

**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  $\pm 0.13$  [ $\pm .005$ ] and angles have a tolerance of  $\pm 2^\circ$ . Figures and illustrations are for identification only and are not drawn to scale.

**1. INTRODUCTION**

This specification covers the requirements for application of .050 Series Standard Edge PCI Surface Mount Connector Assemblies for printed circuit (pc) board applications. These connectors are available with a double row of 60 to 92 positions with contact spacing on 1.27 mm [.050 in.] centerlines.

The connector consists of a housing, surface mount contacts, and hold-downs. The housing features standoffs that allow easy pc board cleaning after soldering, polarizing alignment webs, and a daughter board entry slot. The polarization alignment webs are molded into the housing to ensure polarization with a compatible daughter board when inserted into the daughter board entry slot.

The connectors are supplied in tray form for manual or robotic equipment placement.

When corresponding with Tyco Electronics Personnel, use the terminology provided in this specification to facilitate your inquiries for information. Basic terms and features of this product are provided in Figure 1.

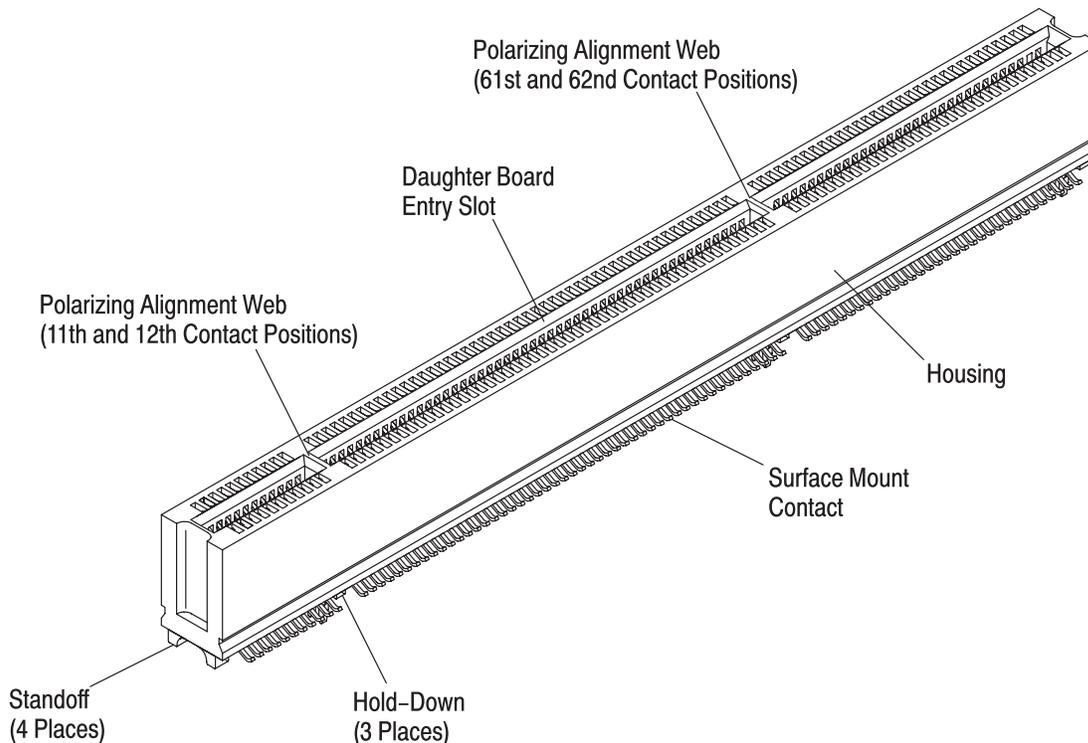


Figure 1

**2. REFERENCE MATERIAL**

**2.1. Revision Summary**

- Updated document to corporate requirements
- Changed hole dimensions in Figure 2
- Deleted Figure 9 and renumbered

## **2.2. Customer Assistance**

Reference Product Base Part Number 145246 and Product Code 2282 are representative of .050 Series Standard Edge PCI Surface Mount Connector Assemblies. Use of these numbers will identify the product line and expedite your inquiries through a service network established to help you obtain product and tooling information. Such information can be obtained through a local Tyco Electronics Representative or, after purchase, by calling PRODUCT INFORMATION at the number at the bottom of page 1.

