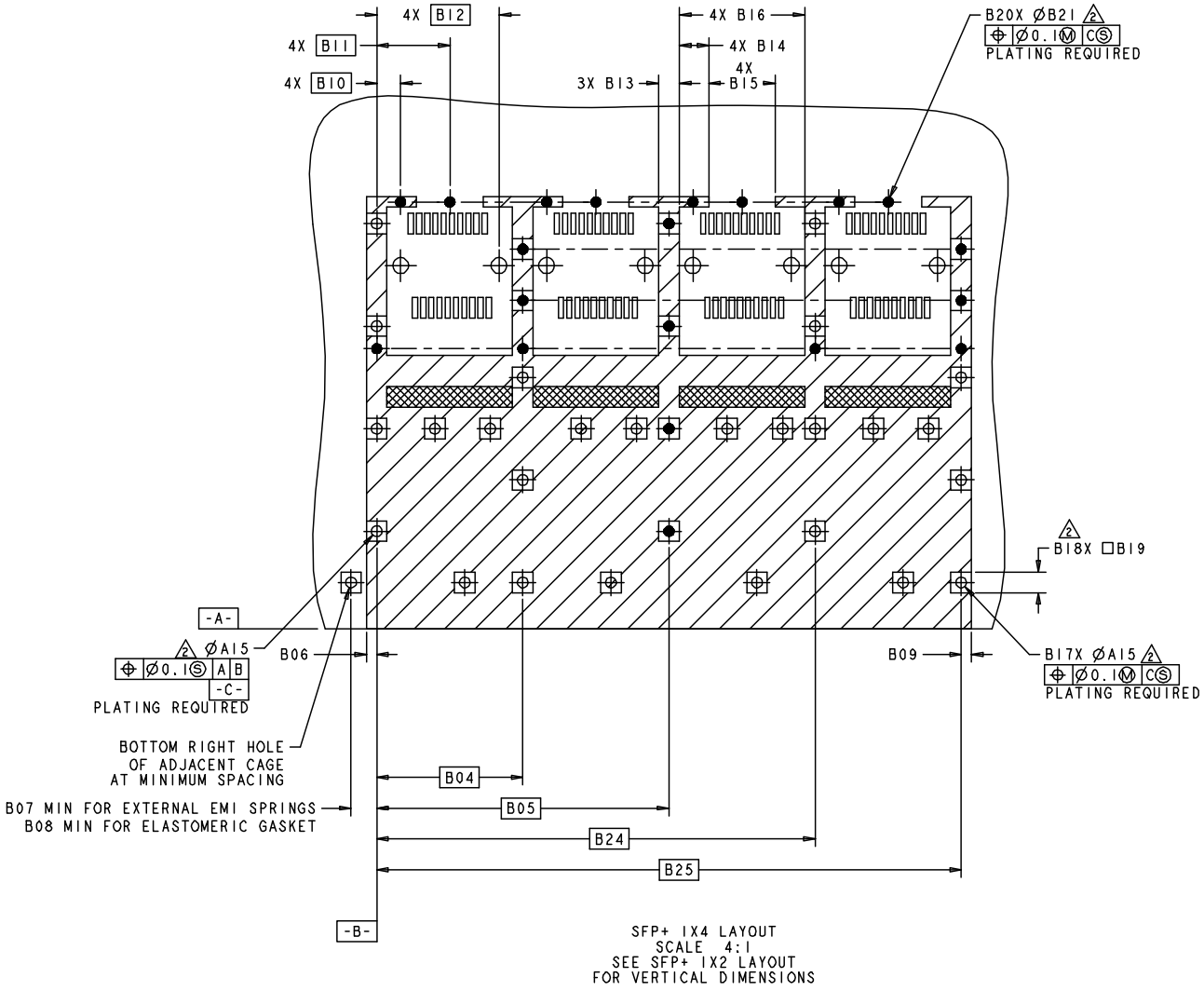
4. PCB Footprints



NOTES:

