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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:

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**SFF Committee**

SFF-8075 Specification for

**PCI Card Version of SFP Cage**

Rev 1.0 July 3, 2001

Secretariat: SFF Committee

Abstract: This specification defines the unique mechanical parameters of the PCI Card version of the SFP (Small Form-factor Pluggable) Cage.

The original cage design defined by the MSA (Multi Source Agreement) is specified by INF-8074i. This derivative enables implementation of the SFP modules in PCI Card based systems.

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

This document 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 document.

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

Support: This document 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.

Adaptec  
Compaq  
DDK Fujikura  
ENDL  
FCI/Berg  
Fujitsu CPA  
Hewlett Packard  
Hitachi GST  
IBM  
Molex  
Seagate  
Sun Microsystems  
Toshiba America  
Tyco AMP  
Unisys

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

Amphenol  
Finisar  
Intel

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. The patent holder has filed 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.

If you are not a member of the SFF Committee, but you are interested in participating, the following principles have been reprinted here for your information.

#### PRINCIPLES OF THE SFF COMMITTEE

The SFF Committee is an ad hoc group formed to address storage industry needs in a prompt manner. When formed in 1990, the original goals were limited to defining de facto mechanical envelopes within which disk drives can be developed to fit compact computer and other small products.

Adopting a common industry size simplifies the integration of small drives (2 1/2" or less) into such systems. Board-board connectors carrying power and signals, and their position relative to the envelope are critical parameters in a product that has no cables to provide packaging leeway for the integrator.

In November 1992, the SFF Committee objectives were broadened to encompass other areas which needed similar attention, such as pinouts for interface applications, and form factor issues on larger disk drives. SFF is a forum for resolving industry issues that are either not addressed by the standards process or need an immediate solution.

Documents created by the SFF Committee are expected to be submitted to bodies such as EIA (Electronic Industries Association) or an ASC (Accredited Standards Committee). They may be accepted for separate standards, or incorporated into other standards activities.

The principles of operation for the SFF Committee are not unlike those of an accredited standards committee. There are 3 levels of participation:

- Attending the meetings is open to all, but taking part in discussions is limited to member companies, or those invited by member companies
- The minutes and copies of material which are discussed during meetings are distributed only to those who sign up to receive documentation.
- The individuals who represent member companies of the SFF Committee receive documentation and vote on issues that arise. Votes are not taken during meetings, only guidance on directions. All voting is by letter ballot, which ensures all members an equal opportunity to be heard.

Material presented at SFF Committee meetings becomes public domain. There are no restrictions on the open mailing of material presented at committee meetings. In order to reduce disagreements and misunderstandings, copies must be provided for all agenda items that are discussed. Copies of the material presented, or revisions if completed in time, are included in the documentation mailings.

The sites for SFF Committee meetings rotate based on which member companies volunteer to host the meetings. Meetings have typically been held during the ASC T10 weeks.

The funds received from the annual membership fees are placed in escrow, and are used to reimburse ENDL for the services to manage the SFF Committee.

If you are not receiving the documentation of SFF Committee activities or are interested in becoming a member, the following signup information is reprinted here for your information.

Annual SFF Committee Membership Fee	\$ 1,800.00
Annual SFF Committee Paper Documentation Fee	\$ 300.00
Annual Surcharge for AIR MAIL to Overseas	\$ 100.00
Annual Surcharge for Electronic Documentation	\$ 360.00

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

Email: \_\_\_\_\_

**Please register me as a Member of the SFF Committee for one year.**

Paper documentation	\$ 1,800
Electronic documentation	\$ 2,160

Check Payable to SFF Committee for \$\_\_\_\_\_ is Enclosed

Please invoice me \$\_\_\_\_\_ on PO #: \_\_\_\_\_

MC/Visa/AmX\_\_\_\_\_ Expires\_\_\_\_\_

**Please register me as an Observer on the SFF Committee for one year.**

Paper documentation	\$ 300 U.S.	\$ 400 Overseas
Electronic documentation	\$ 660 U.S.	\$ 760 Overseas

Check Payable to SFF Committee for \$\_\_\_\_\_ (POs Not Accepted)

MC/Visa/AmX\_\_\_\_\_ Expires\_\_\_\_\_

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**SFF Committee --**

PCI Card Version of SFP Cage

**1. Scope**

This specification documents the physical differences between the PCI Card version of the SFP Cage and the original SFP cage design. This variant will broaden the applications of SFP Adapter Modules to PCI Card based systems.

