SFF Committee documentation may be purchased in hard copy or electronic form.
SFF specifications are available at ftp://ftp.seagate.com/sff

SFF Committee

SFF-8612

Specification for

MiniLink 4/8X Shielded Connector

Rev 0.3 August 20, 2015

Secretariat: SFF Committee

Abstract: This specification defines the physical interface and general performance requirements for the MiniLink connector, which is designed for use in high speed serial, interconnect applications at multi-gigabit speeds. As the connector has a metal shell the connector may be used for both internal and external applications. This connector is popularly referred to as the MiniLink Connector system.

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

This specification is made available for public review, and written comments are solicited from readers. Comments received by the members will be considered for inclusion in future revisions of this specification.

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

Support: This specification is supported by the identified member companies of the SFF Committee.

POINTS OF CONTACT:

Jay Neer
Technical Editor
Molex
2222 Wellington Court
Lisle, Il 60532
Ph: 561-447-2907x555-3889
Email: jay_dot_neer_at_molex_dot_com

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

Ph: 408-867-6630
Email: endlcom_at_acm_dot_org

EXPRESSION OF SUPPORT BY MANUFACTURERS

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

tbd

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

tbd

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

Rev 0.1
- First draft
Rev 0.2
- References to plugs removed as those details are in SFF-8611.
Rev 0.3
- Added to the Abstract
- Added additional specs to Section 2
- Revised title of Figure 4-3

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, and 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:
http://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.

TABLE OF CONTENTS

FIGURES

TABLES

1 Scope

This specification defines the MiniLink shielded cable plug, the shielded host board receptacle, and the latching requirements for them based upon the mating interface defined herein.

1.1 Application Specific Criteria

This connector is capable of meeting the interface requirements for the high density internal I/O requirements of T10 SAS-4.

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

2 Industry Documents

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

- T10 xxxx-D SAS-4 INCITS 534
- T10 2212-D SAS-3 INCITS 519
- SFF-8410 High Speed Serial Testing for Copper Links
- SFF-8435 Maximizing Card Edge Tolerances Technique
- SFF-8611 MiniLink 24 Gb/s 8/4x I/O Cable Assemblies
- SFF-9400 Universal4x/84 Pinout
- SFF-9401 SAS-4 Internal Cabling Pinout Recommendations
- PCIe OCuLink Rev 0.91
- EIA 364 Series - Electrical Connector/Socket Test Procedures
- IPC-A-610 Acceptability of Electronic Assemblies

2.1 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
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 Inter-National Committee for Information Technology Standards (http://tinyurl.com/c4psg).

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

2.2 Conventions

The dimensioning conventions are described in ANSI-Y14.5M, Geometric Dimensioning and Tolerancing. All dimensions are in millimeters.

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

2.3 Definitions

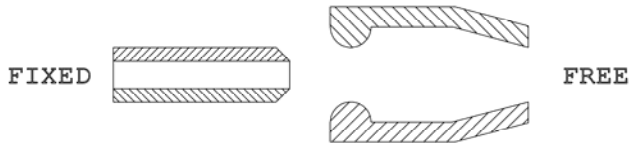
For the purpose of SFF Specifications, the following definitions apply:

Fixed: Used to describe the gender of the mating side of the connector that accepts its mate upon mating. This gender is frequently, but not always, associated with the common terminology "receptacle". Other terms commonly used are "female" and "socket connector". The term "fixed" is adopted from EIA standard terminology as the gender that most commonly exists on the fixed end of a connection, for example, on the board or bulkhead side. In this specification "fixed" is specifically used to describe the mating side gender illustrated in Figure 3-1.

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 specification "free" is specifically used to describe the mating side gender illustrated in Figure 3-1.

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.



Note: The free gender is used on the cable side except in the case of wire termination.

FIGURE 2-1 MATING SIDE GENDER DEFINITION

PCB: Printed Circuit Board

Press-fit: Press-fit is a compliant pin, solder free process used to connect connector pins and tabs to a PCB. The mechanical and electrical interfaces between the connector and the PCB are made by a spring-like compliant pin and a plated thru hole (via).

PTH: Plated Through Hole

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.

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 contact 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.

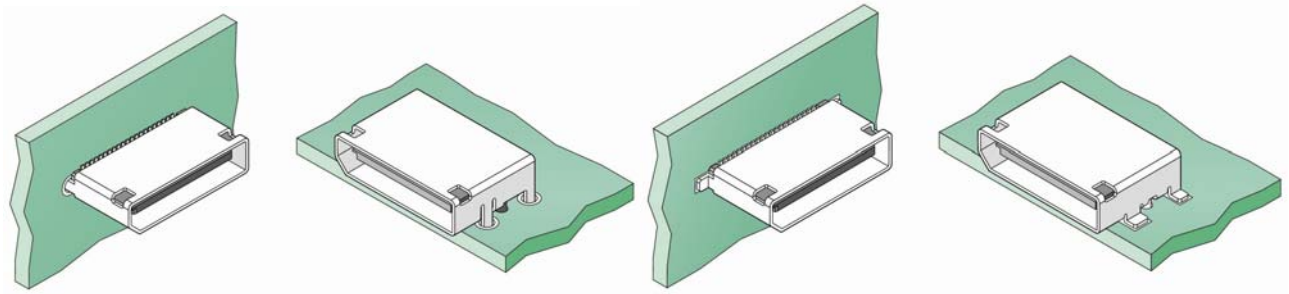
Through Hole: A connector design and a printed circuit board design style where the connector termination points and or shell penetrates the printed circuit board and are subsequently soldered to the printed circuit board.

3 Description

The connector system is based upon vertical and right angle receptacle (fixed) connectors and (free) mating plugs. The host board footprint mounting holes contain the critical dimensions for locating the receptacles to the host board. The integral receptacle guide shell functions as the guide and strain relief for the free (plug) connector interface and also provides the latching points for the plug connector. This connector system provides positive retention along with ease of insertion and removal. See SFF-8611 for the Free (plug) detail/mating interface.

3.1 General View

This specification provides for 1x1 (4X) and 1x1 (8X) vertical and right angle receptacles (fixed side) as well as a 1x1 (4X) and a 1x1 (8X) mating (free side) mating cable plugs (free side).



