



USCAR is the United States Council for Automotive Research

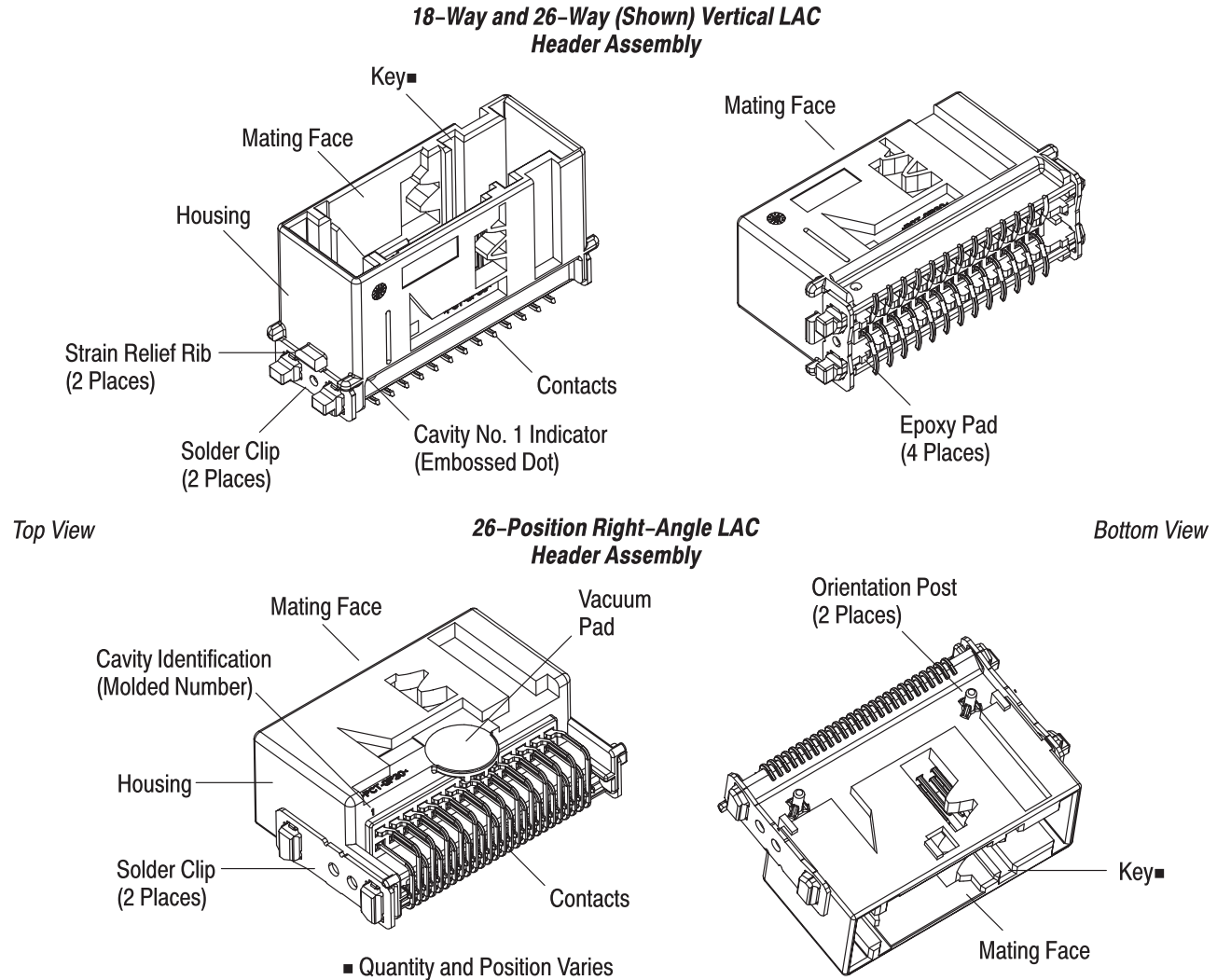


All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Unless otherwise specified, dimensions have a tolerance of  $\pm 0.13$  [ $\pm .005$ ] and angles have a tolerance of  $\pm 2^\circ$ . Figures and illustrations are for identification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

## 1. INTRODUCTION

This specification covers the requirements for application of SMT 0.64mm Generation Y LAC, Hand Mate, GET, and USCAR-approved header assemblies. The header assemblies are available in vertical, right-angle, and hybrid configurations. All configurations (except the hybrid) contain 0.64 [.025] surface mount pin contacts; the hybrid contains 0.64mm and 1.5mm surface mount pin contacts. These header assemblies are available with 6, 18, 20, 26, and 30 positions having in-row contact spacing on 2.54 [1.0] centerlines and row-to-row contact spacing on 1.27 [.050] centerlines.

When corresponding with 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.



