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 (see 2.3).
SFF Committee documents are available by FaxAccess at 408-741-1600

SFF Committee

SFF-8420 Specification for

HSSDC-1 Shielded Connections

Rev 11.1 February 6, 2000

Secretariat: SFF Committee

Abstract: This specification defines the physical interfaces and performance requirements for HSSDC-1 (High Speed Serial Data Connector -1) connectors and retention schemes to be used for Fibre Channel, SSA, and other duplex serial copper applications. Other uses of this general purpose connection system are also possible. These 8 position HSSDC-1 connectors are based on 1.25mm (0.05") ribbon style technology.

The controlling document for the dimensional values is IEC 61076-3-103.

This document provides a common specification for systems manufacturers, system integrators, and suppliers of magnetic disk drives. 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 a connector in this document 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 document is supported by the identified member companies of the SFF Committee.

Documentation: This document has been prepared in a similar style to that of the ISO (International Organization of Standards).

POINTS OF CONTACT:

Bill Ham
Compaq Computer
334 South St
Shrewsbury, MA 01545

Ph: 508-841-2629 Fx: 508-841-5266
Email: Bill_Ham@compaq.com

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

Ph: 408-867-6630 Fx: 408-867-2115

EXPRESSION OF SUPPORT BY MANUFACTURERS

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

AMP
Amphenol
Toshiba America
Unisys

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

Adaptec
Compaq
ENDL
FCI/Berg
Fujitsu CPA
Honda Connector
Maxtor
Molex
Pioneer NewMedia
Quantum
Tyco AMP
Yamagata Fujitsu

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

DDK Electronics
IBM
Matsushita
Seagate
YC Cable

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_____

SFF Committee 408-867-6630
14426 Black Walnut Ct 408-867-2115Fx
Saratoga CA 95070 250-1752@mcimail.com

Foreword

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 in which space was at a premium and time to market with the latest machine was an important factor. System integrators worked individually with vendors to develop the packaging. The result was wide diversity, and with space being such a major consideration in packaging, it was not possible to replace one vendor's drive with a competitive product.

The desire to reduce disk drive sizes to even smaller dimensions such as 1.8" and 1.3" made it likely that devices would become even more constrained in dimensions because of a possibility that such small devices could be inserted into a socket, not unlike the method of retaining semiconductor devices.

The problems faced by integrators, device suppliers, and component suppliers led to the formation of an industry ad hoc group to address the marketing and engineering considerations of the emerging new technology in disk drives. After two informal gatherings on the subject in the summer of 1990, the SFF Committee held its first meeting in August.

During the development of the form factor definitions, other activities were suggested because participants in the SFF Committee faced problems other than the physical form factors of disk drives. In November 1992, the members approved an expansion in charter 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.

At the same time, the principle was adopted of restricting the scope of an SFF project to a narrow area, so that the majority of documents would be small and the projects could be completed in a rapid timeframe. If proposals are made by a number of contributors, the participating members select the best concepts and uses them to develop specifications which address specific issues in emerging storage markets.

Those companies which have agreed to support a documented 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.

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

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

SFF Committee --

HSSDC-1 Shielded Connections

1. Scope

This specification defines the terminology and physical requirements for shielded HSSDC-1 (High Speed Serial Data Connector) connections, complete connectors, and the immediate electrical neighborhood of the connector proper that also influences the behavior of the connector. There is a single mating interface for all versions.

The HSSDC-1 connector style is specified in Fibre Channel, SSA, and Gigabit Ethernet and may be suitable for use with other high speed serial interface standards. These are all external shielded systems that require inter-enclosure connections. These standards only specify the mating interface and have no specific performance requirements so this document, along with the IEC 61076-3-103, define such requirements.

The relevant parts of this IEC document are included in this specification for easy reference. The Fibre Channel, SSA, and Gigabit Ethernet standards call out the contact position numbering for the respective application uses and are the normative sources.

The mating sides (including retention) are compatible for all versions of complete connector and the termination side is specified for a variety of practically important schemes. The controlling document for the dimensional values is the IEC (International Electronics Commission) standard.

The specific versions of complete connectors specified for use with FC-AL, SSA, Gigabit Ethernet, (and P1394) is controlled by this SFF document as not all possible combinations of mating side and termination side are supported.

The HSSDC-1 system was designed from the beginning for the specific purpose of satisfying the needs for gigabit serial data transmissions in a nominal 150 ohm differential balanced copper link. The shield connector mating interface has been designed to provide an EMI-tight (Electro Magnetic Interference) seal. Design goals are minimization of cross talk, minimum transmission line impedance discontinuity across the connector, and management of EMI (caused by the connector or its mating interfaces).

The transmission line impedance of the connector itself (not including the termination interface to the wire or board) matches the electrical media within the tolerances allowed for the media. This connection scheme may be used in multiple places within a cabling environment. Though optimized for a 150 ohm environment this connector will function acceptably at other impedance levels (to be optimized on a case by case basis).

The retention scheme consists of a single press-to-release catch similar to those found on the extremely popular and common ergonomic RJ style network and telephone unshielded connectors. The look and feel of the HSSDC-1 family is well suited for advanced high speed transmission applications. The panel space required is significantly less than that for other styles of connectors.

The physically robust design (e. g. no pins to bend) and relatively small size

enable the HSSDC-1 to be usable in all applications from notebooks to data centers. The connector is of a straightforward construction which does not rely on advanced materials or processes.

The mating sides (including retention) are the same for all versions of complete connector and there is a variety of choices on the termination side.

This document specifies the requirements on the mating and termination sides of the connectors to enable functional multiple sourcing of the complete connectors. The construction of the connectors between the mating and termination sides are not specified by this document.

In the present selection of complete connectors specified all are fully shielded at the mating interface with provision for connecting shields together and for terminating shields. Therefore specifications are included for the backshell-to-connector interfaces. Fibre Channel and SSA standards presently incorporate requirements on the characteristic impedance and ability to transmit Gigabaud signals for cable assemblies and backplanes. As the HSSDC-1 connector system may form part of this interconnect it is also subject to these requirements.

The high speed electrical performance requirements for the connector and its electrical neighborhood are specified in SFF-8410 which is incorporated by reference into this specification. These requirements include operation at 1 Gigabit/second and higher rates.

In an effort to broaden the applications for storage devices, an ad hoc industry group of companies representing system integrators, peripheral suppliers, and component suppliers decided to address the issues involved.

The SFF Committee was formed in August, 1990 and the first working document was introduced in January, 1991.

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 list of Figures and Tables

Clause 4 contains the General Description

Clause 5 contains the Definitions and Conventions

Clause 6 defines the Connector 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.

- 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

- X3.293-199x SSA-PH1 SSA Physical Interface
- T10-1146 SSA-PH2 SSA Physical Interface -2
- IEEE P802.3z Gigabit Task Force
- IEC 61076-3-103 High Speed Serial Data Connector

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 March 26, 2000
SFF-8000		SFF Committee Information
SFF-8001i	E	44-pin ATA (AT Attachment) Pinouts for SFF Drives
SFF-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
SFF-8011i	E	ATA Timing Extensions for Local Bus
SFF-8012	2.3	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
SFF-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
SFF-8033i	E	Improved ATA Timing Extensions to 16.6 MBs
SFF-8034i	E	High Speed Local Bus ATA Line Termination Issues
SFF-8035i	E	Self-Monitoring, Analysis and Reporting Technology
SFF-8036i	E	ATA Signal Integrity Issues
INF-8037i	E	Intel Small PCI SIG
INF-8038i	E	Intel Bus Master IDE ATA Specification
SFF-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	4.2	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	5.4	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-8065	C	40-pin SCA-2 Connector w/High Voltage
SFF-8066	C	80-pin SCA-2 Connector w/High Voltage
SFF-8067	2.6	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
SFF-8080	E	ATAPI for CD-Recordable Media
INF-8090i	3.6	ATAPI for DVD (Digital Video Data)
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
SFF-8400	C	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	-	HSS Requirements for Duplex Optical Links D
SFF-8420	11.1	HSSDC-1 Shielded Connections
SFF-8421	tbd	HSSDC-2 Shielded Connections
SFF-8422	tbd	**FCI** Shielded Connections
SFF-8423	tbd	*Molex* Shielded Connections
SFF-8430	4.1	MT-RJ Duplex Optical Connections
SFF-8441	14.1	VHDCI Shielded Configurations
SFF-8451	10.1	HSS (High Speed Serial) SCA-2 Connections
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	3.0	5 1/4" CD-ROM 1" High 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 fission.dt.wdc.com/pub/standards/sff/spec

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.

TABLE OF CONTENTS

1. 2. Tables of Figures and Tables

1.1 TABLE OF FIGURES

1.2 TABLE OF TABLES

2. General Description

The presently standardized connection systems available for use with external Fibre Channel, SSA, and Gigabit Ethernet require that the system integrator or designer choose between alternatives that are incompatible and of different size and pin style than the HSSDC-1. The new HSSDC-1 connection system is based on ribbon or leaf style contacts while the other alternatives all use round pins. This ribbon style offers single wipe and is based on proven connector technology using the mechanically robust ribbon or leaf contact style. It is very difficult to damage the contacts.

HSSDC-1 connectors find their most important application where electrical performance for signals having slew rates of 200 ps / volt differential or greater and where positive retention is needed but ease of insertion and removal is also desired. This covers virtually all of the external inter-enclosure applications for gigabit serial applications that use balanced copper media for transmission.

The shield contact is required to make contact before any of the signal contacts upon insertion and to break contact only after all contacts are separated upon removal. This ensures that any ground potential differences between enclosures are first exposed to the shield thereby minimizing the risk of damaging the sensitive input and output stages of the transceivers when the signal contacts are mated.

Figure 1 shows the required sequencing of the shield and signal contacts.

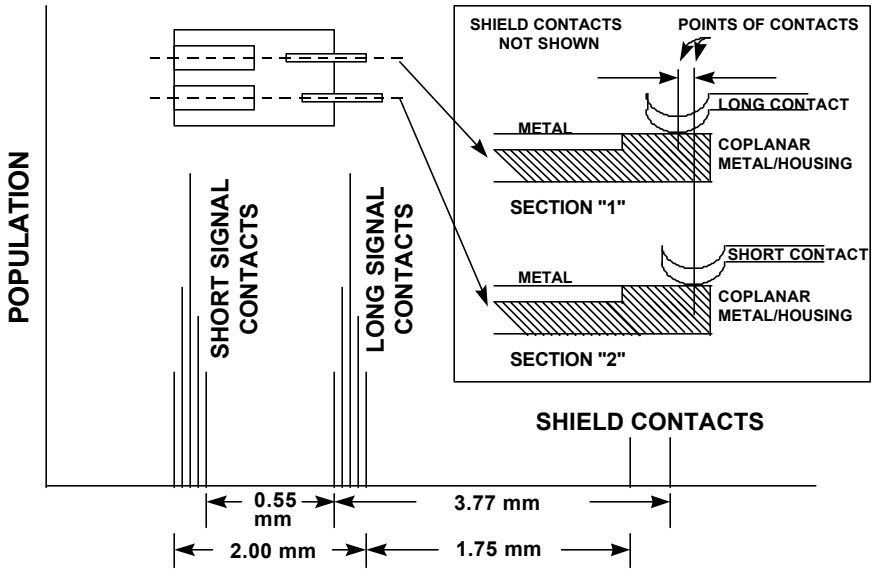


Figure 1 - Contact positioning architecture

The dimensions shown in Figure 1 are for reference only. The details for these dimensions are shown in Figure 18.

The use of the HSSDC-1 technology has no effect on the SSA, FC, or Gigabit Ethernet wiring rules, the SSA, FC, or Gigabit Ethernet protocol or firmware, or the system configuration rules.

3. Definitions and Conventions

3.1 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

Cable Termination: The attachment of wires to the termination side of a connector. Schemes commonly used in the industry are IDC (Insulation Displacement Contact), IDT (Insulation Displacement Termination), wire slots, solder, weld, crimp, braise, etc.

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 document “fixed” is specifically used to describe the mating side gender illustrated in Figure 2.

Free: Used to describe the gender of the mating side of the connector that penetrates its mate upon mating. This gender is frequently, but not always, associated with the common terminology “plug”. Other terms commonly used are “male” and “pin connector”. The term “free” is adopted from EIA standard terminology as the gender that most commonly exists on the free end of a connection, for example, on the cable side. In this document “free” 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.

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

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.

Offset: An alignment shift from the center line of the connector

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. Describing a feature as optional in the text is done to assist the reader. If there is a conflict between text and tables on a feature described as optional, the table shall be accepted as being correct.

Reserved: Where this term is used for defining the signal on a connector pin its actual function is set aside for future standardization. It is not available for vendor specific use. 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.

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

Single row: A connector design for use with surface mount printed circuit board assembly technology where the termination side points are arranged in one line

Single sided termination: A cable termination assembly style and a connector design style where only one side of the connector is accessible when attaching wires. This style frequently has IDC termination points that point in the same direction.

Straddle mount: A connector design style and a printed circuit board design style that uses surface mount termination points on both sides of the board. The connector is frequently centered between the top and bottom surfaces of the board.

Straight: A connector design for use with printed circuit board assembly technology where the mating direction is perpendicular 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

Termination side: The side of the connector opposite the mating side that is used for permanently attaching conductors to the connector. Due to pin numbering differences between mating side genders the termination side shall always be specified in conjunction with a mating side of a specific gender. Other terms commonly used in the industry are: back end, non-mating side, footprint, pc board side, and post side

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.

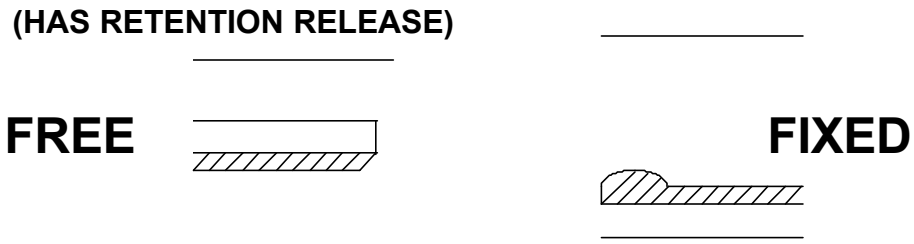


Figure 2 - Mating side gender definition

Annex A contains some explanation and rationalization for the terminology used by EIA for the description of connectors. Since these terms apply largely to the use of the connectors and not directly to the properties of the connectors themselves there is some confusion possible when the connectors are used in certain ways. For example it is perfectly acceptable to use the fixed gender on a cable (thereby making it “free” in the application). This use does not change the name of the gender to “free”. Even though the use may not map to the terminology in all cases these terms are adopted in this document for convenience of reference to the EIA documents. Readers are encouraged to consider the most common applications for the gender when mentally mapping the terminology to the connector properties.

3.2 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 convention of a space and comma.