Intrusive Reflow SMT

FIGURE 3-1 VERTICAL AND RIGHT ANGLE PIN-THRU-PASTE AND SMT CONNECTOR CONFIGURATIONS

TABLE 3-1 CONNECTOR CONFIGURATION POSITIONS

Port	Positions	Vertical	Right Angle
1x1 (4X)	42	X	X
1x1 (8X)	80	X	X

4 Fixed Vertical Connector

1. Dimensions apply to all 4X or 8X fixed connectors
2. Latch window dimensions apply to both windows on all 4X and 8X fixed connectors as shown in Figure 6-1
3. See Table 6-2 and Table 6-3 for the locations of the long and short contacts

4.1 Vertical SMT Receptacle

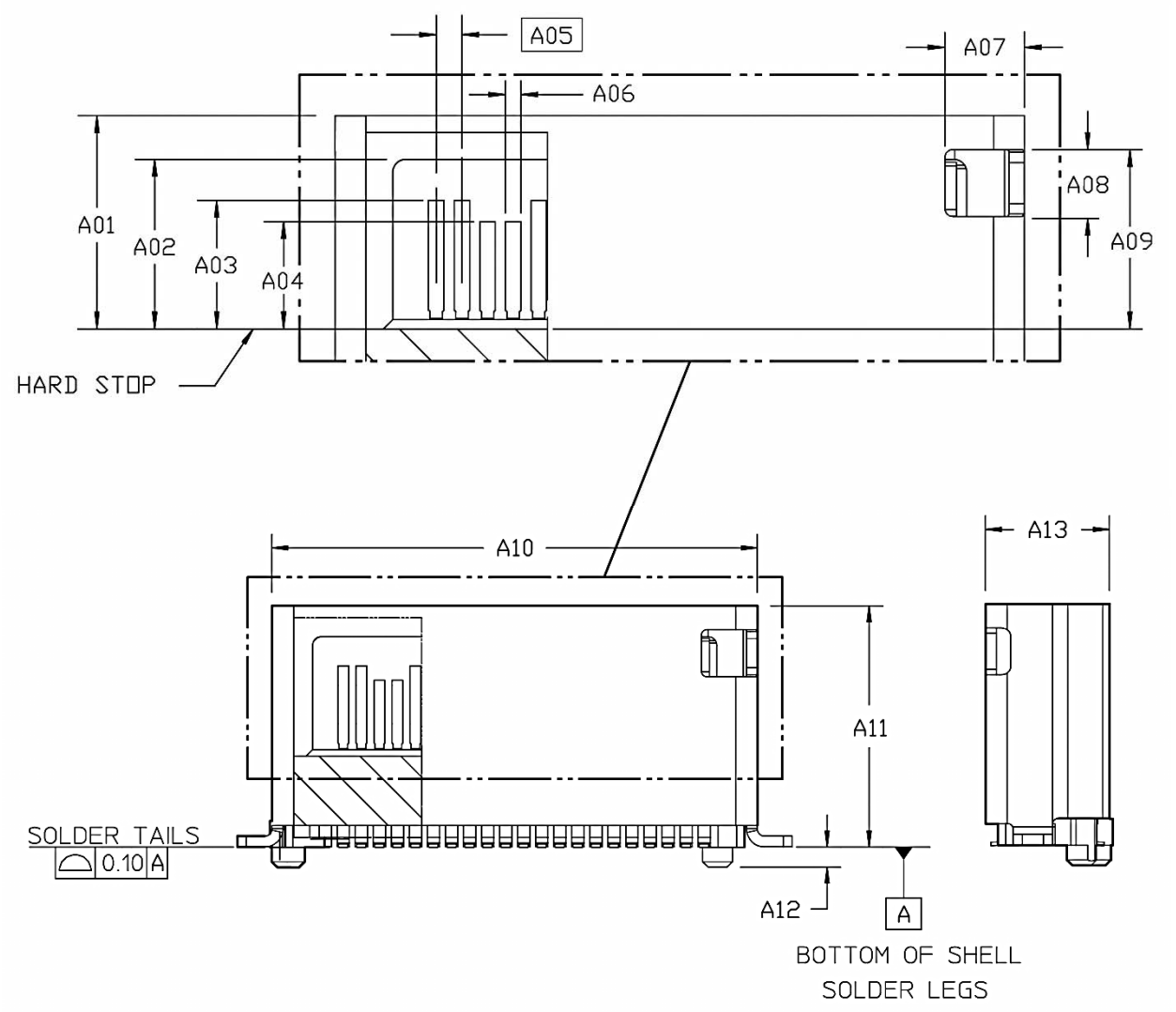


FIGURE 4-1 VERTICAL SMT RECEPTACLE (1 OF 2)

TABLE 4-1 VERTICAL SMT RECEPTACLE DIMENSIONS (1 OF 2)

Designator	Description	Common 4X | 8X	Tolerance ±
A01	Hard Stop to Front of Shell	4.15	0.08
A02	Hard Stop to Interface Paddle Nose (Note 1)	3.30	0.03
A03	Hard Stop to 1st Mate Contacts (Note 1)	2.42	0.12
A04	Hard Stop to 2nd Mate Contacts (Note 1)	1.95	0.12
A05	Fixed Connector Contact Beam Pitch - Typical	0.50	Basic
A06	Fixed Connector Contact Width - Typical	0.30	0.03
A07	Latch Window Width (2x) (Note 2)	1.55	0.08
A08	Latch Window Length (2x) (Note 2)	1.30	0.08
A9	Hard Stop (Housing) to Latch Point (Shell) (2x) (Note 2)	3.49	0.11
A10	Connector (Shell) Overall Length	13.45 | 22.95	Ref
A11	Connector (Shell) Overall Height from Bottom of Shell Solder Legs (Datum A)	6.66	0.08
A12	Locating Peg Height (2X)	0.56	0.10
A13	Connector (Shell) Overall Width	3.43	Ref