Restriction of Hazardous Substances  
(RoHS) Compliant

Figure 1 (Cont'd)

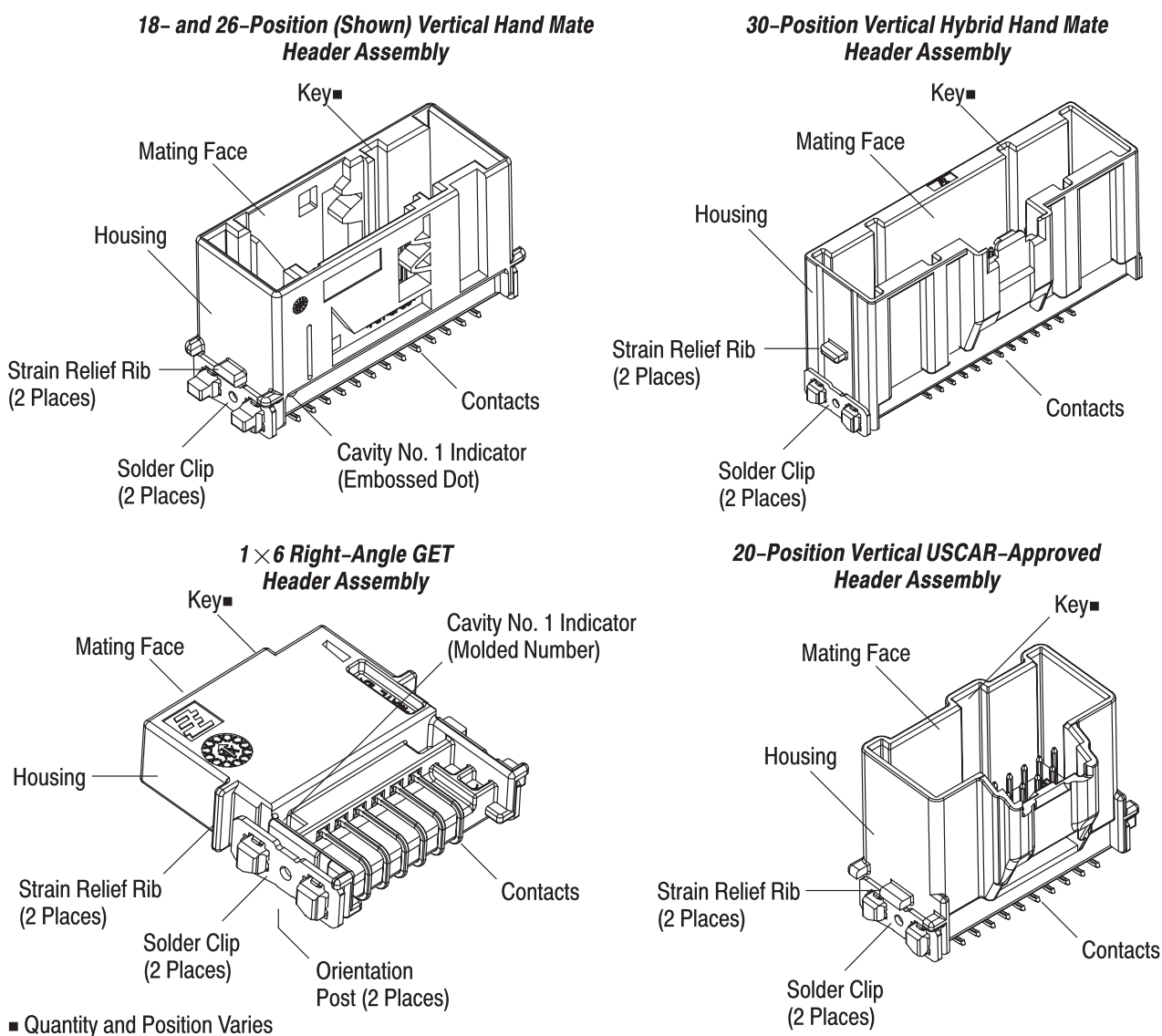


Figure 1 (End)

These header assemblies are available with features that provide proper orientation and strain relief. Orientation features include a cavity No. 1 indicator (embossed dot) or cavity identification (molded numbers) and/or orientation posts. For header assemblies without an orientation feature, silkscreen can be used to mark the silhouette of the header assembly on the pc board to aid in proper orientation during hand placement.

After the header assembly is soldered on the pc board, the solder clips prevent any undue stress from being transferred onto the contact solder tails. In addition, the header assemblies are designed to accept a customer–supplied module (cover) to protect the contact solder tails from outside stress. The strain relief ribs are provided as support points for the module.

The header assemblies can be placed on the pc board by hand or using an automatic machine. The right–angle LAC header assembly features a vacuum pad for pick–and–place applications. Any of the header assemblies can be held in place during the soldering process (for example, when using two–sided pc board application or the pc board is held upside down) by using the epoxy pads. The epoxy pads are designed to contact epoxy applied to the pc board without compromising the coplanarity of the header assembly.