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

4. Connector descriptions:

4.1 Complete connector options

The complete connectors listed in this section are supported in this document. The overall view of the mating sides are shown in Figure 3 and Figure 4.

FREE MATING SIDE CONNECTORS (used on the side that has the retention release) Refer to Figure 17 and Figure 18 for mating side specifications.

CONNECTOR NAME	OVERVIEW	OUTLINE	TERMINATION SIDE
FREE CABLE Version 1	Figure 3	Figure 13	NA

FREE CABLE Version 2	Figure 4	NA

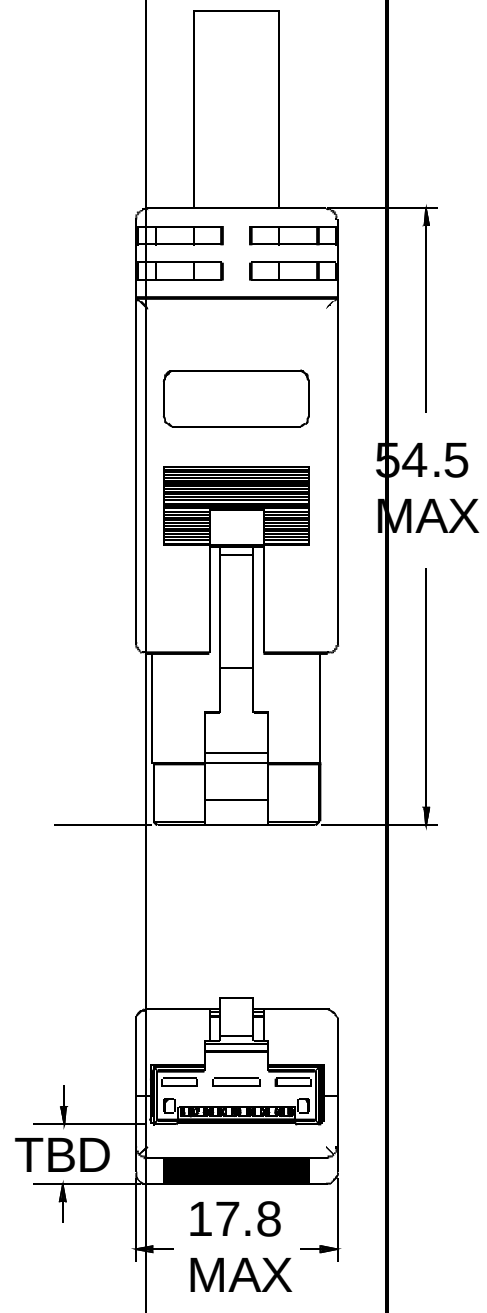
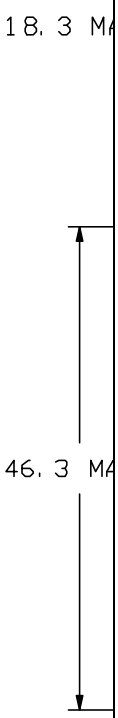


Figure 14

FREE CABLE Version 3	NONE	 Figure 15	NA
FREE CABLE Version 4	Figure 5	Figure 16	NA

FIXED MATING SIDE CONNECTORS (used on the device side except when used with cable terminations) Refer to Figure 18 and Figure 19 for mating side specifications.

CONNECTOR NAME	OVERVIEW	OUTLINE	TERMINATION SIDE
FIXED BOARD RIGHT ANGLE SURFACE MOUNT Version 1	Figure 6	Figure 8	Figure 20
FIXED BOARD RIGHT ANGLE SURFACE MOUNT Version 2 (Bulkhead mount)	Figure 9	Figure 9	Figure 21
FIXED BOARD RIGHT ANGLE SURFACE MOUNT Version 3 (PCI bracket mount)	Figure 10	Figure 10	Figure 21
FIXED BOARD RIGHT ANGLE THRU HOLE	NONE	Figure 11	Figure 22
FIXED BOARD STRADDLE MOUNT	Figure 7	Figure 12	Figure 23

The relevant figures from IEC 61076-3-103 are duplicated for reference below: Only the physical dimensions and a table of the most important performance requirements are included. [with the multiple versions IEC is probably not in sync with this revision of the document.]

4.2 Performance and compatibility requirements

4.2.1 Low frequency performance requirements

HSSDC-1 shielded connectors shall meet the performance requirements specified in IEC 61076-3-103 Some of these are summarized in Table 1. These requirements are all for the connector proper and do not include the high speed requirements that ensure adequate operation at gigabit/s and above rates.

Table 1 - Some low frequency performance requirements for HSSDC-1 connectors

Parameter	Requirements
Rated Voltage	30 VDC
Current Ratings (contact #2 and #7)	1 Ampere / contact (2 non-adjacent contacts energized)
Insulation Resistance	100 Megohms minimum initial
Ambient Temperature	-10°C - +50°C
Mating Cycles	500
Contact Resistance Non-Shield Contacts	35 milliohms maximum initial
Contact Resistance Shield Contacts	42 milliohms maximum initial

Complete low frequency performance requirements are contained in the IEC standard.

4.2.2 High frequency performance requirements

The requirements for the high speed performance are enabled by reference to SFF 8410 a separate SFF document that defines testing methodology and some performance requirements. These high speed performance requirements are incorporated into the HSSDC-1 specification by reference and constitute an essential part of the HSSDC-1 specification. For convenience these requirements are not duplicated here. They are what actually makes the high speed part of this connector system a reality.

4.2.3 PCB compatibility requirements

The physical compatibility requirements for use with printed circuit boards are given in Table 2. Board thicknesses and/or assembly processes that require tail lengths other than that given in Table 2 are not compatible with the connectors defined in this document.

Table 2 - Printed circuit board compatibility requirements

Termination Side Style	Printed Circuit Board Thickness	
	MIN (MM / INCHES)	MAX (MM / INCHES)
Fixed Board Right Angle Surface Mount *	1.0 / 0.057	1.75 / 0.069
Fixed Board Right Angle Thru Hole	1.0 / 0.057	1.75 / 0.069
Fixed Board Straddle Mount	1.0 / 0.057	1.75 / 0.069
* This dimension necessary to accommodate board retention feature that penetrates the board.		

4.3 Dimensional requirements

The drawings in this section use the dimensioning conventions described in ANSI-Y14.5M, Dimensioning and tolerancing. All dimensions are in millimeters.

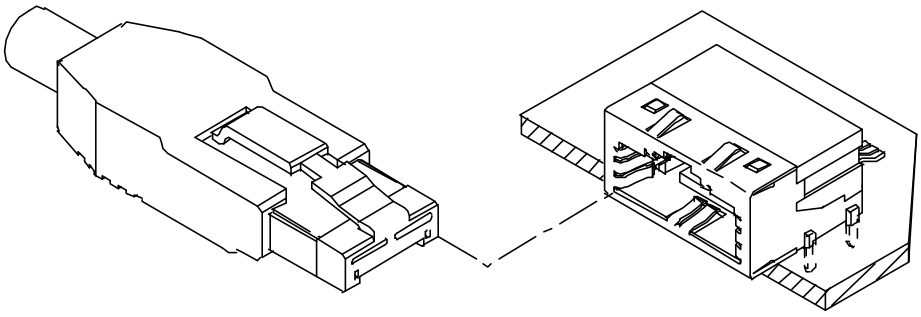


Figure 3 - General view of mating sides (version 1 fixed)

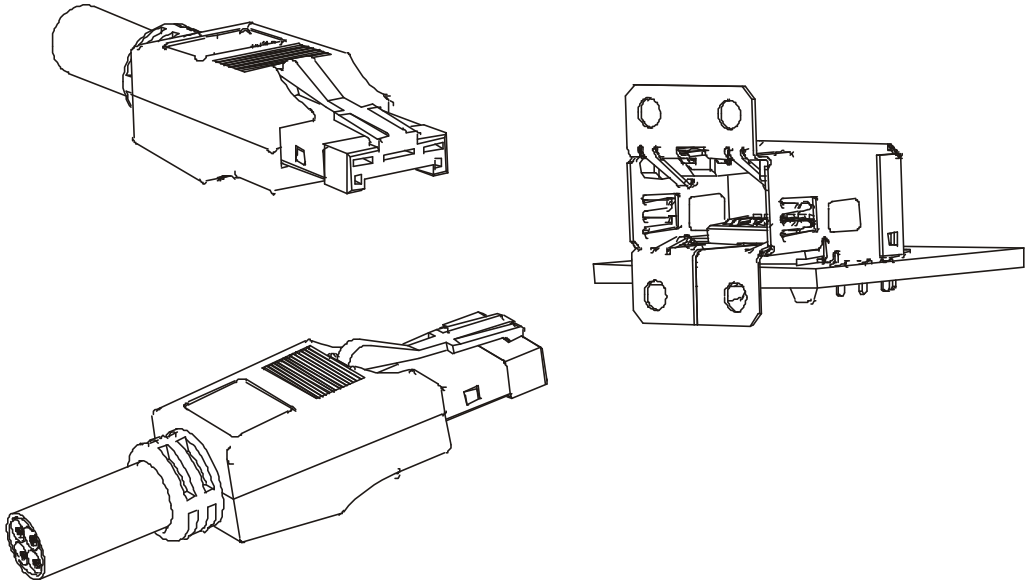


Figure 4 - General view of mating sides (version 2 fixed)