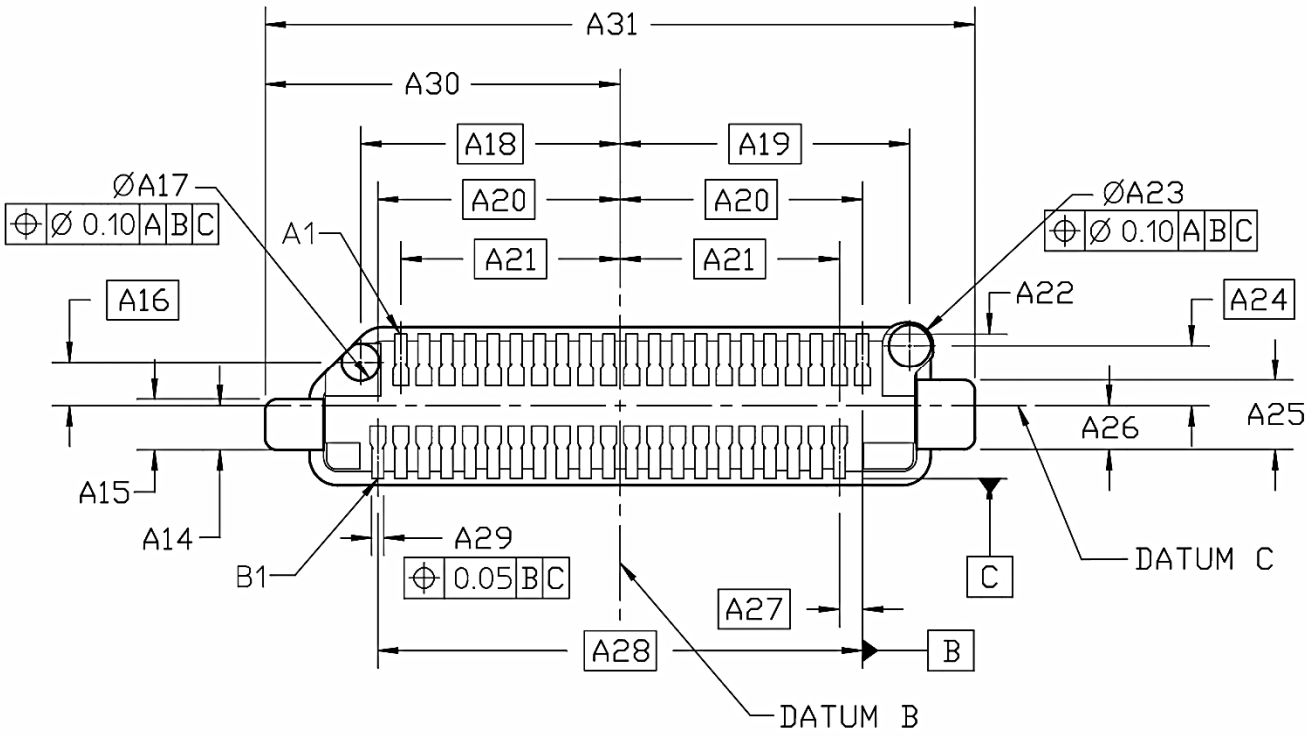


FIGURE 4-2 VERTICAL SMT RECEPTACLE (2 OF 2)

TABLE 4-2 VERTICAL SMT RECEPTACLE (2 OF 2) DIMENSIONS

Designator	Description	Common 4X	Common 8X	Tolerance ±
A14	Horizontal CL of Solder Tail Array (Datum C) to Edge of Small Solder Leg of Shell (Orientation Feature End)	0.95		0.19
A15	Small Solder-Leg (Shell) Width	1.09		0.10
A16	Horizontal CL of Solder Tail Array (Datum C) to CL of Inboard Locating Peg (Orientation Feature End)	0.95		Basic
A17	Small Locating Peg Diameter (Orientation Feature End)	0.82		+.03/-0.15
A18	Vertical CL of Solder Tail Array (Datum B) to CL of Inboard Locating Peg (Orientation Feature End)	5.62	10.12	Basic
A19	Vertical CL of Solder Tail Array (Datum B) to CL of Outboard Locating Peg	6.28	10.78	Basic
A20	Vertical CL of Solder Tail Array (Datum B) to CL of Outside Solder-Tails (Long Offset from Datum B)	5.25	9.75	Basic
A21	Vertical CL of Solder Tail Array (Datum B) to CL of Inside Solder-Tails (Short Offset from Datum B)	4.75	9.25	Basic
A22	Edge of Row A Solder Tail Contacts to Edge of Row B Solder Tail Contacts.	3.14		0.16
A23	Large Locating Peg Diameter	0.97		+.03/-0.15
A24	Horizontal CL of Solder Tail Array (Datum C) to CL of Outboard/ Large Locating Peg	1.31		Basic
A25	Large Solder-Leg (Shell) Width	1.50		0.10
A26	Horizontal CL of Solder Tail Array (Datum C) to Edge Large Solder Leg	0.94		0.19
A27	Solder-Tail Contact Pitch - Typical	0.50		Basic
A28	Outer Solder Tails CL to CL (Lower Left B1 to Upper Right A21)	10.5	19.00	Basic
A29	Solder-Tail Width (Solder-Pad Contact Area)- Typical	0.26		0.03
A30	Vertical CL of Solder Tail Array (Datum B) to Outside Edge of Solder Leg	7.69	12.19	0.05
A31	Width of shell from edge of left solder leg to edge of right solder leg	15.38	24.88	0.10

