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°.

1. INTRODUCTION

This specification covers requirements for application of AMP* Low Profile, Single Lever Actuator, Zero Insertion Force, Pin Grid Array Sockets, also referred to as LP SL ZIF PGA Sockets. They are used primarily in applications where the end user will upgrade a system by placing a PGA device into a SL ZIF socket. These sockets mate with PGA Packages having a 2.54 x 2.54 [.100 x .100] or interstitial 1.27 x 2.54 [.050 x .100] contact patterns. Each socket consists of a plastic housing, a plastic cover, a stainless steel actuator, and copper alloy contacts. Sockets are available in a variety of contact patterns.

When corresponding with AMP Personnel, use the terminology provided on this specification to help facilitate your inquiry for information. Basic terms and features of components are provided in Figure 1.

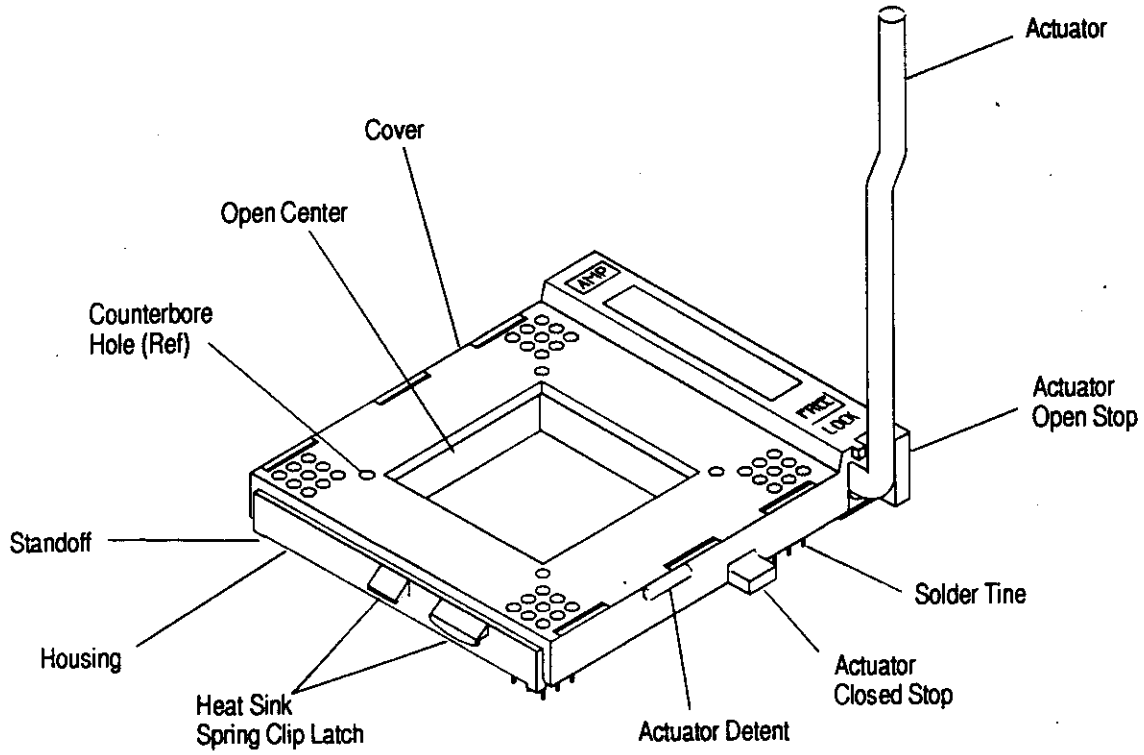


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

This paragraph is reserved for a revision summary of changes and additions made to this specification. No summary is required on this initial release (Rev O).

2.2. Customer Assistance

Reference Part Number 916644-1 and Product Code 2162 are representative numbers of AMP Low Profile, Single Lever Actuator, Zero Insertion Force, Pin Grid Array Sockets. Use of these numbers will identify the product line and expedite your inquiries through an AMP service network established to help you obtain product and tooling information. Such information can be obtained through a local AMP Representative (Sales Engineer, Service Engineer, etc) or, after purchase, by calling the Technical Assistance Center or AMP FAX/Product Information number at the bottom of this page.