All of these header assemblies (except the hybrid) mate with cable plug assemblies having 0.64mm terminals; the hybrid mates with cable plug assemblies having 0.64mm and 1.5mm terminals. The header assemblies are designed with keys to match the correct mating cable plug assembly and ensure proper orientation during mating. The cored area on the surface of the housing varies depending on the key. Some keys also have a color code.

## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

- Initial release of application specification

### 2.2. Customer Assistance

Reference Product Base Part Number 1488956 and Product Code K806 are representative of SMT 0.64mm Generation Y LAC, Hand Mate, GET, and USCAR–approved header 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 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. 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.

### 2.5. Specifications

Product Specification (108–series) provides product performance and test information. There are no documents available that pertain to this product.

### 2.6. Instructional Material

Instruction Sheets (408–series) provide product assembly instructions or tooling setup and operation procedures. There are no documents available that pertain to this product.

### 2.7. Standards and Publications

Standards and publications developed by the Institute for Interconnecting and Packaging Electronic Circuits (IPC) provide industry test and performance requirements. Documents available which pertain to this product are:

IPC–A–610, “Acceptability of Electronic Assemblies”

## 3. REQUIREMENTS

### 3.1. Safety

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

### 3.2. Storage

#### A. Ultraviolet Light

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

#### B. Shelf Life

The header assemblies should remain in the shipping containers until ready for use to prevent deformation to the contacts. The header assemblies 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 header assemblies 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

### 3.3. PC 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 pc board.

#### B. Coplanarity of Contact Solder Tails

The respective customer drawing gives the maximum coplanarity of the contact solder tails.

#### C. Allowable Bow of PC Board

Maximum allowable bow of the pc board over the length of the header assembly is dependent on the solder paste thickness, coplanarity of the pc board solder pads, and coplanarity of the contact solder tails.

*For example, if:*

solder paste thickness is 0.20 [.008]

coplanarity of the contact solder tails is 0.13 [.005]

coplanarity of the solder pads is 0.03 [.001]

*then:* maximum allowable bow of the pc board over the length of the header assembly is 0.04 [.0015]  
(0.20 [.008] – 0.13 [.005] – 0.03 [.001] = 0.04 [.0015])

**NOTE**

Contact must be maintained between the contact solder tails and the solder paste during reflow.



#### D. Solder Pads

The pc board solder pads and solder clip pads must be solderable in accordance with Test Specification 109–11. Maximum allowable coplanarity of the solder pads to the pc board is dependent upon the solder paste thickness, coplanarity of the contact solder tails, and the bow of the pc board over the length of the header assembly.

*For example, if:*

solder paste thickness is 0.20 [.008]

coplanarity of the contact solder tails is 0.13 [.005]

maximum allowable bow of the pc board over the length of the header assembly is 0.04 [.0015]

*then:* coplanarity of the solder pads is 0.03 [.001]  
(0.20 [.008] – 0.13 [.005] – 0.04 [.0015] = 0.03 [.001])

**NOTE**

Contact must be maintained between the contact solder tails and the solder paste during reflow.



#### E. Holes

The holes for orientation posts must be drilled through to specific dimensions to prevent stubbing during placement of the header assemblies on the pc board. Hole diameters are provided in the pc board layout on the customer drawing for the specific header assembly.