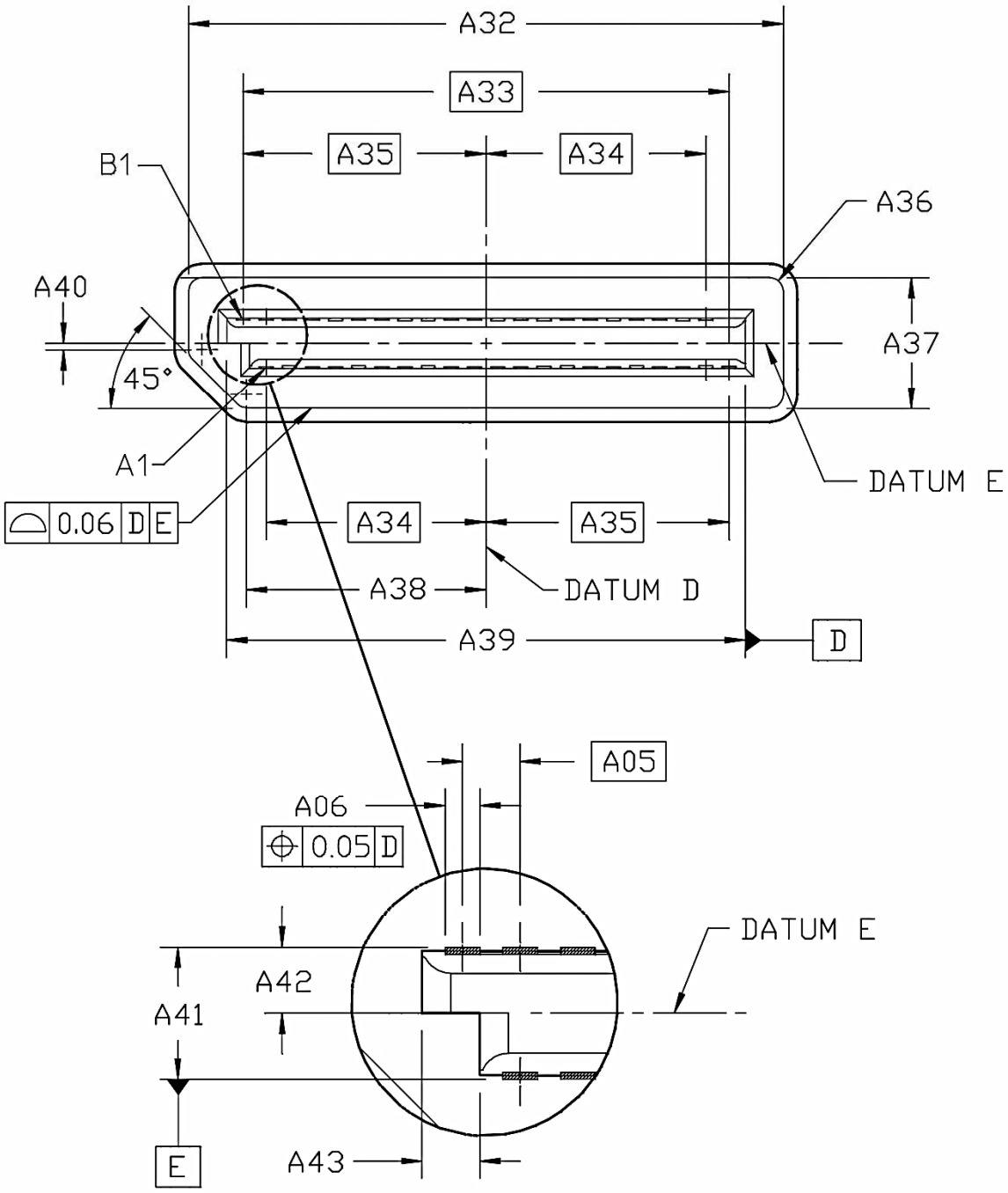
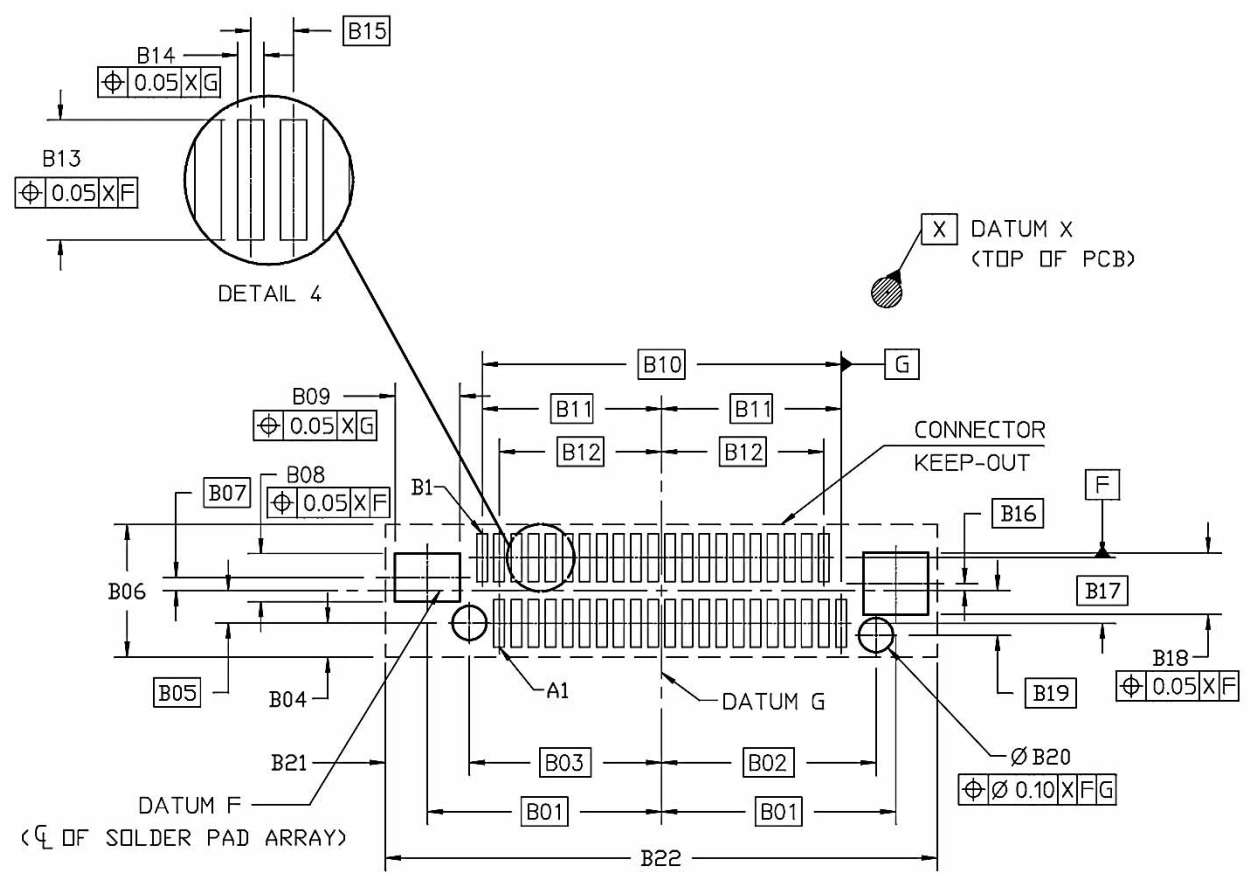


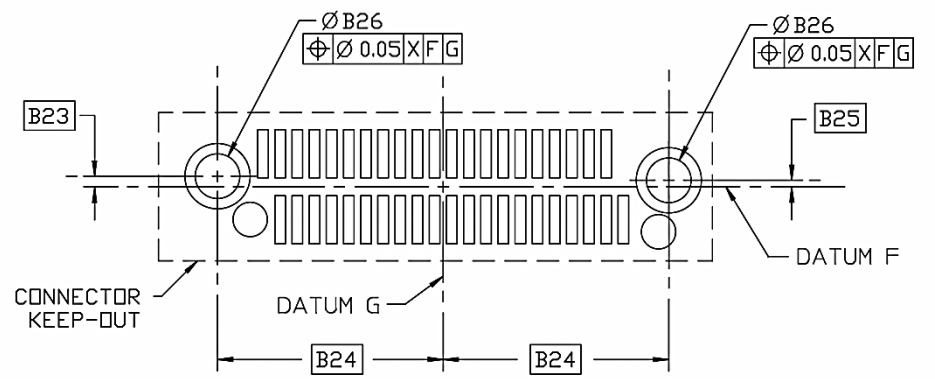
FIGURE 4-3 FIXED CONNECTOR MATING INTERFACE

TABLE 4-3 VERTICAL CONNECTOR MATING INTERFACE DIMENSIONS

Designator	Description	Common 4X | 8X		Tolerance ±
A06	Fixed Connector Contact Pitch (Repeated Dimension)	0.50		Basic
A07	Fixed Connector Contact Width (Repeated Dimension)	0.30		0.03
A32	Interface (Inside Shell) Cavity Width	12.85	21.85	0.03
A33	Outer Contacts CL to CL (Upper Left B1 to Lower Right A21)	10.50	19.50	Basic
A34	CL of Interface Paddle Length (Datum D) to CL Inner Terminals (2x) (Short Offset from Datum D))	4.75	9.25	Basic
A35	CL of Interface Paddle Length (Datum D) to CL Outer Terminals (2x) (Long Offset from Datum D))	5.25	9.75	Basic
A36	Inside Radius of Fixed Connector Shell (5x)	0.30		0.05
A37	Interface (Inside Shell) Cavity Height	2.83		0.04
A38	CL of Interface Paddle Length (Datum D) to Inside Shell Radius TSC	5.23	9.73	0.06
A39	Interface Paddle Length	11.2	20.20	0.03
A40	CL of Interface Paddle Thickness (Datum E) to Inside Shell Radius TSC	0.25		0.09
	Enlarged view			
A41	Interface Paddle Thickness (Over Top of Contact Beams; Plastic/Paddle must be Below Top of Contact Beams)	1.08		.06
A42	Orientation Feature (on Paddle) Thickness	0.54		.03
A43	Orientation Feature (on Paddle) Width	0.48		0.06

