

REV	REASON	TBC (Twin Beam Contact) PLUS INTERCONNECTION SYSTEM	ENGINEERING RELEASE DATE
			9-7-90
			APPROVAL TOM CLARK

## 1. INTRODUCTION

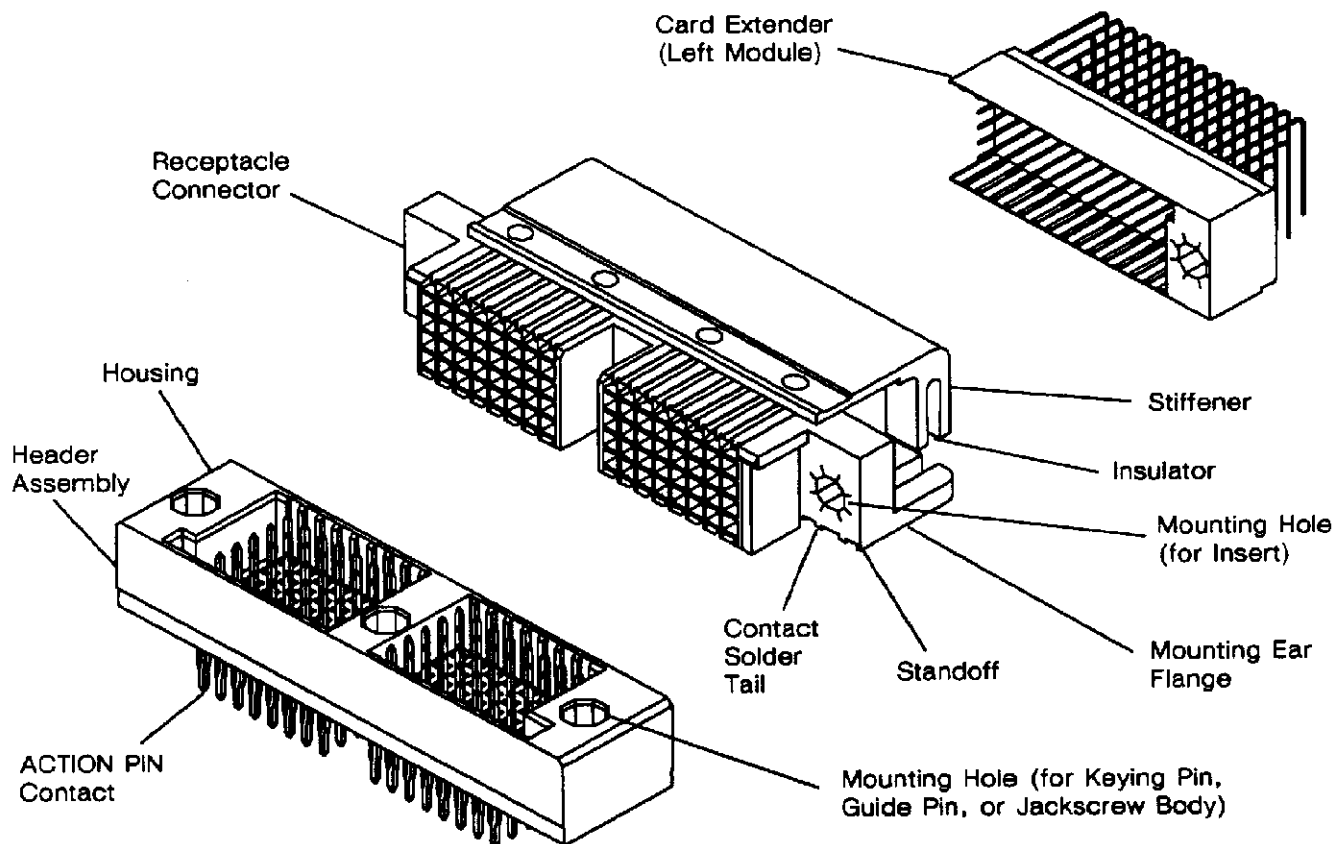
This specification covers the requirements for application of the AMP\* TBC Plus Interconnection System which includes Pin Header and Receptacle Connectors. All have six rows of twin beam contacts on .100 inch centers and a variety of contact positions. They are available in one-piece and modular configurations for multi-layer printed circuit (pc) board applications.

Pin headers are available with straight contacts that have split posts (ACTION PIN\*) or solder-type tails of various heights to provide four-level sequencing of ground, power, and signals. They are also available with right-angle solder tail contacts for card (pc board) extender applications. They may be placed on the pc board by hand or by automatic machine. Those with ACTION PIN contacts must be seated with a seating tool.

Receptacle connectors are available with right-angle solder-type contact tails for solder applications. They are designed to be placed on the pc board by hand. See Figure 1 for product features that will be referenced in this specification.

### NOTE

*All dimensions presented in this document are in inches unless otherwise specified. All dimensional tolerances are  $\pm .005$  and angular tolerances are  $\pm 3^\circ$  unless otherwise specified. Metric equivalents (mm) can be calculated by multiplying the given dimension by 25.4.*



**Fig. 1. Product Features**

## 2. REFERENCE MATERIALS

### 2.1. Customer Assistance

Reference part number 535919 and product code 5619 are representative numbers that identify the AMP TBC Plus Header and Receptacle Product Line. These numbers are used in the AMP network of customer services to access tooling and product application information. This service is provided by your local AMP representative (Field Sales Engineer, Field Application Engineer, etc) or, after purchase, by calling the CUSTOMER SERVICE number at the top of the first page.

### 2.2. Engineering Drawings

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

### 2.3. Specifications

AMP Product Specification 108-1188 outlines product test performance information.

### 2.4. Instructional Material

There is an AMP Customer Manual (CM) and several AMP Instruction Sheets to assist you in the assembly and repair of these headers and receptacles. CM 5567 provides machine setup and operation for the power unit recommended for seating headers with ACTION PIN Contacts on a pc board. IS 9543 provides information for the seating tools that are used in the machine to seat the connectors onto the pc board; IS 9141 provides information on the alignment tools recommended for hand insertion of these connectors and headers; and IS 6921, IS 9142, and IS 9185 provide procedures for removal and replacement of contacts.

AMP Corporate Bulletin No. 52 is available upon request and can be used as a guide in soldering. This bulletin provides information on various flux types and characteristics along with the commercial designation and flux removal procedures. A checklist is attached to the bulletin as a guide for information on soldering problems.