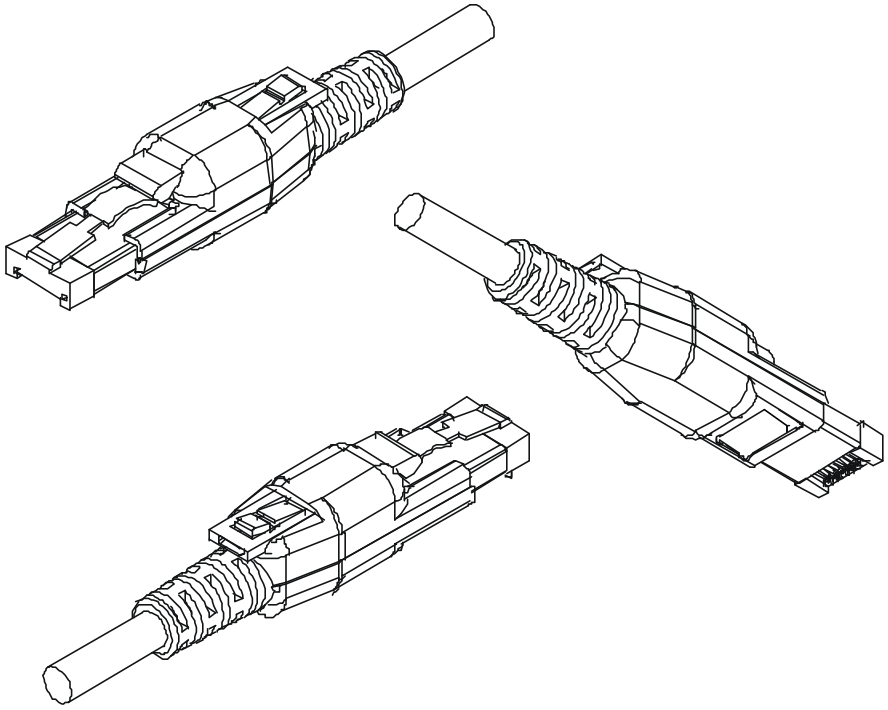


Figure 5 - Free cable version 4 overview

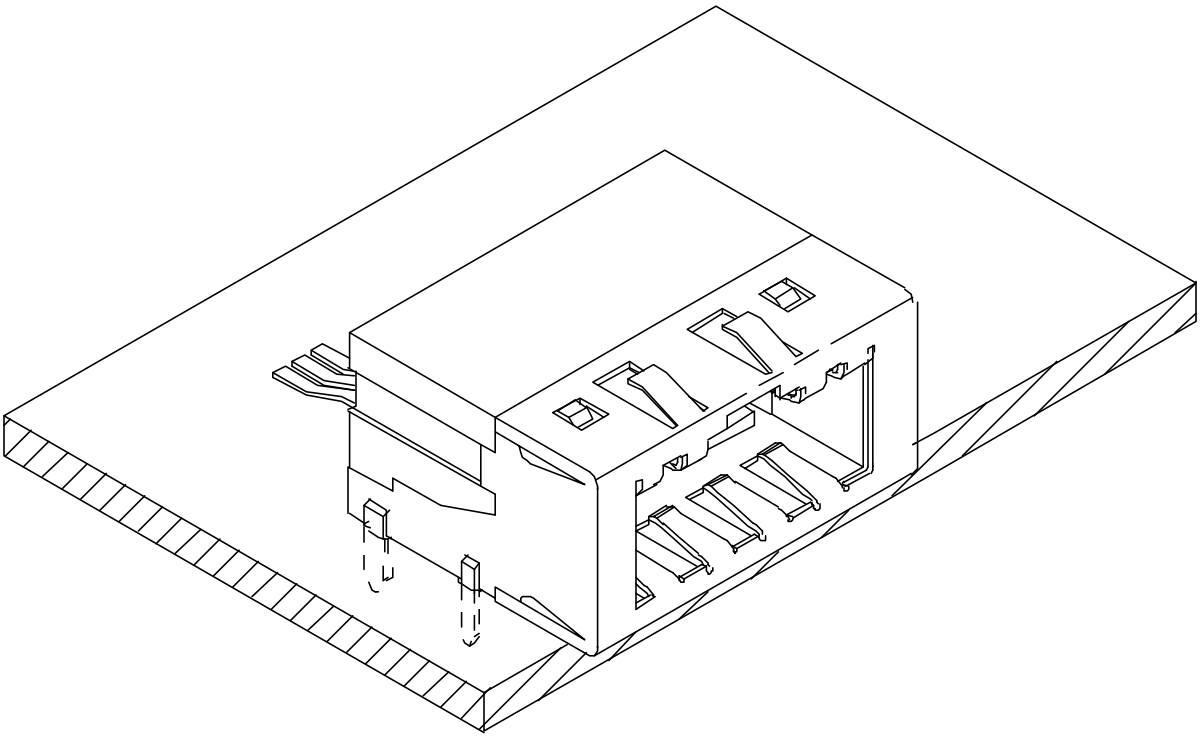


Figure 6 - Fixed board right angle surface mount version 1 overview

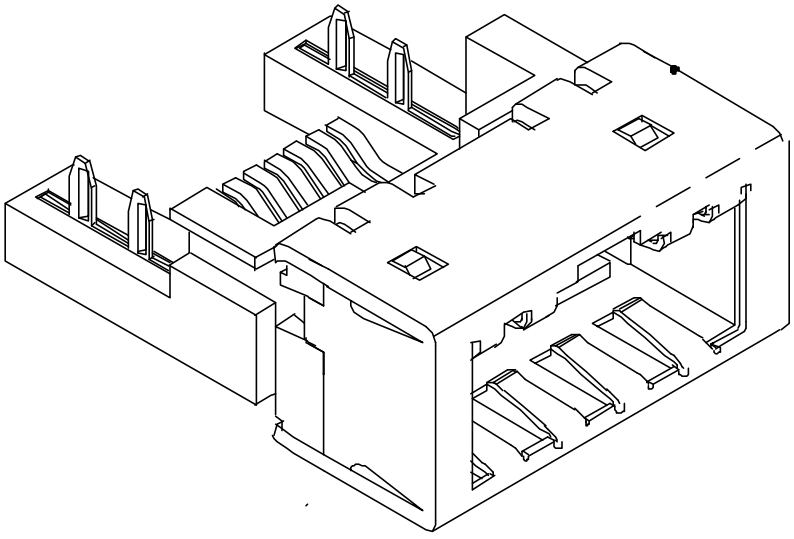


Figure 7 - Fixed board straddle mount overview

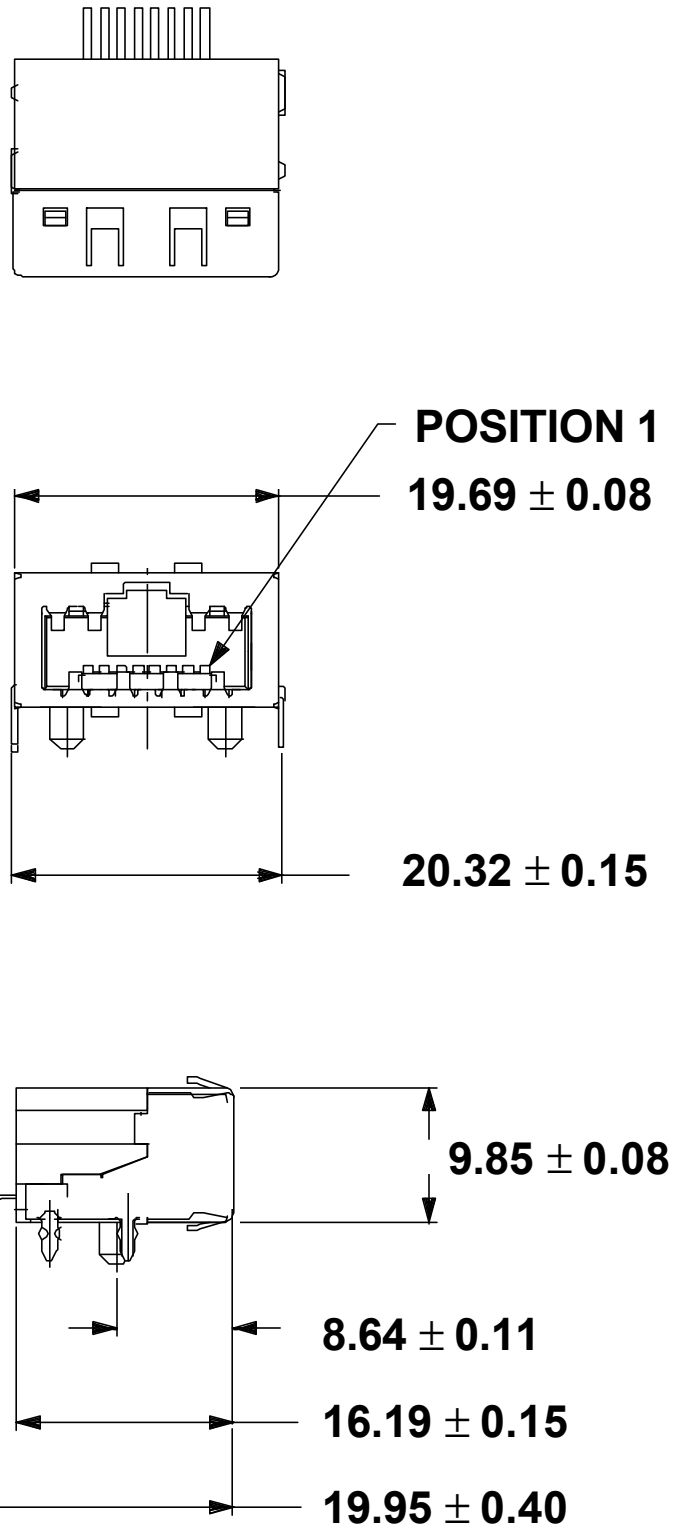


Figure 8 - Fixed board right angle surface mount version 1 outline dimensions

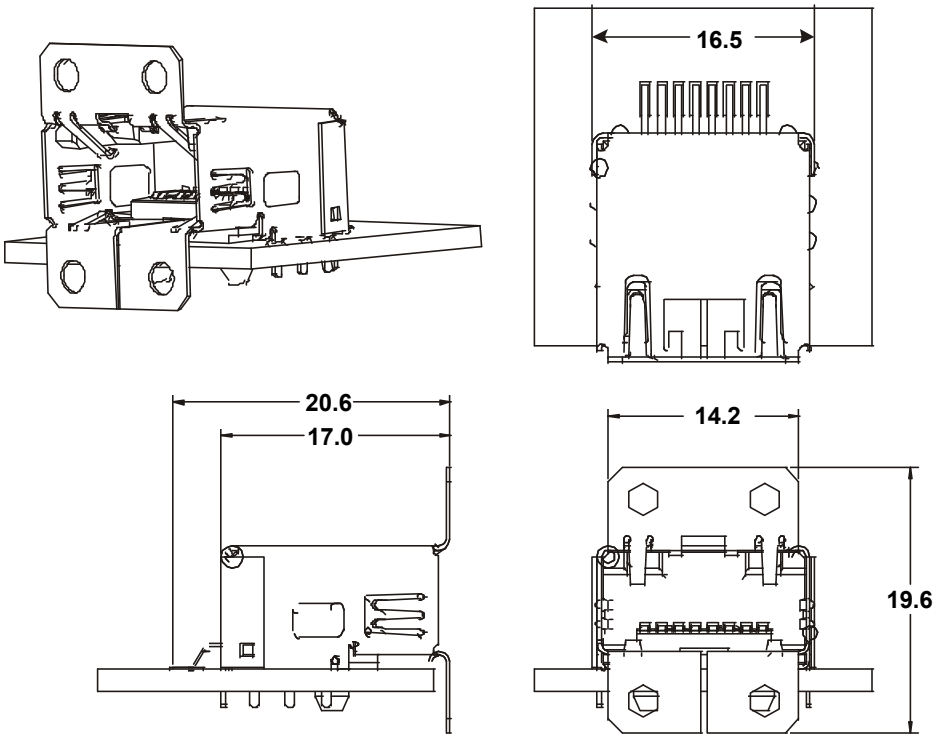


Figure 9 - Fixed board right angle surface mount version 2 (Bulkhead mount) outline dimensions and overview

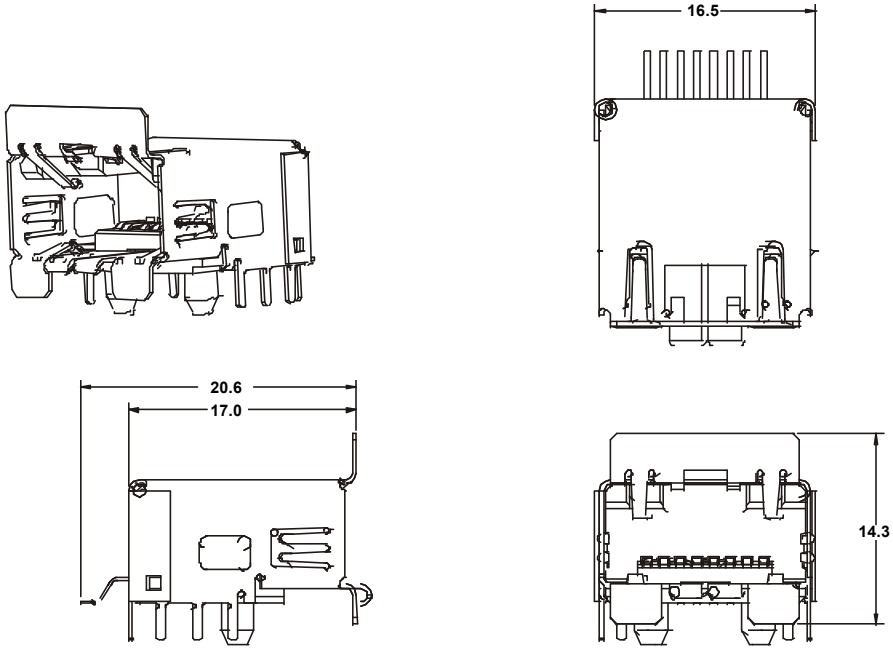


Figure 10 - Fixed board right angle surface mount version 3 (PCI bracket mount) outline dimensions and overview