**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

Clause 4 contains the Definitions and Conventions

Clause 5 contains the Cage Descriptions and Dimensions

**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 this Specification.

The following interface standards are relevant to this Specification.

- X3.230-1994 FC-PH Fibre Channel Physical Interface
- X3.297-199x FC-PH-2 Fibre Channel Physical Interface -2
- X3.303-199x FC-PH-3 Fibre Channel Physical Interface -3
- IEEE P802.3Z Gigabit Task Force
- INF-8074i SFP (Small Formfactor Pluggable) Transceiver

**2.2 SFF Specifications**

There are several projects active within the SFF Committee. At the date of printing document numbers had been assigned to the following projects. The status of Specifications is dependent on committee activities.

- |                 |  |
|-----------------|--|
| F = Forwarded   | The document has been approved by the members for forwarding to a formal standards body.   |
| P = Published   | The document has been balloted by members and is available as a published SFF Specification.   |
| A = Approved    | The document has been approved by ballot of the members and is in preparation as an SFF Specification.   |
| C = Canceled    | The project was canceled, and no Specification was Published.  |
| D = Development | The document is under development at SFF.  |
| E = Expired     | The document has been published as an SFF Specification, and the members voted against re-publishing it when it came up for annual review.   |
| e = electronic  | Used as a suffix to indicate an SFF Specification which has Expired but is still available in electronic form from SFF e.g. a specification has been incorporated into a draft or published standard which is only |

available in hard copy.

- i = Information The document has no SFF project activity in progress, but it defines features in developing industry standards. The document was provided by a company, editor of an accredited standard in development, or an individual. It is provided for broad review (comments to the author are encouraged).
- s = submitted The document is a proposal to the members for consideration to become an SFF Specification.

Spec #	Rev	List of Specifications as of July 4, 2001
SFF-8000		SFF Committee Information
INF-8001i	E	44-pin ATA (AT Attachment) Pinouts for SFF Drives
INF-8002i	E	68-pin ATA (AT Attachment) for SFF Drives
SFF-8003	E	SCSI Pinouts for SFF Drives
SFF-8004	E	Small Form Factor 2.5" Drives
SFF-8005	E	Small Form Factor 1.8" Drives
SFF-8006	E	Small Form Factor 1.3" Drives
SFF-8007	E	2mm Connector Alternatives
SFF-8008	E	68-pin Embedded Interface for SFF Drives
SFF-8009	4.1	Unitized Connector for Cabled Drives
SFF-8010	E	Small Form Factor 15mm 1.8" Drives
INF-8011i	E	ATA Timing Extensions for Local Bus
SFF-8012	3.0	4-Pin Power Connector Dimensions
SFF-8013	E	ATA Download Microcode Command
SFF-8014	C	Unitized Connector for Rack Mounted Drives
SFF-8015	E	SCA Connector for Rack Mounted SFF SCSI Drives
SFF-8016	C	Small Form Factor 10mm 2.5" Drives
SFF-8017	E	SCSI Wiring Rules for Mixed Cable Plants
SFF-8018	E	ATA Low Power Modes
SFF-8019	E	Identify Drive Data for ATA Disks up to 8 GB
INF-8020i	E	ATA Packet Interface for CD-ROMs
INF-8028i	E	- Errata to SFF-8020 Rev 2.5
SFF-8029	E	- Errata to SFF-8020 Rev 1.2
SFF-8030	1.8	SFF Committee Charter
SFF-8031		Named Representatives of SFF Committee Members
SFF-8032	1.4	SFF Committee Principles of Operation
INF-8033i	E	Improved ATA Timing Extensions to 16.6 MBs
INF-8034i	E	High Speed Local Bus ATA Line Termination Issues
INF-8035i	E	Self-Monitoring, Analysis and Reporting Technology
INF-8036i	E	ATA Signal Integrity Issues
INF-8037i	E	Intel Small PCI SIG
INF-8038i	E	Intel Bus Master IDE ATA Specification
INF-8039i	E	Phoenix EDD (Enhanced Disk Drive) Specification
SFF-8040	1.2	25-pin Asynchronous SCSI Pinout
SFF-8041	C	SCA-2 Connector Backend Configurations
SFF-8042	C	VHDCI Connector Backend Configurations
SFF-8043	E	40-pin MicroSCSI Pinout
SFF-8045	4.3	40-pin SCA-2 Connector w/Parallel Selection
SFF-8046	E	80-pin SCA-2 Connector for SCSI Disk Drives
SFF-8047	C	40-pin SCA-2 Connector w/Serial Selection
SFF-8048	C	80-pin SCA-2 Connector w/Parallel ESI
SFF-8049	E	80-conductor ATA Cable Assembly
INF-8050i	1.0	Bootable CD-ROM
INF-8051i	E	Small Form Factor 3" Drives
INF-8052i	E	ATA Interface for 3" Removable Devices
SFF-8053	5.5	GBIC (Gigabit Interface Converter)