## **2.3. Drawings**

Customer Drawings for product part numbers are available from the service network. If there is a conflict between the information contained in the Customer Drawings and this specification or with any other technical documentation supplied, call PRODUCT INFORMATION at the number at the bottom of page 1.

## **2.4. Specifications**

Product Specification 108-14034 provides product performance and test information.

## **2.5. Instructional Material**

Instruction Sheets (408-series) provide product assembly instructions or tooling setup and operation procedures and Customer Manuals (409-series) provide machine setup and operation procedures. There are no documents available which pertain to this product.

## **2.6. Manuals**

Manual 402-40 can be used as a guide to soldering. This manual provides information on various flux types and characteristics with the commercial designation and flux removal procedures. A checklist is included in the manual as a guide for information on soldering problems.

## **2.7. Standards and Publications**

Standards and publications developed by the International Electrotechnical Commission (IEC), Institute of Electrical and Electronics Engineers (IEEE), and Electronic Industries Alliance (EIA) provide industry test and performance requirements. Documents available which pertain to this product are:

IEC 60512-6, "Electromechanical Components for Electronic Equipment; Basic Testing Procedures and Measuring Methods Part 6: Climatic Test and Soldering Tests"

IEEE 1386, "Common Mezzanine Card (CMC) Family"

EIA-364-52, "Solderability of Contact Terminations Test Procedure for Electrical Connectors and Sockets"

EIA-700AAAB, "Detail Specification for 1.0 Millimeter, Two-Part Connectors for Use with Parallel Printed Boards"

## **3. REQUIREMENTS**

### **3.1. Safety**

Do not stack product shipping containers so high that the containers buckle or deform.

### **3.2. Material**

The housings are made of high-temperature thermoplastic polycyclohexyl dimethylene terephthalate (PCT), UL 94V-0. The contacts are made of phosphor bronze; the mating interface is underplated with nickel and plated with gold and the solder tine is plated with matte tin-lead. The hold-downs are made of brass plated with matte tin-lead.

### **3.3. Storage**

#### **A. Ultraviolet Light**

Prolonged exposure to ultraviolet light may deteriorate the chemical composition used in the connector material.

#### **B. Shelf Life**

The connectors should remain in the shipping containers until ready for use to prevent deformation to the contacts. The connectors should be used on a first in, first out basis to avoid storage contamination that could adversely affect performance.

**C. Chemical Exposure**

Do not store connectors near any chemical listed below as they may cause stress corrosion cracking in the contacts.

Alkalies	Ammonia	Citrates	Phosphates	Citrates	Sulfur Compounds
Amines	Carbonates	Nitrites	Sulfur Nitrites		Tartrates

**3.4. PC Board (Mother Board and Daughter Board)**

**A. Material and Thickness**

The pc board material shall be glass epoxy (FR-4 or G-10). There is no required thickness for the mother board. The mother board will accept a daughter board with a maximum thickness of 1.78 mm [.070 in.] (including circuit pads).



*Contact PRODUCT INFORMATION at the number listed at the bottom of page 1 for suitability of other board materials.*

**B. Tolerance**

Maximum allowable bow of the mother board shall be 0.10 mm [.004 in.] over the length of the connector.

**C. Holes**

The holes in the mother board for the connector hold-downs must be drilled through to the dimensions given in Figure 2.

**D. Layout**

The mother board layout must be designed using the dimensions provided on the customer drawing for the specific connector. Reference *sample* of the recommended pc board layout is shown in Figure 2.

The daughter board configuration must be in accordance with the dimensions and tolerances provided on the customer drawing for the specific connector. A slot must be cut at the 11th and 12th and 61st and 62nd contact positions to align with the polarizing alignment webs of the connector. A *typical* recommended daughter board configuration is shown in Figure 2.