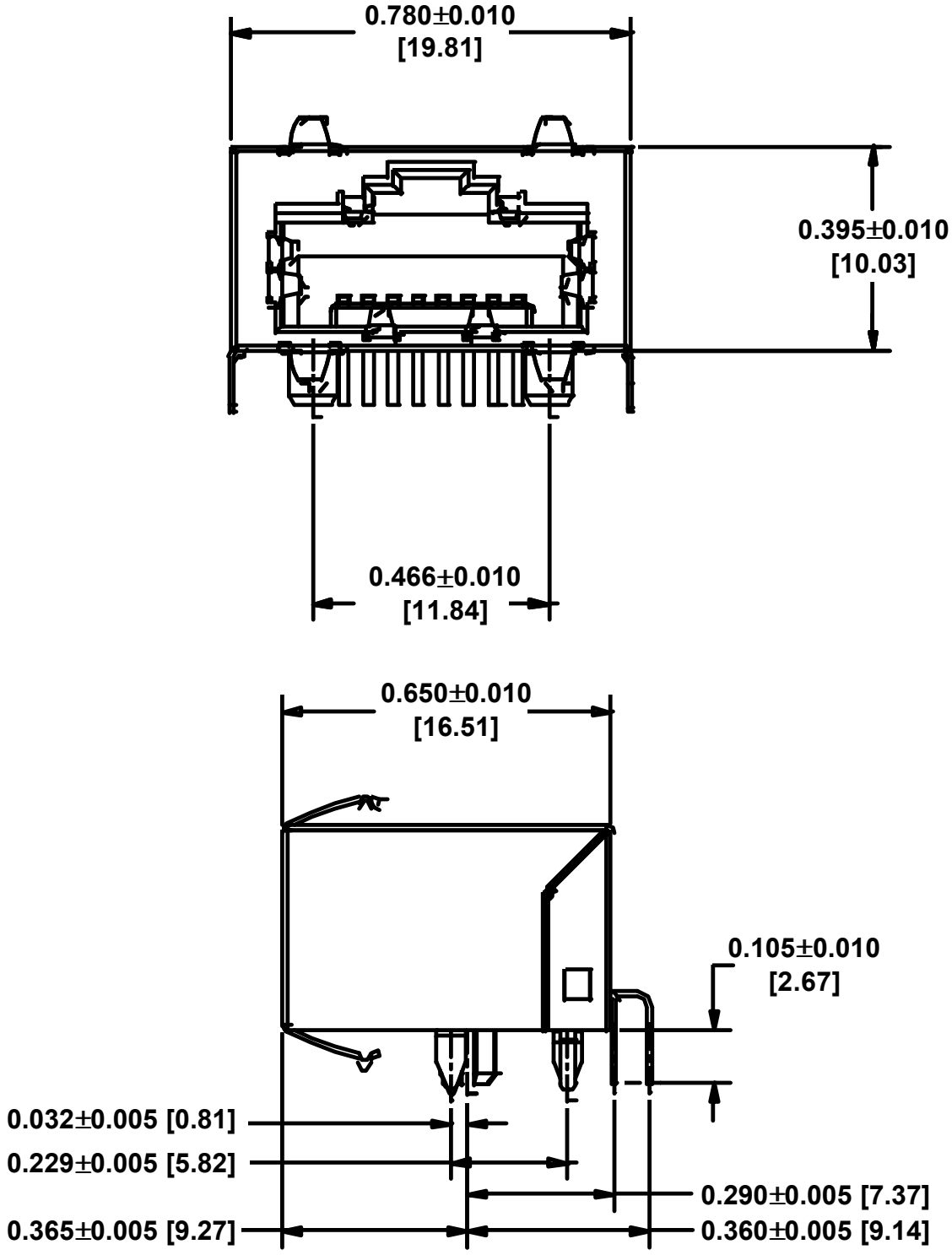


Figure 11 - Fixed board right angle thru hole

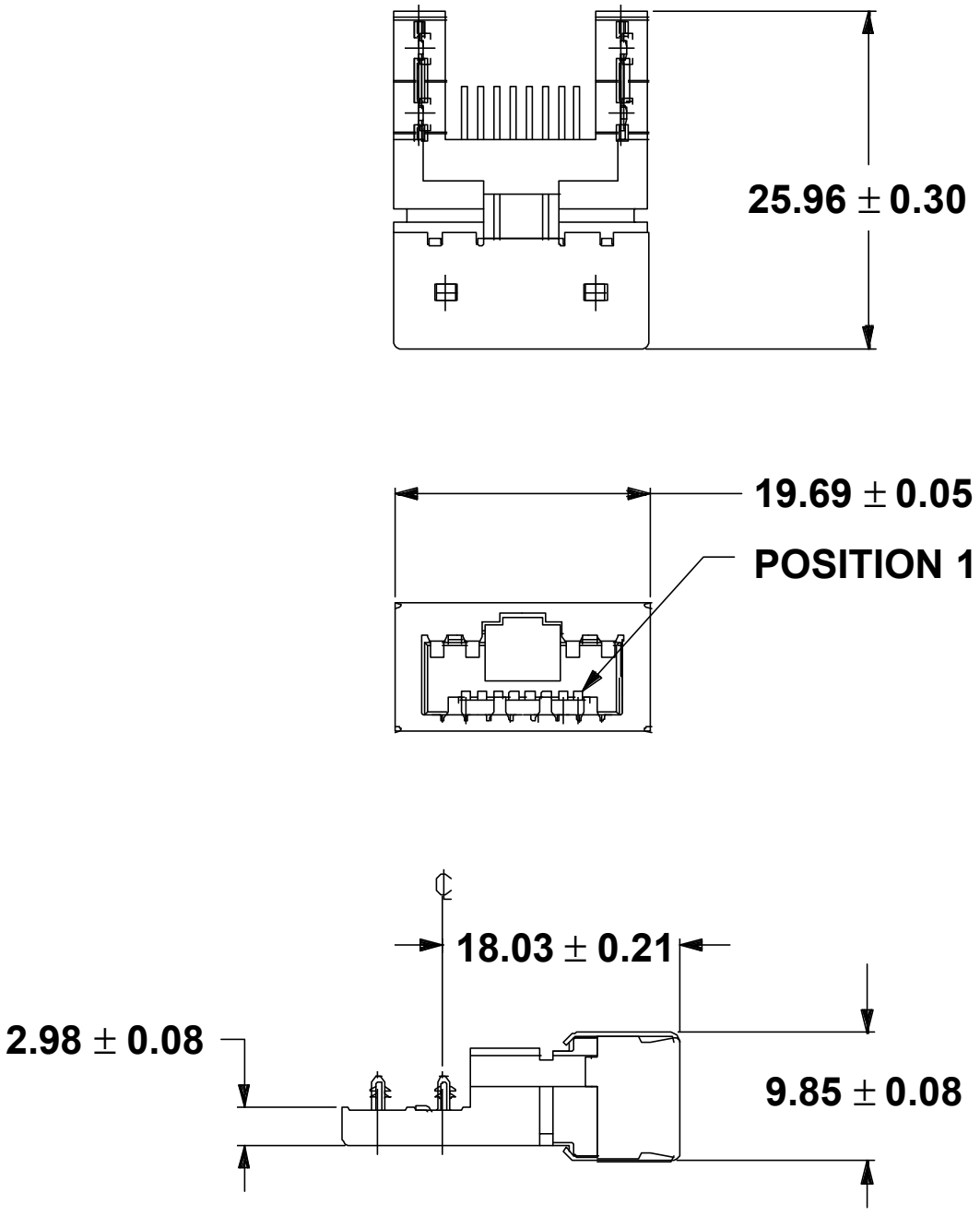


Figure 12 - Fixed board straddle mount outline dimensions

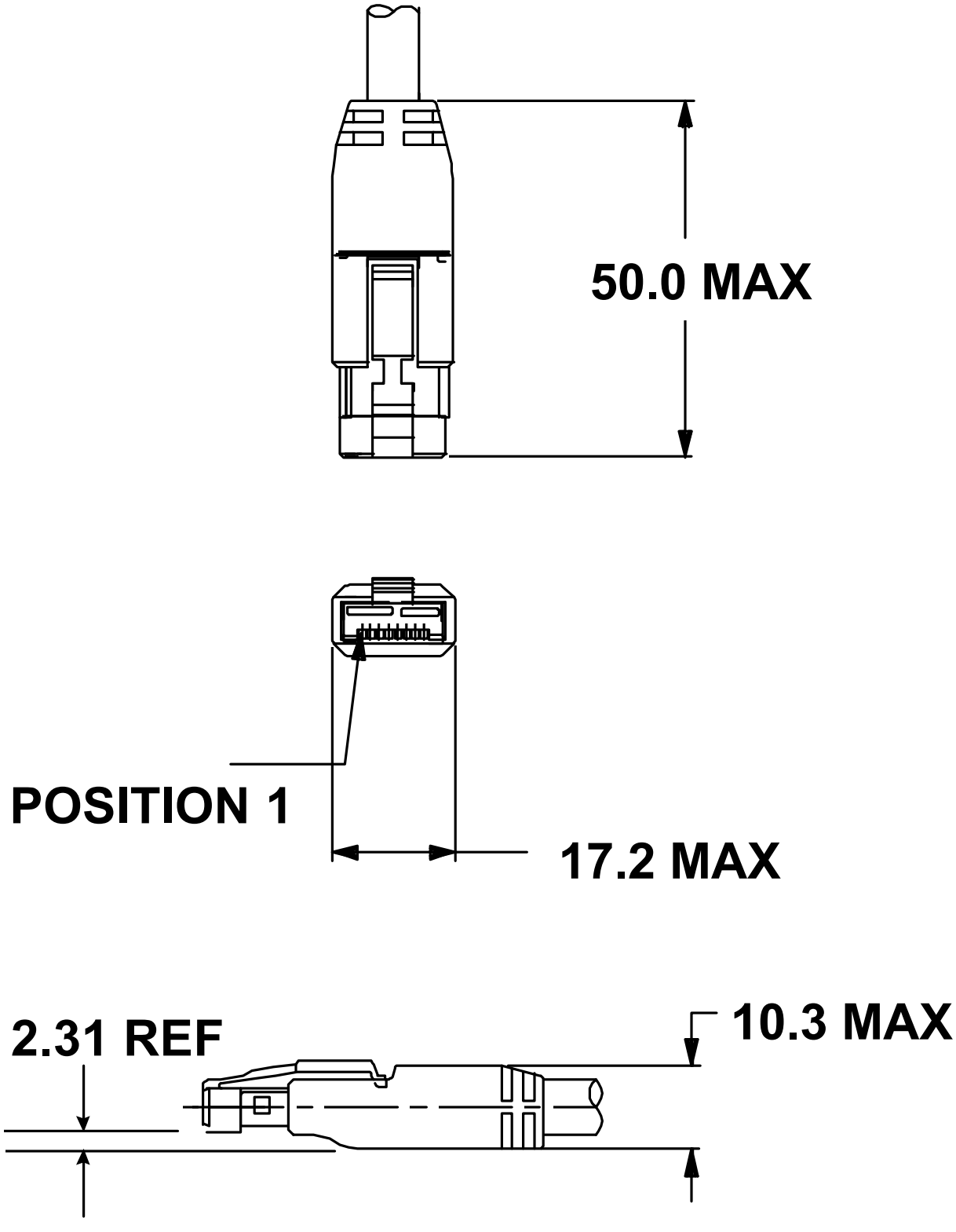


Figure 13 - Free cable version 1 outline dimensions

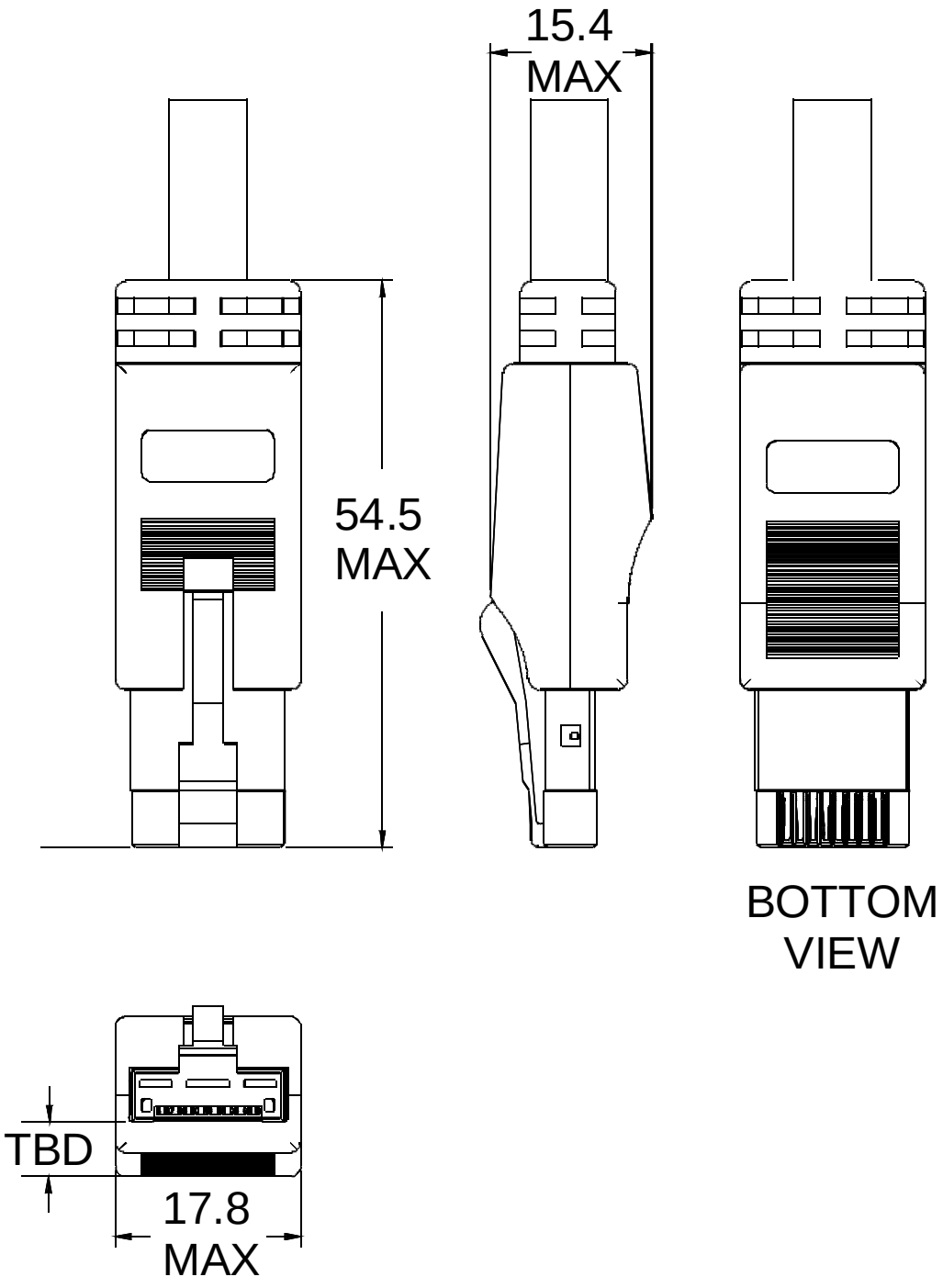


Figure 14 - Free cable version 2 outline dimensions

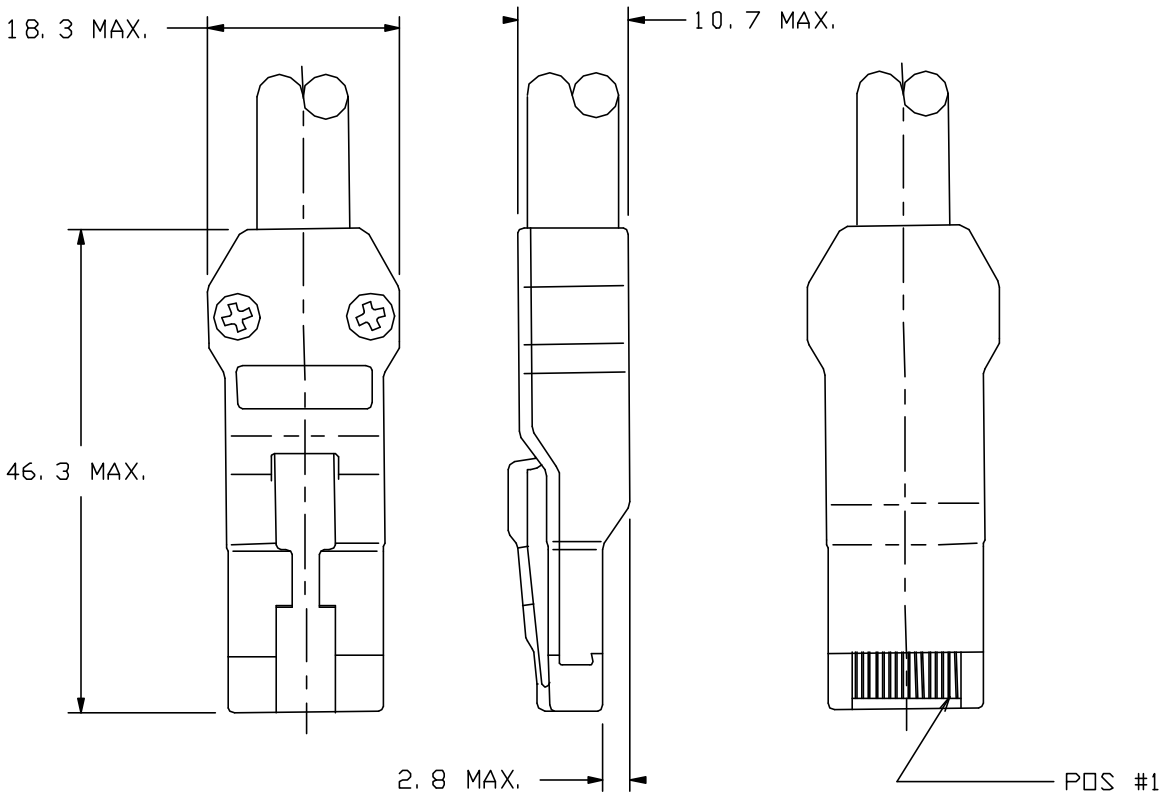


Figure 15 - Free cable version 3 outline dimensions

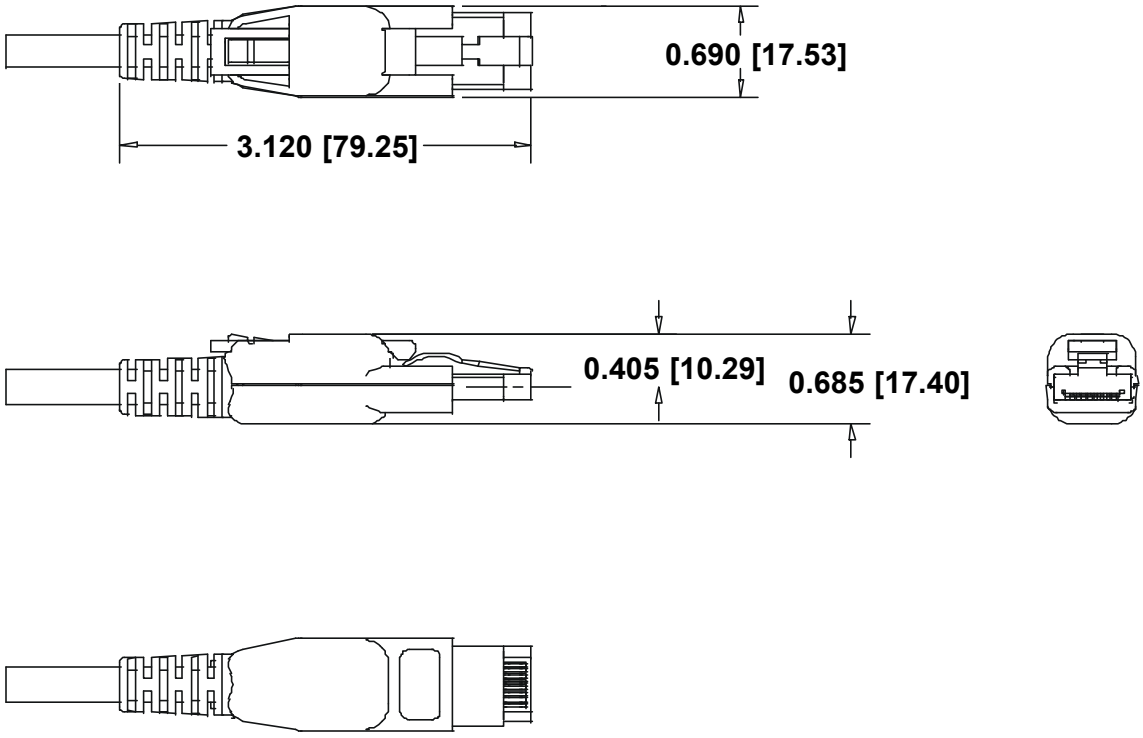


Figure 16 - Free cable version 4 outline dimensions