## 3. REQUIREMENTS

**CAUTION**

*The connectors should be kept in their shipping container until ready for use, to prevent deformation of the contact solder tails. Care must be used to prevent deformation of contacts after connectors are removed from their protective container.*

### 3.1. Printed Circuit Board

#### A. PC Board Thickness

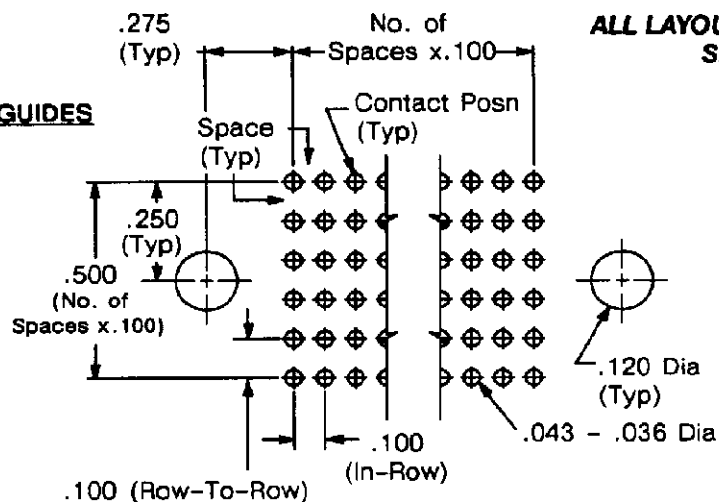
1. Headers are available with two different contact styles and will accommodate different pc board thicknesses:
  - (a) ACTION PIN contact tails require a minimum printed circuit board thickness of .084.
  - (b) Solder contact tails are available in  $.120 \pm .010$  length.
2. Receptacles are available with contact solder tails in lengths of  $.165 \pm .010$  and  $.185 \pm .010$  below the housing standoff. Printed circuit board thickness will determine the contact tail length to use.

#### B. Circuit Pattern Layout

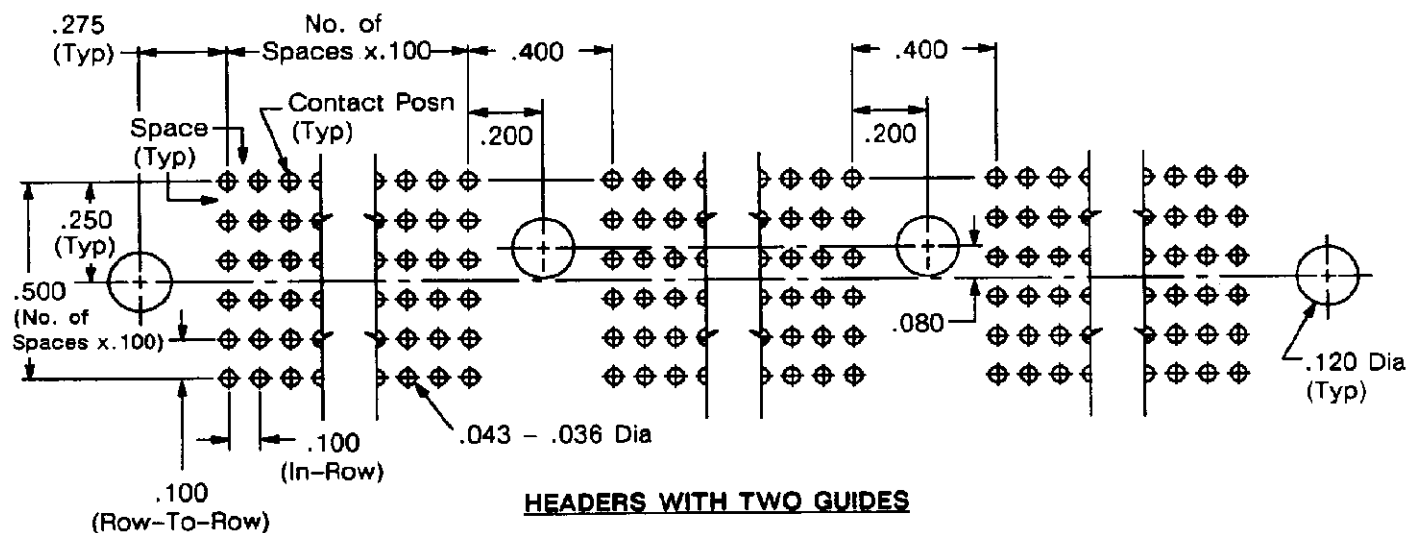
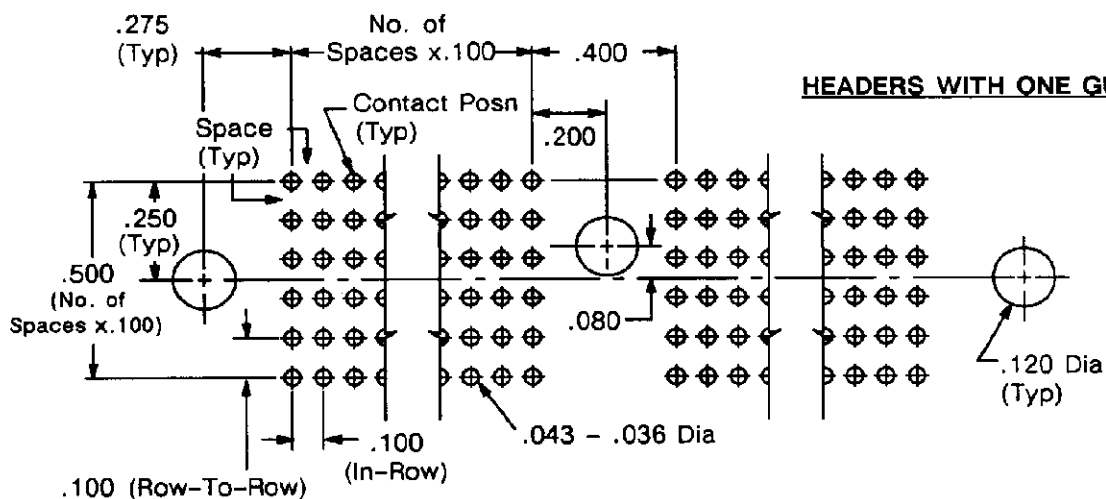
There are printed circuit board layouts for the four basic connector configurations:

- Headers with straight solder tails
- Headers with straight ACTION PIN tails
- Headers with right-angle solder tails for card extender applications
- Receptacles with solder tails

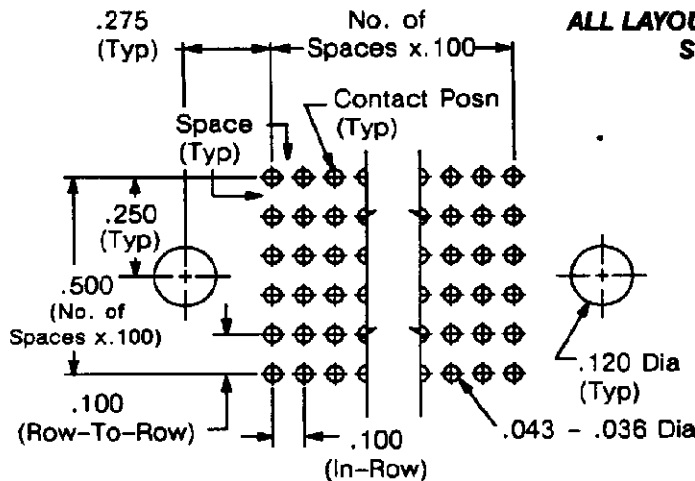
Determine the type of connector to be used, then select appropriate printed circuit board layout from Figure 2, 3, 4, or 5.

**HEADERS WITH NO GUIDES**

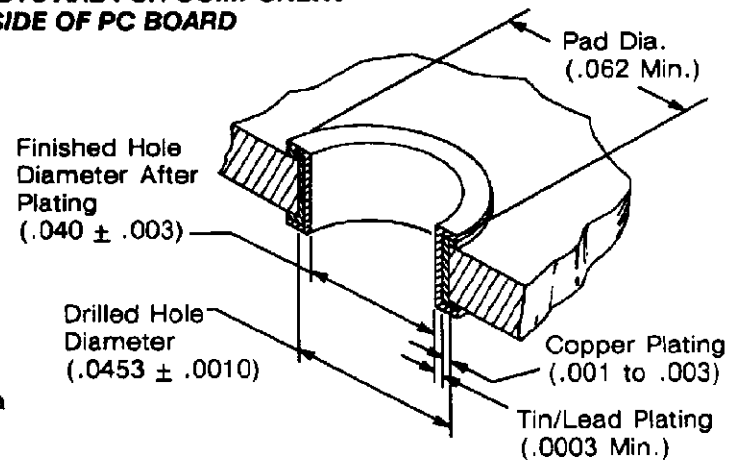
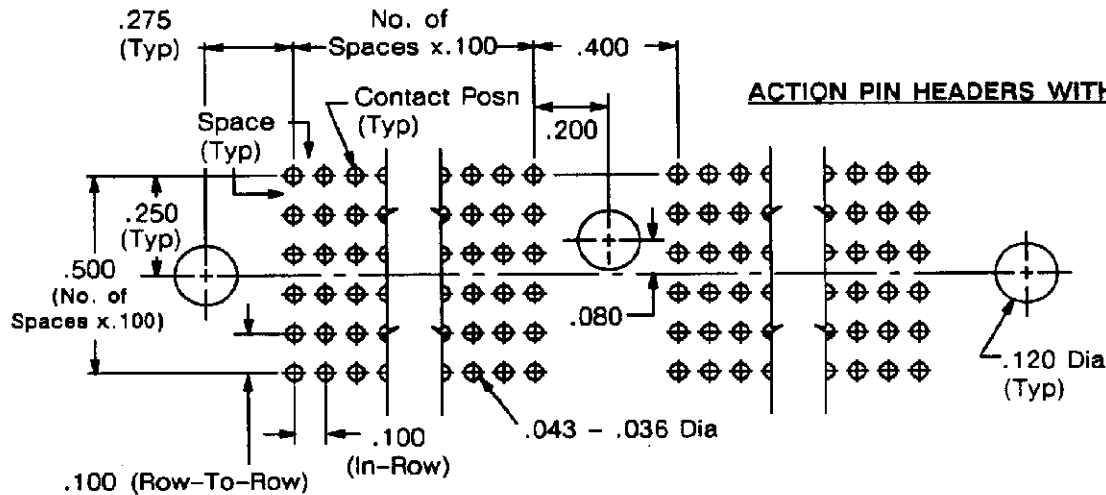
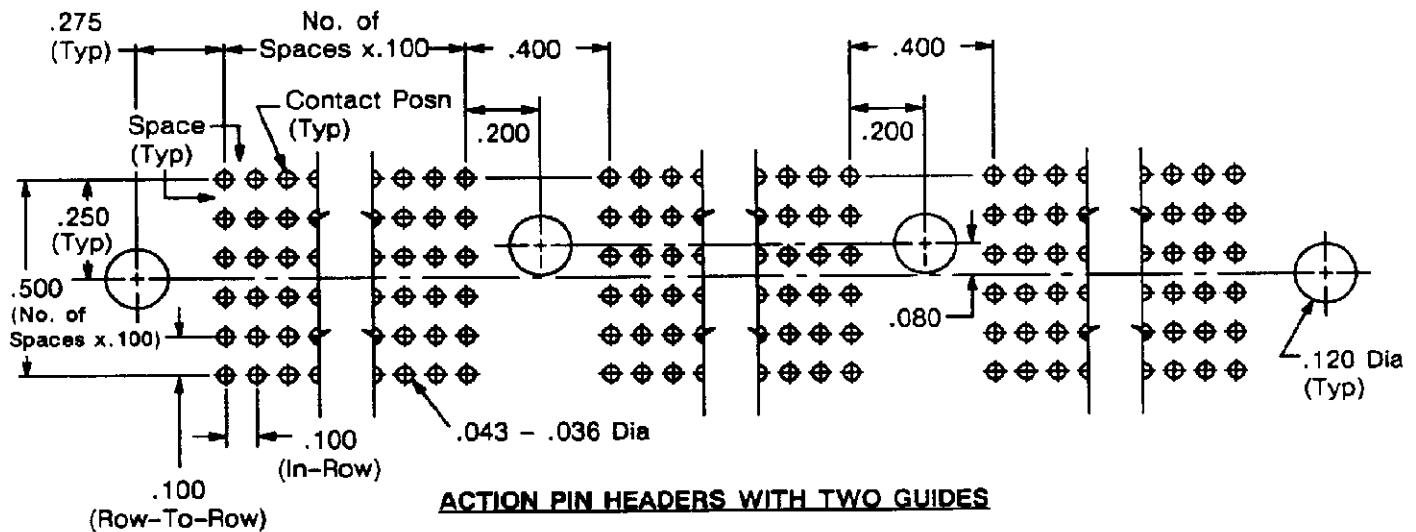
**ALL LAYOUTS ARE FOR COMPONENT  
SIDE OF PC BOARD**