2.3. Drawings

AMP Customer Drawings for product part numbers are available from the service network. The information contained in Customer Drawings takes priority if there is a conflict with this specification or with any other technical documentation supplied by AMP Incorporated.

2.4. Bulletins

AMP Corporate Bulletin 52 is available from the service network. 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 a guide for information on soldering problems.

2.5. Specifications

AMP Product Specification 108-1572 covers test and performance requirements.

3. REQUIREMENTS

NOTE *The procedures on this specification are specific to the socket part number referenced in Paragraph 2.2. For variations to product or application requirements, consult your local AMP Representative.*

3.1. Storage

Sockets should remain in the protective packaging until ready for use, to prevent deformation or overstressing of the contact solder tines, and to prevent damage to the plastic components.

3.2. Special Features

A. Standoffs

The plastic housing is designed with 0.71 [.028] high standoffs to allow easy printed circuit (pc) board cleaning after the soldering operation.

B. Configuration of Various PGA Packages

Different pin patterns can be used by changing the hole pattern in the plastic cover, and by selectively loading socket contacts in the plastic housing cavities. When the PGA package pattern is significantly smaller than the minimum allowable in the plastic cover, rows and columns of holes may exist in the cover around the outside edges. These holes balance the cover during the molding process and serve no other function. Contacts will be loaded in the plastic housing under the functional hole pattern only. In cases where nonfunctional holes exist in the cover, a solid plastic border will separate nonfunctional from functional contact positions on all sides of the PGA package pattern. The functional hole pattern for each socket is detailed on the AMP Customer Drawing for each specific socket part number.

C. Counterbored Cavities

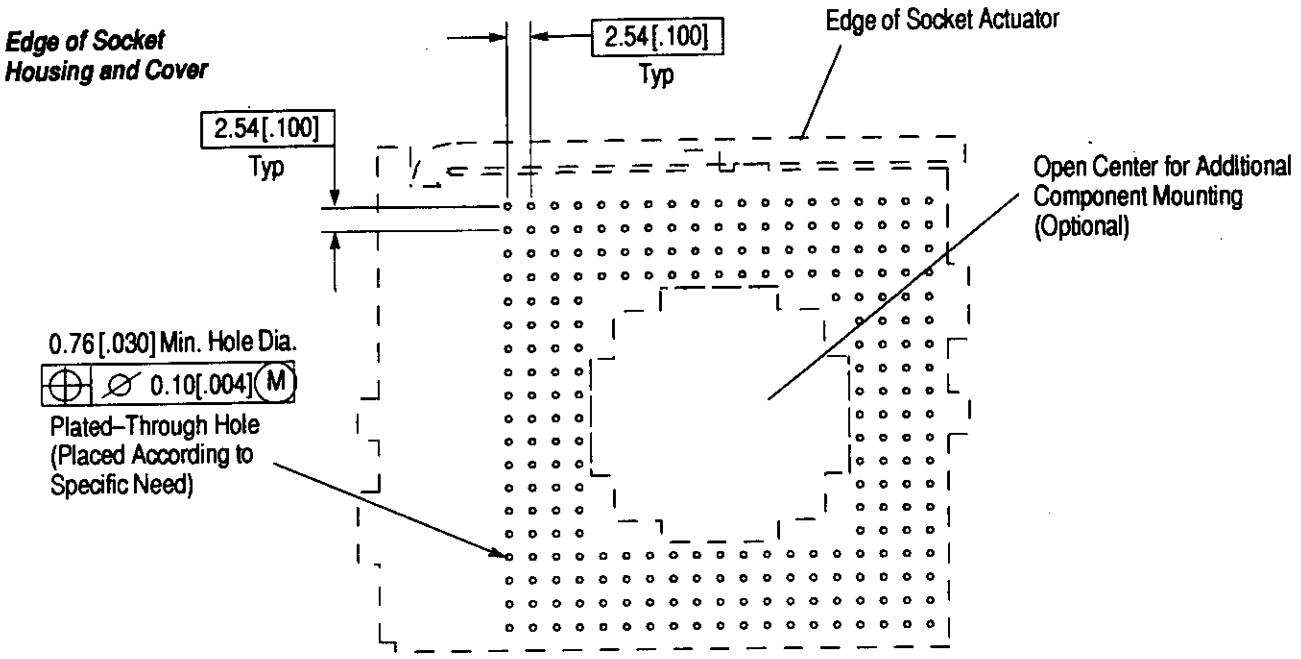
Many PGA packages are manufactured with standoffs on various corner pins. These AMP Sockets accommodate these larger diameter standoffs by providing corresponding counterbored cavities in the plastic cover. These counterbores can and do occur at various positions in the many PGA package patterns available. See Customer Drawings for specific PGA package pattern. See reference counterbore hole reference in Figure 1.