**Sample Recommended Mother Board Layout  
(Connector Side)**

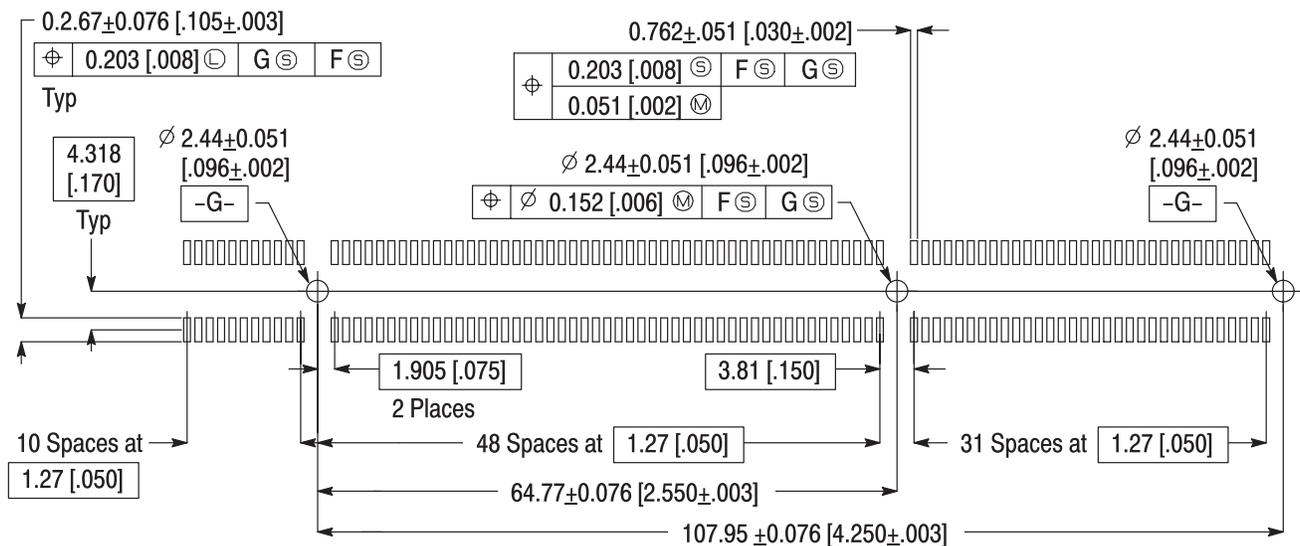


Figure 2 (cont'd)