**HEADERS WITH ONE GUIDE**

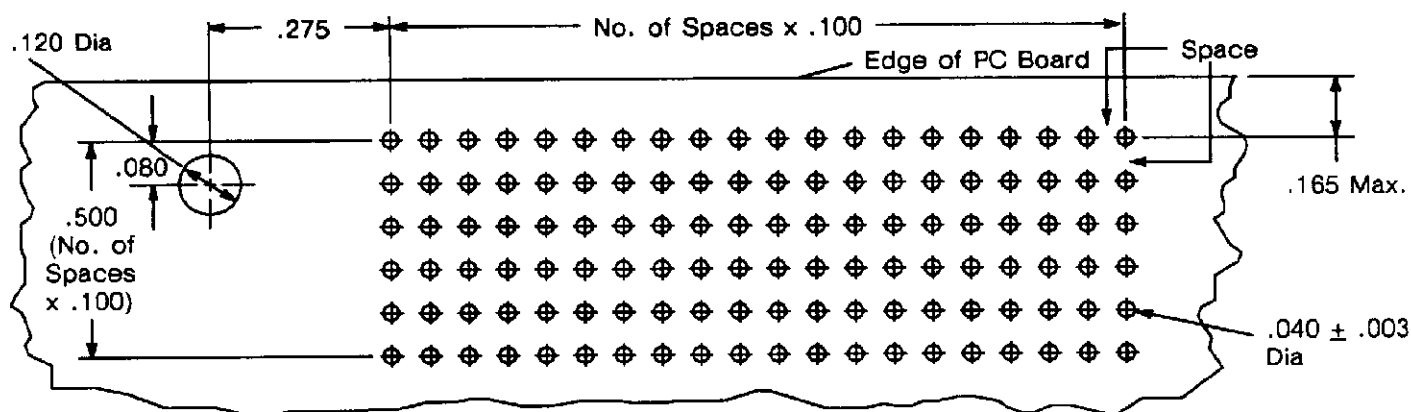
**Fig. 2. Headers with Straight Solder Tails**

**ACTION PIN HEADERS WITH NO GUIDES**

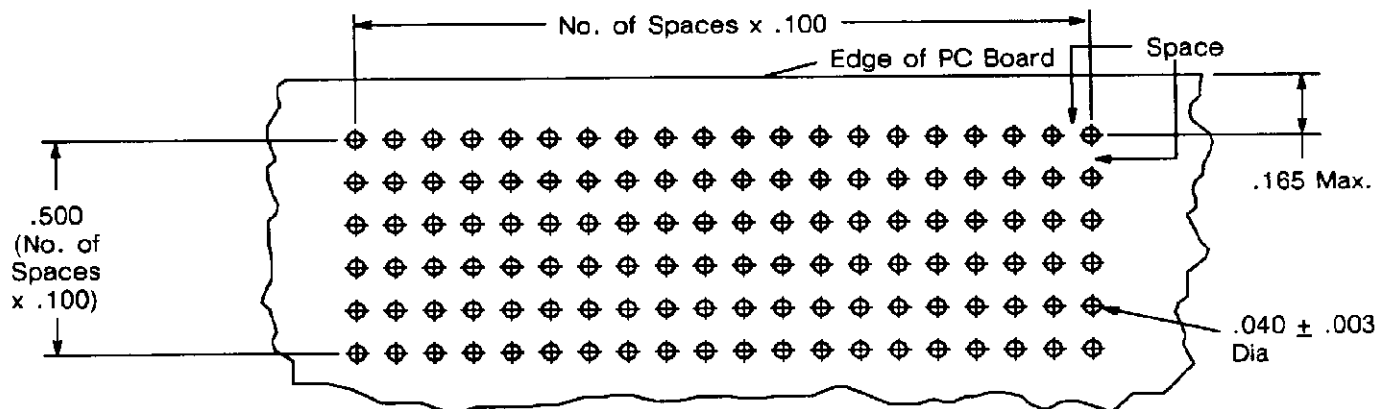
**ALL LAYOUTS ARE FOR COMPONENT  
SIDE OF PC BOARD**

**ACTION PIN HOLE REQUIREMENTS****ACTION PIN HEADERS WITH ONE GUIDE****ACTION PIN HEADERS WITH TWO GUIDES****Fig. 3. Headers with ACTION PIN Contact Tails**