D. Keying PGA Package to Socket

The ability to selectively position cavities and contacts in both the plastic cover and the plastic housing also allows the option of keying the pattern to a specific PGA package, providing positive orientation of the package to the socket. This is done in most cases by eliminating a cavity on the cover in a corner corresponding to a missing contact pin on the PGA package. See Customer Drawings for specific PGA package pattern.

E. Open Center

Sockets are available with open centers to expose additional pc board space for mounting of other components inside the socket. (This is convenient for mounting decoupling capacitors close to the PGA package.) Location and configuration of sockets with open centers are detailed on the Customer Drawings for the specific socket. A typical layout for maximum pin hole arrangement and an open center configuration is shown in Figure 2.



NOTE: Datums for locating socket holes must be determined by customer requirements. See Customer drawing for specific contact pattern.

Figure 2

F. Actuator Closed Position

The socket is designed with a positive stop to prevent the actuator from bottoming on the pc board when closing it. It also features a detent to securely lock the actuator in the closed position. See Figure 1.

G. Actuator Open Position

Actuator rotation is 90° between the fully opened and fully closed positions of the socket. Positive stops on the socket prevent actuator movement beyond 90°. The actuator must be in the fully upright position for proper insertion and removal of the PGA package. Rotating the actuator to the closed stop brings the pins and the sockets in contact with each other to ensure a solid connection. See Figure 3.

H. Actuator Clearance With PGA Package Heat Sinks

Care must be taken to ensure that the heat sink chosen is compatible with both the actuator and the cover. Consideration should be given to the following methods of attaching heat sink to the PGA package.

1. Heat sink mounted directly to PGA package using adhesive: you must verify that the heat sink will not interfere with the travel of the actuator. Various heat sink designs are available to minimize this problem.

2. Heat sink mounted to PGA package using separable spring clips: along with heat sink and actuator clearance, you must verify that the spring clips do not interfere with the travel of the actuator, or with fully seating the PGA package into the socket.

3. Heat sink pulled against PGA package by separable spring clips attached to the socket: recommended when large heat sinks are required (heat sinks that extend well beyond the outer edges of the socket), or when high shock and/or vibration are anticipated.