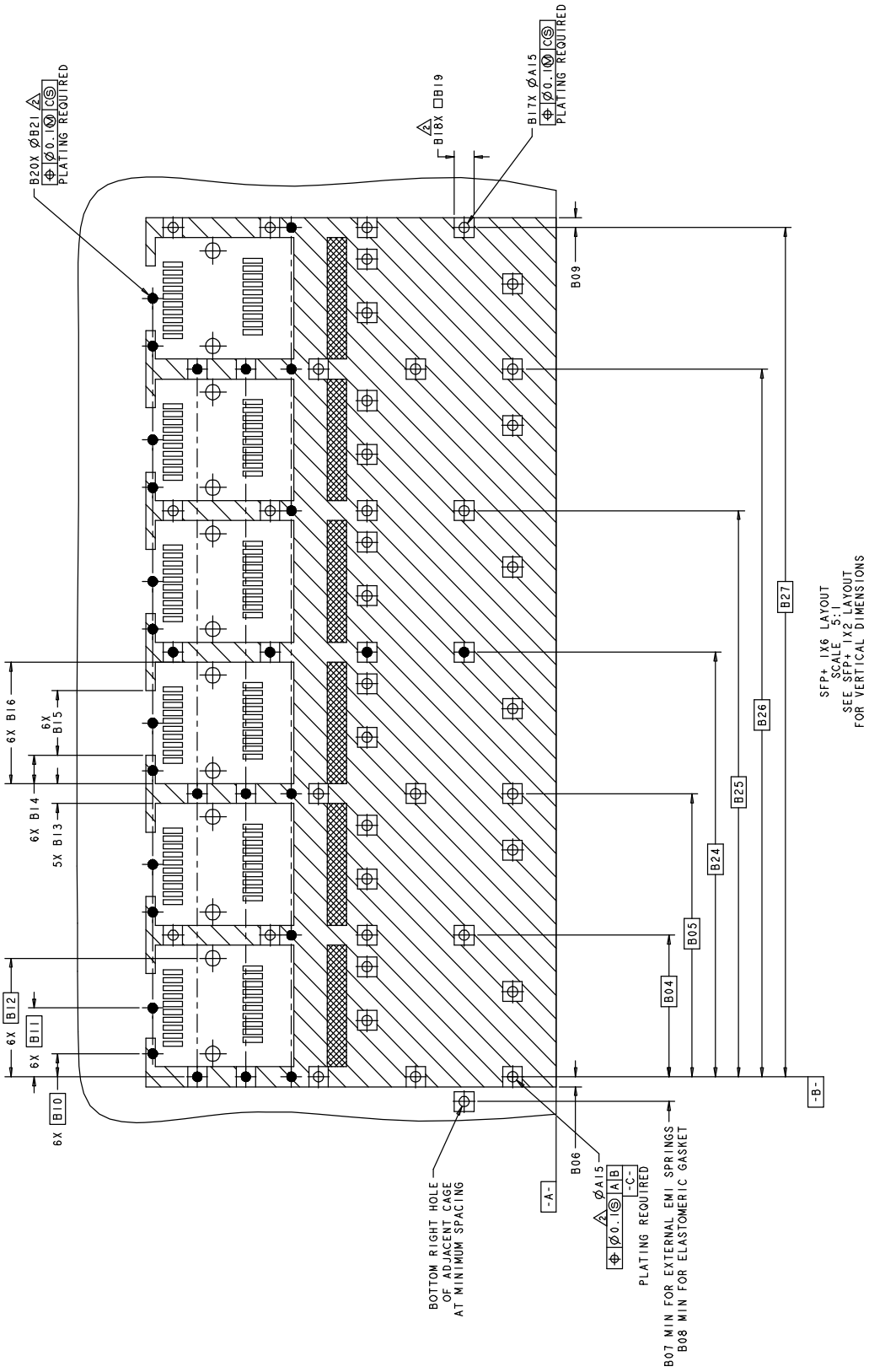
1. APPLIES TO ALL GANGED LAYOUTS.
2. PADS AND VIAS ARE CHASSIS GROUND.
3. EXPOSED CHASSIS GROUND.
4. HOLE PATTERN REPEATS FOR EACH PORT. SPACING BETWEEN PORTS IS 14.25mm. APPLIES TO ALL GANGED LAYOUTS.