INF-8055i E SMART Application Guide for ATA Interface  
 SFF-8056 C 50-pin 2mm Connector  
 SFF-8057 E Unitized ATA 2-plus Connector  
 SFF-8058 E Unitized ATA 3-in-1 Connector  
 SFF-8059 E 40-pin ATA Connector  
  
 SFF-8060 1.1 SFF Committee Patent Policy  
 SFF-8061 1.1 Emailing drawings over the SFF Reflector  
 SFF-8062 Rolling Calendar of SSWGs and Plenaries  
 SFF-8065 C 40-pin SCA-2 Connector w/High Voltage  
 SFF-8066 C 80-pin SCA-2 Connector w/High Voltage  
 SFF-8067 2.8 40-pin SCA-2 Connector w/Bidirectional ESI  
 INF-8068i 1.0 Guidelines to Import Drawings into SFF Specs  
 SFF-8069 E Fax-Access Instructions  
  
 INF-8070i 1.2 ATAPI for Rewritable Removable Media  
  
 SFF-8072 1.2 80-pin SCA-2 for Fibre Channel Tape Applications  
 SFF-8073 - 20-pin SCA-2 for GBIC Applications  
 INF-8074i 1.0 SFP (Small Formfactor Pluggable) Transceiver  
 SFF-8075 1.0 PCI Card Version of SFP Cage  
 SFF-8080 E ATAPI for CD-Recordable Media  
 INF-8090i 5.3 ATAPI for DVD (Digital Video Data)  
  
 SFF-8101 3 Gbs and 4 Gbs Signal Characteristics  
 SFF-8110 C 5V Parallel 1.8" drive form factor  
 SFF-8111 1.1 1.8" drive form factor (60x70mm)  
 SFF-8120 1.1 1.8" drive form factor (78x54mm)  
  
 SFF-8200e 1.1 2 1/2" drive form factors (all of 82xx family)  
 SFF-8201e 1.3 2 1/2" drive form factor dimensions  
 SFF-8212e 1.2 2 1/2" drive w/SFF-8001 44-pin ATA Connector  
  