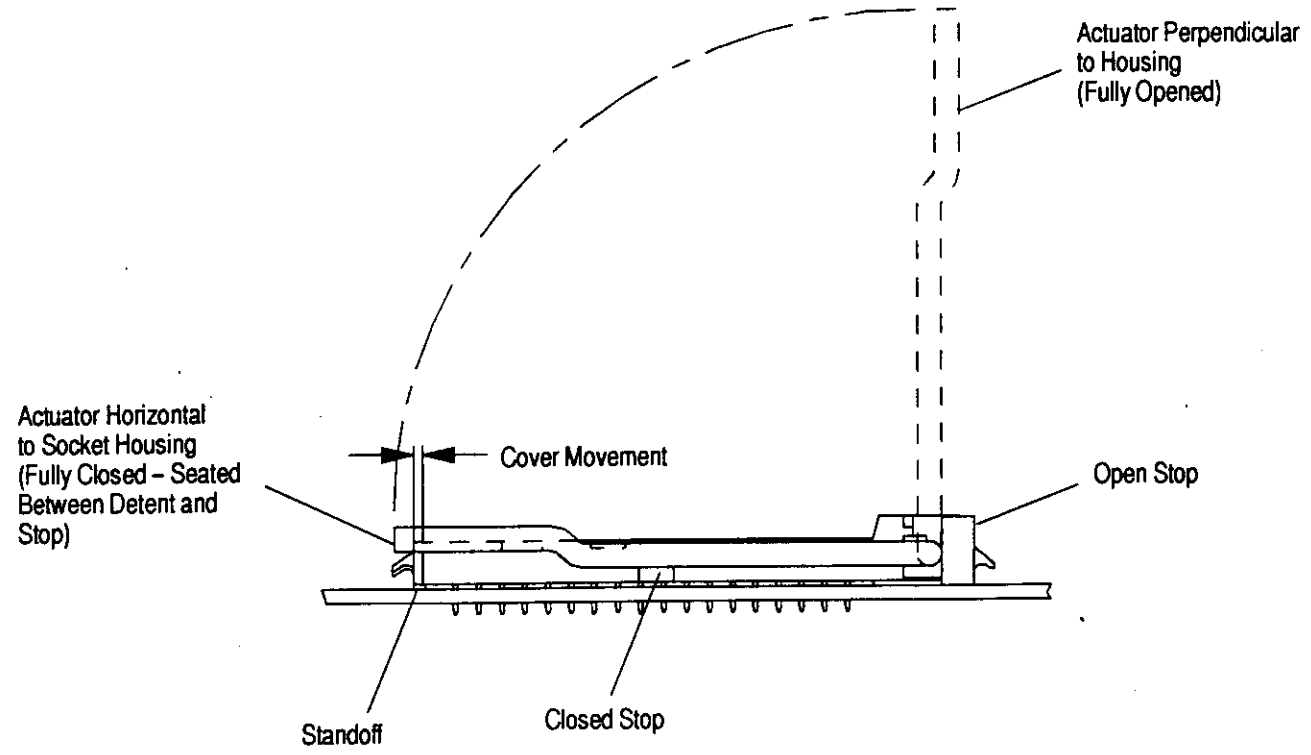


Figure 3

I. Heat Sink Spring Clip Latches

Heat sink spring clip latches have been designed into the socket for convenient direct attachment of the heat sink to the socket. The heat sink must **not** be installed on the PGA package until the socket is in the fully closed position. It must be removed **before** the socket actuator is rotated to the open position.

3.3. Printed Circuit Board

The tines must extend through the pc board far enough to allow a 360° solder fillet to form around each tine. Sockets with other solder tine lengths can be provided to meet the requirements for other board thicknesses. The Customer Drawing for a specific socket part number will show the tine length for comparison to the board thickness. The sockets described on this specification have standard solder tine lengths to fit pc boards having the nominal thickness. See Figure 4.

SOLDER TINE LENGTH	PC BOARD THICKNESS
2.79 [.110]	1.57 [.062]

Figure 4

Figure 2 shows the pc board layout dimensions required for placement of a socket. The dimensions given are common to all layouts. Refer to Customer Drawings for specific PGA pattern dimensions, including distances from the plated-through hole pattern to the edges of the socket body.

NOTE *Leave clearance space on the pc board for operation of the actuator, PGA package placement and removal, package mounted heat sinks, and any other application-specific space requirements.*

3.4. Special Handling

The following precautions for handling must be observed in order to ensure proper application of sockets. If you have questions concerning problems unique to specific applications, contact your AMP representative.

CAUTION *Each of the following subparagraphs describes special handling during some stage of assembly. During each process, care must be exercised to prevent damage to the socket components.*

A. Positioning

Sockets should remain in their protective packaging until ready for use. Handle sockets by the plastic components only, and not by the solder tines. Carefully align ALL of the solder tines with their respective pc board holes before inserting the tines into the holes. A single misaligned solder tine provides little resistance and can be bent easily. Using care, solder tines can be straightened without damaging contacts.

B. Mounting

The housing standoffs must be seated on the pc board within the limits shown in Figure 5.

