NOTE

All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Unless otherwise specified, dimensions have a tolerance of ±0.13 [±.005] and angles have a tolerance of ±2°. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers requirements for application of Micro-Strip Board-to-Board Plug and Receptacle Connectors designed for printed circuit (pc) board applications. The connectors have in-row contact spacing on 1.27 mm [.050 in.] centers and row-to-row contact spacing on 2.54 mm [.100 in.]. There are designs to accommodate 40 thru 240 contact positions. The connectors are designed for manual placement on pc boards.

Figures 1 and 2 provide connector features and terms used throughout this specification. Use these terms when corresponding with Tyco Electronics Representatives to facilitate assistance.

1.1. Plug Connectors

Plug connectors are vertical configurations. There are designs with ACTION PIN* contacts which provide a force fit and eliminate the need for soldering, and there are designs with straight contact tines for solder applications. Some of the solder-type connectors have two retentive contacts at both ends and on both sides of the connector, that will help hold the connector in the pc board prior to soldering, and some have only straight contact tines where customer hold-down will be used to hold the connector in place. One version has mounting flanges. All plugs have two polarizing slots that match polarizing ribs in the mating receptacle. A single rib on the housing indicates the number 1 pin position and two ribs on the housing indicate the number 2 position. See Figure 1.

1.2. Receptacle Connectors

Receptacle designs are available in vertical and right-angle designs with various solder tine lengths. The right-angle connectors have mounting flanges and the vertical connectors do not. Each housing has two polarizing ribs that match the polarizing slots in the plugs. A single marker on the housing indicates the number 1 contact position and a double marker indicates the number 2 position. See Figure 2.

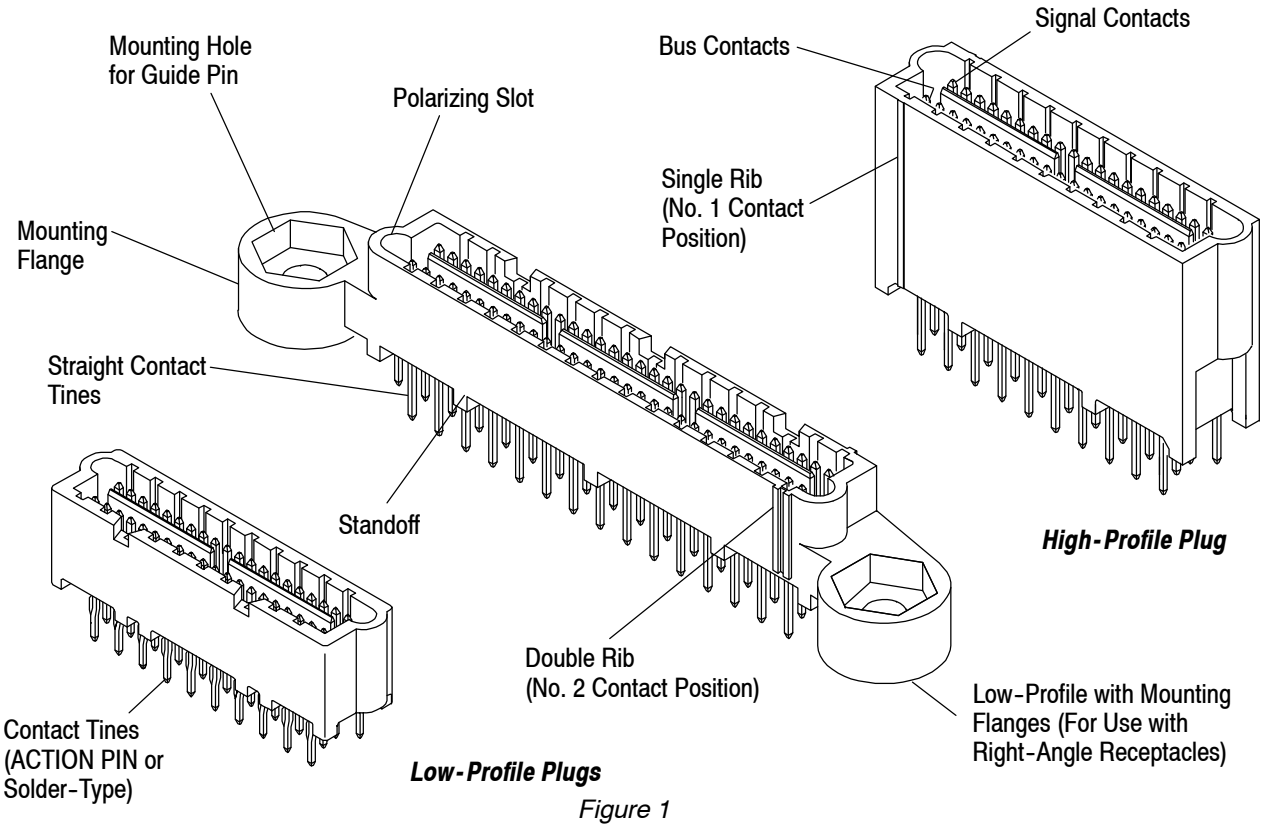


Figure 1

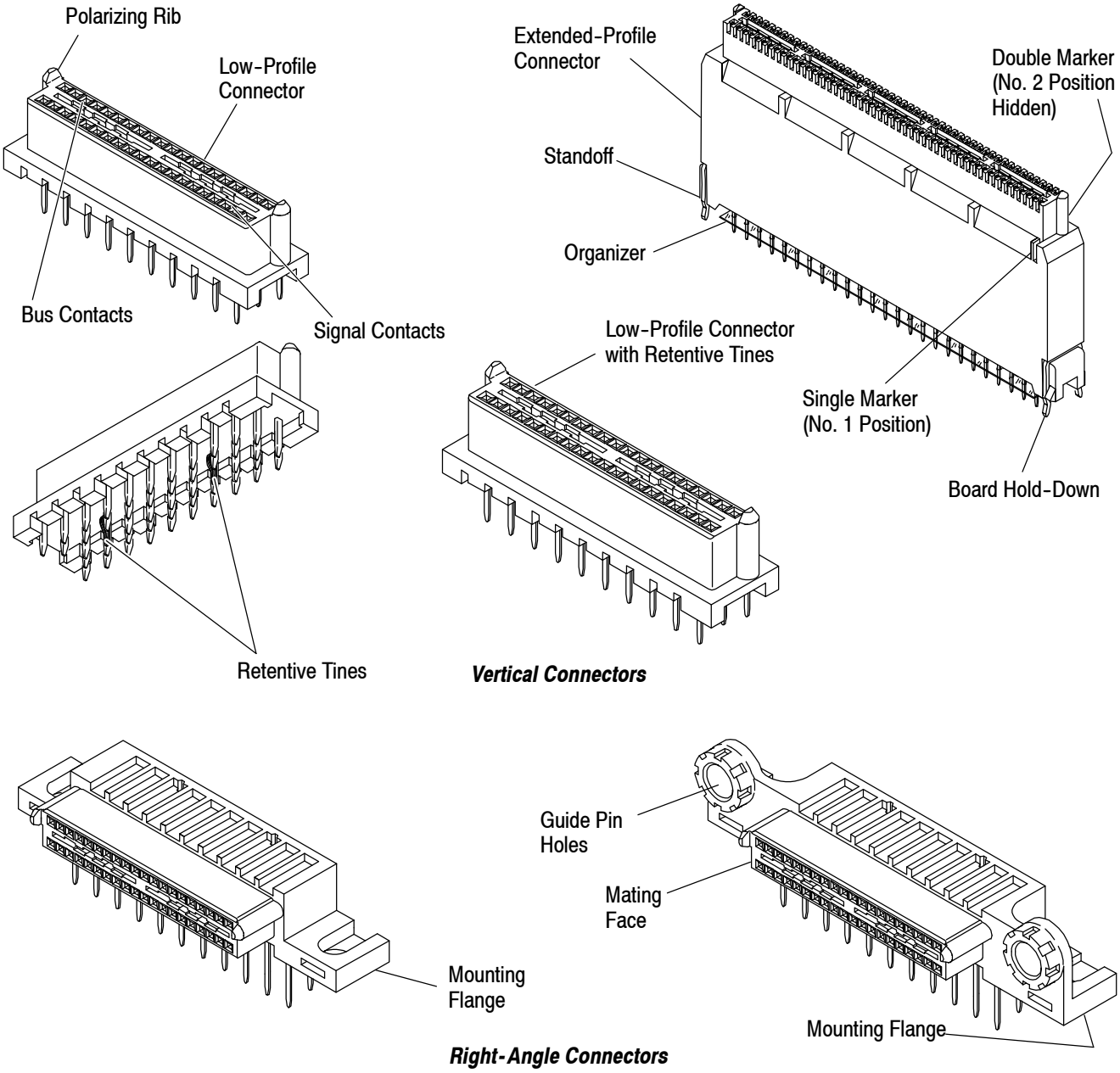


Figure 2

2. REFERENCE MATERIAL

2.1. Revision Summary

This paragraph is reserved for a revision summary of the most recent additions and changes made to this specification which include the following:

- Updated document to corporate requirements
- Corrected spelling error in title

2.2. Customer Assistance

Reference Product Base Part Number 536254 and Product Code 3591 are representative of Micro-Strip Board-to- Board Plug and Receptacle Connectors. These numbers are used in a customer service network to access tooling and product application information. This service is provided by your local Tyco Electronics Representative or, after purchase, by calling the Tooling Assistance Center or the Product Information number at the bottom of page 1.

2.3. Engineering Drawings

Customer Drawings for specific products are available from the responsible Engineering Department via the service network. The information contained in the Customer Drawing takes priority if there is a conflict with this specification or any other technical documentation supplied by Tyco Electronics.

2.4. Specifications

Product Specifications 108-17 and 108-1272 describes performance tests for these connectors.

2.5. Technical Publications

The following list includes available instruction sheets (408-series) that provide assembly procedures for product, operation, maintenance and repair of tooling; and customer manuals (409-series) that provide setup, operation, and maintenance of machines.

Document Number	Document Title
408-9708	Contact Replacement Kit 311686-7
408-9895	Seating Tool 90687-[ ]

2.6. Manuals

Manual 402-40 is available upon request and can be used as a guide in soldering solder-type connectors. The manual provides information on various flux types and characteristics along with commercial designations and flux removal procedures. A checklist is included in the manual as a guide for information on soldering problems.

3. REQUIREMENTS

3.1. Product Materials

Micro-Strip Connector housings are constructed of high-temperature thermoplastic. The receptacle and plug connector contacts are made of copper alloy. Contacts are underplated with nickel. They have tin plating on the solder tines and gold plating in the contact interface area.

3.2. Storage

Connectors are packaged and shipped in either protective anti-static tube or tray containers. They should remain in the containers until ready for use to prevent physical damage to the housings and contacts. The connectors should be used on a first-in/first-out basis to avoid storage contamination that could adversely affect signal transmissions and solderability of the solder-type connectors. If a receptacle has a tine organizer, it should remain on the contacts through the entire process of handling and final assembly.

3.3. Polarization

The receptacle connectors have two polarizing ribs with a tapered lead-in and the plug connectors have two mating slots to prevent reverse mating.

3.4. Circuit Identification

Plug and receptacle housings have a single rib molded into the sidewall at one end to indicate the number 1 position. They have two ribs on the other side to indicate the number 2 position.

3.5. Mating Dimensions

Full mating of connectors is essential to assure a good connection. The required mating dimensions for the various connector styles are provided in Figure 3. Note that the connectors are shown unmated for clarity, but the dimensions given are for fully mated connectors. Contact the Tooling Assistance Center or the Product Information number listed on page 1 for other mating dimensions.

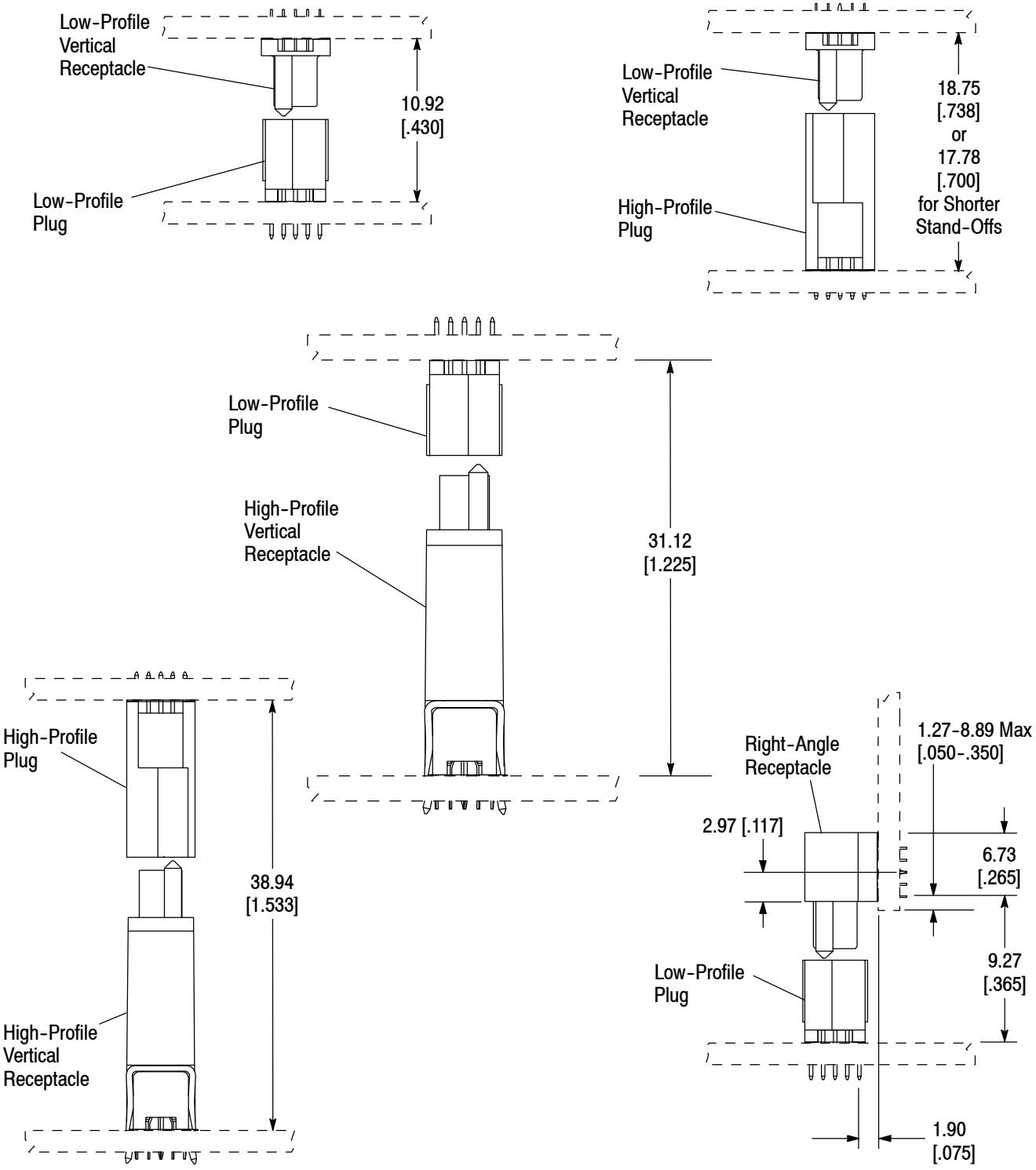


Figure 3

3.6. Mating/Unmating Technique

The pressure used to mate and unmate connectors must be applied evenly and in-line with the connectors to prevent deformation or other damage to the contacts, housing, or surrounding board components. The knifing or peeling action of applying force to one end or one side must be avoided. The end-to-end and side-to-side limitations are provided in Figure 4.