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 4-1 FIGURE DIMENSIONS

Designator	Description	1X2	1X4	1X6	Tolerance
A01	Datum C Ground Row Datum A	4.8	=	=	Max
A02	Datum C Ground Row to Ground Row 2	5	=	=	Basic
A03	Datum C Ground Row to Ground Row 3	10	=	=	Basic
A04	Datum C Ground Row to Ground Row 4	15	=	=	Basic
A05	Datum C Ground Row to Ground Row 5	20	=	=	Basic
A06	Datum C Ground Row to Row 6, Optional Plating Holes	22.8	=	=	Basic
A07	Datum C Ground Row to Ground Row 7	25	=	=	Basic
A08	Datum C Ground Row to Ground Row 8	27.5	=	=	Basic
A09	Datum C Ground Row to Connector Guide Pin Hole Row (Row 9)	30.9	=	=	Basic
A10	Datum C Ground Row to Ground Row 10	32.5	=	=	Basic
A11	Datum C Ground Row to Ground Row 11	35	=	=	Basic
A12	Datum C Ground Row to Ground Row 11	37.1	=	=	Basic
A14	Datum C Chassis Ground Pad	17.1	=	=	+/-0.13
A15	Diameter of Datum C Hole and Others	1.05	=	=	+/-0.05
A16	Datum C to Component Keep-out, Front	22.30	=	=	+/-0.13
A17	Datum C to Component Keep-out, Rear	36.80	=	=	+/-0.13
A18	Datum C to End of Component & Trace Keep-out Area	37.80	=	=	Min
A19	Ground Column To Chassis Ground Pad	1.10	=	=	+/-0.10
B01	Datum B Ground Column to Ground Column 2	5.68	=	=	Basic
B02	Datum B Ground Column to Ground Column 3	8.58	=	=	Basic
B03	Datum B Ground Column to Ground Column 4	11.08	=	=	Basic
B04	Datum B Ground Column to Center Ground Column (Single Port Width)	14.25	=	=	Basic
B05	Datum B Ground Column to Ground Column 6 (2 Port Width)	28.5	=	=	Basic
B06	Datum B Ground Column to Edge of Component & Trace Keep-out Area	1.0	=	=	Min
B07	Datum B Ground Column to Adjacent Cage Column, External EMI Springs	2.50	=	=	Min
B08	Datum B Ground Column to Adjacent Cage Column, Elastomeric Gasket	5.75	=	=	Min
B09	Ground Column to Edge of Component & Trace Keep-out Area	1.0	=	=	Min
B10	Datum B Ground Column to 0.95 dia hole	2.33	=	=	Basic
B11	Datum B Ground Column to 0.95 dia hole	7.13	=	=	Basic
B12	Datum B Ground Column to Connector Guide Pin Hole	11.93	=	=	Basic
B13	Component & Trace Keep-out Area, width	2	=	=	+/-0.10

Designator	Description	1X2	1X4	1X6	Tolerance
B14	Edge of Trace Allowed Area To Edge of Entry Area	2.88	=	=	+/-0.10
B15	Width of Trace Keep-out Area	6.49	=	=	+/-0.10
B16	Component (Keep Out Area Width)	12.25	=	=	+/-0.05
B17	Quantity of 1.05 dia holes (Less Datum C)	12	25	38	N/A
B18	Quantity of square pads	19	34	49	N/A
B19	Size of square pad	2.0	=	=	+/-0.10
B20	Quantity of 0.95 dia holes with plating required	12	20	28	N/A
B21	Diameter size	0.95	=	=	+/-0.05
B22	Width of Chassis Ground Pad	12.05	=	=	+/-0.10
B23	Height of Chassis Ground Pad	2.0	=	=	+/-0.10
B24	3 Port Width	N/A	42.75	=	Basic
B25	4 Port Width	N/A	57.0	=	Basic
B27	5 Port Width	N/A	N/A	71.25	Basic
B28	6 Port Width	N/A	N/A	85.5	Basic
C01	Bezel cutout width	29.7	58.2	86.7	+/-0.10
C02	Bezel cutout height	10.40	=	=	+/-0.10
C03	Bottom of bezel cutout to top of pc board	0.19	=	=	+/-0.10
C04	Bezel cutout pitch, applies to External Spring EMI Gasket	31.00	59.50	88.00	min
C05	Bezel cutout pitch, applies to elastomeric EMI Gasket	34.25	62.75	91.25	Min
C06	Max radius on corners of cutout	0.03	=	=	max
C07	Distance from Rear of bezel to centerline of connector guide pin through holes, applies to Elastomeric EMI Gasket version only	38.9	=	=	+/-0.30
C08	Distance from centerline of bezel to centerlines of connector guide pin through holes, applies to External Spring EMI Gasket only	39.4	=	=	N/A
C09	Tolerance for the C09 Dimension as calculated from the formula in Section 6.1	N/A	N/A	N/A	See Section 6.1
C10	Distance from edge of pc board to centerlines of connector guide pin through holes.	35.4	=	=	max