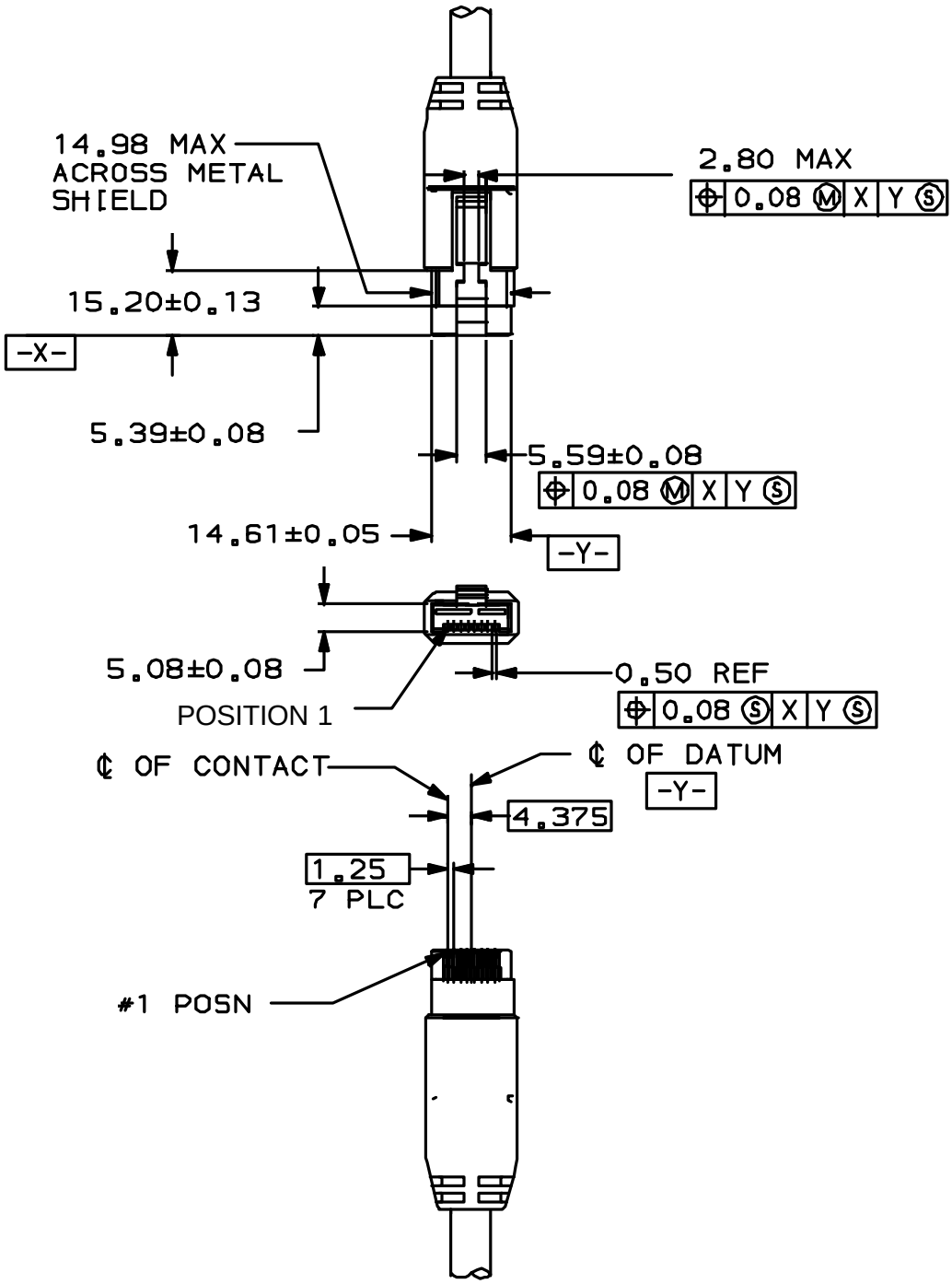


Figure 17 - Free side mating dimensions

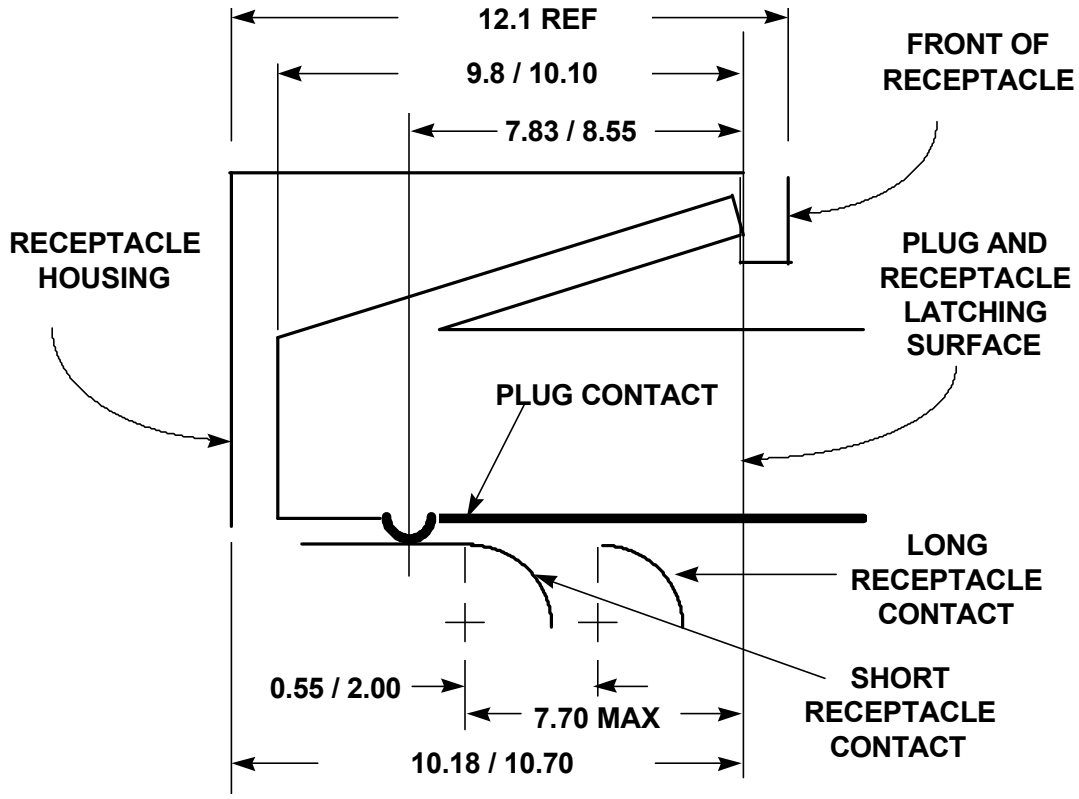


Figure 18 - Mated contact locations

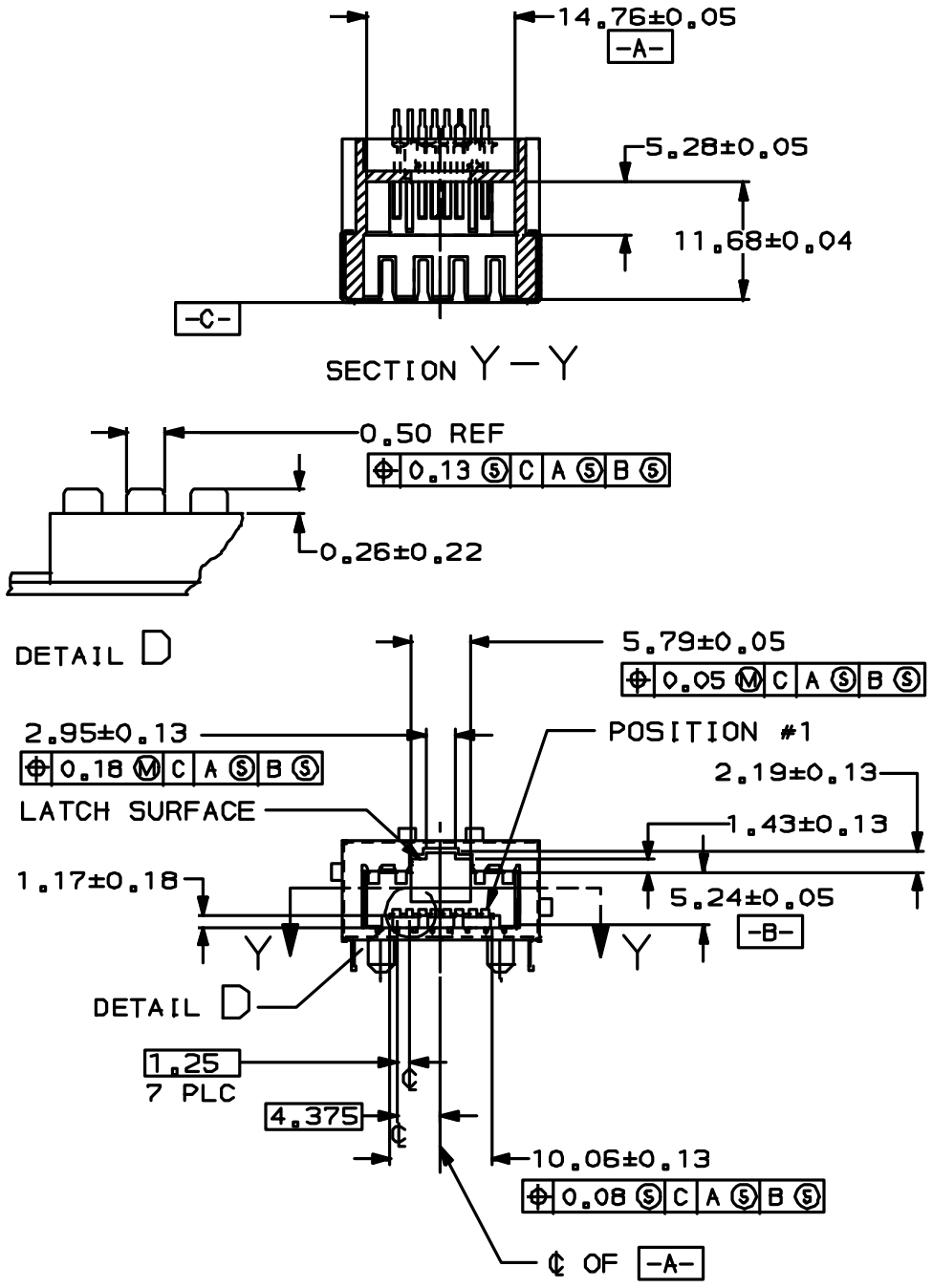


Figure 19 - Fixed mating side dimensions

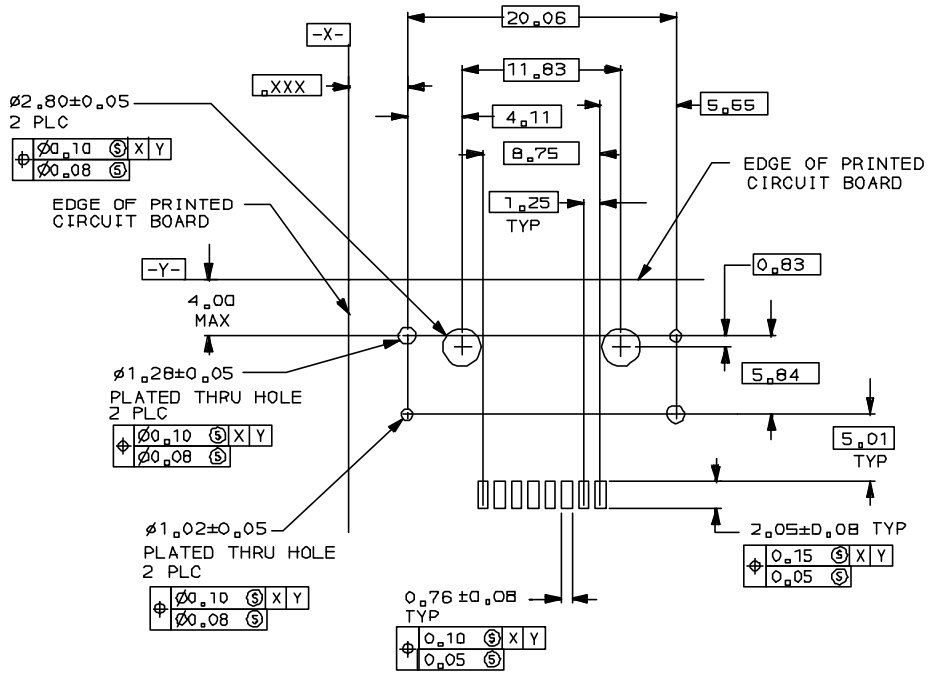


Figure 20 - Fixed board right angle surface mount version 1 footprint

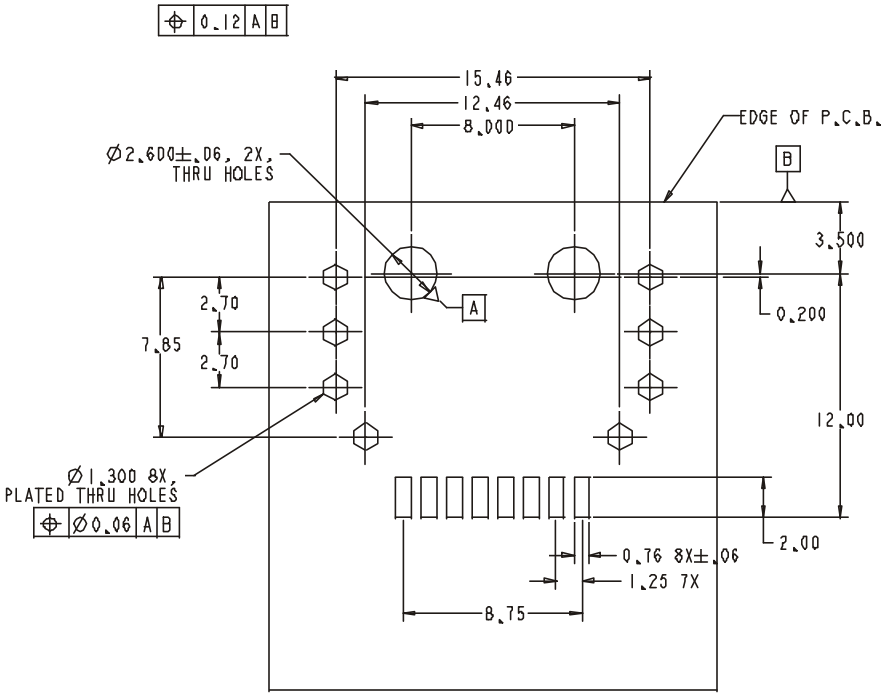


Figure 21 - Fixed board right angle surface mount version 2 (Bulkhead mount) and version 3 (PCI bracket mount) footprint