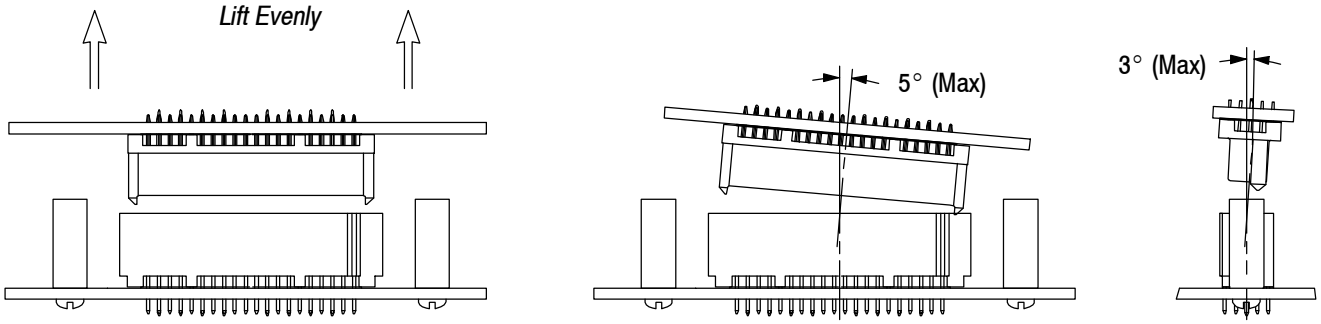
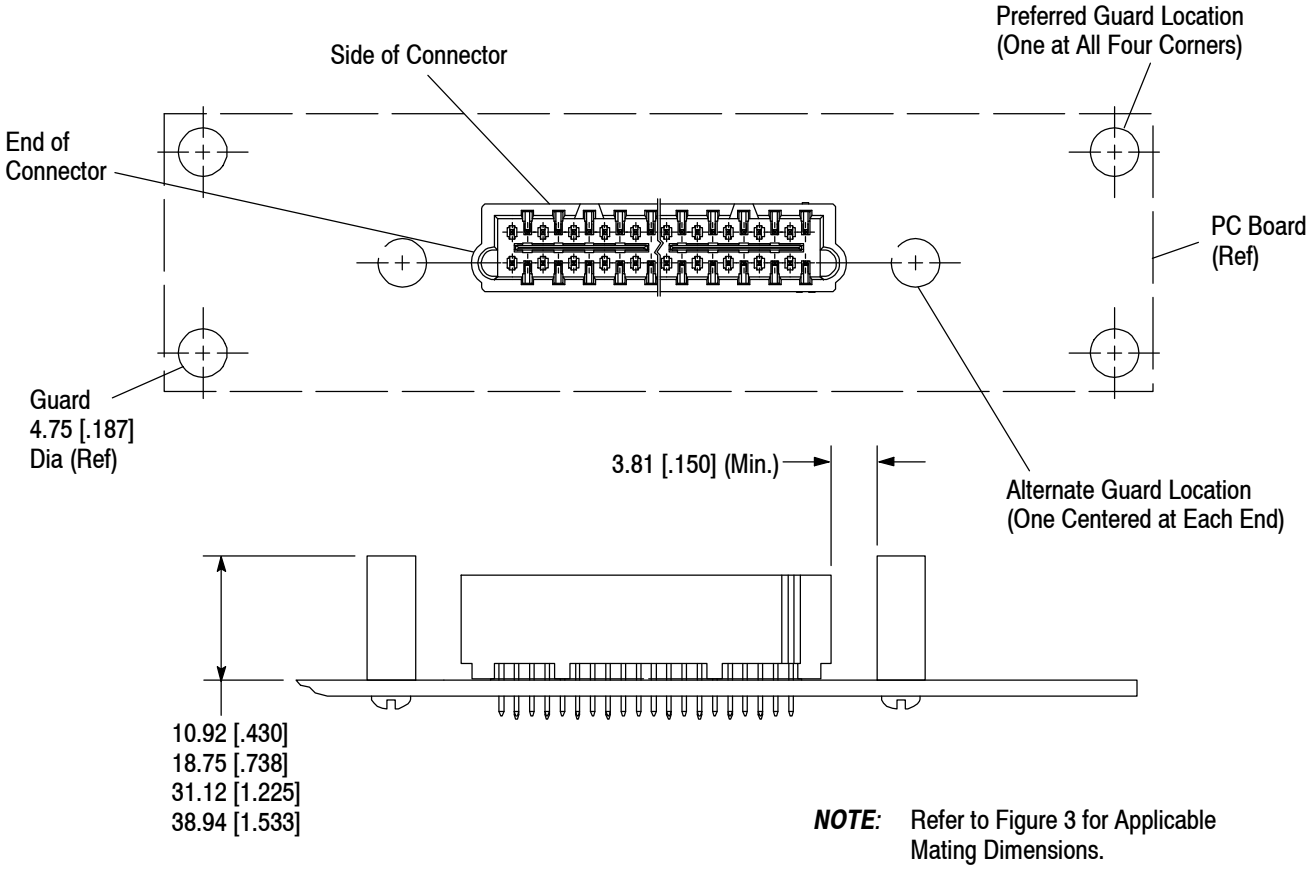


Figure 4

NOTE

Guards will help prevent uneven disengagement of connectors which could damage the contacts, housing, or other components on the pc board. The preferred location is one at each of the four corners of the pc board; however, a guard can be centered at each end of the first (polarized row of contacts in the connector. Guards can be mounted to either the plug or receptacle pc board. Suggested guard designs and required spacing are provided in Figure 5.



NOTE: Refer to Figure 3 for Applicable Mating Dimensions.

Figure 5

3.7. PC Board Layouts

The contact holes and, when applicable, mounting holes must be precisely located to assure proper contact tine placement and optimum performance of the connector. The “X” and “Y” symbols on the pc board layouts represent customer established datums. They are the origin for the basic dimension (XXX and YYY datum), the point from which ALL hole positions must be located. All layouts depict the top (component) side of the pc boards.

NOTE

There is a minimum dimension of 12.7mm [.500 in.] required between all plug connectors when they are to be mated with right-angle receptacle connectors that are mounted to a 1.52 mm [.060 in.] thick pc board. This dimension is increased 0.76 mm [.030 in.] for each 0.76 mm [.030 in.] increase in pc board thickness. See Figure 6.