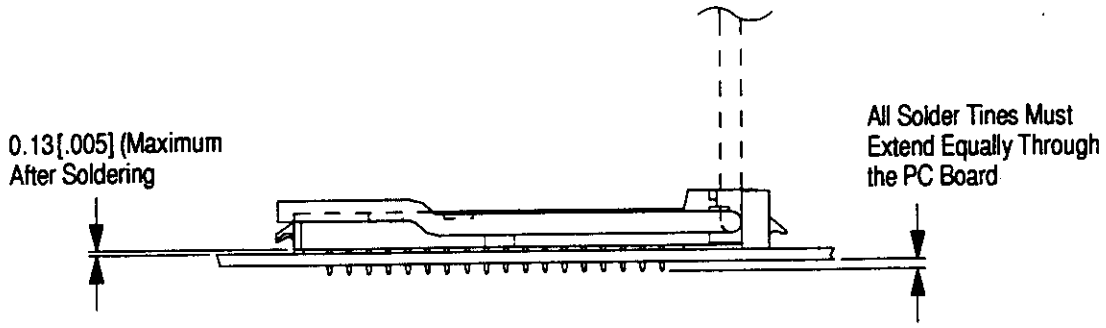


Figure 5

NOTE *These sockets do not have hardware mounting holes. If it is necessary to hold the socket against the pc board during soldering, solder tacking of select contacts to pads, weights, gigs, or some other suitable means of holding the socket in position must be employed. Whatever method is used, care must be used to prevent overstress to the solder tines.*

C. Soldering

The socket housing consists of material that is 40% glass filled plastic and is suitable for vapor phase, infrared reflow, and hand soldering processes.

Solder tines must be fluxed prior to soldering with a rosin base flux. Selection of proper flux will depend on the type of printed circuit board and other components mounted on the pc board. Also, the flux must be compatible with the soldering process as recommended by manufacturing and safety requirements.

1. Select the socket version most suitable for your application requirements.

2. Solder only after housing standoffs are securely seated on the pc board.

3. Prior to hand soldering, mate a PGA package (preferably a dummy) to the socket, and make sure the socket is closed. This stabilizes the socket spring contacts so they will not be displaced from their normal operating positions. During hand soldering, be careful not to push on the ends of the solder tines, thereby dislodging contacts from socket housing. The best procedure is to place the soldering tip against the side of the tines to heat them.

4. After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder and flux for recommended cleaning solvents. A list of common cleaning solvents that will not affect the sockets, and the time and temperature exposure for each cleaning solvent, is provided in Figure 6.

5. After cleaning, inspect the assembly to be sure no solder balls, bridges, or other visible shorting exists between adjacent solder tines. Each solder fillet must adhere 360° to the solder tine and through-hole of the pc board.

NOTE *Inspection techniques must provide a clear picture of possible areas of shorting.*

CLEANER		TIME (Minutes)	TEMPERATURES (Maximum)	
NAME	TYPE		CELSIUS	FAHRENHEIT
Alpha 2110■	Aqueous	1	132	270
Bioact EC–7◆	Solvent	5	100	212
Carbitol●	Solvent	1	Room Ambience	
Isopropyl Alcohol	Solvent	5	100	212
Kester 5778❋	Aqueous	5	100	212
Kester 5779❋	Aqueous	5	100	212
Lonco 520●	Aqueous	5	100	212
Lonco 530●	Aqueous	5	100	212
Terpene Solvent	Solvent	5	100	212

■ Product of Fry's Metals, Inc. ◆ Product of Petroferm, Inc. ● Product of Union Carbide Corp. ❋ Product of Litton Systems, Inc.

Figure 6

D. Alignment

In order to function properly, the completed soldered socket and contact solder tines must conform to the dimensions and callouts shown in Figure 5.

3.5. Intermateability

A. PGA Package Pin Cross Section

These sockets are designed to mate with PGA packages having pins with a diameter of 0.46 ± 0.05 [.018 ± .002]. Sockets to mate with packages with pin diameters 0.38–0.53 [.015–.021] are available upon request. No special pin tip lead–ins are required, but some amount of chamfer on the pin tips will help guide them into the socket cavities.

B. PGA Package Pin Length

Sockets are available to accommodate the variety of pin lengths used in different PGA packages. Consult the notes on the appropriate customer drawing for the recommended pin lengths.

C. PGA Package Pin True Position

The true position of the PGA package pins should be within 0.20 [.008] MMC (Maximum Material Condition).