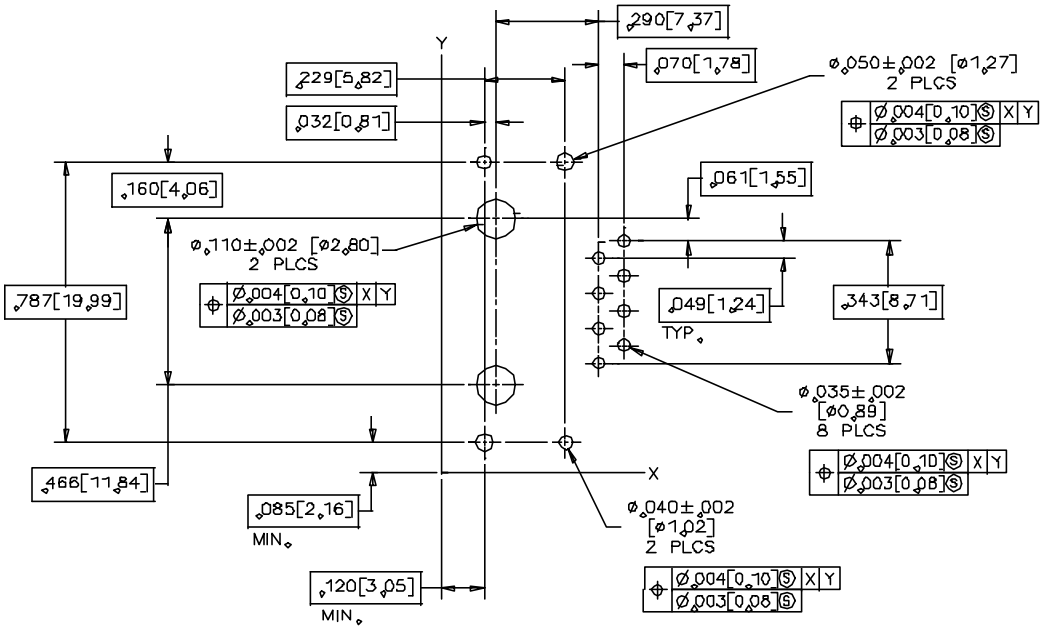


Figure 22 - Fixed board right angle thru hole

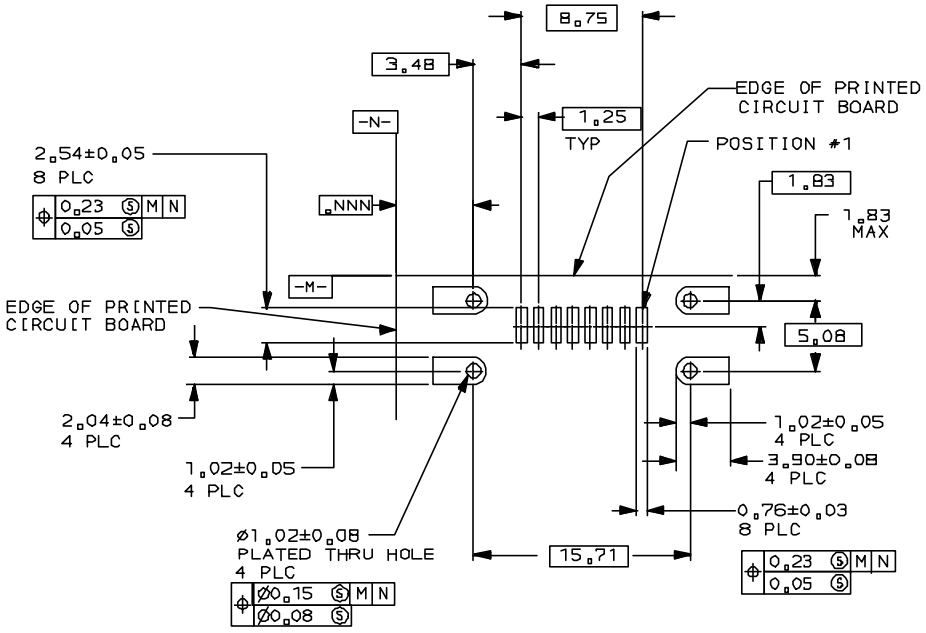


Figure 23 - Fixed board straddle mount footprint

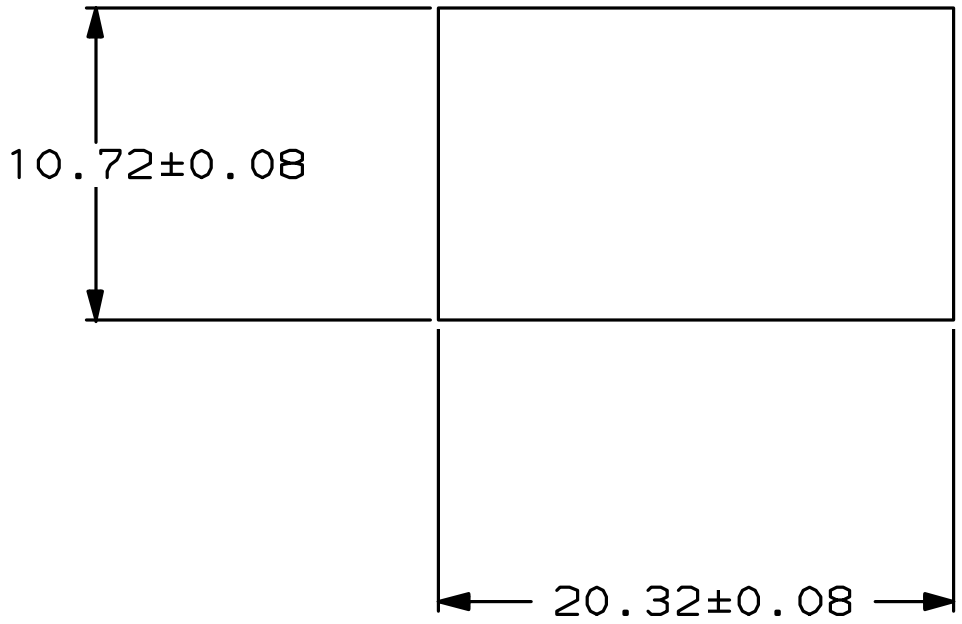


Figure 24 - Bulkhead cutout fixed board right angle surface mount version 1

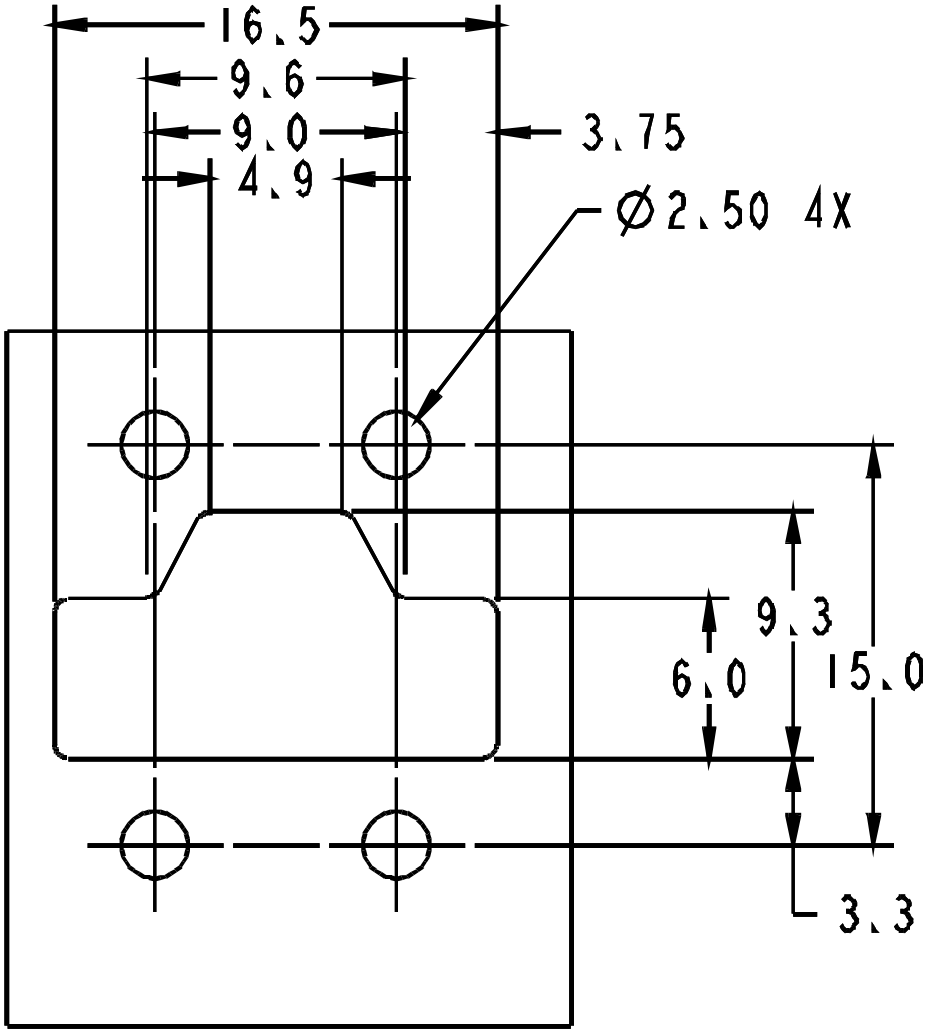


Figure 25 - Bulkhead cutout fixed board right angle surface mount version 2

4.4 Multibay and boardlock options

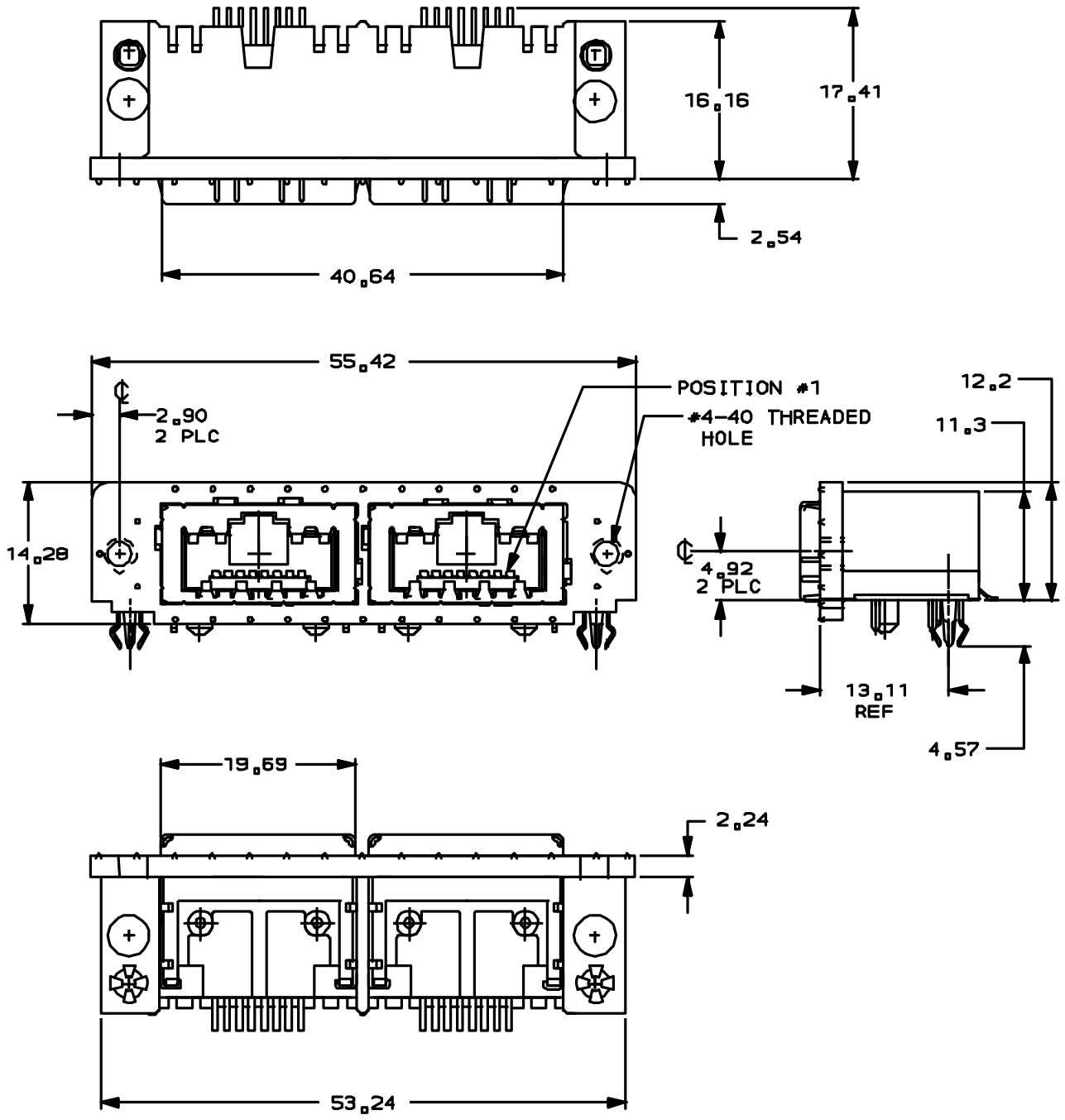


Figure 26 - Outline dimensions for 2-bay panel mount fixed board right angle with rearward boardlocks