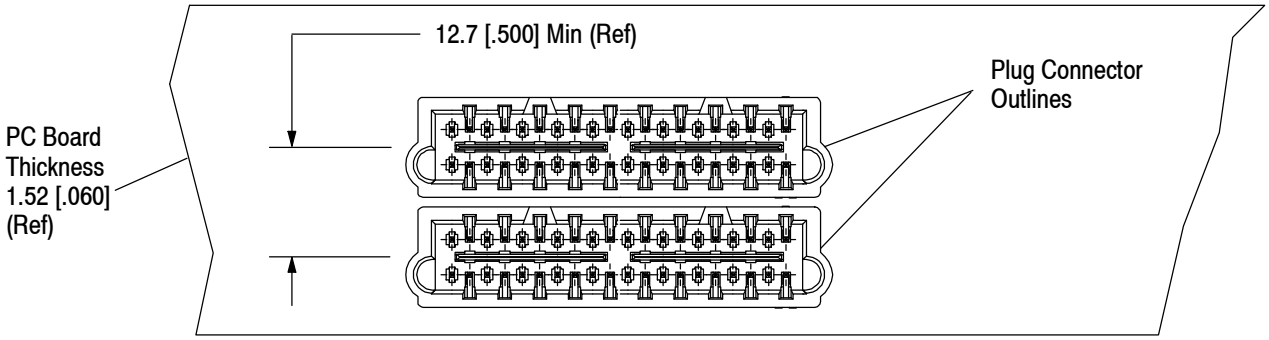
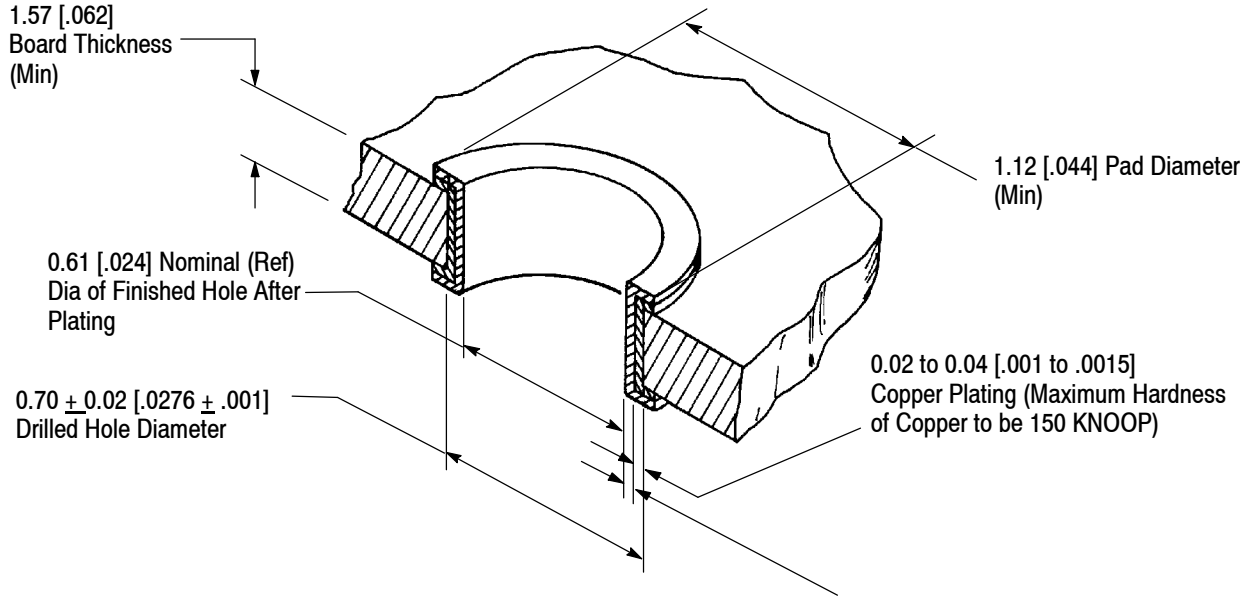


Figure 6

A. ACTION PIN Contact Holes

The holes in the pc board for ACTION PIN Contacts must be drilled and plated through to specific dimensions. See Figure 7.

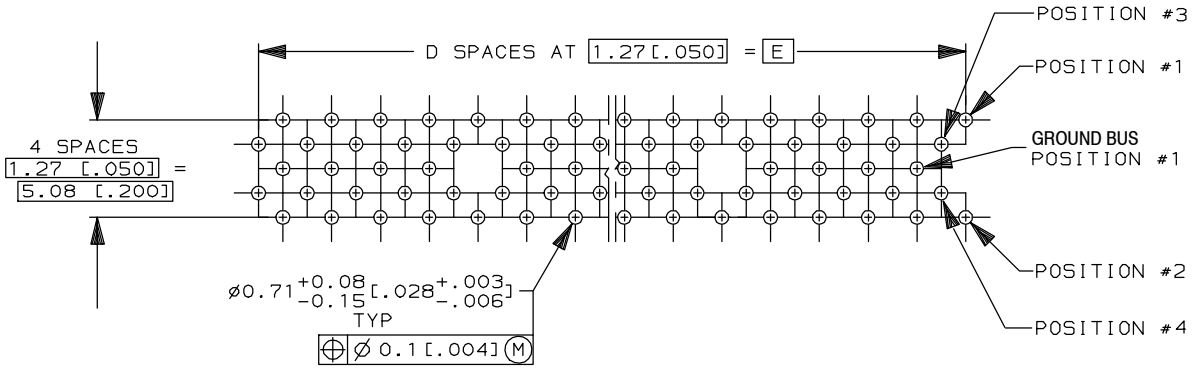


SURFACE FINISH	THICKNESS
HASL SnPb	0.004-0.010 [.00016-.00039]
Immersion Sn	0.0005 [.00002] Min
OSP	0.0002-0.0005 [.000008-.00002]
Immersion Au/Ni	0.004-0.005 [.00016-.0002 Ni, 0.0001-0.0005 [.000004-.00002] Au
Immersion Ag	0.0001 [.000004] Min

Figure 7

B. Plug Connector Layouts for ACTION PIN and Solder-Type Contacts

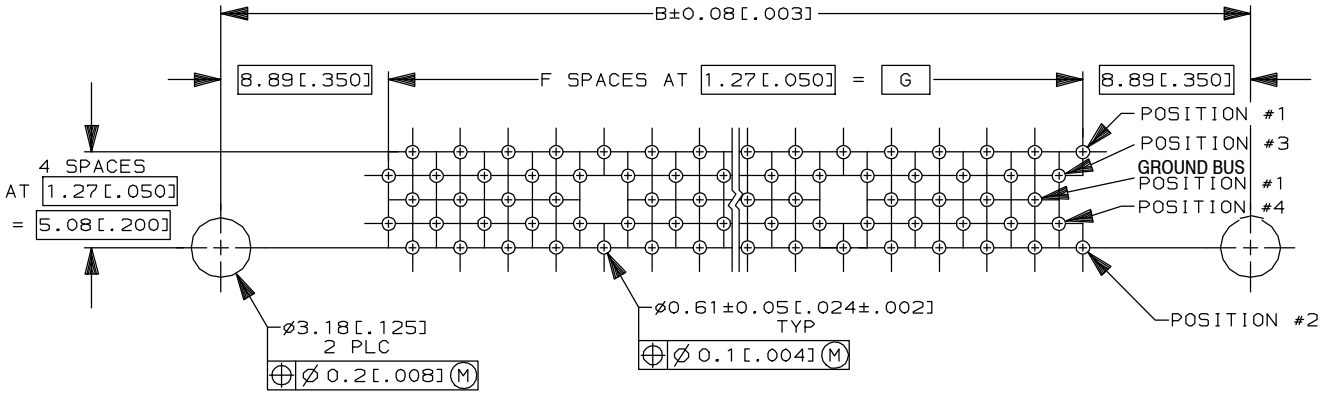
Plug connectors are available with and without mounting flanges. Those with mounting flanges are designed to be secured to the pc board with guide pins and attaching hardware. Layout patterns are provided in Figure 8.



E	D	NO OF POS
125.73[4.950]	99	200
113.03[4.450]	89	180
100.33[3.950]	79	160
87.63[3.450]	69	140
74.93[2.950]	59	120
62.23[2.450]	49	100
49.53[1.950]	39	80
36.83[1.450]	29	60
24.13[.950]	19	40

RECOMMENDED PC BOARD HOLE LAYOUT
(VIEWED FROM CONNECTOR SIDE)

Plugs without Mounting Flanges



G	F	NO OF POS
151.13[5.950]	119	240
138.43[5.450]	109	220
125.73[4.950]	99	200
113.03[4.450]	89	180
100.33[3.950]	79	160
87.63[3.450]	69	140