 SFF-8300e 1.1 3 1/2" drive form factors (all of 83xx family)  
 SFF-8301e 1.2 3 1/2" drive form factor dimensions  
 SFF-8302e 1.1 3 1/2" Cabled Connector locations  
 SFF-8332e 1.2 3 1/2" drive w/80-pin SFF-8015 SCA Connector  
 SFF-8337e 1.2 3 1/2" drive w/SCA-2 Connector  
 SFF-8342e 1.3 3 1/2" drive w/Serial Unitized Connector  
 INF-8350i 6.1 3 1/2" Packaged Drives  
  
 SFF-8400 C VHDCI (Very High Density Cable Interconnect)  
 SFF-8410 16.1 High Speed Serial Testing for Copper Links  
 SFF-8411 High Speed Serial Testing for Backplanes  
 SFF-8412 3.1 HSS Requirements for Duplex Optical Links  
 SFF-8415 1.1 HPEI (High Performance Electrical Interconnect)  
 SFF-8416 HSS Bulk Cable Performance Requirements  
 SFF-8420 11.1 HSSDC-1 Shielded Connections  
 SFF-8421 1.1 HSSDC-2 Shielded Connections  
 SFF-8422 C FCI Shielded Connections  
 SFF-8423 C Molex Shielded Connections  
  
 SFF-8430 4.1 MT-RJ Duplex Optical Connections  
 SFF-8441 14.1 VHDCI Shielded Configurations  
 SFF-8451 10.1 SCA-2 Unshielded Connections  
 SFF-8452 3.1 Glitch Free Mating Connections for Multidrop Aps  
  
 SFF-8460 1.1 HSS Backplane Design Guidelines  
 SFF-8470 Four Lane Copper Connector  
 SFF-8472 Diagnostic Monitoring Interface for Optical Xcvrs  
 SFF-8480 2.1 HSS (High Speed Serial) DB9 Connections  
  
 SFF-8500e 1.1 5 1/4" drive form factors (all of 85xx family)  
 SFF-8501e 1.1 5 1/4" drive form factor dimensions

SFF-8508e 1.1 5 1/4" ATAPI CD-ROM w/audio connectors  
SFF-8551 3.2 5 1/4" CD Drives form factor  
SFF-8572 - 5 1/4" Tape form factor

SFF-8610 C SDX (Storage Device Architecture)

## 2.3 Sources

Copies of ANSI standards or proposed ANSI standards may be purchased from Global Engineering.

15 Inverness Way East 800-854-7179 or 303-792-2181  
Englewood 303-792-2192Fx  
CO 80112-5704

Copies of SFF Specifications are available by joining the SFF Committee as an Observer or Member.

14426 Black Walnut Ct 408-867-6630x303  
Saratoga 408-867-2115Fx  
CA 95070 FaxAccess: 408-741-1600

The increasing size of SFF Specifications has made FaxAccess impractical to obtain large documents. Document subscribers and members are automatically updated every two months with the latest specifications. Specifications are available by FTP at <ftp://ftp.seagate.com/sff>

Electronic copies of documents are also made available via CD\_Access, a service which provides copies of all the specifications plus SFF reflector traffic. CDs are mailed every 2 months as part of the document service, and provide the letter ballot and paper copies of what was distributed at the meeting as well as the meeting minutes.

## 3. General Description

The SFP Cage was initially designed and released as part of a Multi Source Agreement (MSA).

The MSA also included a connector for receiving removeable/pluggable adapter modules. The adapter modules themselves included both copper and optical solutions thus enabling end users the flexibility of implementing solutions based on their particular needs.

It became apparent there was a need to implement SFP's in the server and workstation PCI Card environment. As the initial implementation was geared towards switches where there is no card cage, no provision had been made for them.

This specification defines the additional dimensions required to manufacture an SFP cage which will fit into a PCI card cage.

## 4. Definitions and Conventions

### 4.1 Definitions

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

4.1.1 Optional: This term describes features which are not required by the SFF Specification. However, if any feature defined by the SFF Specification is implemented, it shall be done in the same way as defined by the Specification.