4.2 Vertical Connector Footprint





Alternate Footprint for Shell Attach

FIGURE 4-4 VERTICAL CONNECTOR FOOTPRINT

TABLE 4-4 VERTICAL CONNECTOR FOOTPRINT DIMENSIONS

Designator	Description	Common 4X	Common 8X	Tolerance ±
B01	Vertical CL of Solder-Pad Array (Datum G) to CL of (Shell) Solder-Pads	6.85	11.60	0.10
B02	Vertical CL of Solder-Pad Array (Datum G) to CL of Outboard Locating Hole	6.28	11.03	Basic
B03	Vertical CL of Solder-Pad Array (Datum G) to CL of Inboard Locating Hole	5.62	10.37	Basic
B04	CL of Inboard Locating Hole to Keep-Out Zone (Length)	0.75		0.10
B05	Horizontal CL of Solder-Pad Array (Datum F) to CL of inboard (Left) Locating Hole	0.95		Basic
B06	Connector Keep-Out Zone Height	4.40		0.15
B07	Horizontal CL of Solder-Pad Array (Datum F) to CL of Small Solder-Pad	0.37		0.10
B08	Small (Shell) Solder-Pad Height	1.40		0.10
B09	(Shell) Solder-Pad Width (x2)	1.90		0.10
B10	CL to CL of Outer Solder-Pads (Horizontal)	10.50	20.00	Basic
B11	Vertical CL of Solder-Pad Array (Datum G) to CL Outside Solder-Pads	5.25	10.00	Basic
B12	Vertical CL of Solder-Pad Array (Datum G) to CL Inside Solder-Pads	4.75	9.50	Basic
B13	Signal Solder-Pad Length	1.40		0.05
B14	Signal Solder-Pad Width	0.31		0.03
B15	Solder-Pad Pitch	0.50		Basic
B16	Horizontal CL of Solder-Pad Array (Datum F) to CL of Large Solder-Pad	0.20		0.05
B17	Horizontal CL (Row A) to CL (Row B) Solder-Pads	1.92		Basic
B18	Large (Shell) Solder-Pad Height	1.80		0.15
B19	Horizontal CL of Solder-Pad Array (Datum F) to CL Outboard (Right) Locating Hole	1.31		Basic
B20	Locating Hole Diameter (x2)	1.00		0.05
B21	CL of Inboard (Left) Locating Hole to Keep-Out Zone	2.68		0.15
B22	Connector Keep-out Zone Length	16.60	26.26	0.15
B23	Horizontal CL of Solder-Tail Array (Datum G) to CL of Left Tail Hole	0.31		Basic
B24	Vertical CL of Solder-Tail Array (Datum F) to CL of Both Tail Holes	6.58	11.33	Basic
B25	Horizontal CL of Solder-Tail Array (Datum G) to CL of Right Tail Hole	0.19		Basic
B26	Solder-Tail Hole Diameter	1.30		Basic

5 Fixed Right Angle Connector

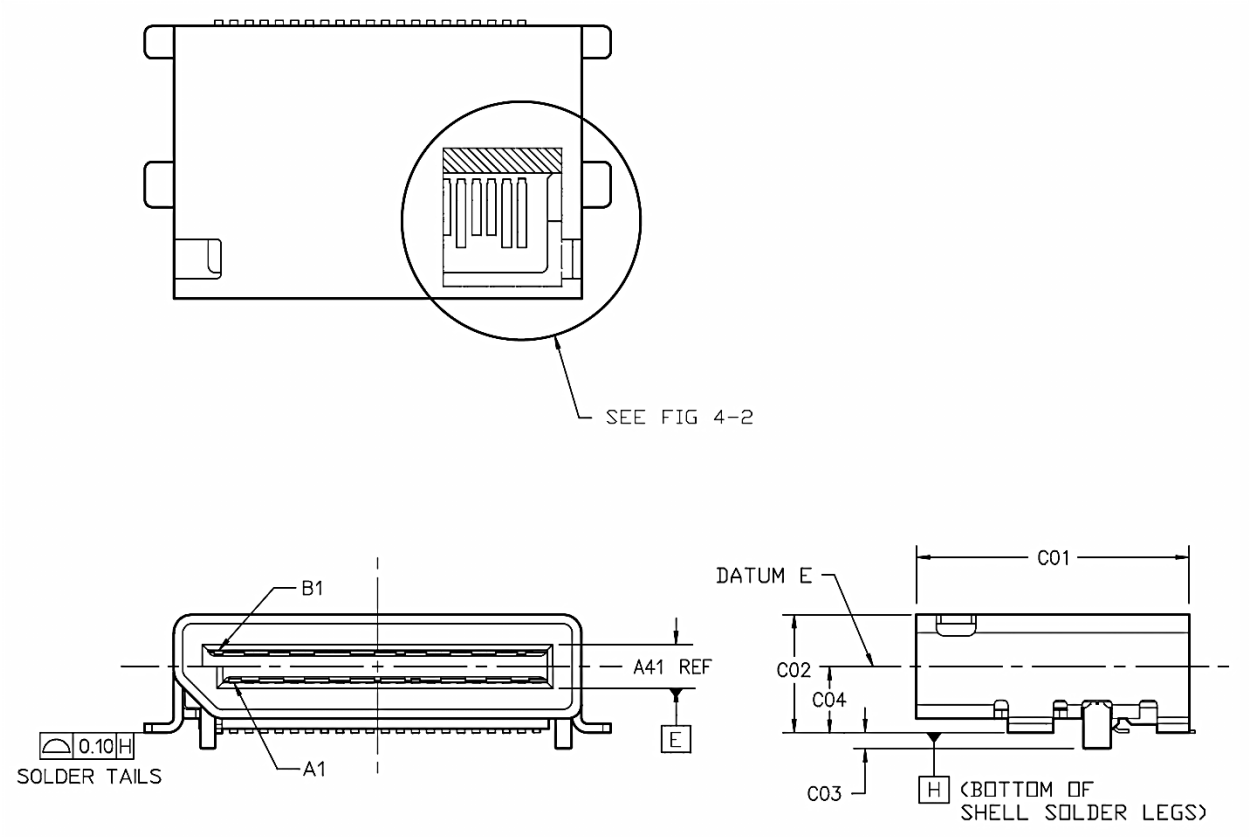


FIGURE 5-1 RIGHT ANGLE CONNECTOR (1 OF 2)

