

**Modular Jacks**

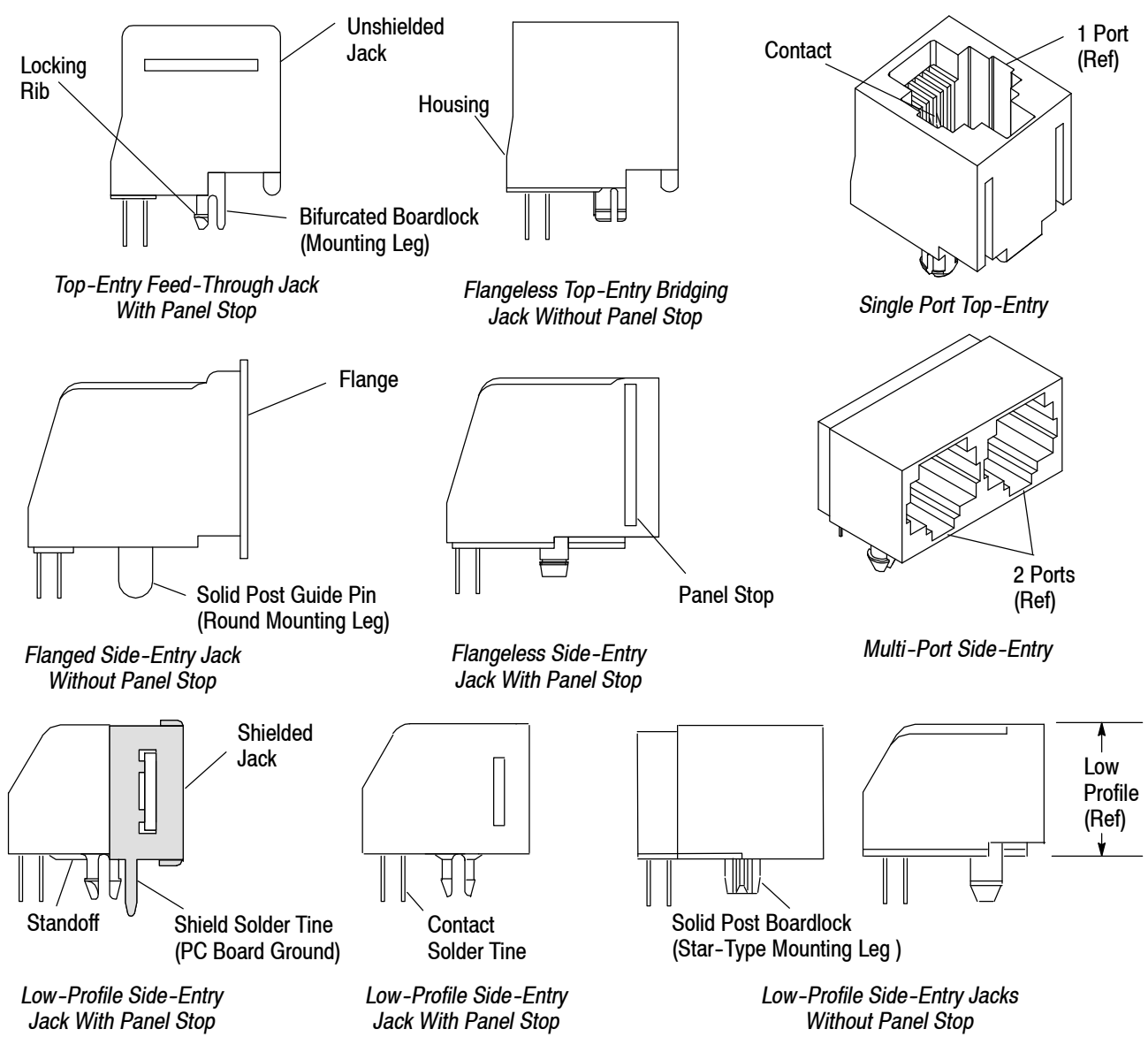


All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Unless otherwise specified, dimensions have a tolerance of  $\pm 0.13$  [ $\pm 0.005$ ] and angles have a tolerance of  $\pm 2^\circ$ . Figures and illustrations are for identification only and are not drawn to scale.

**1. INTRODUCTION**

This specification covers the requirements for application of Modular Jacks designed to be mounted to a printed circuit (pc) board. The jacks are available as unshielded, shielded, and filtered designs to accommodate specific application requirements. There are 4 position handset jacks and there are 4, 6, 8, and 10 position line jacks. This specification pertains to all shielded and unshielded jacks with top and side entry ports, and with single or multiple ports.

When corresponding with TE Personnel, use the terminology provided on this specification to help facilitate assistance. Basic terms and features of components are provided in Figure 1.



**Typical Modular Jack Designs**

Figure 1

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## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

This paragraph is dedicated to a revision summary of changes and additions since the previous release of this application specification. The following changes were made for this revision:

- Changed dimension in Shielded 8 Position Jacks in Figure 4

### 2.2. Customer Assistance

Reference Part Number 520250 and Product Code 1055 identify the pc board mounted modular jacks. These numbers are used in a service network of customer service to access tooling and product application information. This service is provided by your local TE Representative or, after purchase, by calling the Tooling Assistance Center or Product Information number at the bottom of page 1.