D. PGA Package Pin Plating

The socket contacts are plated with gold to mate with gold plated pins. Other platings can be provided upon request through your AMP representative.

E. Engaging and Disengaging PGA Package

The actuator of the socket must be fully perpendicular to the socket when installing or removing a PGA Package. See Figure 7.

CAUTION *Any attempt to install or remove a PGA package with the actuator closed may result in permanent damage to the components.*

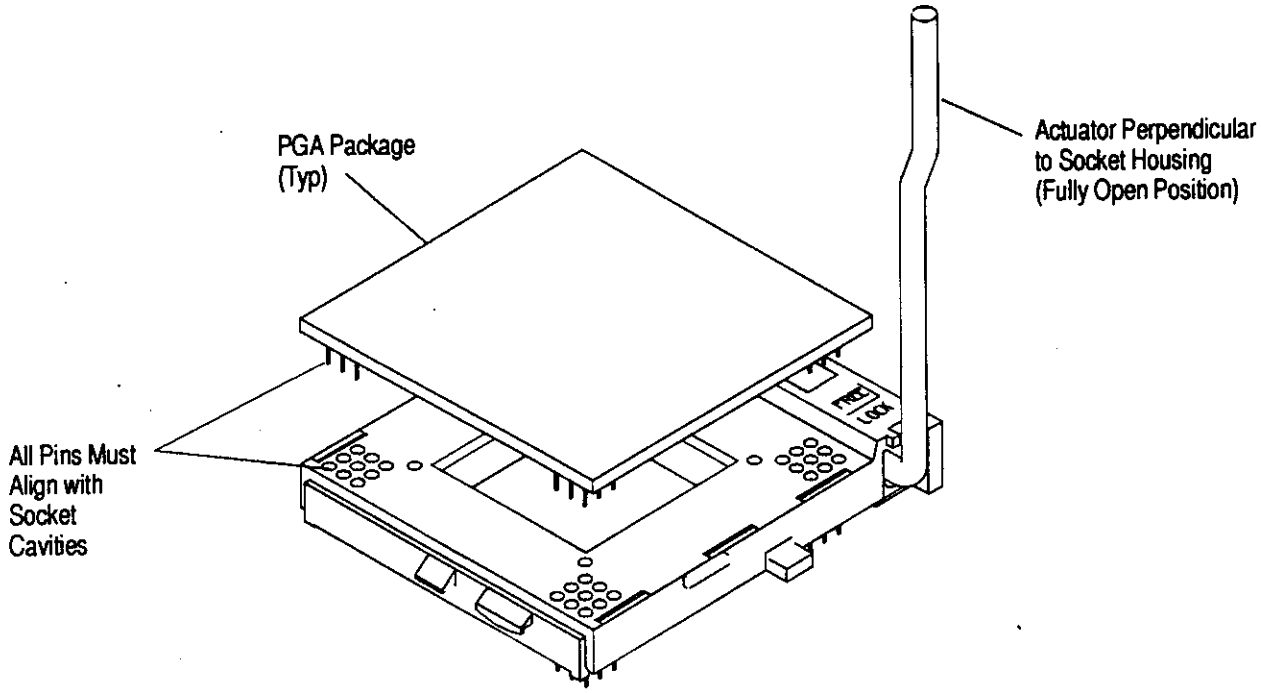


Figure 7

1. Installation/Engagement Requirements

All PGA package contacts must be straight and aligned with the respective socket cavities. *No force is needed to insert the package.* See Figure 7.

The PGA package must be fully seated in the socket before the actuator is closed and the contacts are engaged. Full engagement will occur only when the actuator is seated between the actuator detent and stop. See Figure 8.