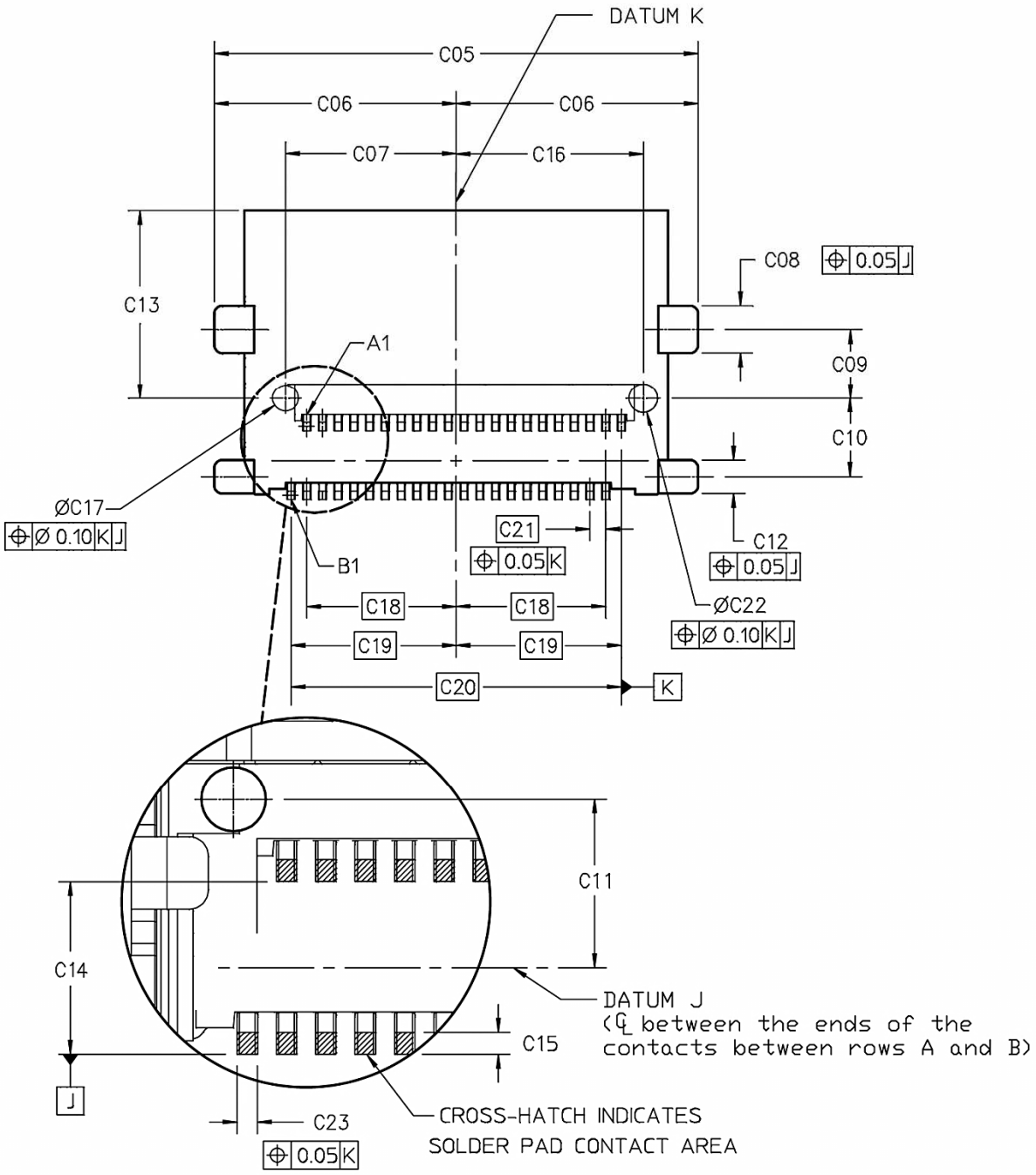
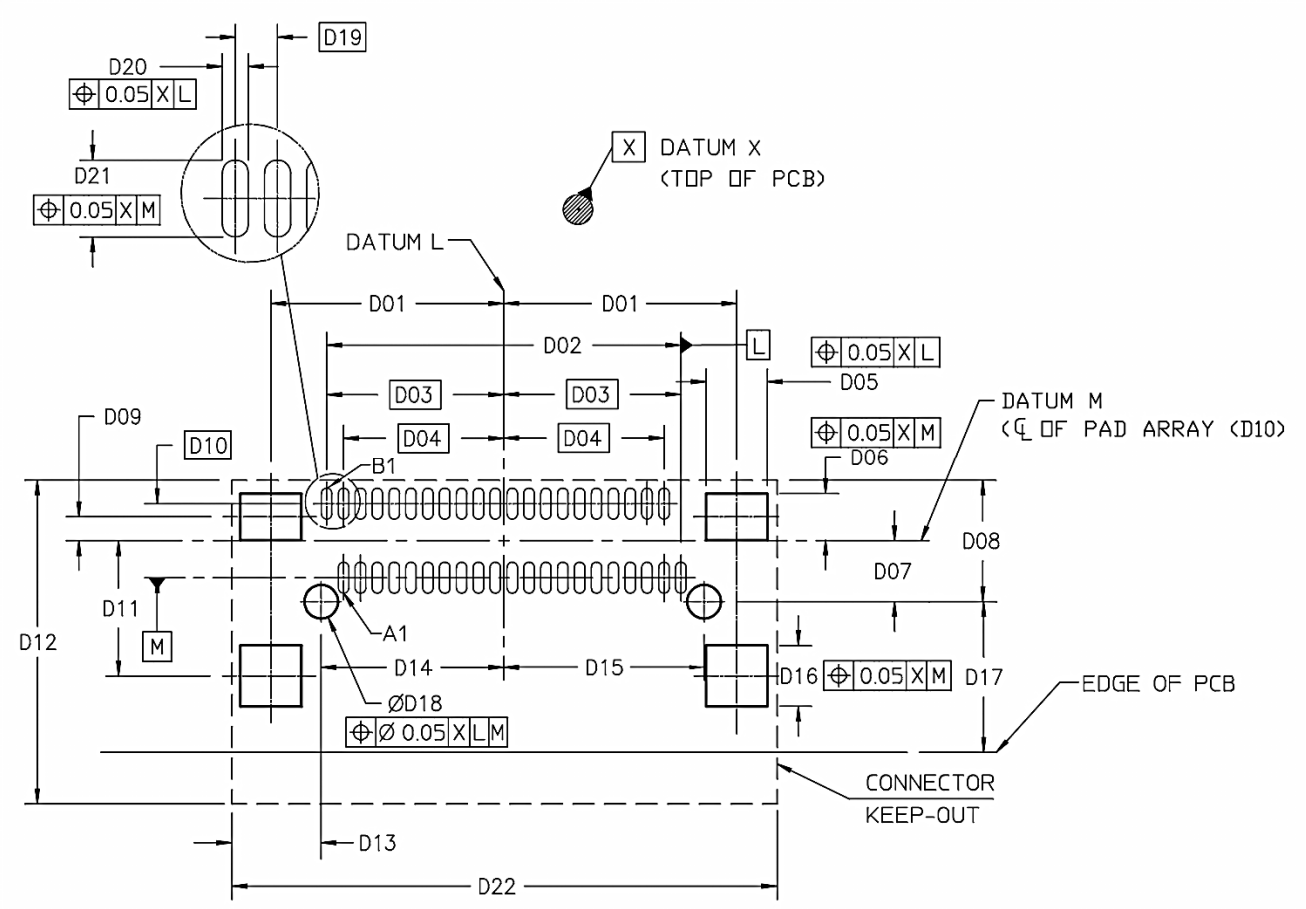