#### F. Layout

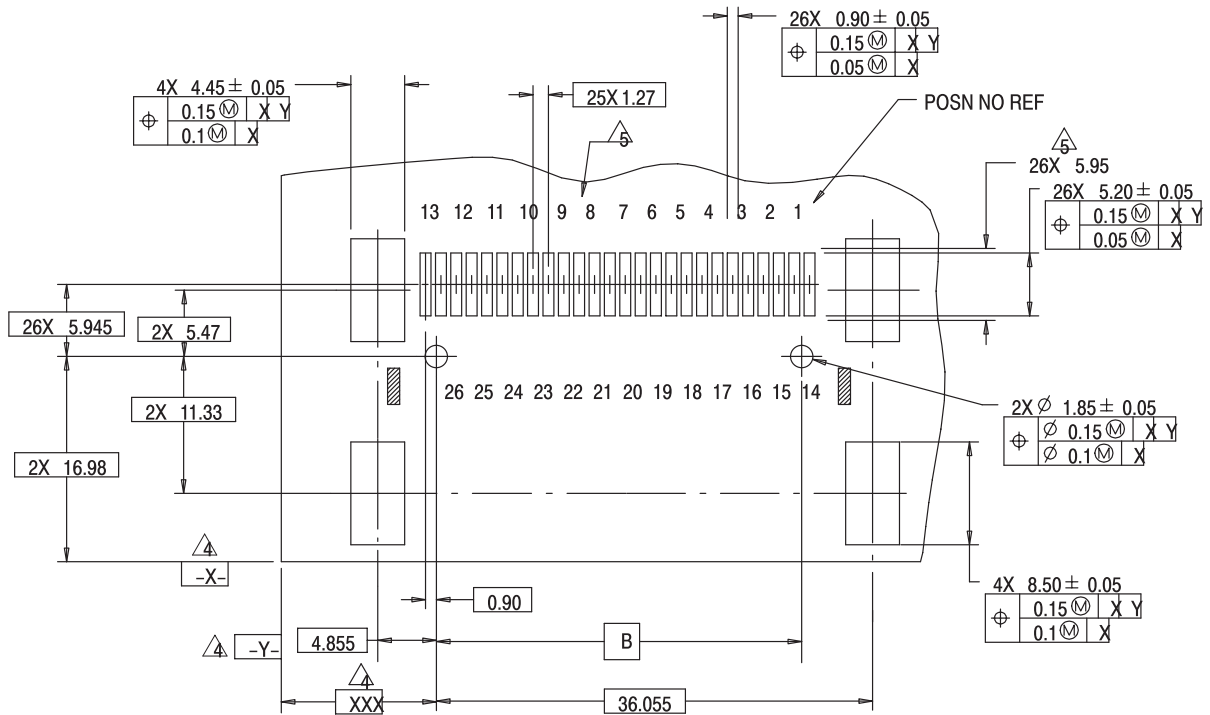
The pads and, if applicable, holes in the pc board must be precisely located to ensure proper placement and optimum performance of the header assembly. The pc board layout must be designed using the dimensions provided on the customer drawing for the specific header assembly. A *sample* of recommended pc board layouts are shown in Figure 2.

If the epoxy pads are used, a dot of epoxy (for each epoxy pad) must be applied to the pc board before the header assembly is placed on the pc board. Size and height of epoxy dot is epoxy specific. PC board location of epoxy dots are provided upon request.

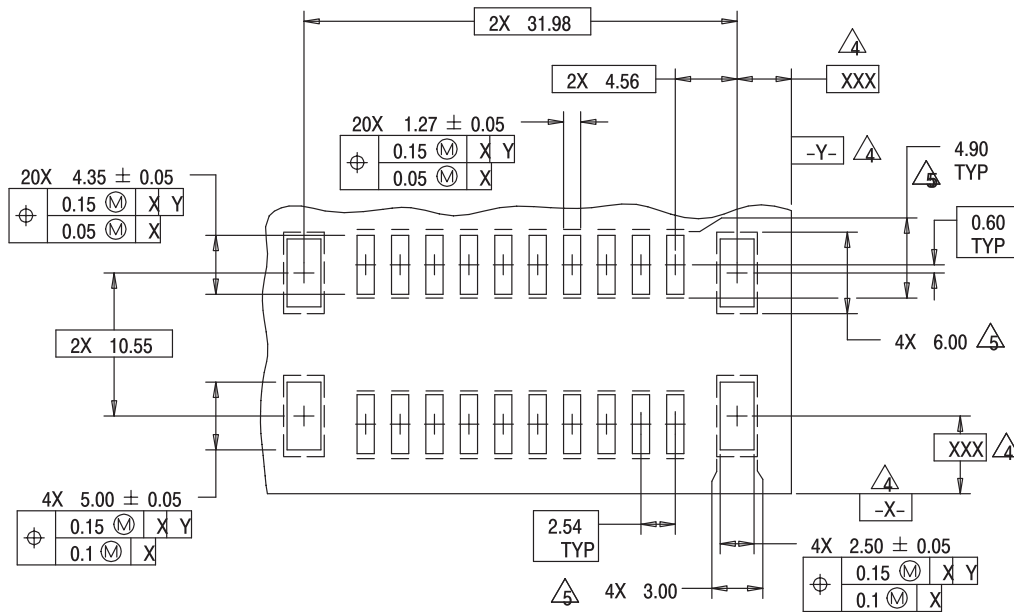
If a silkscreen profile or text is used, space must be allowed for over–printing on the pc board.

**Sample Recommended PC Board Layout**

**26-Position Right-Angle LAC Header Assembly**



**20-Position Vertical USCAR-Approved Header Assembly**



△ Datums and Basic Dimensions Established by Customer

△ Allow for Over-Printing on PC Board

Figure 2

### 3.4. Soldering

#### A. Solder Paste Thickness

The recommended minimum lead or lead-free solder paste thickness is 0.15 when considering coplanarity of the header assembly only. The thickness can be greater depending on the design of the pc board, warpage, and solder pad coplanarity.

#### B. Solder Paste Characteristics

- Alloy type shall be 63 Sn/37 Pb, 60 Sn/40 Pb, or 62 Sn/36 Pb/2 Ag
- Flux incorporated in the paste shall be rosin, mildly active (RMA) type.
- Paste shall be at least 80% solids by volume.