4.1.2 Reserved: Where this term is used for bits, bytes, fields and code values; the bits, bytes, fields and code values are set aside for future standardization. The default value shall be zero. The originator is required to define a Reserved field or bit as zero, but the receiver should not check Reserved fields or bits for

zero.

4.1.3 VU (Vendor Unique): This term is used to describe bits, bytes, fields, pins, signals, code values and features which are not described in this SFF Specification, and may be used in a way that varies between vendors.

4.1.4 VU Mode: A mode of execution by the drive in which its use is not defined by this SFF Specification. The means by which a vendor invokes vendor unique operations within a drive is defined by this SFF Specification.

4.2 Conventions

Certain terms used herein are the proper names of signals. These are printed in uppercase to avoid possible confusion with other uses of the same words; e.g., ATTENTION. Any lower-case uses of these words have the normal American- English meaning.

A number of conditions, commands, sequence parameters, events, English text, states or similar terms are printed with the first letter of each word in uppercase and the rest lower-case; e.g., In, Out, Request Status. Any lower- case uses of these words have the normal American-English meaning.

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 convention of a space and comma.

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

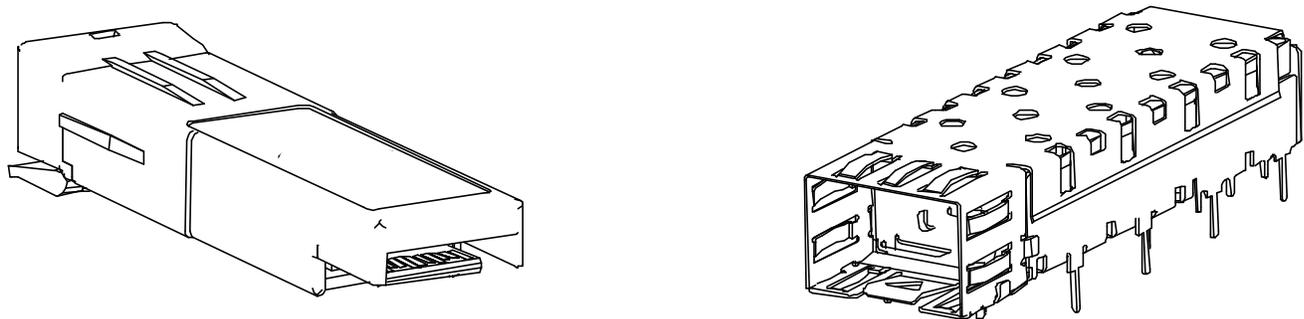
4.2 Glossary

PCB: Printed Circuit Board assembly

5. Cage Descriptions and Dimensions

The original SFP cage design as specified in INF-8074i provides the basis for this PCI Card Cage variation. The SFP dimensions specified in INF-8074i are not repeated here, as all of them apply except the one which defines how the cage sits on top of the host PCB. The basic cage is rotated such that it resides on a plane degreed above the mounting surface of the PCB.

Figure 1 provides a view of the cage for a PCI applications and an SFP module.