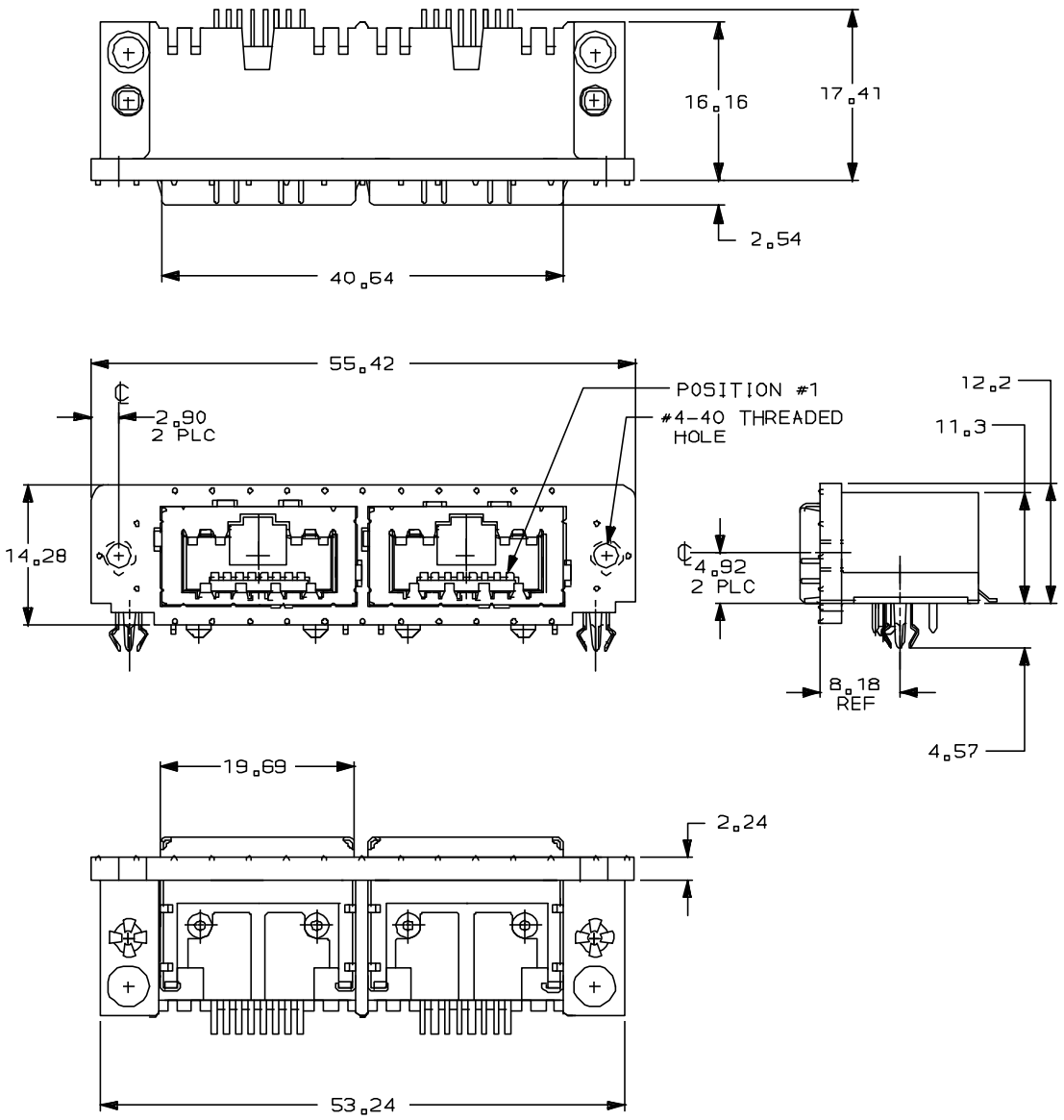


Figure 27 - Outline dimensions for 2-bay panel mount fixed board right angle with forward boardlocks

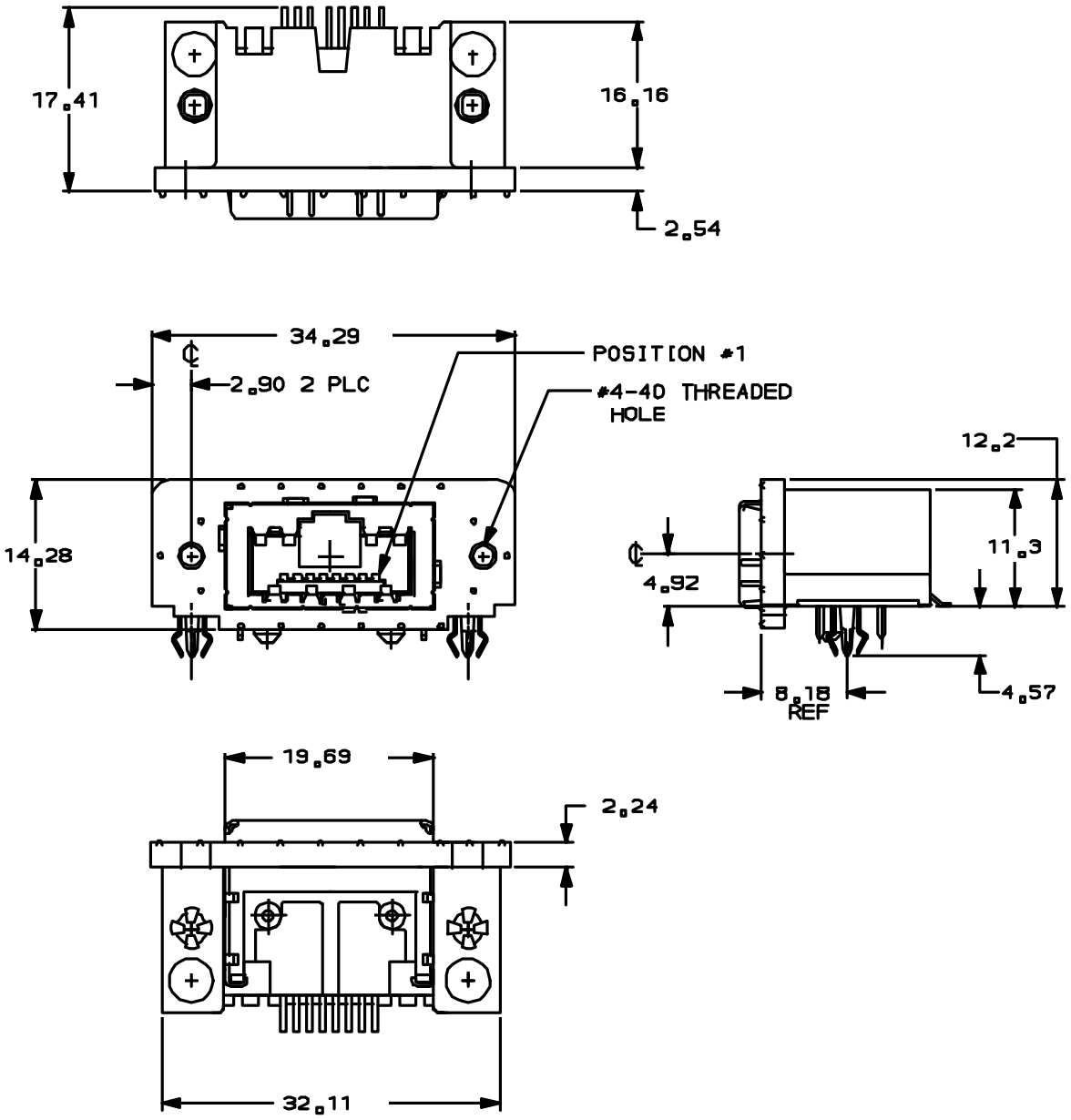


Figure 28 - Outline dimensions for 1-bay panel mount fixed board right angle with forward boardlocks

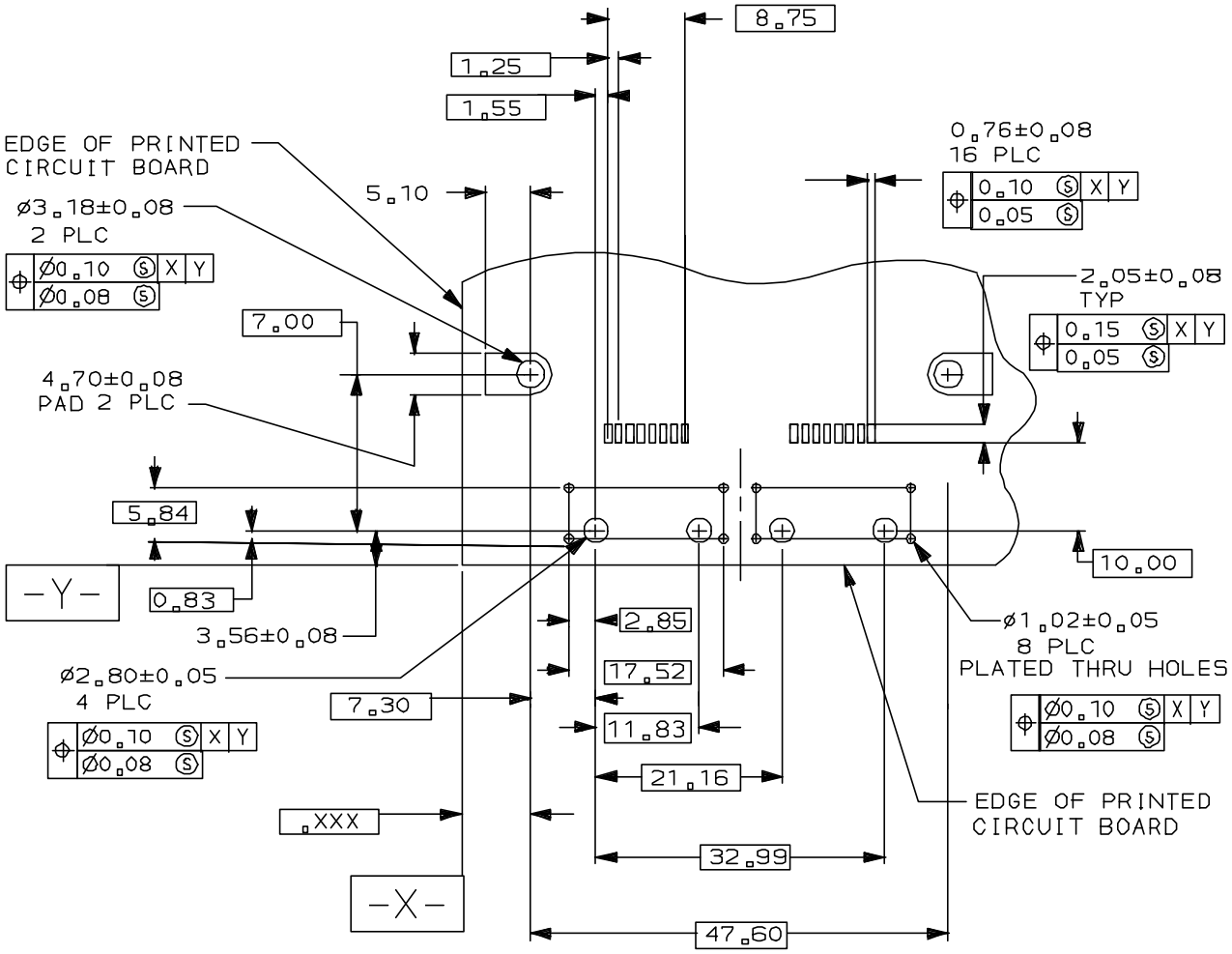


Figure 29 - Footprint for 2-bay panel mount fixed board right angle with rearward boardlocks

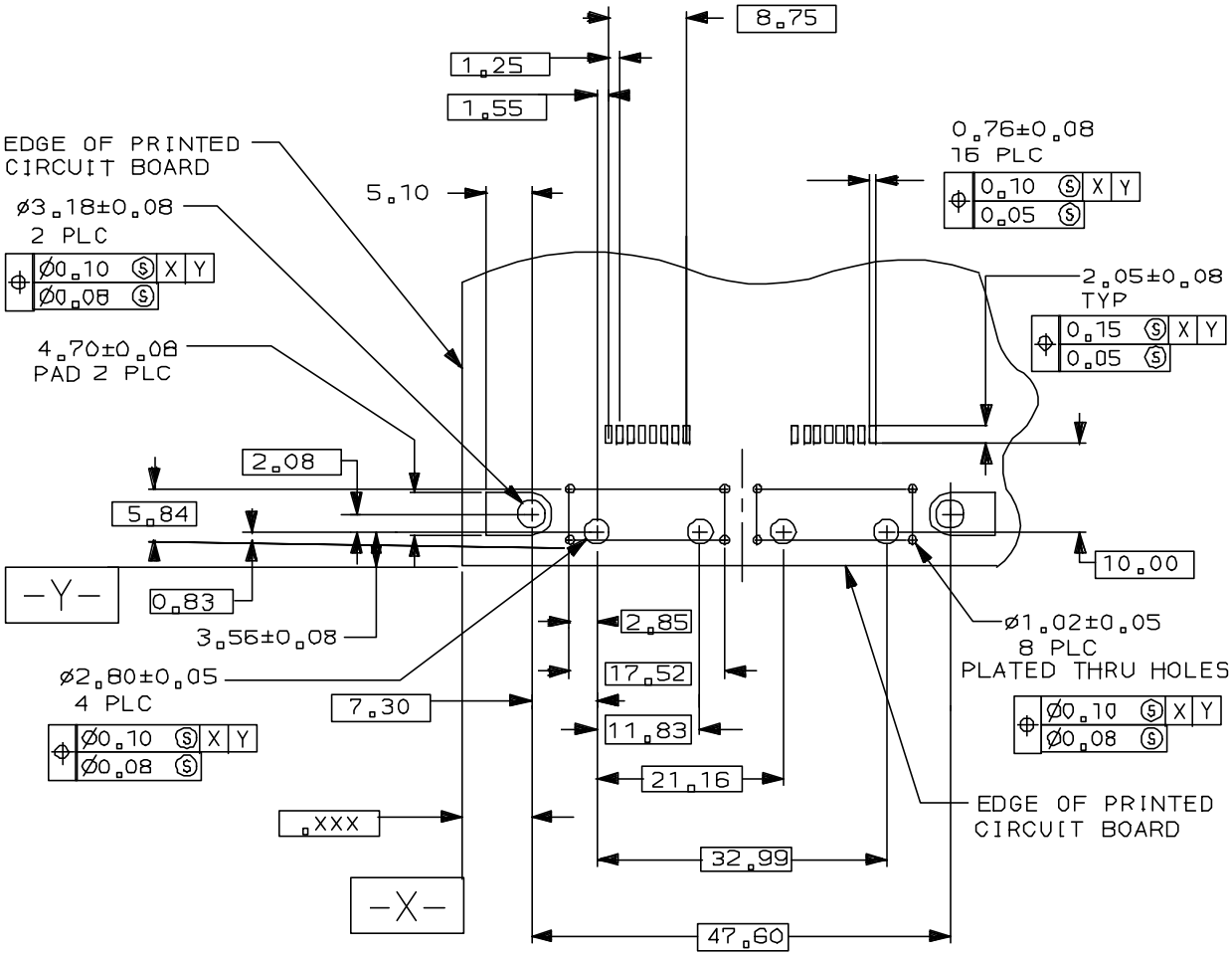


Figure 30 - Footprint for 2-bay panel mount fixed board right angle with forward boardlocks