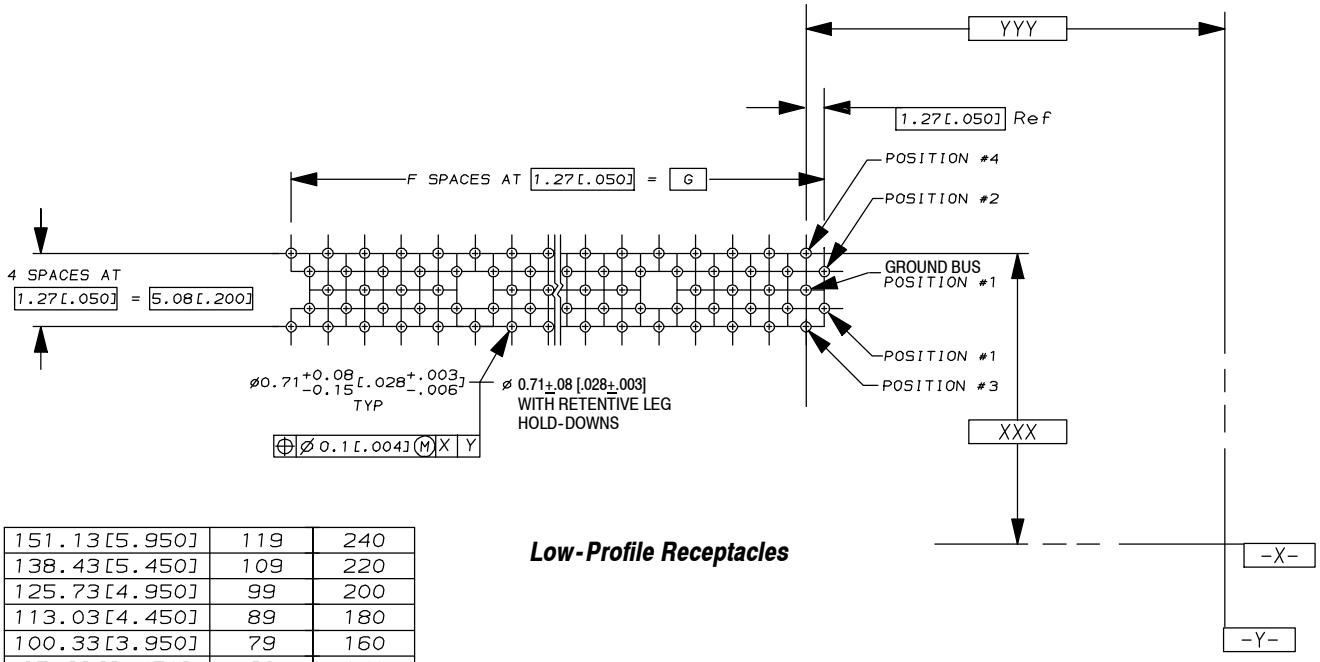
RECOMMENDED PC BOARD HOLE LAYOUT
(VIEWED FROM CONNECTOR SIDE)

Plugs with Guide Pin Mounting Flanges

Figure 8

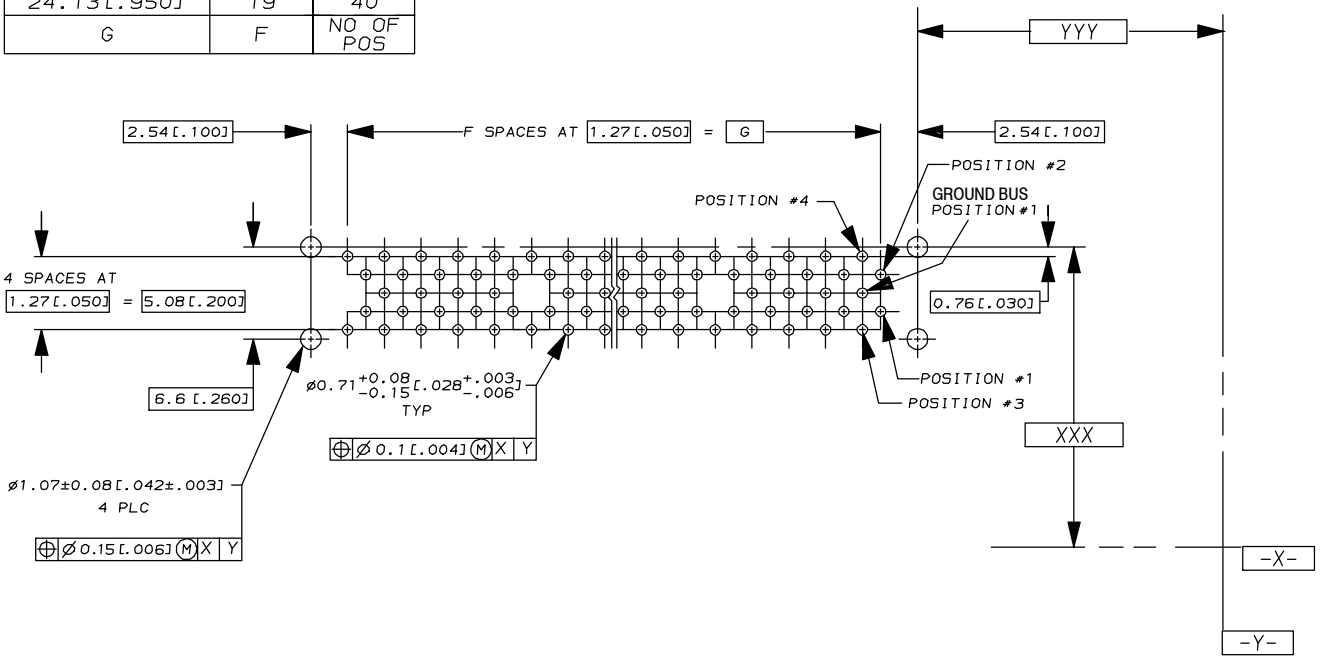
C. Vertical Receptacle Connector Layouts

Vertical receptacle connectors are available as low-profile with retentive leg hold-downs and high-profile with auxiliary outer hold-downs to stabilize and hold the connector in position for soldering. See Figure 9.



151.13[5.950]	119	240
138.43[5.450]	109	220
125.73[4.950]	99	200
113.03[4.450]	89	180
100.33[3.950]	79	160
87.63[3.450]	69	140
74.93[2.950]	59	120
62.23[2.450]	49	100
49.53[1.950]	39	80
36.83[1.450]	29	60
24.13[.950]	19	40
G	F	NO OF POS