#### C. Process

The header assembly is compatible with the soldering technique, temperature, and time specified in Figure 3.

SOLDERING PROCESS	TEMPERATURE (Max)	TIME (Max)
Non-Focused Infrared (IR) Reflow Forced Convection Only	260° C [500° F]	30 Seconds

Figure 3

### 3.5. Silkscreen

Properties of the silkscreen must be customer determined.

### 3.6. Epoxy

Type and thickness of epoxy and method of application must be customer determined.

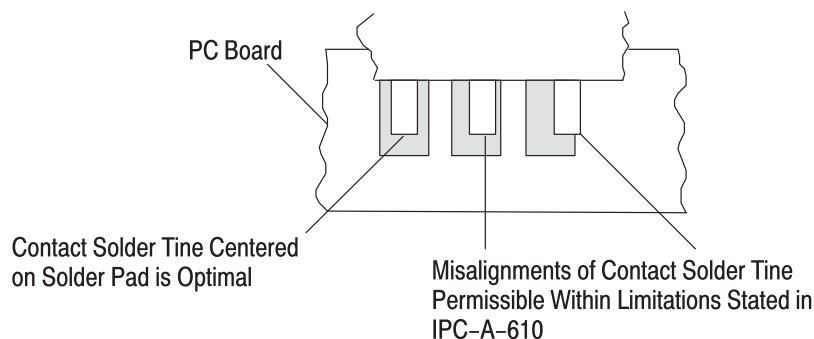
### 3.7. Header Assembly Spacing

Care must be used to avoid interference between adjacent header assemblies and other components to ensure proper mating. If robotic equipment is used, other space allowances will be required for the grippers.

### 3.8. Header Assembly Placement

#### A. Position

It is imperative that the contact solder tines and contact surface of the solder clips are sufficiently pressed into the solder paste. Optimally, the contact solder tine should be centered on the solder pads; however, misalignments are permissible as shown in Figure 4. The same requirements apply to the surface of the solder clips.



**Note:** Same Requirements Apply to Contact Surface of Solder Clips

Figure 4

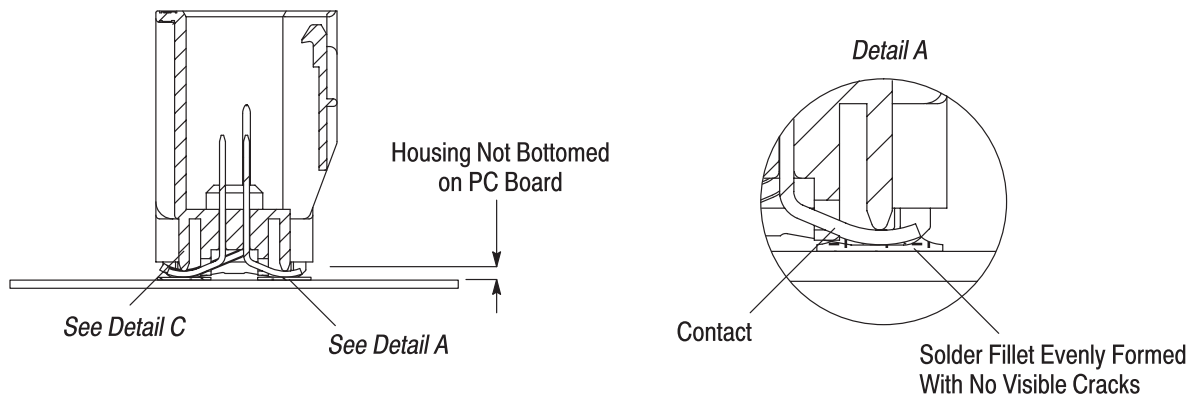
### 3.9. Checking Installed Header Assembly

The installed header assembly must conform to the following (refer to Figure 5):