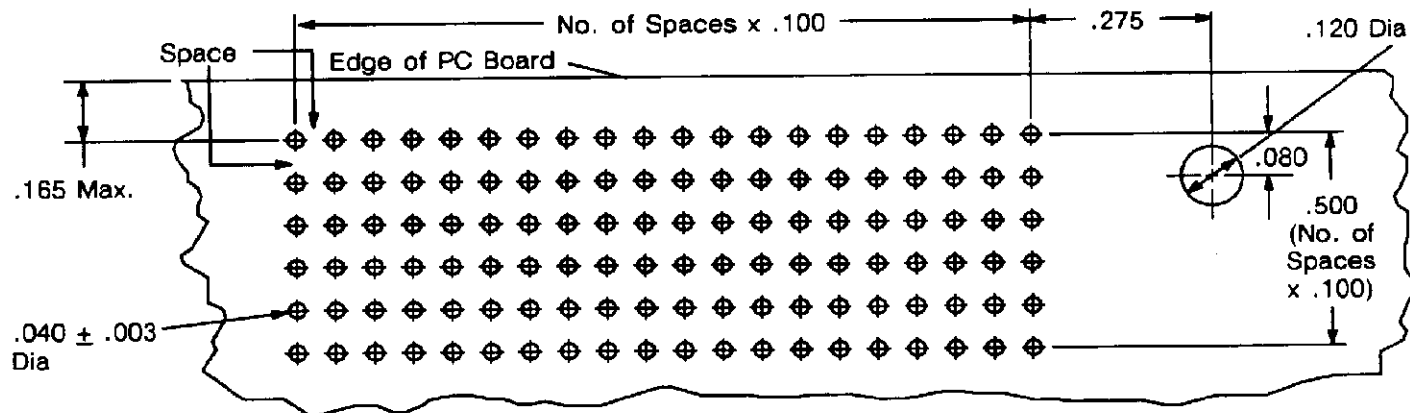
**ALL LAYOUTS ARE FOR COMPONENT  
SIDE OF PC BOARD**



**LEFT MODULE CARD EXTENDER WITH RIGHT-ANGLE SOLDER TAIL CONTACTS AND NO GUIDES**



**CENTER MODULE CARD EXTENDER WITH RIGHT-ANGLE SOLDER TAIL CONTACTS AND ONE GUIDE**

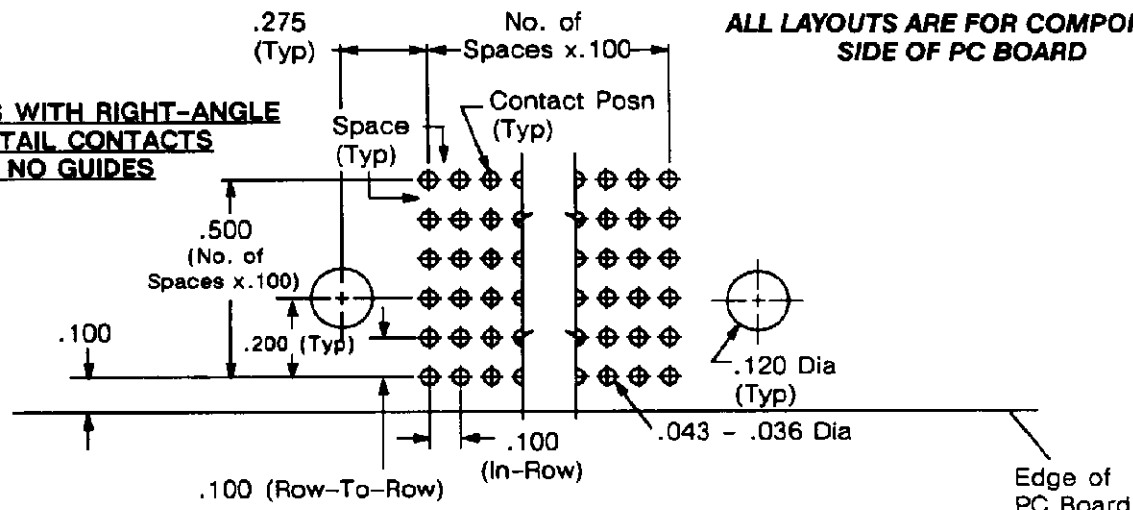


**RIGHT MODULE CARD EXTENDER WITH RIGHT-ANGLE SOLDER TAIL CONTACTS AND TWO GUIDES**

**Fig. 4. Headers with Right-Angle Solder Tails for Card Extender Applications**

ALL LAYOUTS ARE FOR COMPONENT  
SIDE OF PC BOARD

**RECEPTACLES WITH RIGHT-ANGLE  
SOLDER TAIL CONTACTS  
AND NO GUIDES**



**RECEPTACLES WITH RIGHT-ANGLE  
SOLDER TAIL CONTACTS  
AND ONE GUIDE**

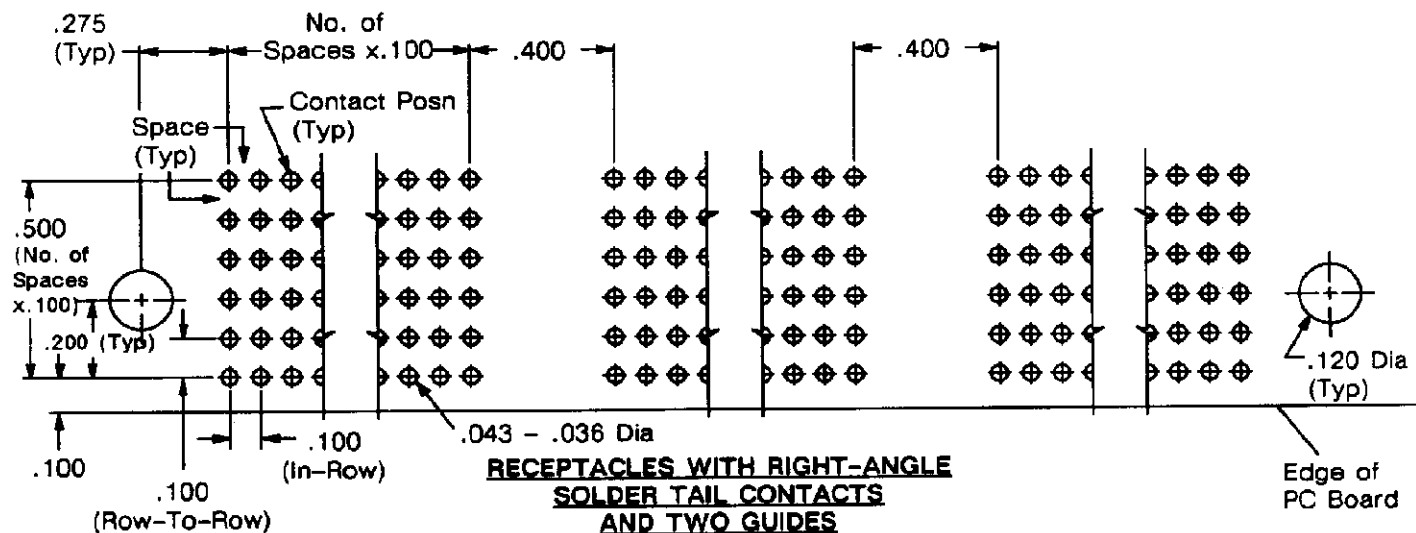
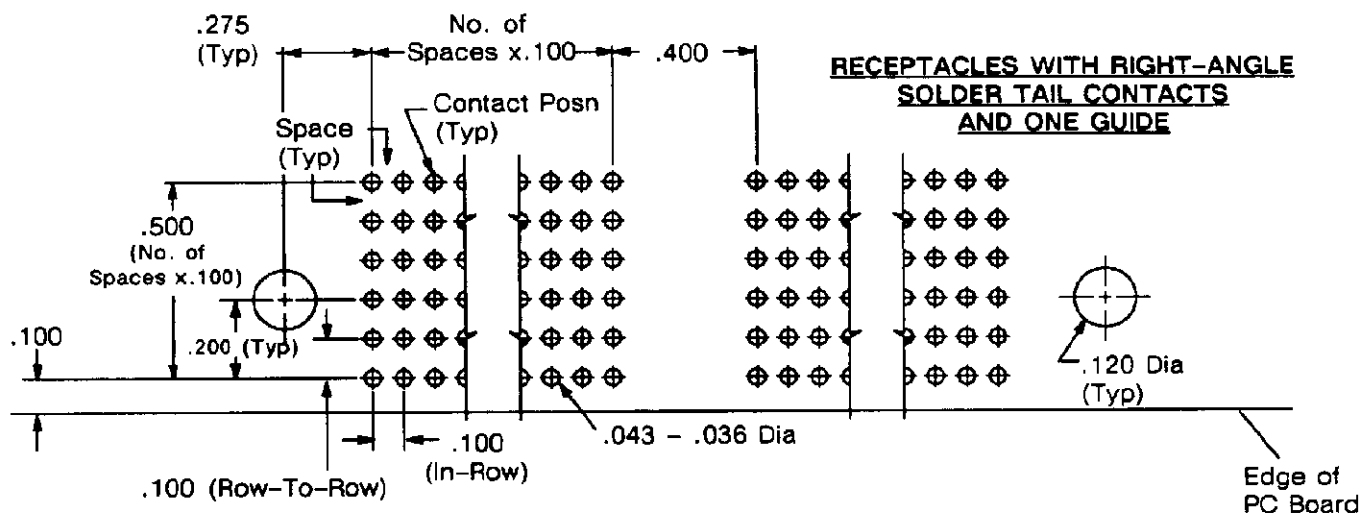