### 2.3. Drawings

Customer Drawings for product numbers are available from the service network. The information on the customer drawing and this specification takes priority over any other document supplied by TE. If there is a conflict with the information on the customer drawing and this specification call either of the customer service numbers at the bottom of page 1 for assistance.

### 2.4. Product Specifications

Product Specifications 108-1163 (shielded and unshielded modular jacks), 108-1721 (unshielded bridging jacks), and 108-1432 (filtered modular jacks ) cover test and performance requirements.

### 2.5. Manuals

Manual 402-40 is available upon request and 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.

## 3. REQUIREMENTS

### 3.1. Storage

#### A. Ultraviolet Light

Prolonged exposure to ultraviolet light may deteriorate the chemical composition used in the modular jack housings.

#### B. Shelf Life

Modular jacks should remain in the shipping containers until ready for use to prevent damage. The products should be used on a first in, first out basis to avoid storage contamination that could adversely affect signal transmissions.

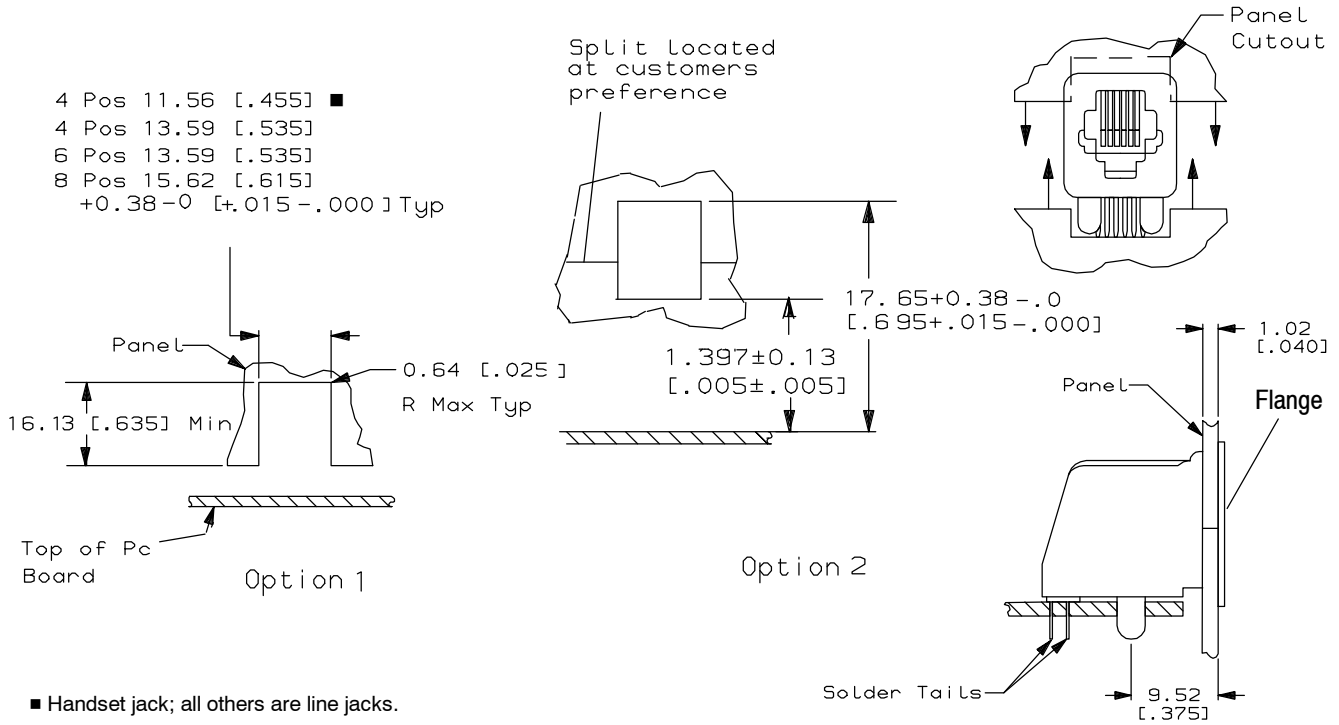
#### C. Chemical Exposure

Do not store modular jacks near any chemicals listed below, as they may cause stress corrosion cracking in the components.