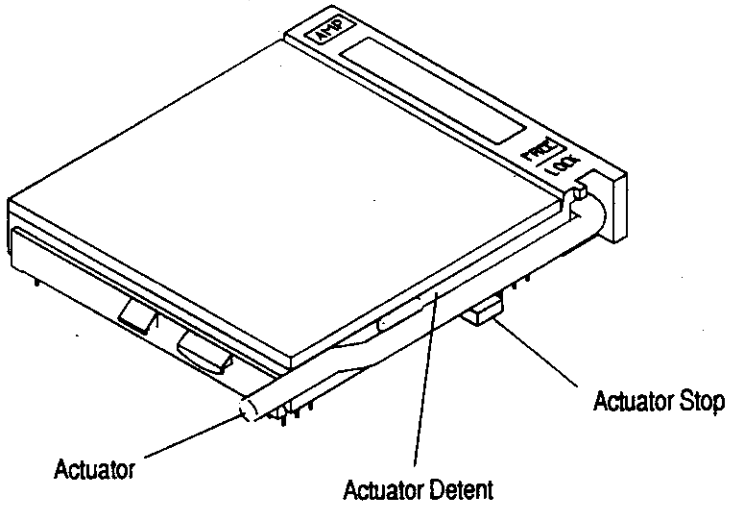


Figure 8

2. Disengagement and Removal Requirements

The actuator must be in the fully open position to disengage the contacts from the PGA package pins. See Figure 7.

The PGA package must be gripped by the edge of the housing and pulled straight out of the socket to protect against deformation of the PGA socket contacts and PGA package pins. See Figure 9.

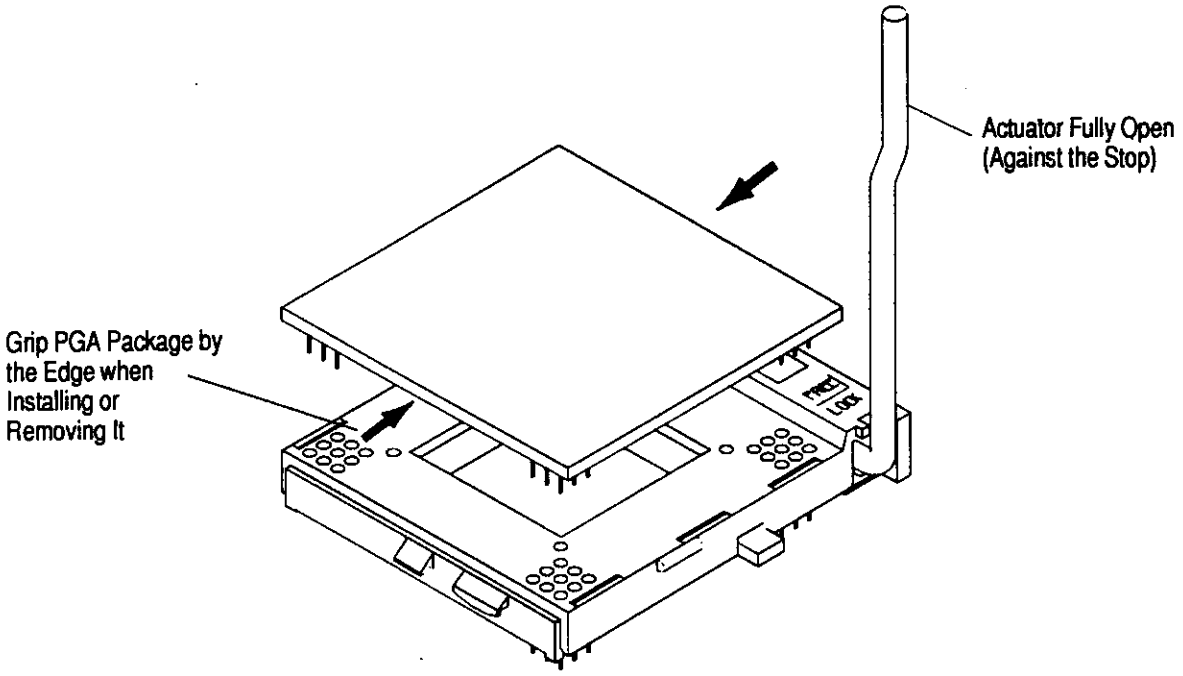


Figure 9

4. QUALIFICATION

The AMP Low Profile, Single Lever, Zero Insertion Force, Pin Grid Array Sockets are listed by Underwriters' Laboratories, Inc. (UL) under File No. E28476, and certified to the Canadian Standards Association (CSA) under File No. LR7189A.

5. TOOLING

No tooling is required for the application of the sockets.