Fig. 5. Receptacles with Solder Tails

### 3.2. Polarization and Keying

The pin headers have two polarizing slots and the receptacles have two tabs that prevent inadvertent engagement of assemblies. Keying pins and inserts, capable of providing eight different positions each, are available to prevent mating of headers and receptacles of identical size that may be used in the same area. See Figure 6.

#### NOTE

*When securing headers and receptacles to a pc board, tighten screws and/or nuts to a torque value of 3 in.-lb.*

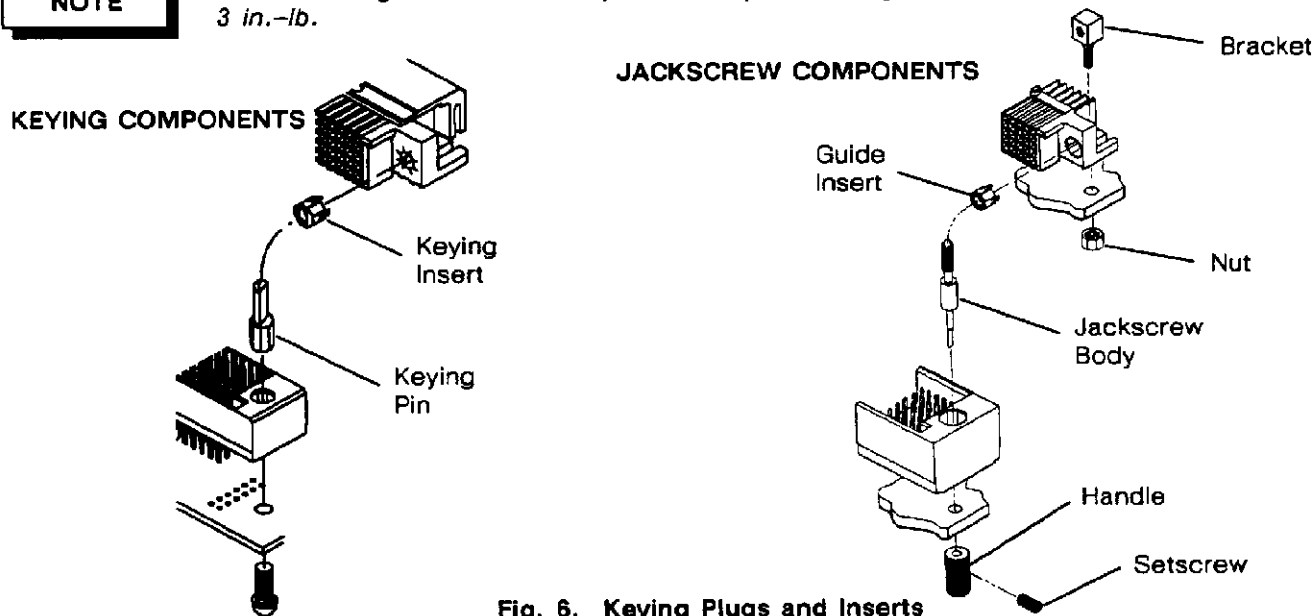


Fig. 6. Keying Plugs and Inserts

### 3.3. Guide Pins

Guide pins are available to help align headers and receptacles during mating. They are especially helpful when several connectors of varying sizes are used in a confined area where keying is not a requirement. They can not be used in place of, or with keying plugs and inserts. See Figure 7.