Low-Profile Receptacles

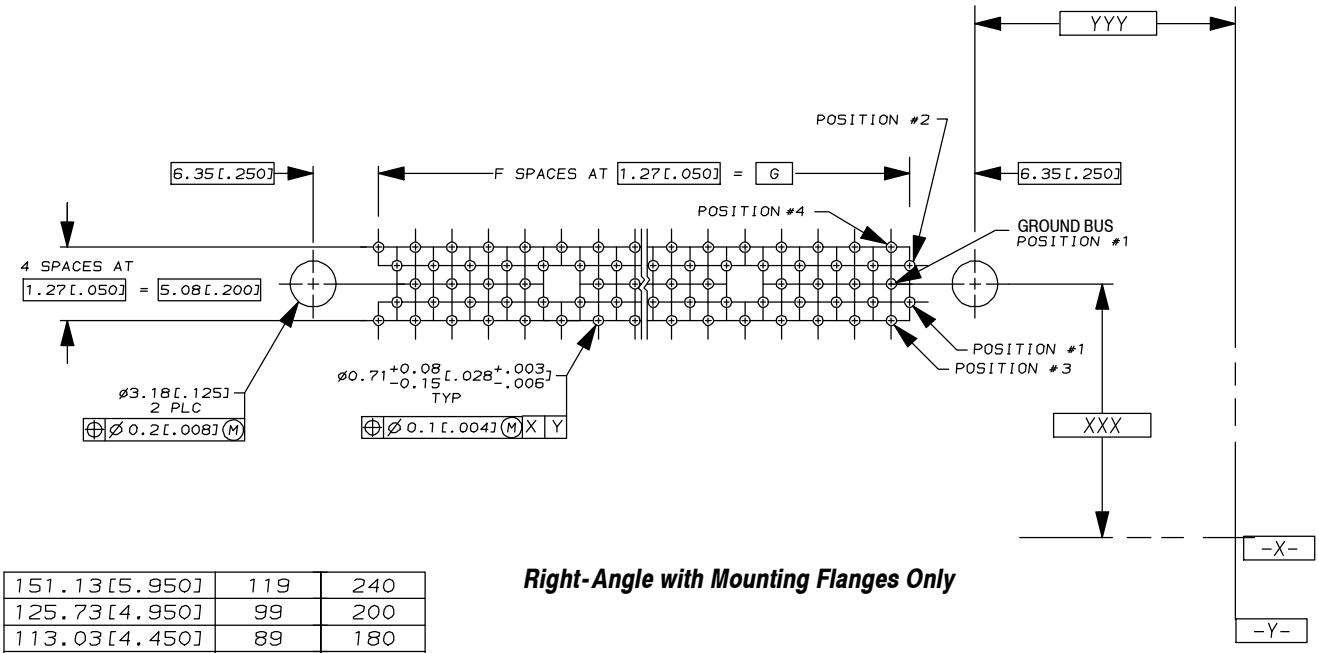


High-Profile Receptacles with Stabilizer/Hold-Down

Figure 9

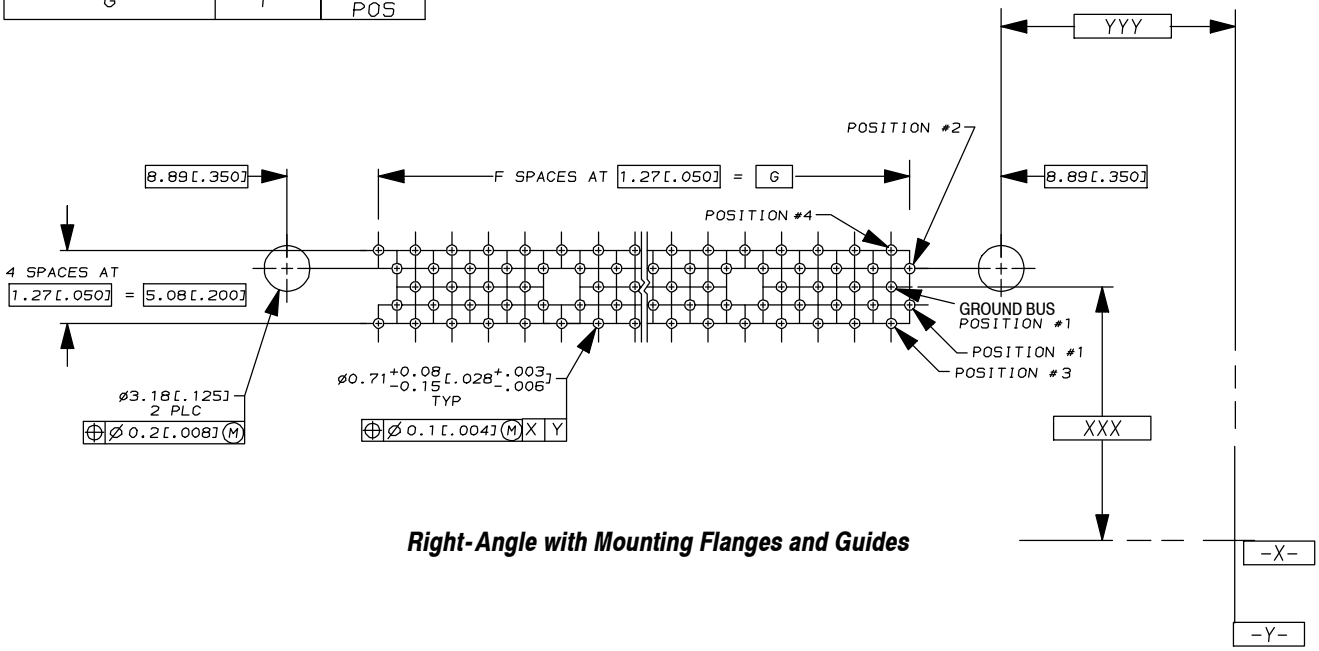
D. Right-Angle Receptacle Connector Layouts

Right–Angle Receptacles have mounting flanges and may have guides. See layout dimensions in Figure 10.



Right-Angle with Mounting Flanges Only

G	F	NO OF POS
151.13[5.950]	119	240
125.73[4.950]	99	200
113.03[4.450]	89	180
100.33[3.950]	79	160
87.63[3.450]	69	140
74.93[2.950]	59	120
62.23[2.450]	49	100
49.53[1.950]	39	80
36.83[1.450]	29	60
24.13[.950]	19	40



Right-Angle with Mounting Flanges and Guides

Figure 10

3.8. Mounting Hardware

A. Screw, Washer, and Nut Assembly

Receptacle connectors with mounting flanges are designed to be secured to the pc board with two commercially available screws, lockwashers, and nuts. The screw can be inserted from the top or bottom of the pc board. See Figure 11.

B. Guide Post 536304-2

Plug connectors with mounting flanges are designed to be secured to the pc board with two 536304–2 Guide Posts and two commercially available passivated stainless steel No. 2–56 pan head cross–recessed screws and two commercially available 0.76 mm [.030 in.] thick washers. A screw length of 6.35 mm [.250 in.] will be required for 1.57 mm [.062 in.] thick pc board. See Figure 11.

C. Guards

Customer–made guards should be designed into the system before the pc board layouts are made (Paragraph 3.6). They can be attached to the pc board with screws or any other hardware compatible with the material used in the system. See Figure 11.