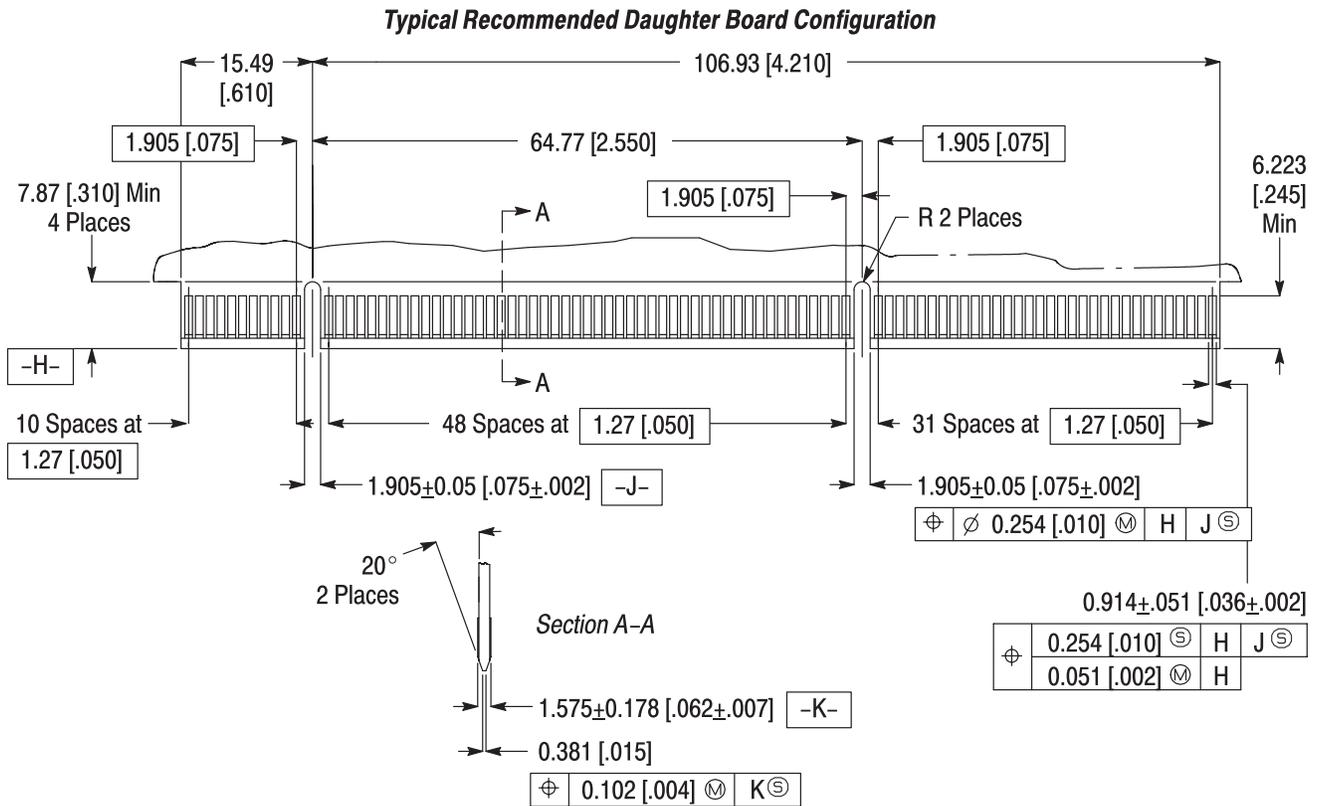


Figure 2 (end)

### 3.5. Connector Placement

These connectors can be placed onto the pc board manually or by robotic equipment. Connectors should be taken from the tray and placed directly on the pc board. It is NOT recommended emptying connectors from the tray into piles or in bowl feeders prior to placement.



Connectors should be handled only by the housing to avoid deformation, contamination, or damage to the contact solder tines.

### 3.6. Connector Seating

All hold-downs must align with their intended pc board holes, then inserted into the holes simultaneously. The hold-downs will assist in alignment of the contact solder tines with their matching pads. It is imperative that the solder tines are sufficiently pressed into the solder paste. Optimally, the contact solder tines should be centered on the pads; however, slight misalignment is permissible as long as the entire solder tine is on the pad as shown in Figure 3.

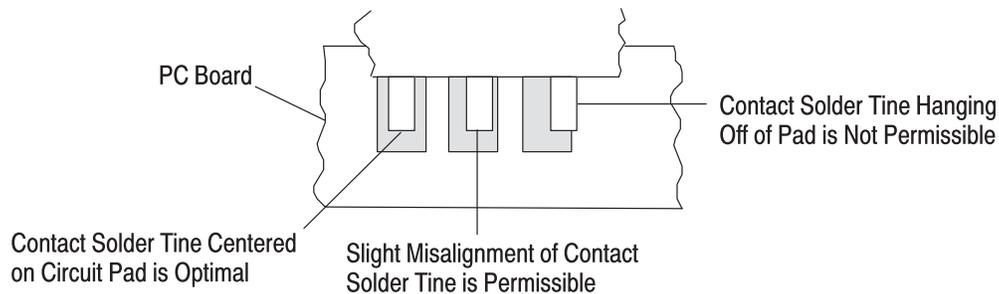


Figure 3

### 3.7. Functional Tolerances

The seated connector must not exceed the tolerances given in Figure 4.

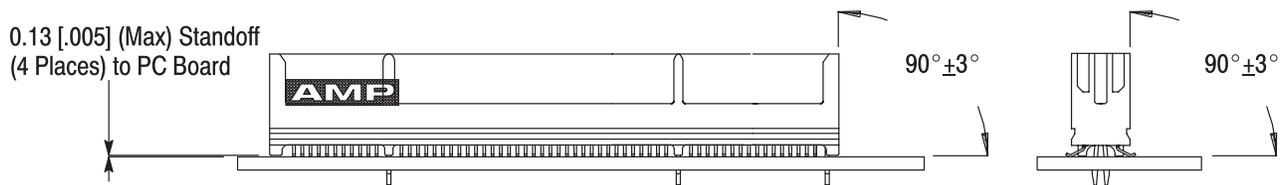


Figure 4

### 3.8. Connector Spacing

Care must be used to avoid interference between adjacent connectors and other components. The minimum allowable distance between connectors to ensure proper insertion of the daughter board is shown in Figure 5.