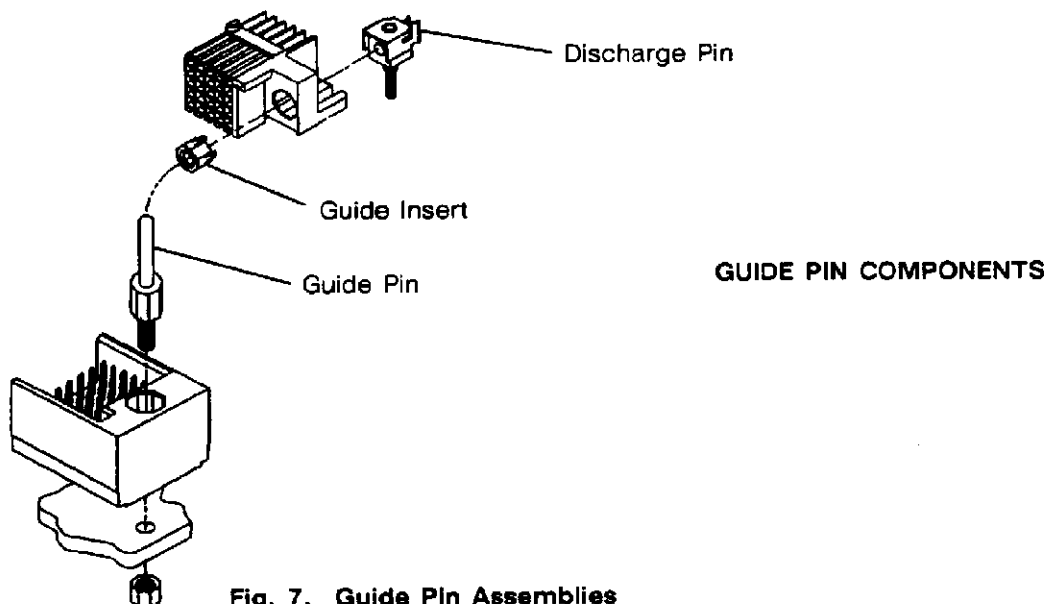


Fig. 7. Guide Pin Assemblies

### 3.4. Attaching Hardware

Commercially available hardware such as screws and nuts or rivets are recommended for securing receptacle connectors to a pc board. They may also be used to secure the headers to a pc board when keying plugs and pins or guide pin assemblies are not used.

### 3.5. Soldering Process

Connectors must be soldered to the pc board. See Instructional Material in Paragraph 2.4 for available soldering guide.

#### A. Connector Placement

Placement of headers and receptacles on the pc board can be done by picking them up by the sides of the housing and carefully positioning the contacts in the alignment tool, referenced in Paragraph 5, as described in the instruction sheet packaged with the tool. After the tool is removed, seat the header or receptacle housing on the pc board before soldering the contact tails. (Soldering is not required for ACTION PIN contact tails.)

#### B. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder and flux for recommended cleaning solvents. The following is a listing of common cleaning solvents that will not affect the connectors for a period of 5 minutes at 105°F.

1,1,1-Trichlorethane

Dow Prelete●

Allied Genesolv■

Freon TMS†

Freon TA†

Freon TE†

Freon TF†

Freon TMC†

● Designation of Dow Chemical Company

■ Designation of Allied-Signal, Inc.

† Designation of DuPont

#### C. Drying

When drying cleaned assemblies and printed circuit boards, make certain that temperature limitations of -55° to 105° C are not exceeded. Excessive temperatures may cause housing degradation.

### 3.6. Repair

Header assemblies can be repaired without removing them from the pc board, using the AMP Removal and Replacement Tools and Instruction Sheets referred to in Paragraph 5 and Paragraph 2.4 respectively. Use a standard AMP solder tail or ACTION PIN contact to replace damaged ACTION PIN Contacts.

One-piece receptacle connectors can not be repaired. However, modular connectors can be repaired. If a module in a modular system is damaged beyond use, it must be removed from the pc board and replaced with an undamaged one as follows:

1. Remove plastic heat stake lugs from aluminum stiffener by milling/drilling a .150 diameter hole to a depth of .015 at the center point of each stake lug.
2. Remove hardware securing the connector to the pc board and any keys or guide pins from the connector.
3. Gently pry the aluminum stiffener from the connector with a standard flat blade screwdriver or similar type tool. Use care to prevent damage to the pc board.
4. Remove solder securing the contacts in the pc board using any standard solder heat and removal technique.
5. Replace the damaged connector with an undamaged one of the same type and size.
6. If guide pins or keying pins and keying inserts were installed on the damaged connector, replace them with new ones.
7. Place the aluminum stiffener on the connector assembly and secure with mounting screws. Heat staking of the replacement connector to the pc board is not necessary.
8. Solder the connector to the pc board using a standard soldering technique.



#### 4. QUALIFICATIONS

AMP TBC Plus Connectors are in the process of agency approval.

#### 5. TOOLING (Figure 8)

##### A. Installations

Cam actuated alignment tools with the base part number of 58302 are designed for ease of placing the contact tails in the tool and supporting them until the tails have started into the pc board. Seating tools with the base part number of 58411 are designed to insert headers with ACTION PIN Contacts.

##### B. Removal and Replacement

ACTION PIN Removal Tool 58209-1 is designed to remove the contacts without removing the header from the pc board and Replacement Kit 265871-1 is designed for the replacement of contacts. The housing and pc board must be supported when removing and installing contacts.

**NOTE**

*Use the instruction material packaged with the tools (reference in Paragraph 2.4) for proper use.*