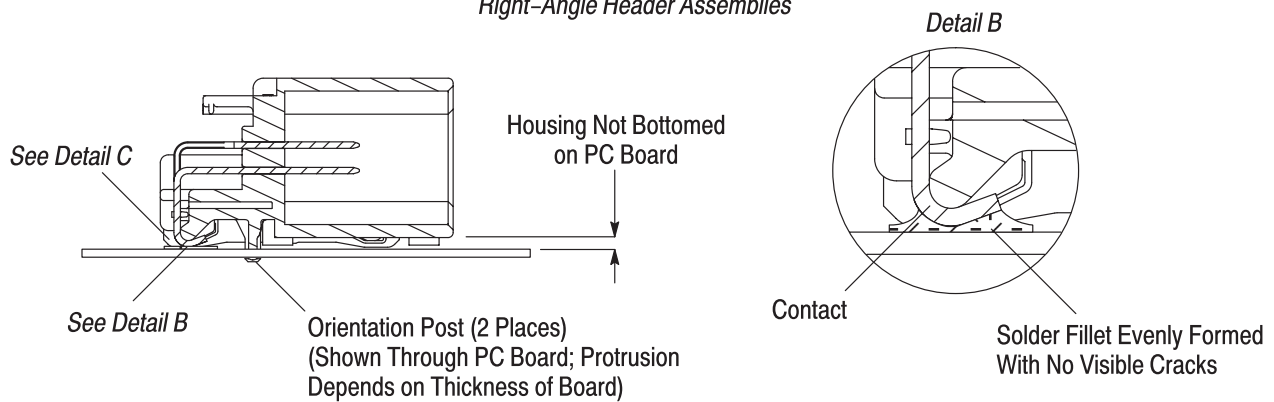
- the housing must not be bottomed on the pc board
- solder fillets are evenly formed around each contact solder tine and contact surface of the solder clip
- for header assemblies with orientation posts, each orientation post must enter the pc board (amount of protrusion from the other side of the board depends on the thickness of the board)
- if used, the header assembly epoxy pads must contact the epoxy dot (epoxy pads must not touch the pc board)

#### Placement and Inspection

##### Vertical Header Assemblies



##### Right-Angle Header Assemblies



##### Detail C

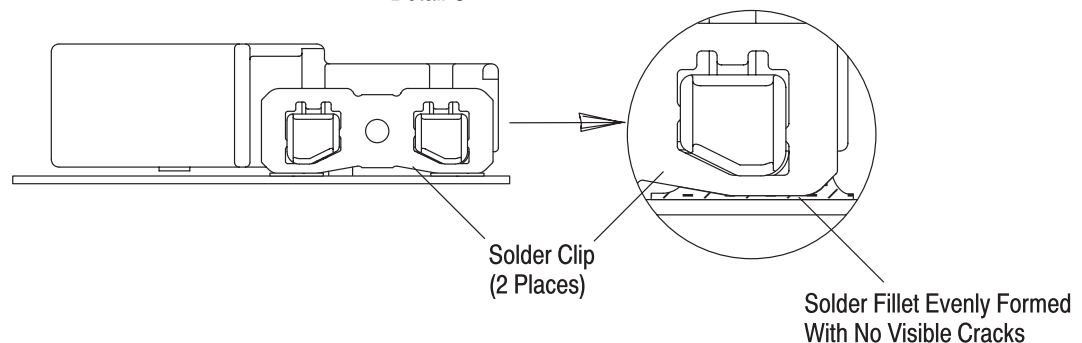


Figure 5

### 3.10. Special Assembly Consideration

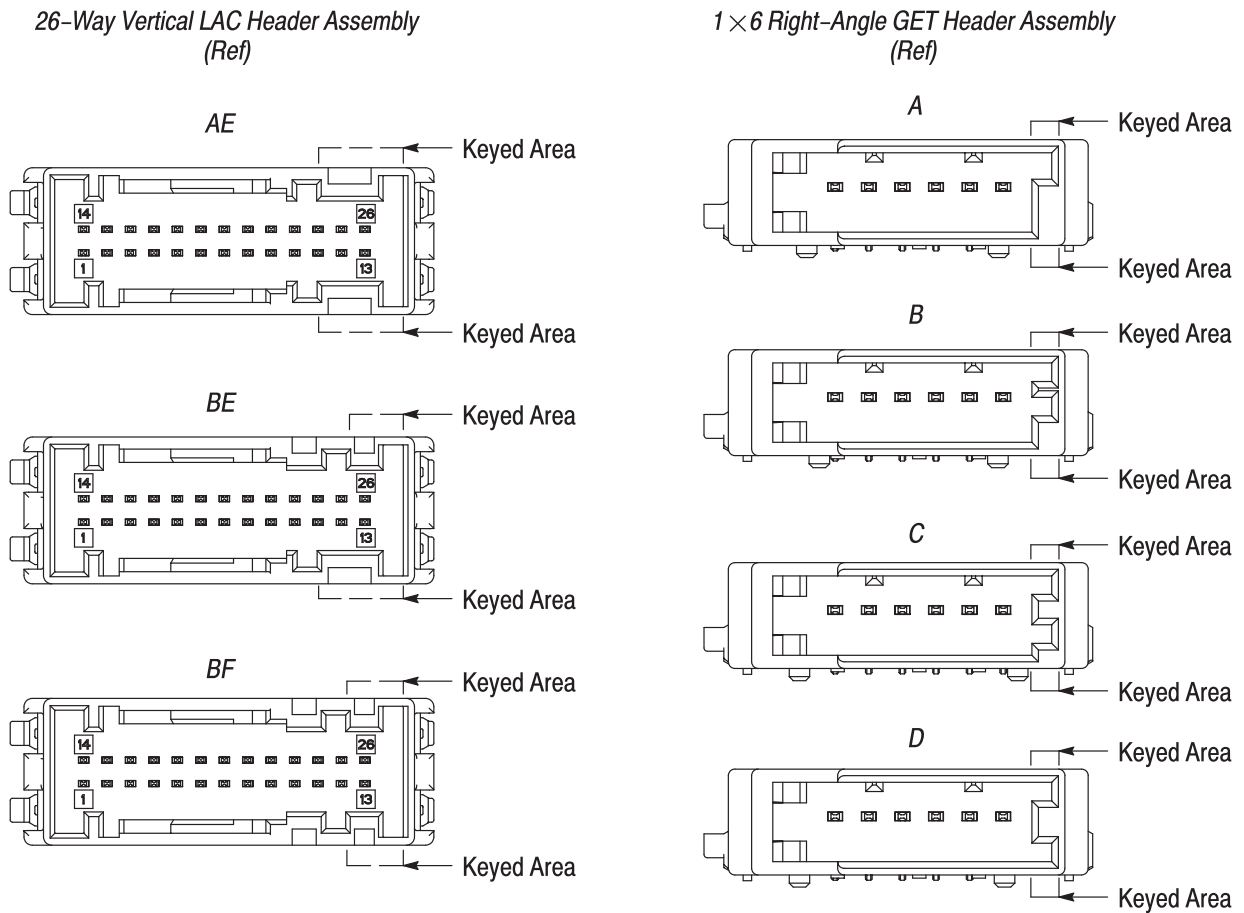
The header assemblies MUST NOT support the weight of the pc board.