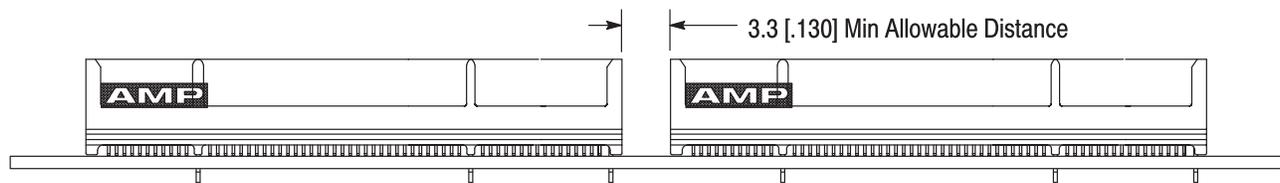


Figure 5

### 3.9. Soldering

#### A. Pads

The pc board circuit pads must be solderable in accordance with Test 12a of IEC 60512-6.

#### B. Solder Paste Characteristics

1. Alloy type shall be 63 Sn/37 Pb or 60 Sn/40 Pb.
2. Flux incorporated in the paste shall be rosin, mildly active (RMA) type.

#### C. Solder Mask

Solder mask is recommended to minimize solder bridging between circuit pads. If a trace is run between adjacent pads on the solder side of the pc board, a solder mask **MUST** be applied over the trace to prevent bridging and wicking of solder away from the contact solder tines. Additionally, there should be solder mask covering any traces in the area of the hold-down solder deposit. Liquid photo imageable or dry film solder masks in step with modern processing techniques are recommended.

The solder mask must not exceed the height of the circuit pad by more than 0.05 mm [.002 in.].



*Since the connector may rest on top of the solder mask, an excessively high mask would allow too much space between the lead and the pad for a good solder joint. A solder joint under these conditions would be weak, and would not provide long-term performance for the connector.*

#### D. Stencil (or Screen)

Recommended stencil thickness is 0.15 mm [.006 in.].

The stencil aperture is determined by the circuit pad size and stencil thickness. It may be any shape as long as it prevents solder bridging from one pad to another. Generally, the thinner stencil will need a larger aperture to maintain the given volume of solder paste.

**E. Solder Volume**

Minimum solder volume (V) (before curing) for each circuit pad must be calculated by multiplying the pad length (L) by the pad width (W) by the stencil thickness (T):

$$2.67 \times 0.76 \times 0.15 = 0.304 \text{ mm}^3 \text{ [}.105 \times .030 \times .006 = .0000189 \text{ in.}^3\text{]} \text{ volume per circuit pad}$$



*Using solder volume over that which is recommended could cause excess wicking on the contact solder tine, resulting in a reduction of solder tine compliance or solder joint failure.*

**F. Process**

The connectors should be soldered using wave, non-focused infrared reflow (IR), or equivalent soldering technique. Manual 402-40 contains soldering guidelines. The reflow temperature and time is specified in Figure 6.

SOLDERING PROCESS	TEMPERATURE (Max)	TIME
IR	220°C [428°F]	3 Minutes

Figure 6

**G. Cleaning**

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder and flux for recommended cleaning solvents. Cleaners must be free of dissolved flux and other contaminants. It is recommended cleaning with the pc board on its edge. Common cleaning solvents with times and temperatures that will not affect these connectors is specified in Figure 7.



*Even when using “no clean” solder paste, it is imperative that the contact interface be kept clean of flux and residue, since it acts as an insulator. Flux may migrate under certain conditions with elevated temperatures and, therefore, cleaning is necessary.*

CLEANER		TIME (Minutes)	TEMPERATURE (Maximum)
NAME	TYPE		
ALPHA 2110	Aqueous	1	132°C [270°F]
Isopropyl Alcohol	Solvent	5	100°C [212°F]
KESTER 5778	Aqueous	5	100°C [212°F]
KESTER 5779	Aqueous	5	100°C [212°F]
LONCOTERGE 520	Aqueous	5	100°C [212°F]
LONCOTERGE 530	Aqueous	5	100°C [212°F]

Figure 7



*Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. Refer to the manufacturer’s Material Safety Data Sheet (MSDS) for characteristics and handling of cleaners. Trichloroethylene and Methylene Chloride is not recommended because of harmful occupational and environmental effects. Both are carcinogenic (cancer-causing).*



*If you have a particular cleaning solvent that is not listed, contact PRODUCT INFORMATION at the number at the bottom of page 1.*

**H. Drying**

When drying cleaned assemblies and pc boards, temperature limitations must not be exceeded: -55° to 105°C [-68° to 221°F]. Excessive temperatures may cause housing degradation.