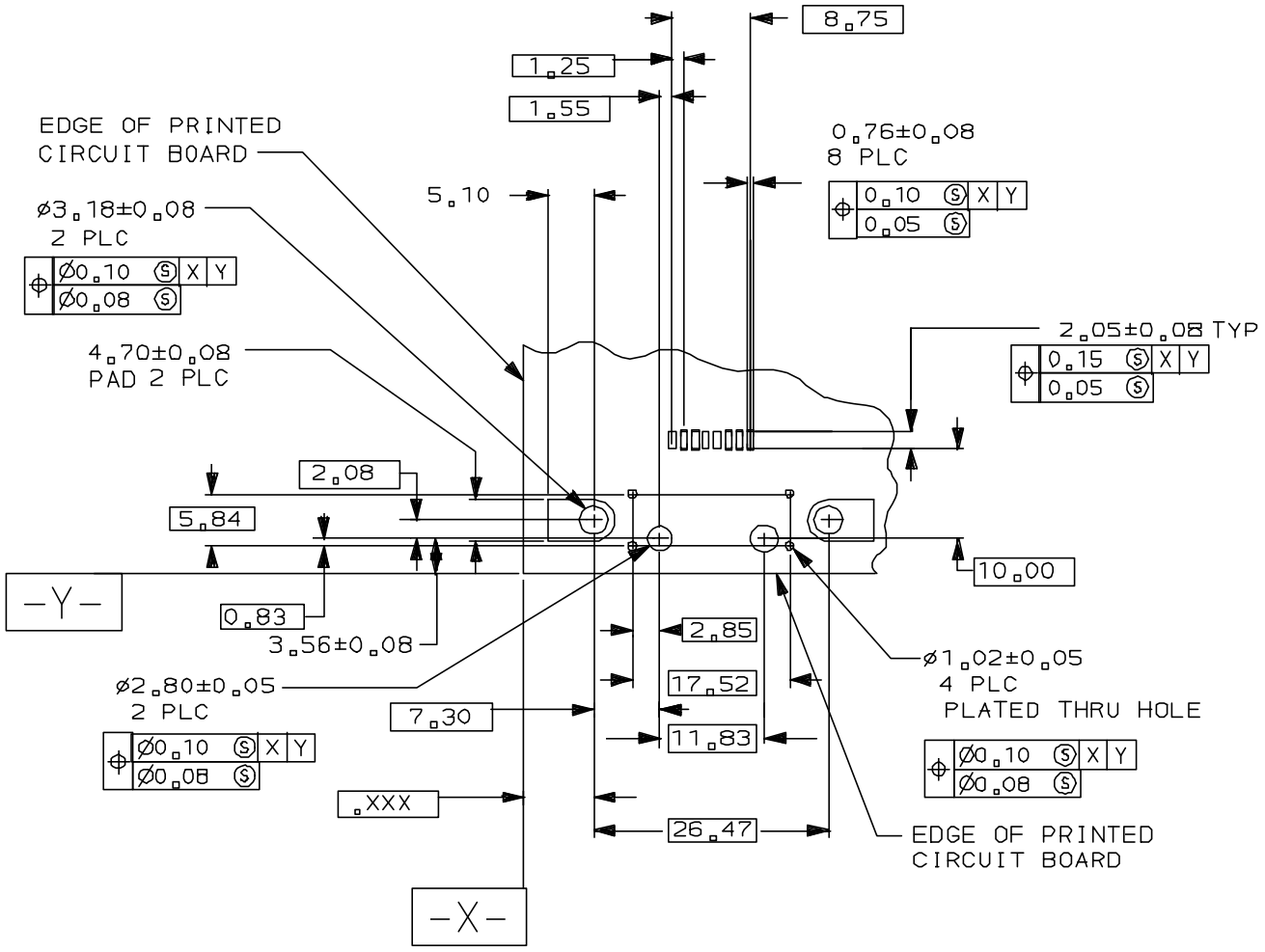


Figure 31 - Footprint for 1-bay panel mount fixed board right angle with forward boardlocks

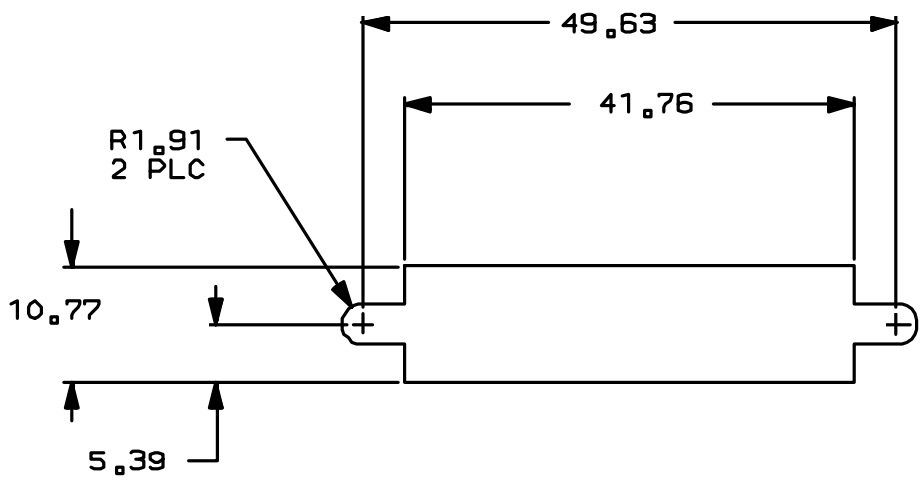


Figure 32 - Cutout dimensions for 2-bay panel mount fixed board right angle

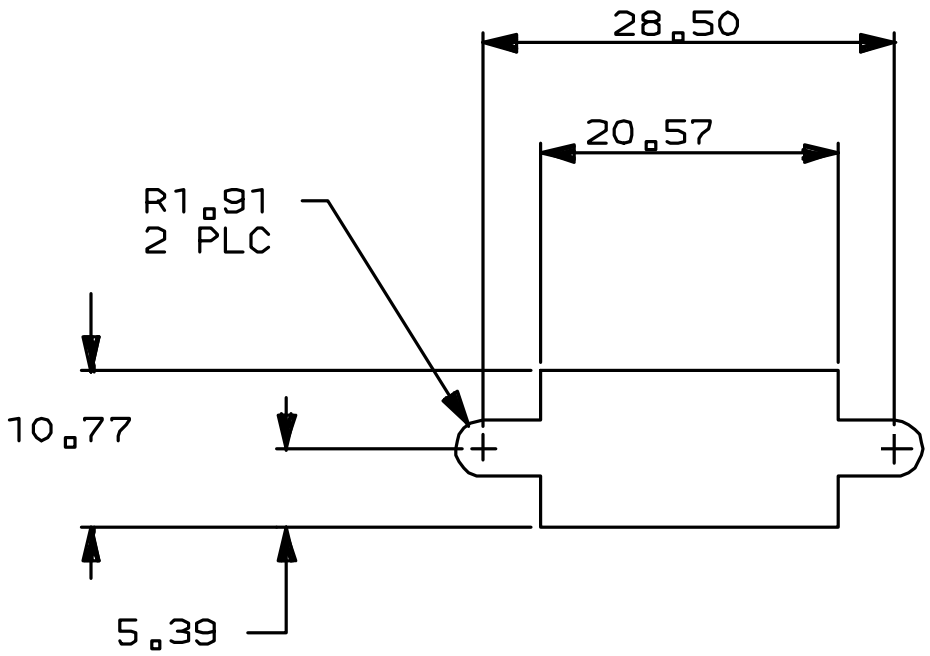


Figure 33 - Cutout 1-bay panel mount fixed board right angle

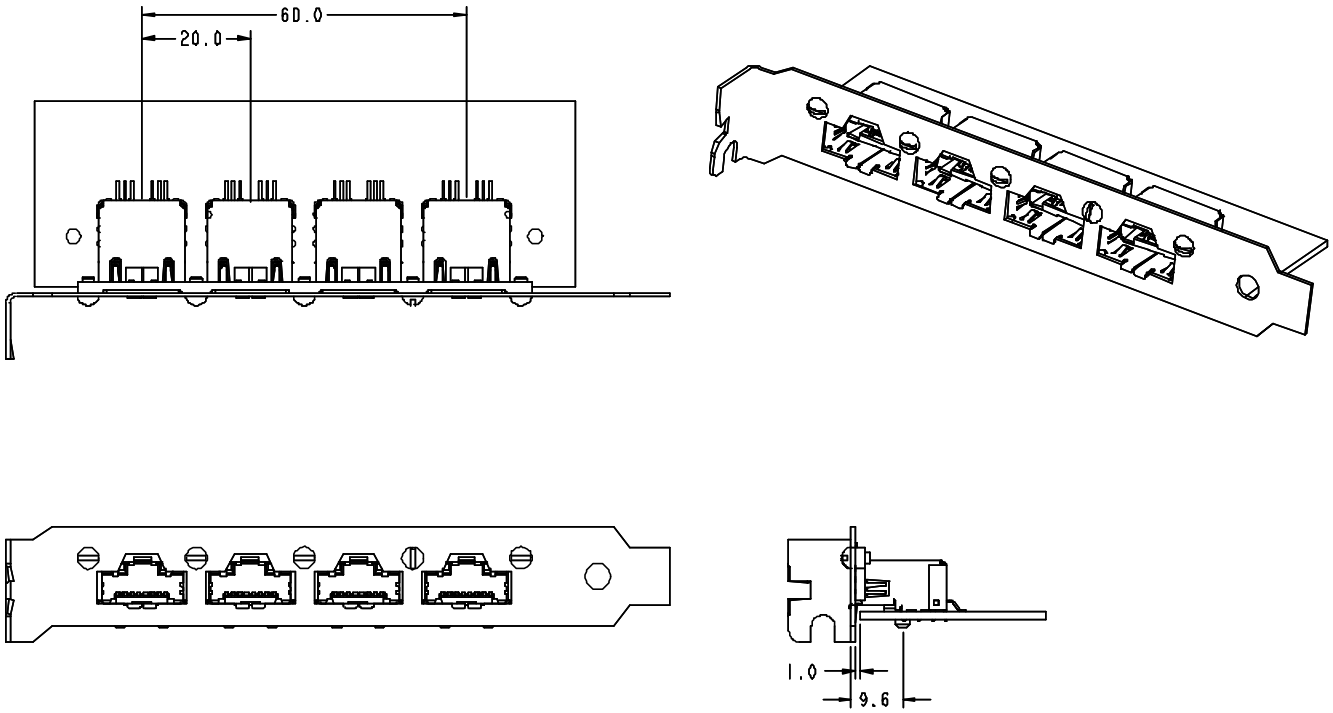


Figure 34 - PCI bracket 4 bay dimensions fixed board right angle surface mount (version 3)

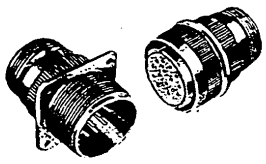
ANNEX A

EIA TERMINOLOGY FOR CONNECTOR GENDER

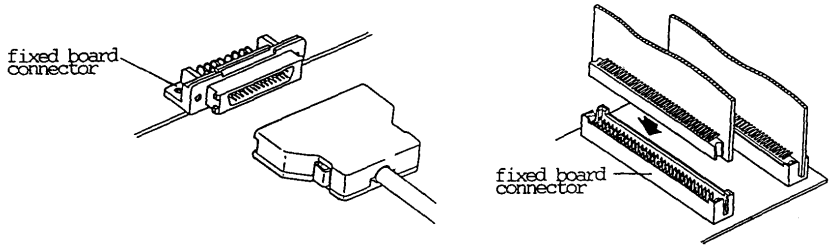
Figure 35 and Figure 36 describe the rationale for the EIA connector gender terminology.

(Expansion Connector)
A connector that provides a flexible connection between a rigid conductor and electrical apparatus.

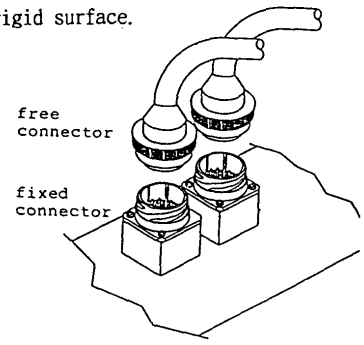
(Fireproof Connector) 581-06-09
A connector capable of withstanding flame of a specified temperature for a specified time.



(Fixed board Connector) 581-06-39
A connector mounted on removal printed board, for engagement with a Free Cable Connector or a Free Board Connector.



(Fixed Connector) 581-06-10
A connector for attachment to a rigid surface.



(Flat Cable Connector)
Connector designed specifically to terminate flat cable. May be designed for flat conductor, flat cable or round conductor flat cable.

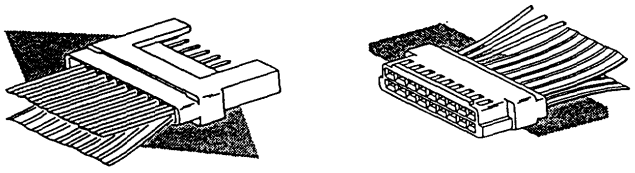
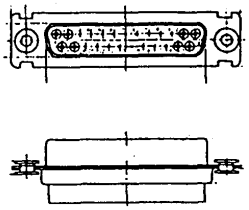
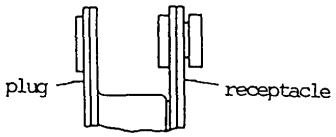


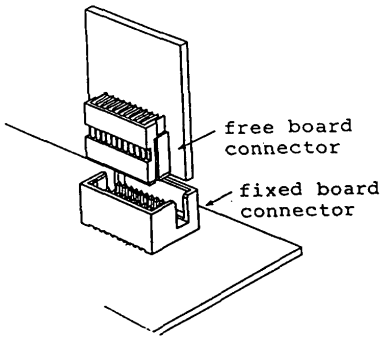
Figure 35 - EIA definitions of free and fixed connectors

(Float Mounting Connector) 581-06-11
A fixed connector with mounting means permitting movement to facilitate align -ment with the mating connector.

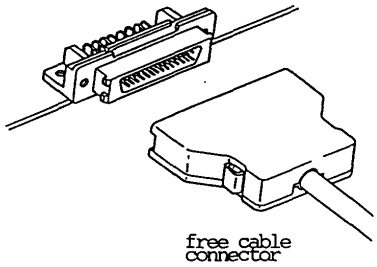




(Free Board Connector) 581-06-40
A connector mounted on a printed board which can be separated from Mother Board or Back Plane.

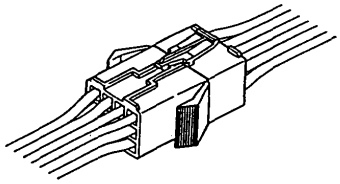


(Free Cable Connector) 581-06-12
A connector for attachment to the free end of a wire or cable.



(Free Coupler Connector) 581-06-13
A connector that mates with a Free Connector in a cable-to-cable appli -cation.

(Free Hanging Connector)
A connector that is movable and not fixed to a board, panel, or frame. It will mate another free-hanging connector or with a panel-mount connector.



(Hermaphroditic Connector) 581-06-14
A connector which mates with an identical connector.

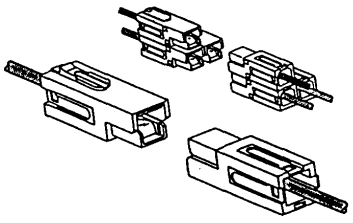


Figure 36 - EIA definitions for connector terminology