6. VISUAL AID

Figure 10 shows a typical application of Low Profile, Single Lever, Zero Insertion Force, Pin Grid Array Sockets. 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 on the preceding pages of this specification and in the instructional material shipped with the product.

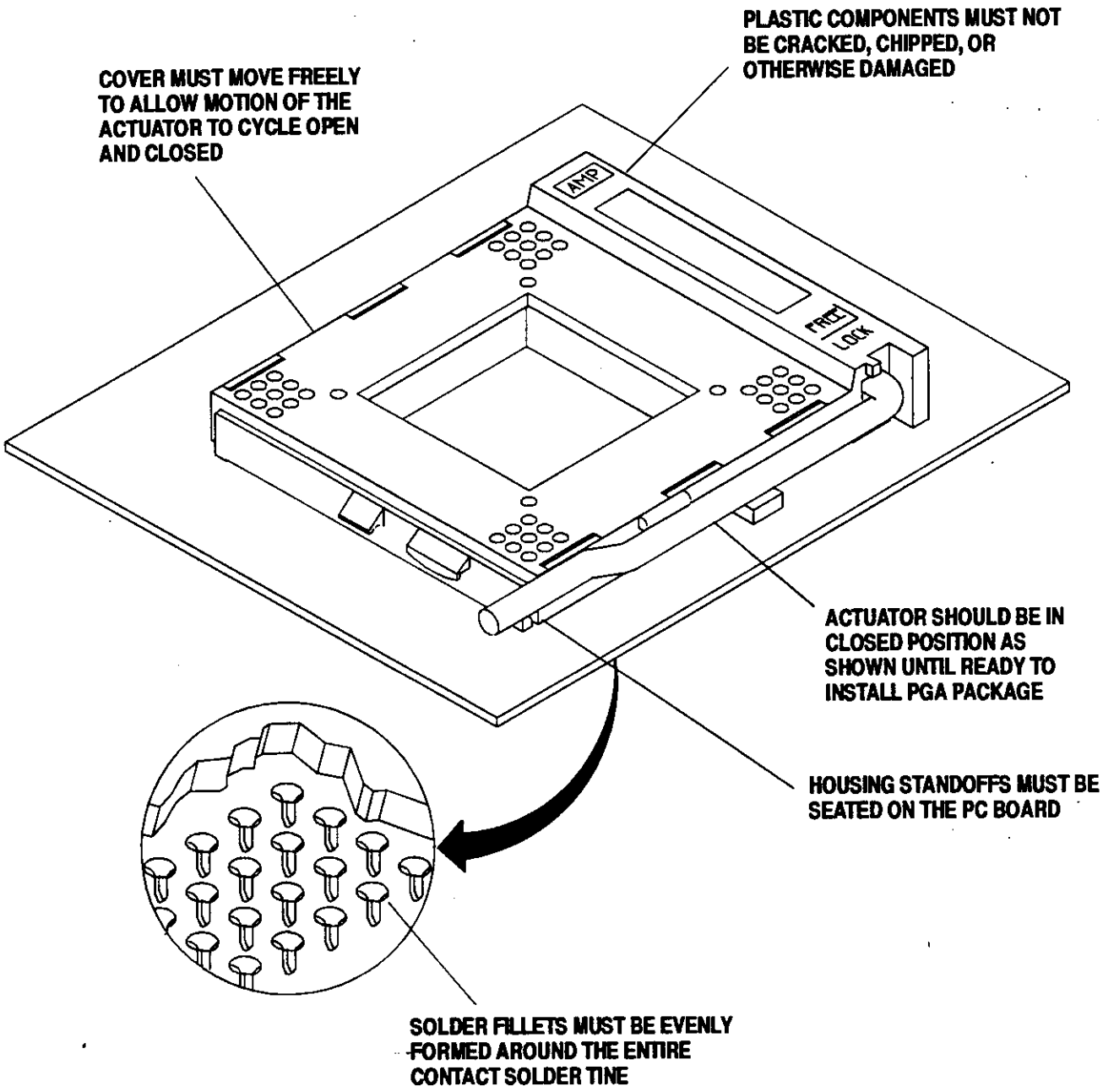


FIGURE 10. VISUAL AID