**3.10. Checking Installed Connector**

The installed connector must have solder fillets evenly formed around each contact solder tine. All solder joints should conform to those specified in Workmanship Specification 101-21 and all other requirements specified in this document.

**3.11. Polarization**

A polarizing pattern for placing the connector on the pc board is provided by the number of solder tines in each cluster of solder tines and the hold-downs.

Polarization for the mating daughter board is provided by the polarization alignment webs of the connector which match the slots of the daughter board.

**3.12. Installing Daughter Board** (Figure 8)

The daughter board must be oriented with the slots aligned with the polarizing alignment webs of the connector. The side-to-side and front-to-back angles must be visually aligned with the connector, then the daughter board must be pushed straight into the daughter board entry slot of the connector until bottomed. This method requires less insertion force and there will be less chance of damage to components.

**3.13. Removing Daughter Board**

The daughter board must be gripped firmly and pulled straight out of the connector. The daughter board must not be shifted side-to-side or front-to-back as excessive angles could damage the contacts, housing, or pc boards. This method protects the connector from damage and will ease extraction of the daughter board.

**3.14. Connector Removal**

The connectors can be removed from the pc board by standard de-soldering methods. Connectors **MUST NOT** be re-used after removal from the pc board.

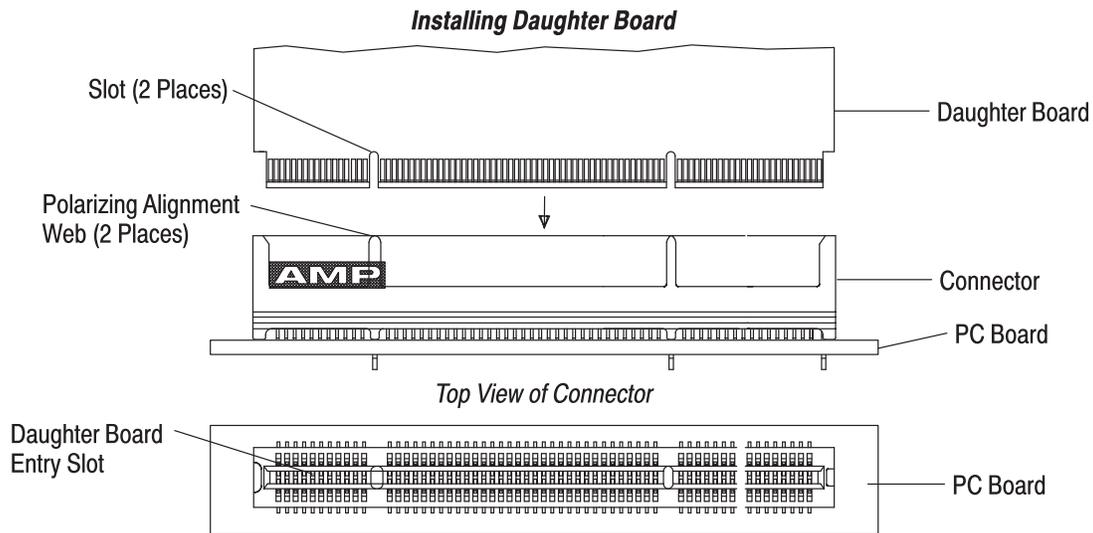


Figure 8

**3.15. Repair**

These connectors are not repairable. Damaged or defective connectors **MUST NOT** be used.