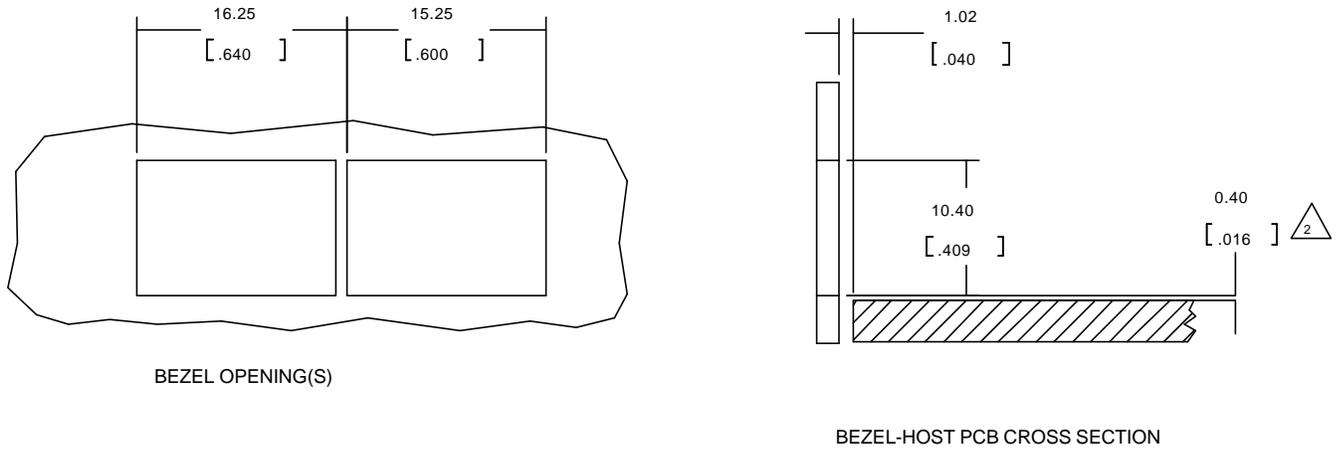


ADAPTER MODULE

CAGE

FIGURE 1 PCI CARD SFP CAGE AND SFP MODULE

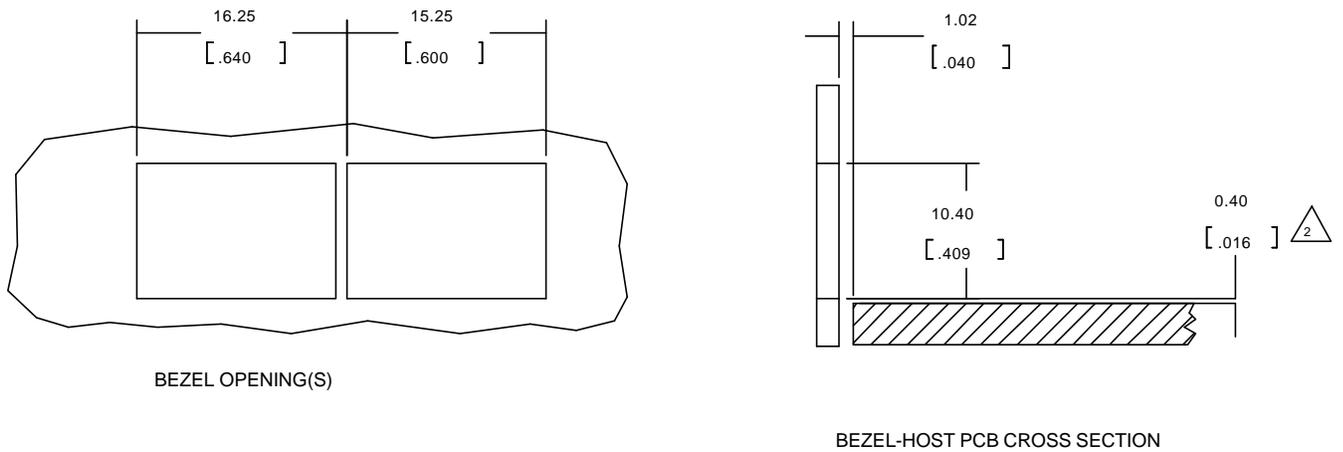
Figure 2 provides detail of the dimension difference.



 SFF-8475 opening 0.4mm below PCB surface, PCI 0.4mm above

FIGURE 2 ORTHOGRAPHIC PROJECTION OF PCI CARD SFP CAGE

Figure 3 defines the dimensions required to locate an opening in the bulkhead to accommodate the SFP PCI Card Cage. The reader's attention is drawn to the fact that these dimensions differ from those defined in INF-8074i and should be used when implementing SFF-8075.



 SFF-8475 opening 0.4mm below PCB surface, PCI 0.4mm above

FIGURE 3 BULKHEAD OPENING FOR PCI CARD SFP CAGE