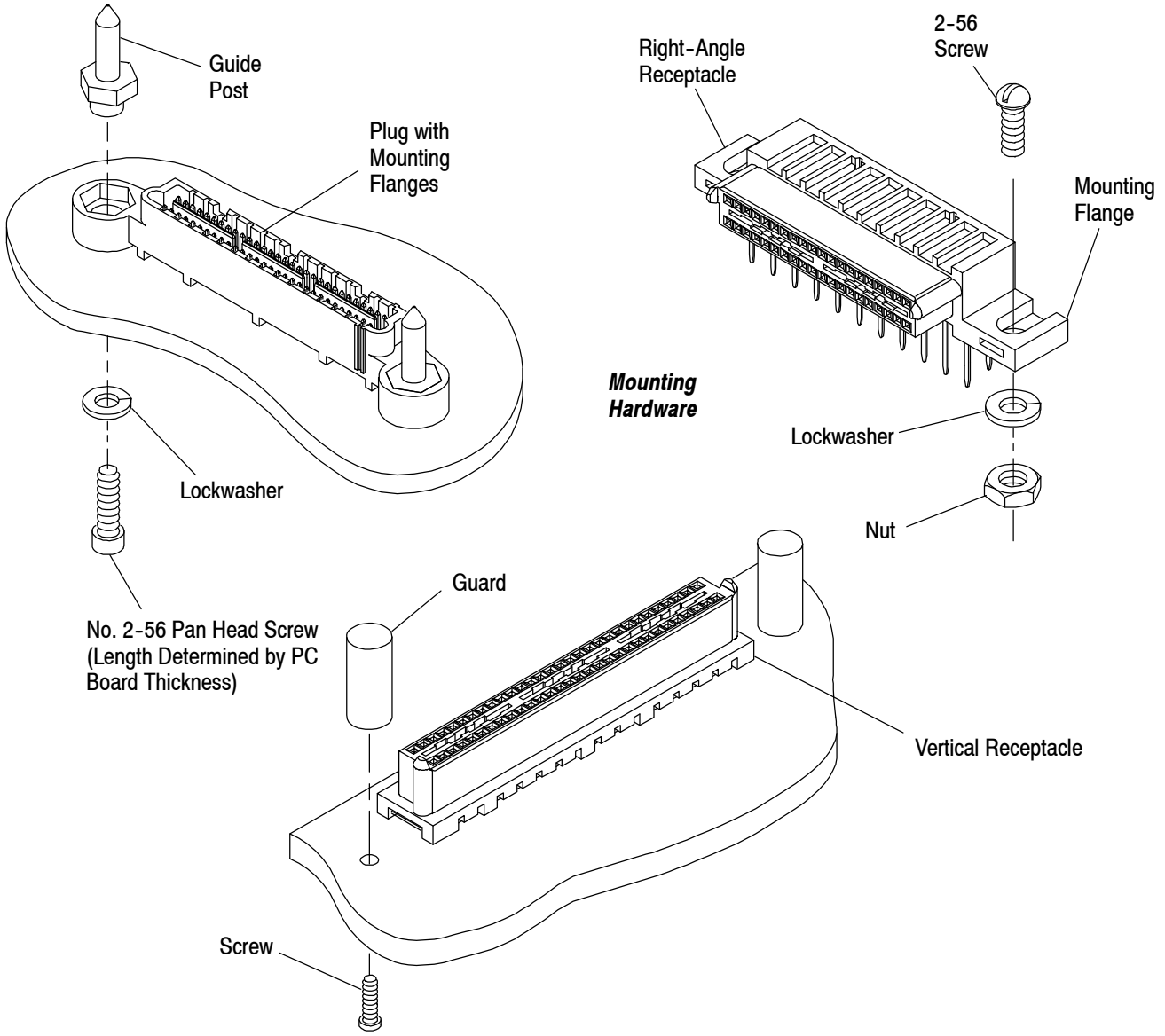


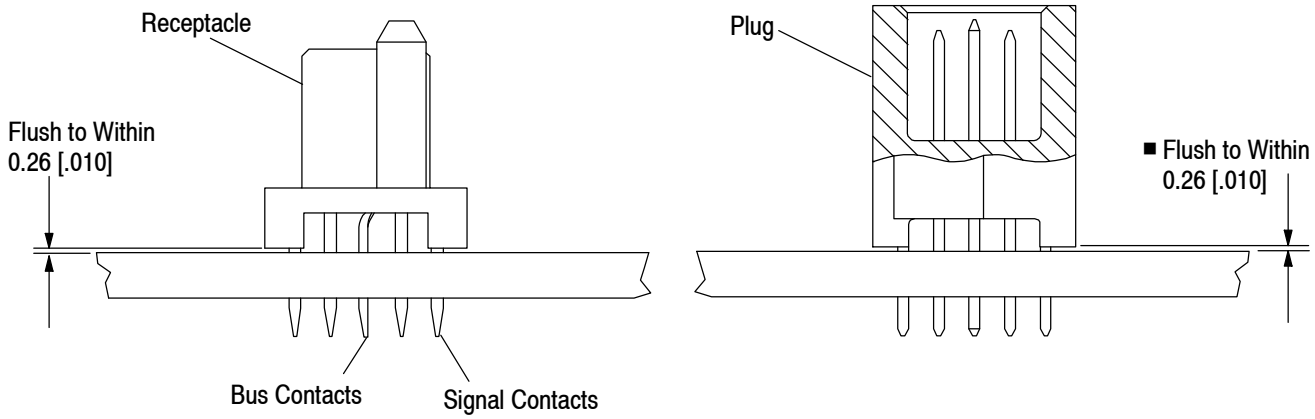
Figure 11

3.9. Placing Connector on PC Board

CAUTION

The connector should be handled only by the housing to avoid deformation, contamination, or other damage to the contact tines.

Pick up the connector by the housing. Make sure the number 1 contact is oriented to align with the number one hole in the pc board, then start the row of contacts into the pc board holes. Slowly rotate the connector to the other side while making sure all contacts enter their respective holes in the pc board, then seat the connector housing on the pc board. If installing a connector with ACTION PIN Contacts, a seating tool will be needed (refer to Paragraph 5). For proper placement on the pc board, see Figure 12.



■ ***NOTE***: This dimension applies to ACTION PIN and solder tine contacts.

Figure 12

3.10. Soldering

NOTE

Manual 402-40 provides some guidelines for establishing soldering practices.

Micro-Strip Connectors can be soldered using wave, vapor phase, or infrared reflow processes, provided the temperatures and exposure time are within the ranges specified in Figure 13.

SOLDERING PROCESS	TEMPERATURE		TIME (At Max Temp)
	CELSIUS	FAHRENHEIT	
PARTS WITH TIN-LEAD PLATED LEADS			
Wave Soldering	260†	500†	5 Seconds
Vapor Phase Soldering	215	419	5 Minutes
Convection Reflow Soldering	230	446	5 Minutes
PARTS WITH TIN PLATED LEADS			
Wave Soldering	265†	509†	5 Seconds
Vapor Phase Soldering	245	473	30 Seconds
Convection Reflow Soldering	260	500	30 Seconds

†Wave Temperature

Figure 13

A. Flux Selection

The solder tines and, if applicable, attaching hardware must be fluxed prior to soldering with a rosin base flux. Selection of the flux will depend on the type of printed circuit board and other components mounted on the board. Additionally, the flux must be compatible with the wave solder line, manufacturing, and safety requirements. Some fluxes that are compatible with these connectors are provided in Figure 14. Call the Product Information number at the bottom of page 1 for consideration of other types of flux.

FLUX TYPE	ACTIVITY	RESIDUE	COMMERCIAL DESIGNATION	
			KESTER	ALPHA
Type RMA (Mildly Activated)	Mild	Noncorrosive	185/197	611
Center (Activated)	Medium	May be Corrosive	1544, 1545, 1547	711, 809, 811

Figure 14

B. Cleaning

After soldering, removal of fluxes and activators is necessary. Consult the supplier of the solder and flux for recommended cleaners. Common organic and aqueous cleaners that these connectors can be exposed to for a period of 5 minutes at 40.5°C [105°F] with no harmful effect are provided in Figure 15.

Cleaners must be free of dissolved flux and other contaminants. We recommend cleaning with the pc board on its edge. If using an aqueous cleaner, we recommend standard equipment such as a soak–tank or an automatic in–line machine

DANGER

Consideration must be given to toxicity and other safety and health requirements as recommended in the Material Safety Data Sheet (MSDS) supplied by the solvent manufacturer.

CLEANER		TIME (Minutes)	TEMPERATURES (Maximum)	
NAME	TYPE		CELSIUS	FAHRENHEIT
ALPHA 2110	Aqueous	1	132	270
BIOACT EC-7	Solvent	5	100	212
Butyl CARBITOL	Solvent	1	Room Ambience	
Isopropyl Alcohol	Solvent	5	100	212
KESTER 5778	Aqueous	5	100	212
KESTER 5779	Aqueous	5	100	212
LONCOTERGE 520	Aqueous	5	100	212
LONCOTERGE 530	Aqueous	5	100	212
Terpene Solvent	Solvent	5	100	212

Figure 15

C. Drying

Air drying of cleaned connectors is recommended. Temperature for the connectors should not exceed –55 to 105°C [–67 to 221°F]. Degradation of the housings could result from extreme temperatures.

3.11. Repair

Connectors with damaged solder–type contacts can not be repaired. The solder must be removed and the entire connector replaced. Connectors with damaged ACTION PIN Contacts can be repaired by removing the damaged contact(s) and replacing it using the tool kit provided in Paragraph 5 and the appropriate replacement contact, of which there are three: offset, straight, and bus. When extracting or inserting contacts, make sure you use a backup plate suitable to support the housing with a slot or hole deep enough to receive the contact.

NOTE

The extraction of contacts removes some of the pc board material. We recommend three times as the maximum number of times that a contact should be extracted and replaced in any one cavity.

4. QUALIFICATIONS

Micro–Strip Connectors are Listed by Underwriters Laboratories Inc. (UL) in File E28476 and Certified to CSA International in File LR7189.

5. TOOLING

The only tooling needed for Micro-Strip Connectors is that which is required for the ACTION PIN Contact Connectors. This tooling includes seating tools, board supports (customer-supplied), power source machines, and individual contact replacement tooling. See Figure 16.

5.1. Connector Installation Tooling

Seating Tools are designed to fit the conformation of the connector so that the machine force will push evenly on all contacts simultaneously. A pc board support plate must be constructed to the configuration of your pc board to provide support when insertion force is applied to the connector.

The maximum insertion force to install a Micro-Strip ACTION PIN is 133.45 N [30 lb.].