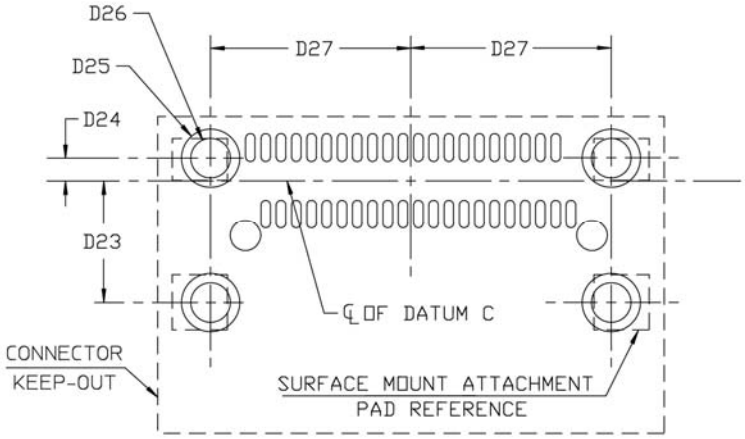
FIGURE 5-2 RIGHT ANGLE CONNECTOR (2 OF 2)

TABLE 5-1 RIGHT ANGLE CONNECTOR DIMENSIONS

Designator	Description	Common 4X	Common 8X	Tolerance ±
C01	Connector (Shell) Length	9.00		0.05
C02	Connector (Shell) Height from Bottom of Shell Solder Legs (Datum A)	3.90		Ref
C03	Locating Peg Length (2X)	0.52		0.10
C04	CL of Interface to Paddle Thickness (Datum E) Bottom of Shell Solder Legs (Datum A)	2.19		0.08
C05	Outside Edge of Left Solder Leg to Outside Edge of Right Solder Leg	15.38		24.88
C06	Vertical CL of Solder Tail Array (Datum B) to Outside Edge Solder-Leg	7.69	12.44	0.05
C07	Vertical CL of Solder Tail Array (Datum B) to CL of Left Locating Peg	5.42	10.16	0.08
C08	Large Shell Solder Leg Width	1.50		0.10
C09	Horizontal CL Locating Pegs to CL of Large Solder-Legs	2.20		0.11
C10	Horizontal CL Locating Pegs to CL of Small Solder-Leg	2.50		0.11
C11	Horizontal CL of Locating Pegs to CL Solder-Tail Array (Datum L)	2.14		0.19
C12	Small Solder-Leg Width	1.06		0.10
C13	Horizontal CL of Locating-Pegs to Front of Shell	5.97		0.11
C14	End of Solder Tail “A” Contacts to End of Solder Tail “B” Contacts	2.18		0.16
C15	Solder-Pad Contact Area (Length)	0.28		0.03
C16	Vertical CL of Solder Tail Array (Datum B) to CL of Right Locating Peg	5.95	10.69	0.08
C17	Large Locating Peg Diameter	0.82		+0.03/-0.15
C18	Vertical CL of Solder Tail Array (Datum K) To CL of Inside Solder Tails	4.75	9.50	Basic
C19	Vertical CL of Solder Tail Array (Datum K) to CL of Outside Solder Tails	5.25	10.00	Basic
C20	CL to CL of Outside Solder Tails	10.50	20.00	Basic
C21	Solder Tail Contact Pitch	0.50		Basic
C22	Small Locating Peg Diameter	0.97		+0.03/-0.15
C23	Solder Tail Width (Solder Pad Contact Area)	0.26		0.03

5.1 Right Angle Connector Footprint





Alternate Footprint for Shell Attach

FIGURE 5-3 RIGHT ANGLE CONNECTOR FOOTPRINT

TABLE 5-2 RIGHT ANGLE CONNECTOR FOOTPRINT

Designator	Description	Common 4X	Common 8X	Tolerance ±
D01	Vertical CL of Solder-Pad Array (Datum L) to CL Solder Pads (Shell)	6.91	11.66	0.05
D02	CL to CL of Outside Solder-Pads of the Array	10.50	20.00	0.05
D03	Vertical CL of Solder-Pad Array (Datum L) to Outside Solder-Pads	5.25	10.00	Basic
D04	Vertical CL of Solder-Pad Array (Datum L) to Inside Solder-Pads	4.75	9.50	Basic
D05	Shell Solder Pad Width (4X)	1.81		0.10
D06	Small Shell Solder-Pad Length (2X)	1.38		0.10
D07	Horizontal CL of Locating Holes to CL of Solder-Pad Array (Datum M)	1.81		0.10
D08	CL Locating Holes to Back Keep-Out	3.45		0.10
D09	Horizontal CL of Solder-Pad Array (Datum M) to CL of Small Shell Solder-Pads (2X)	0.71		0.10
D10	Horizontal CL of row B solder pads to CL of row A Solder-Pads	2.19		Basic
D11	Horizontal CL of Solder-Pad Array (Datum M) to CL of Large Shell Solder Pads (2X)	4.01		0.05
D12	Connector (Shell) Depth Keep-Out Zone	10.42		0.15
D13	CL Locating Holes to Front of Connector Keep-Out Zone	6.47		0.15
D14	Vertical CL of Solder-Pad Array (Datum L) to CL Left Locating Hole	5.41	10.16	0.05
D15	Vertical CL of Solder-Pad Array (Datum L) to CL Right Locating Hole	5.94	10.69	0.05
D16	Large Shell Solder-Pad Length (2X)	1.80		0.10
D17	Horizontal CL of Locating Holes to Front Edge of PCB	4.46		0.10
D18	Diameter of Locating Holes (2X)	1.00		0.05
D19	Solder-Pad Pitch	0.50		Basic
D20	Solder-Pad Width	0.31		0.03
D21	Solder-Pad Length	0.91		0.03
D22	Connector (Shell) Width Keep-Out Zone	16.63	26.15	0.15
D23	Horizontal CL of row B solder pads to CL of Front Solder Tail Holes	4.01		0.05
D24	Horizontal CL of row B solder pads to CL of Rear Solder Tail Holes	0.78		0.10
D25	Diameter of Solder Ring (4X)	1.90		0.05
D26	Diameter of Solder Tail Holes (4X)	1.30		0.05
D27	Vertical CL of Solder-Pad Array (Datum L) to CL Left and Right Solder Tail Holes	6.58	11.32	0.05

6 Fixed Connector Latch Windows

The windows in the top of the 4X Fixed right angle connector and the windows in the side wall of the Fixed vertical connector serve as the latching points for the Free Cable latches. The windows accept both passive and active latching solutions that are defined on the Free cable side.

The windows are located in relation to the connector contacts to enable the cable side to reliably mate to the host side connector with acceptable minimum contact wipe in worst case tolerance conditions.