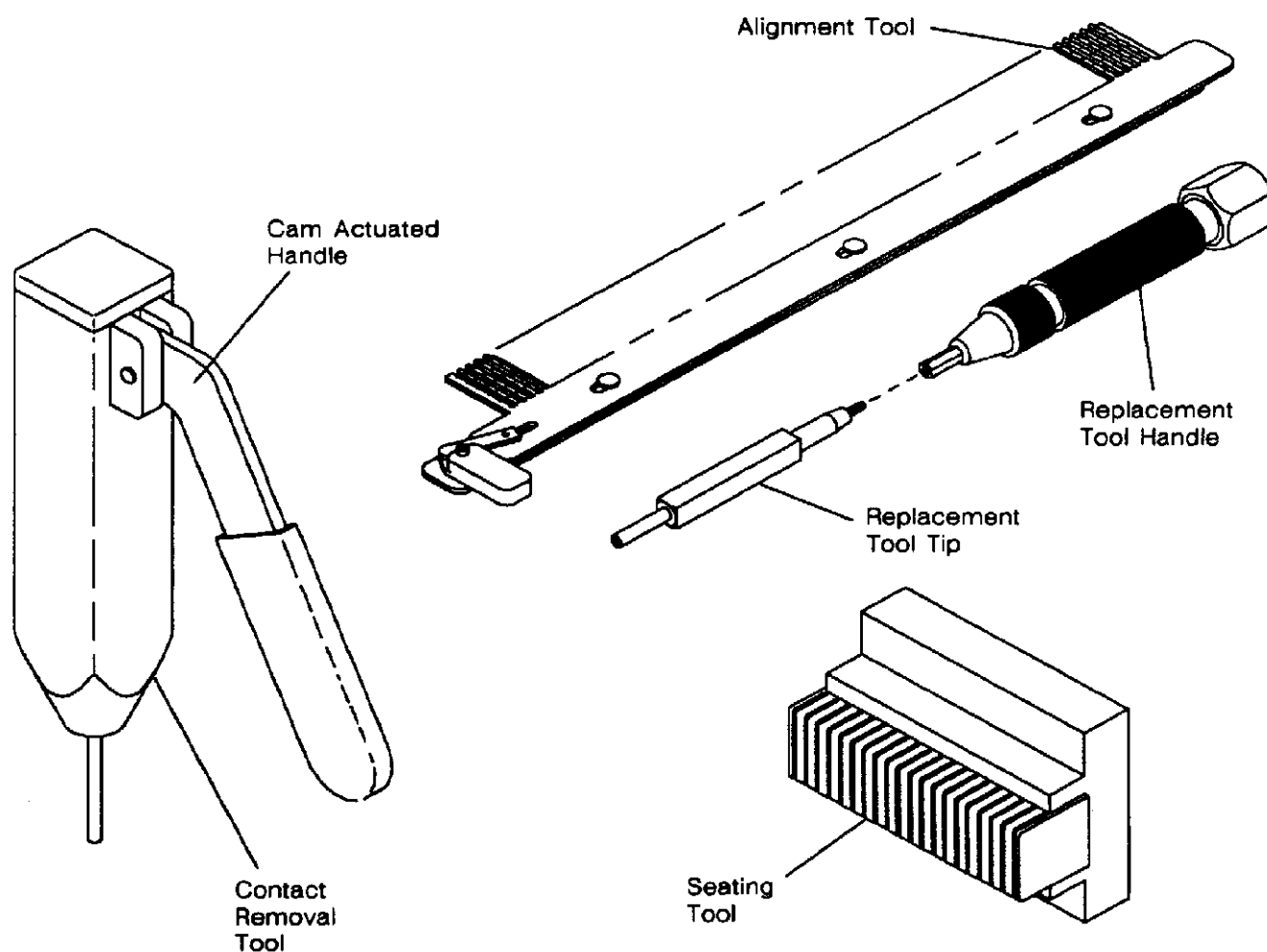


Fig. 8. Tooling

## 6. VISUAL AID

The following illustration shows a typical application of an AMP TBC Plus Connector and calls out the conditions that production personnel should check to ensure a good installation. For dimensional inspection, refer to the details in the preceding pages of this specification.

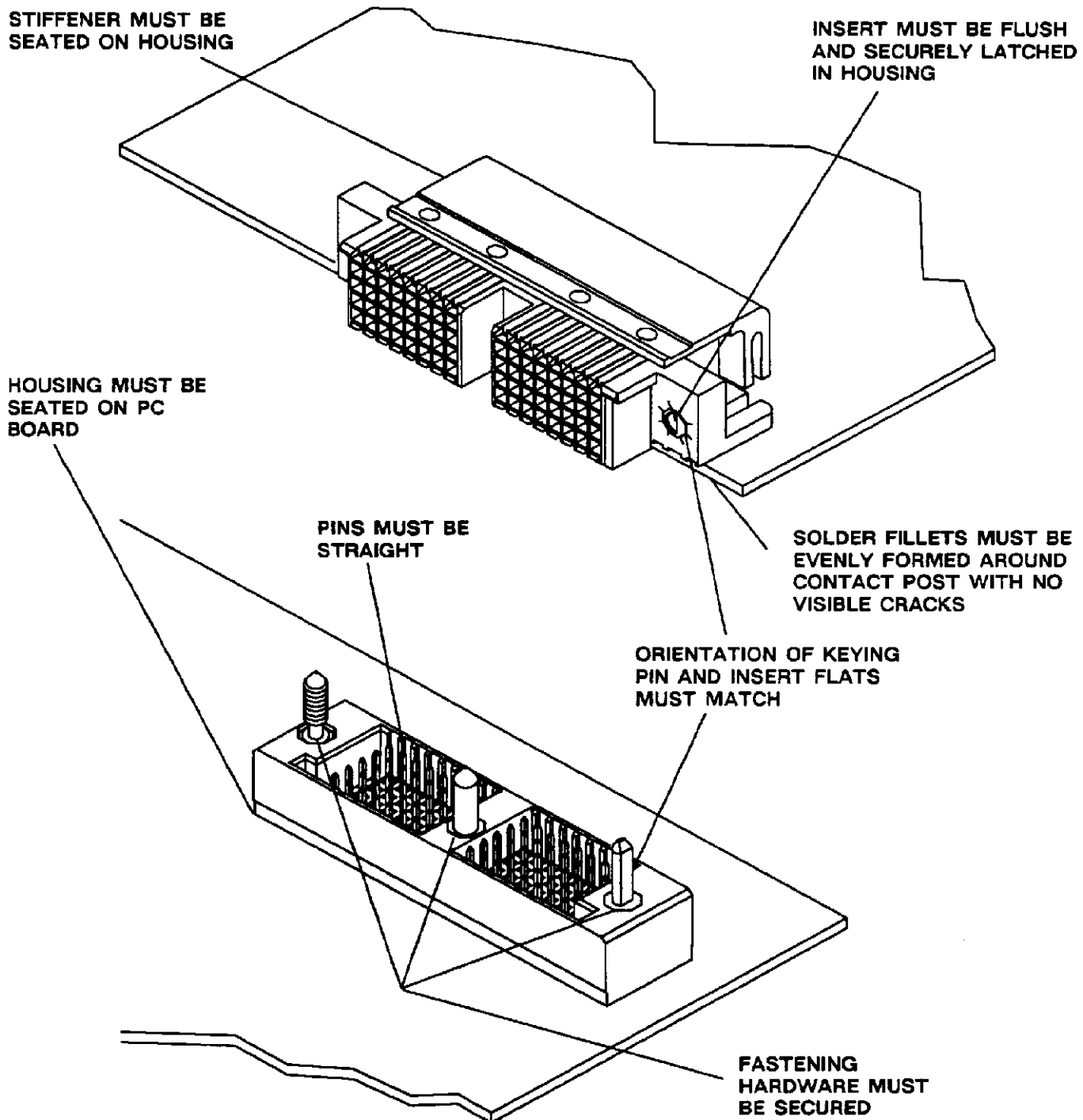


FIG. 9. VISUAL AID