5.2. Contact Replacement Tooling

Contact Replacement Tooling consists of an impact tool with interchangeable signal contact removal and contact replacement tips, and bus contact removal/replacement tip. The support must have a hole or slot sufficient to receive the contact. An illustration of the tooling, the tooling part numbers, and instruction material references are provided in Figure 16.

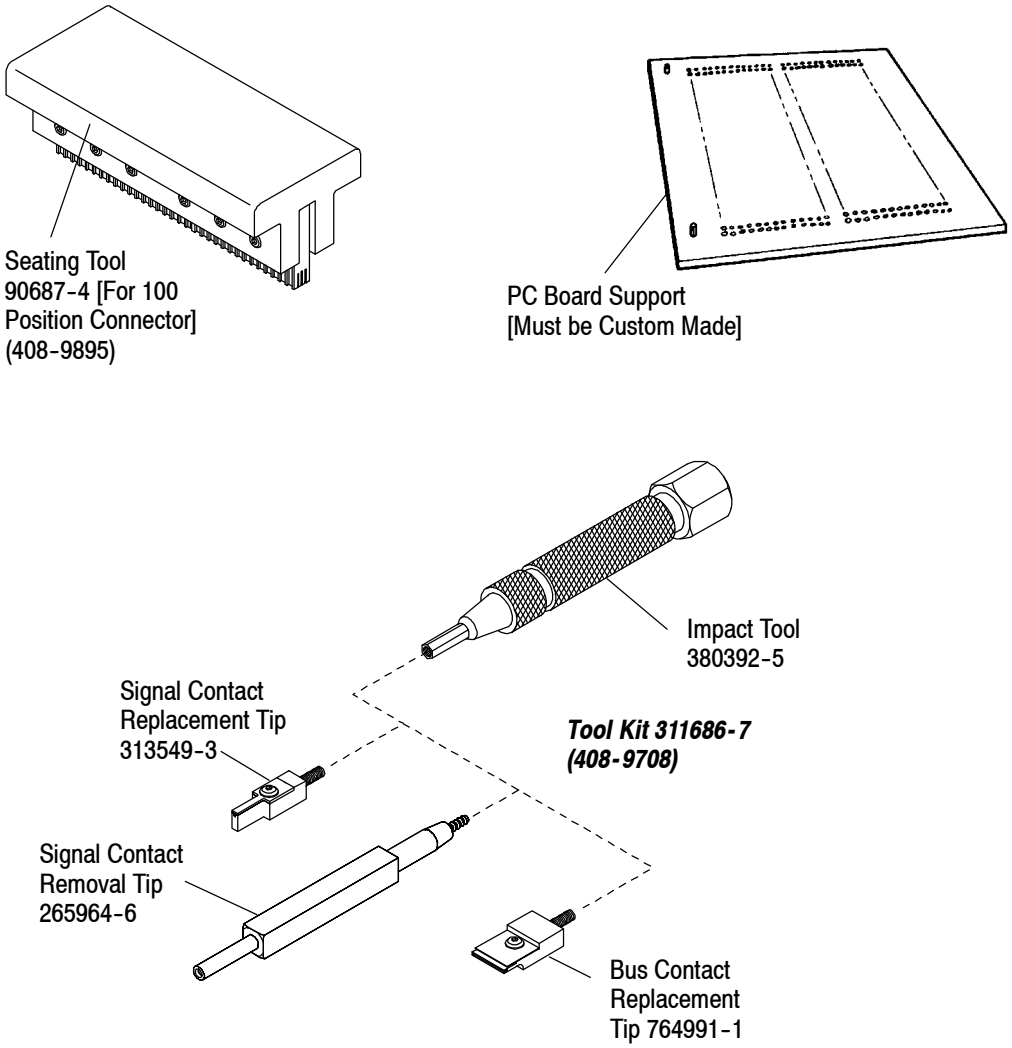


Figure 16

6. VISUAL AID

The following illustration provided in Figure 17 is to be used by production personnel to ensure properly applied product. The view suggests requirements for good terminations. Applications that appear visually incorrect should be inspected using the information on the preceding pages of this specification.

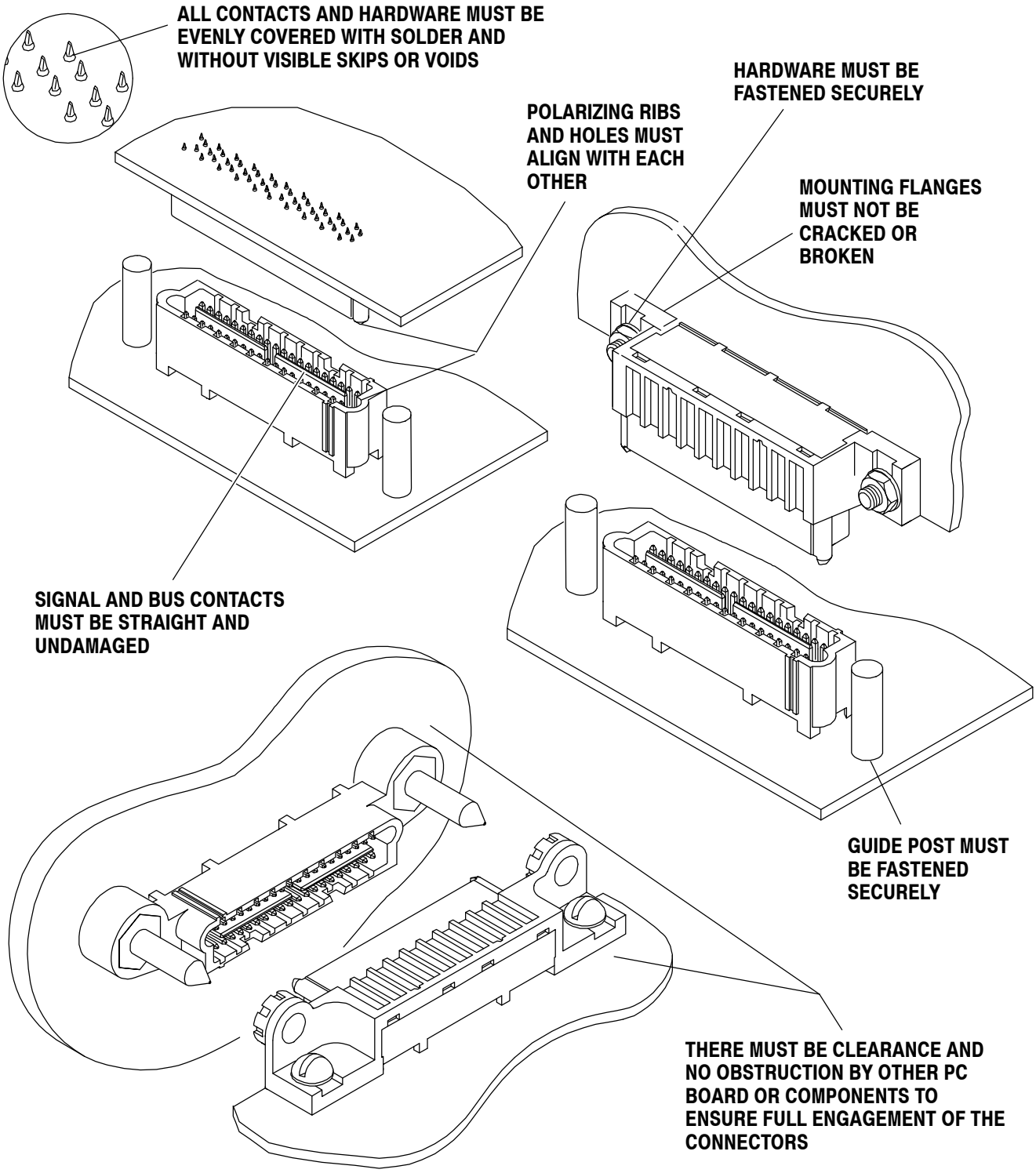


FIGURE 17. VISUAL AID