Where applicable, a customer–supplied module (cover) should be installed over the header assemblies. When installed, the module should contact the header assembly housing and strain relief ribs. Refer to the customer drawing of the specific header assembly for position and height of the strain relief ribs.

### 3.11. Keying

Description of keying codes and coordinating housing colors are shown on the customer drawing for the specific header assembly. Available keying codes and coordinating housing colors are given and *samples* of keying codes are shown in Figure 6.

#### Sample Keying Codes



KEYING CODE	COLOR	HEADER ASSEMBLY
AE	Black	LAC, Hand Mate
BE	Gray or Natural	
BF	Blue, Natural, or Purple	
CE	Green	Vertical LAC
CF	Black	
A, B, C, D	Black	USCAR–Approved, Hybrid Hand Mate, GET
E, F	Black	USCAR–Approved

Figure 6

**3.12. Repair**

Defective or damaged header assemblies **MUST NOT** be used. These header assemblies are not repairable. The header assembly may be removed from the pc board by standard de-soldering methods and replaced.

**4. QUALIFICATION**

These header assemblies do not require agency approval.

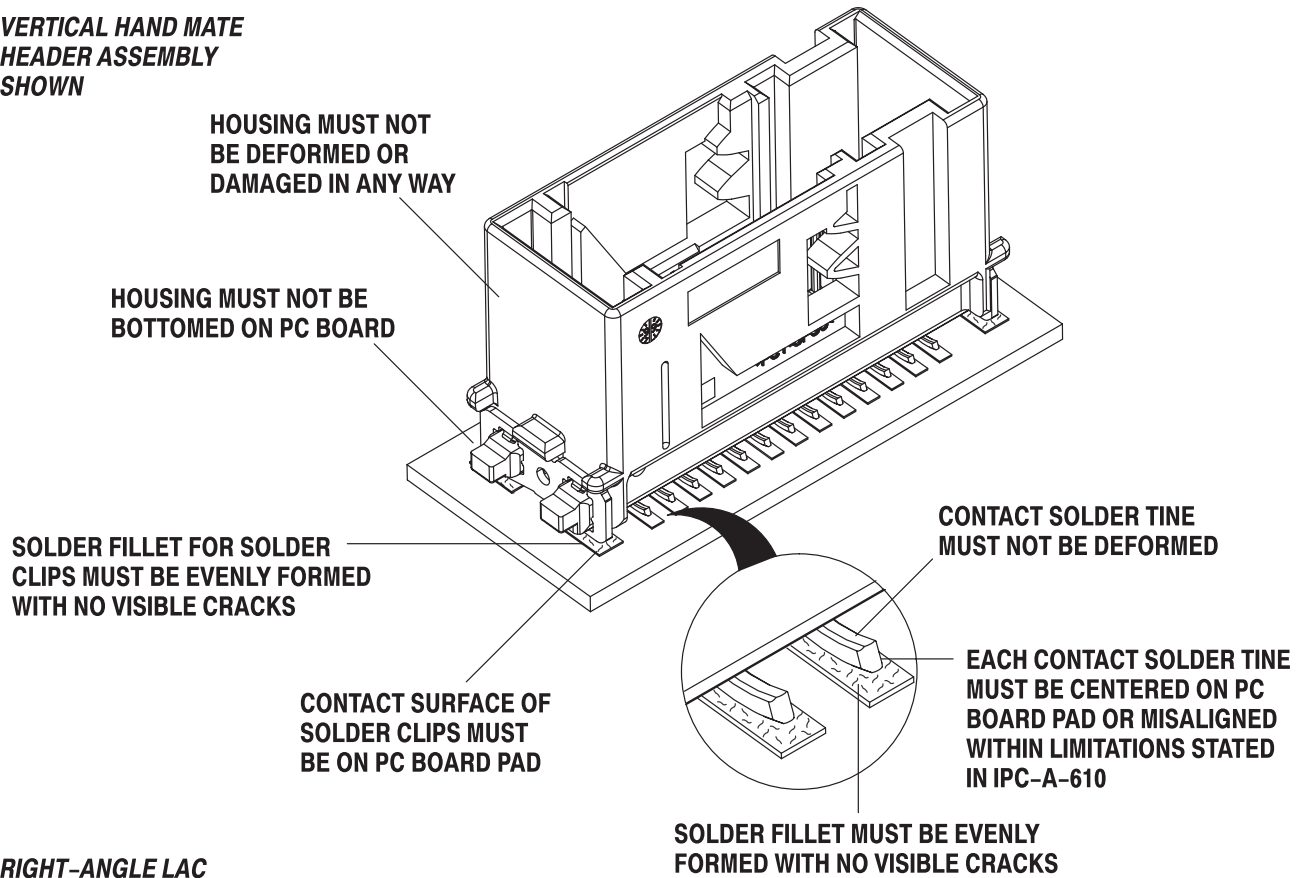
**5. TOOLING**

No tooling is required for manual placement of the header assemblies. For automatic machine placement, the robotic equipment must have a true position accuracy to properly locate the header assemblies. This includes gripper and fixture tolerances as well as equipment repeatability. It must use the datum surfaces detailed on the customer drawing to ensure reliable placement.

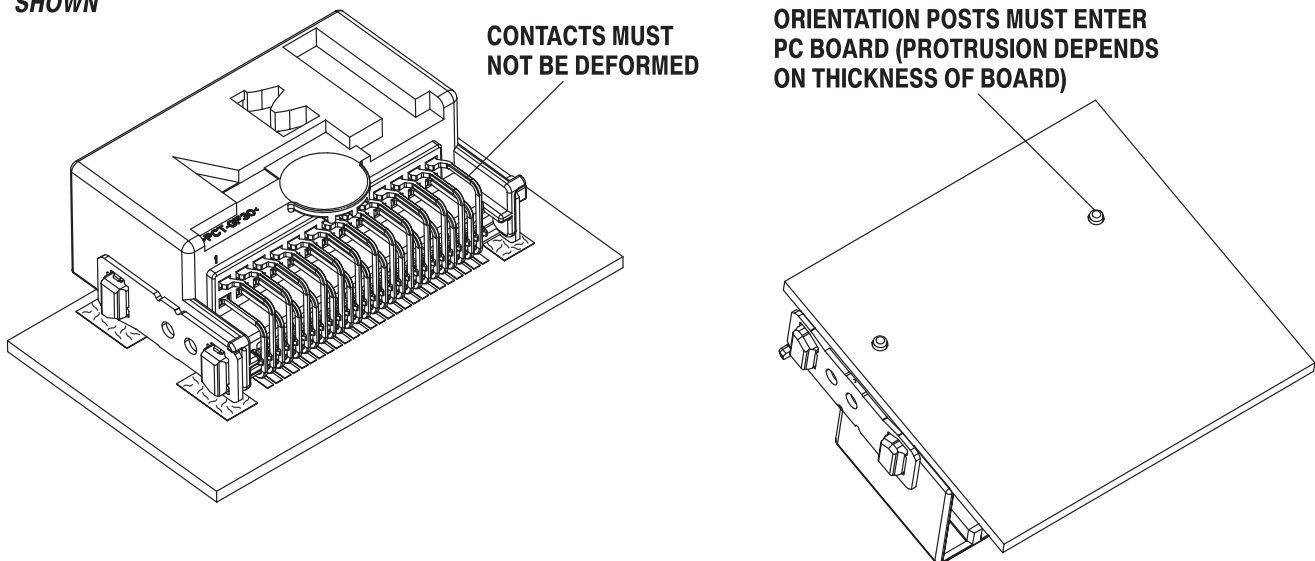
**6. VISUAL AID**

The illustration below shows a typical application of SMT 0.64mm Generation Y LAC, Hand Mate, GET, and USCAR-approved header 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.

**VERTICAL HAND MATE  
HEADER ASSEMBLY  
SHOWN**



**RIGHT-ANGLE LAC  
HEADER ASSEMBLY  
SHOWN**



**FIGURE 7. VISUAL AID**

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