**4. QUALIFICATION**

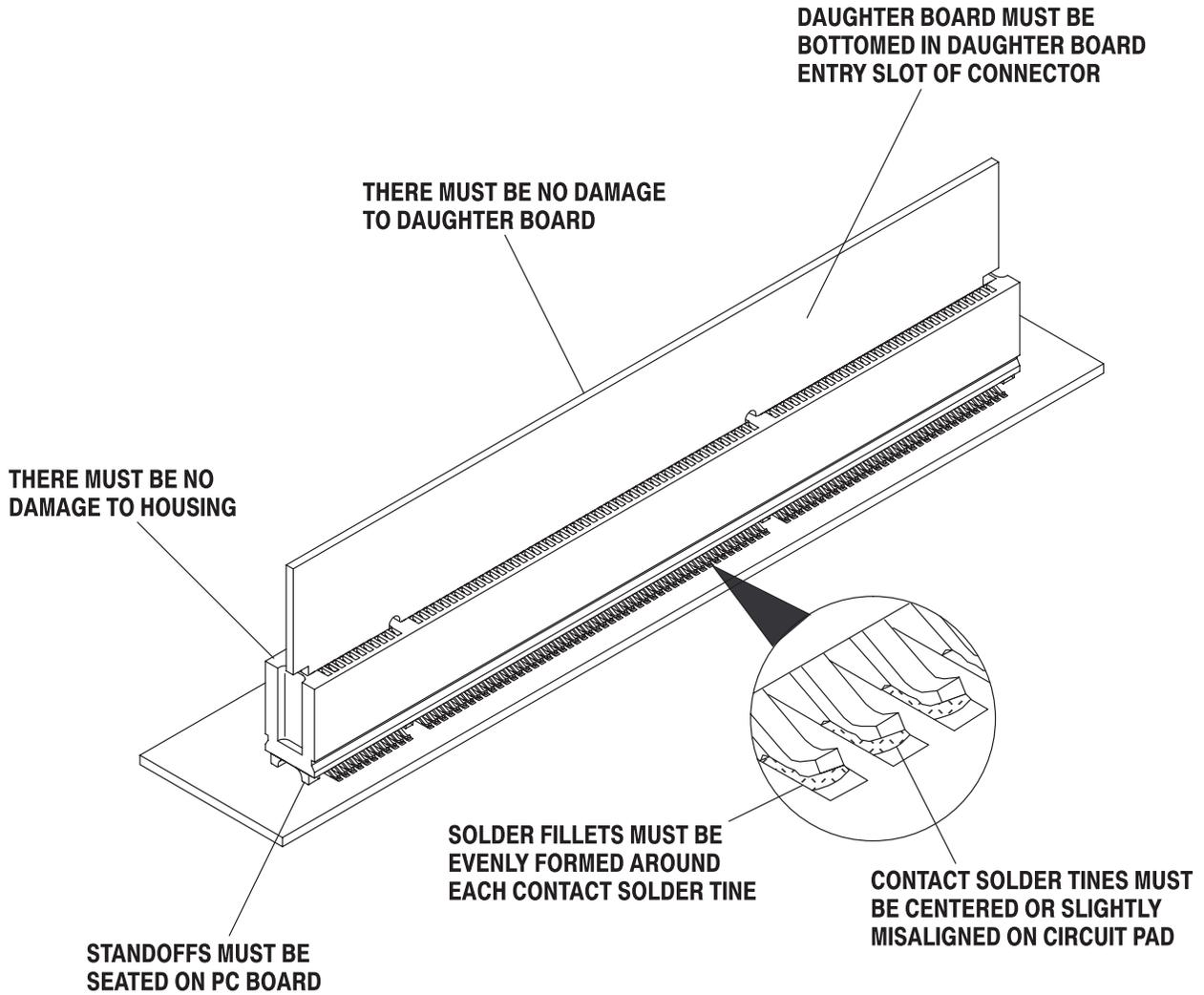
The .050 Series Standard Edge PCI Surface Mount Connector Assemblies are Listed by Underwriters Laboratories Inc. (UL) in File E 28476 and Certified by CSA International in File LR 7189.

**5. TOOLING**

No tooling is required for manual placement of the connectors. For robotic equipment placement, a pc board support must be used to prevent bowing of the pc board during the placement of connectors on the board. It should have flat surfaces with holes or a channel large enough and deep enough to receive the connector hold-downs. The robotic equipment must have a true position accuracy tolerance of 0.05 mm [.002 in.]. This includes gripper and fixture tolerances as well as equipment repeatability. It must use the socket datum surfaces detailed on the customer drawing to ensure reliable placement.

**6. VISUAL AID**

Figure 9 shows a typical application of .050 Series Standard Edge PCI Surface Mount Connector Assemblies. This illustration should be used by production personnel to ensure a correctly applied product. Applications which DO NOT appear correct should be inspected using the information in the preceding pages of this specification and in the instructional material shipped with the product or tooling.



**FIGURE 9. VISUAL AID**