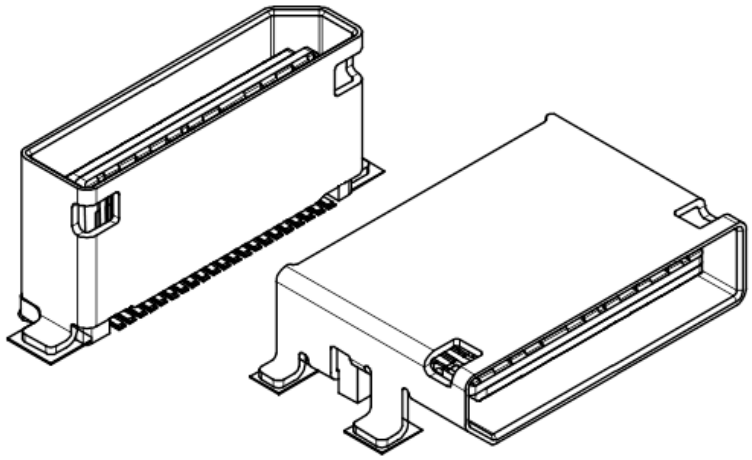


FIGURE 6-1 FIXED CONNECTOR LATCH WINDOWS

TABLE 6-1 LATCHING REQUIREMENTS

Description	Min	Max	Units	Conditions / Comments
Mating Force				Rate 19-31 mm/s EIA 364-13
- Connector (w/out latch)	3	20	N	
- Connector W/ Passive Latch	3	35	N	
- Connector W/Active Latch	3	35	N	
Un-Mating Force				Rate 19-31 mm/s EIA 364-13
- Connector (w/out latch)	1	20	N	
- Connector W/ Passive Latch	1	35	N	
- Connector W/Active Latch W/Pull	1	35	N	
Wrenching Strength W/ Mated Cable- Internal		25	N	Bend cable 90 degrees at minimum bend radius. Pull in 4 axis directions for round cable. Pull in 2 axis directions for flat cable. No damage to Latch Window
Wrenching Strength W/ Mated Cable- External		40	N	Bend cable 90 degrees at minimum bend radius. Pull in 4 axis directions for round cable. Pull in 2 axis directions for flat cable. No damage to Latch window
Active Latch Retention Strength - Internal	30		N	No damage to plug/cable assembly below Minimum Value
Active Latch Retention Strength - External	60		N	No damage to plug/cable assembly below Minimum Value

6.1 Locations of the Long and Short Contacts Alternate Footprint for Shell Attach

The contact position numbers are shown in the top row, with the long and short contacts designated as “L” and “S” respectively in the bottom row.

TABLE 6-2 LOCATIONS OF THE 4X LONG AND SHORT CONTACTS

Description		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
The contact functions are defined by the application	Row A																					
	Row B																					
Long/Short contact positions		S	L	S	S	L	S	S	L	S	S	L	S	S	L	S	S	L	S	S	L	S

TABLE 6-3 LOCATIONS OF THE 8X LONG AND SHORT CONTACTS

Description		1	2	3	4	5	6	7	8	The LSSL contact length sequence continues through positions 9-29	30	31	32	33	34	35	36	37	38	39	40
The pin functions are defined by the application	Row A																					
	Row B																					
Long/Short contact positions		L	S	S	L	S	S	L	S		S	L	S	S	L	S	S	L	S	S	L

6.2 Faceplate Opening

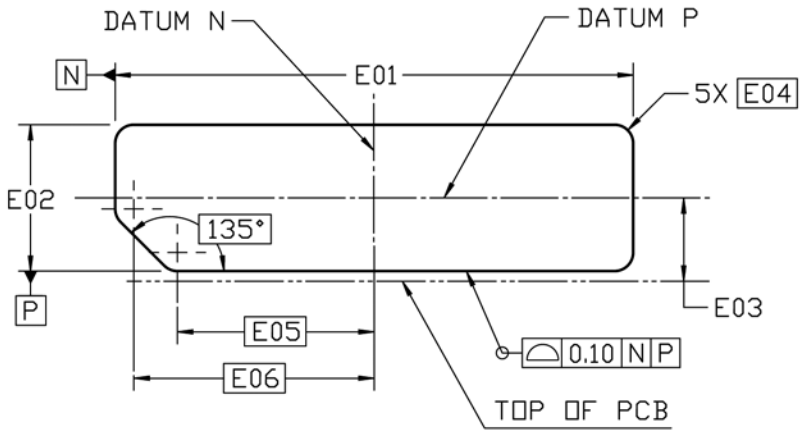


FIGURE 6-2 FACEPLATE OPENING

TABLE 6-4 FACEPLATE OPENING DIMENSIONS

Designator	Description	Common 4X | 8X		Tolerance ±
E01	Opening Width	13.95	23.45	0.08
E02	Opening Height	3.93		0.08
E03	Top of PCB to Horizontal CL (Datum P) of Opening	2.24		0.08
E04	All inside Radii	0.50		Basic
E05	Vertical CL of Opening (Datum N) to the Lower TSC of the Polarizing Feature	5.28	10.03	Basic
E06	Vertical CL of Opening (Datum N) to the Upper TSC of the Polarizing Feature	6.48	11.22	Basic
Dimensions may be adjusted to enable special EMI or other solution requirements.				

7 Performance Requirements

See section 1.1 for the Electrical Performance requirements for this connector solution.

This specification conforms to the test sequences as defined in EIA-364 TS-1000.

TABLE 7-1 TS-1000 REQUIREMENTS

Description	Requirement
Rated Durability Cycles	250
Field Life (3, 5, 7, or 10 years)	10 years ***3 years***
Field Temperature (57, 60, 65, 75, or 85C)	65C degrees
Field Operating Temperature - External	***-25C ~ +55C degrees***
Field Operating Temperature - Internal	***-25C ~ +60C degrees***
Storage Temperature	***-40C to +85C degrees***
Test Group 4 Option	1B
Plating Type (Precious / non-Precious)	Precious
Surface Treatment (Lubricated or non-Lubricated)	Manufacturer to specify

TABLE 7-2 ELECTRICAL REQUIREMENTS

Description	Requirement	Procedure
Current	0.5 A per contact***, except the two 5 V pins shall be 1 A per contact MAX.***	
Voltage	30 VDC per contact	
Low Level Contact Resistance	Baseline	EIA 364-23 20 mVDC, 10 mA
Insulation Resistance	1000 Megohms minimum between adjacent contacts	100 VDC
Dielectric Withstanding Voltage	No defect or breakdown between adjacent contacts	300 VDC minimum for 1 minute
The minimum Hi-Pot requirement for cable assemblies shall be 240 VDC for 100 ms.		

TABLE 7-3 MECHANICAL REQUIREMENTS

Description	Requirement	Procedure
Mating Force	150N maximum	EIA 364-13
Un-mating Force	50N maximum	EIA 364-13
Vibration	- No Damage - No discontinuity longer than 1 microsecond allowed. - 20 milliohms maximum change from initial (baseline) contact resistance ***- 30 mOhm maximum change from initial (baseline) contact resistance***	EIA 364-28
Mechanical Shock	- No Damage ***- No discontinuity longer than one microsecond allowed.*** - 20 milliohms maximum change from initial (baseline) contact resistance ***- 30 mOhm maximum change from initial (baseline) contact resistance***	EIA 364-27
Surface Treatment (Lubri cated or non-Lubricated)	***Specified by Manufacturer***	
Rated Durability Cycles – External	***10,000***	
Rated Durability Cycles – Internal	***50***	

TABLE 7-4 ENVIRONMENTAL REQUIREMENTS

Description	Requirement	
Storage Temperature	-20C to +85C degrees ***-40C to +85C degrees***	
Humidity	80 percent Relative Humidity	