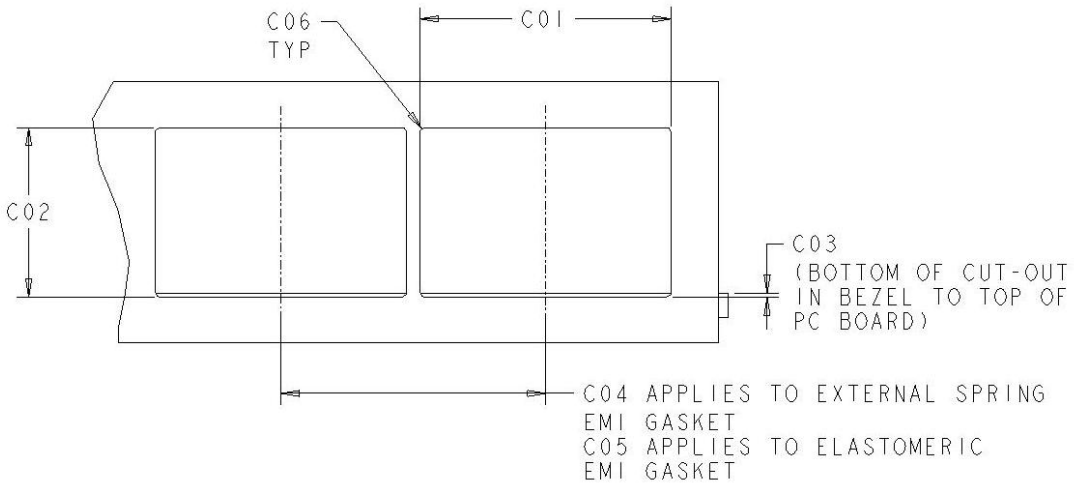
5. Bezel Cutout Design

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.

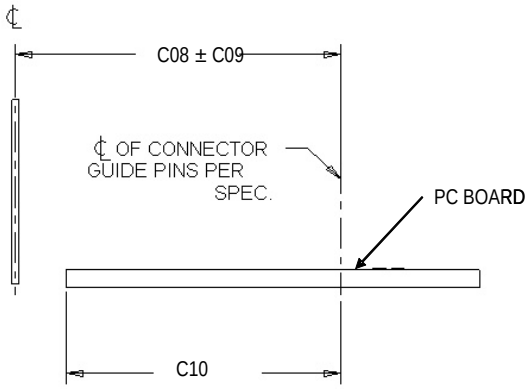
5.1 Calculating Connector Location for the External EMI Spring Version

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:

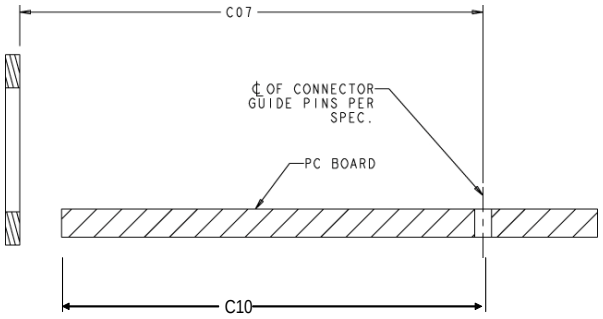
A = 0.3mm + (Bezel Thickness)/2



Front View



Side View External EMI Spring



Side View Elastomeric EMI Gasket

FIGURE 5-1 BEZEL CUTOUT DESIGN

6. Reference Material

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

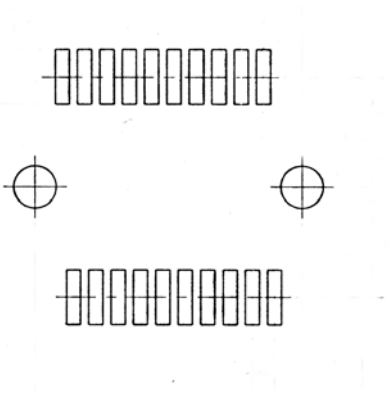


FIGURE 6-1 ILLUSTRATION FOR CONNECTOR PC BOARD LAYOUT, SFF-8083

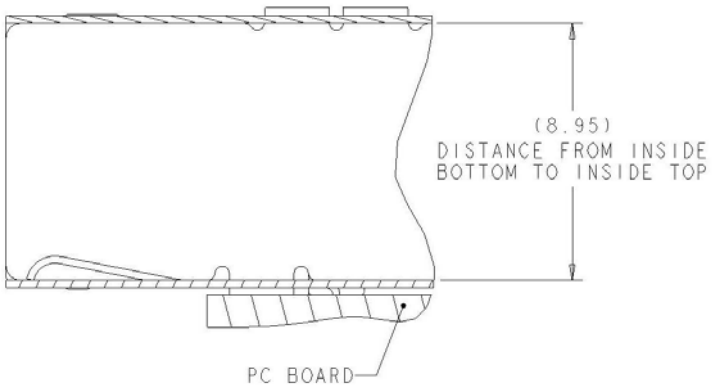


FIGURE 6-2 SECTION VIEW OF CAGE ASSEMBLY, INF-8074I