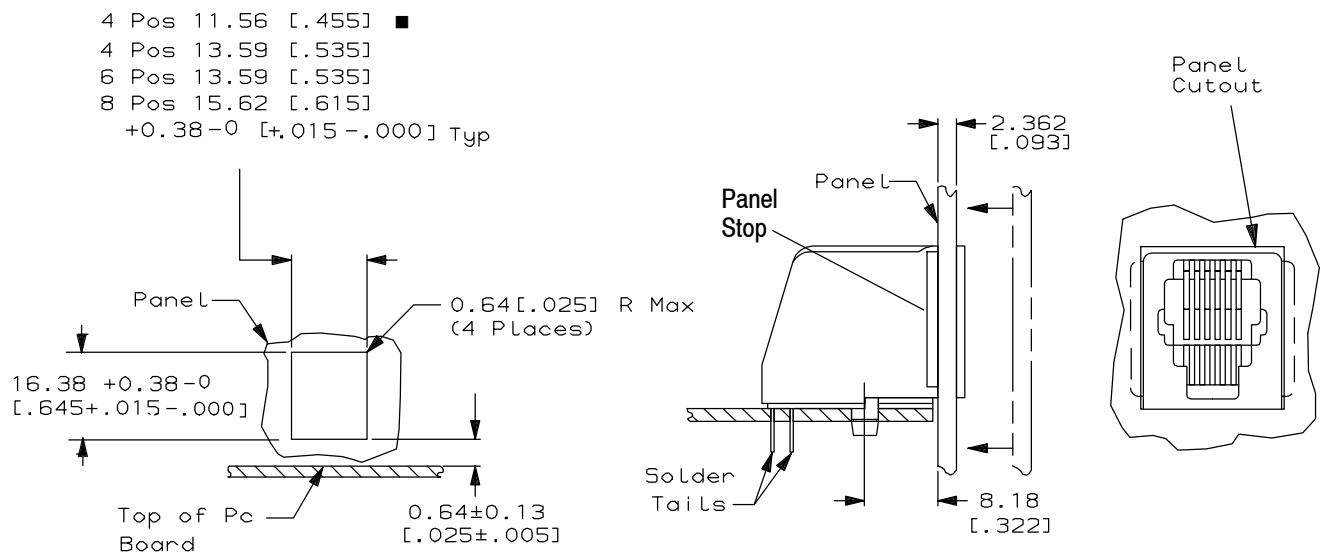
Alkalies	Ammonia	Citrates	Phosphates	Citrates	Sulfur Compounds
Amines	Carbonates	Nitrites	Sulfur Nitrites		Tartrates

### 3.2. Panel Cutout

The flanged jacks will require a panel cutout that will allow the jack flange to be on the outside of the panel. This may be accomplished with three-sided panel cutout (Option 1) or a split panel cutout (Option 2). The flangeless jacks with panel stops are designed to be back mounted to a panel connected on all four sides. The suggested panel cutout for each style of modular jack is provided in Figure 2.



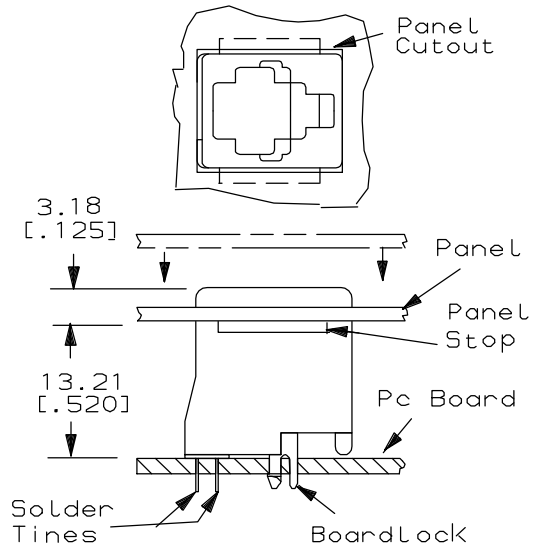
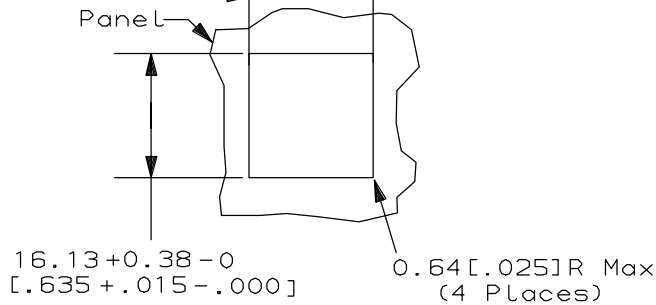
#### Unshielded 4 Position Handset, and 4, 6, and 8 Position Line Side-Entry Jacks with Flange



#### Unshielded 4 Position Handset, and 4, 6, and 8 Position Line Flangeless Side-Entry Jacks with Panel Stop

Figure 2 (cont'd)

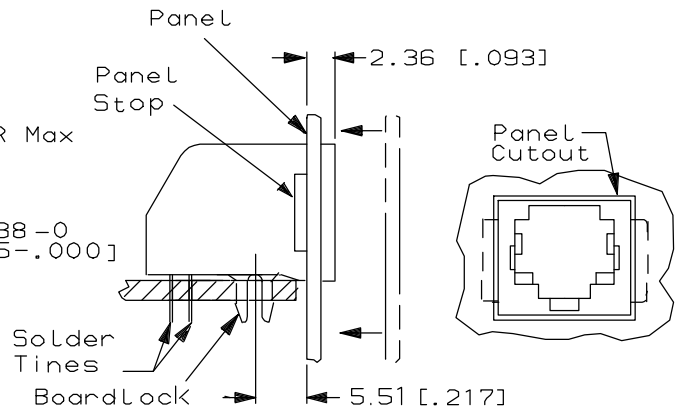
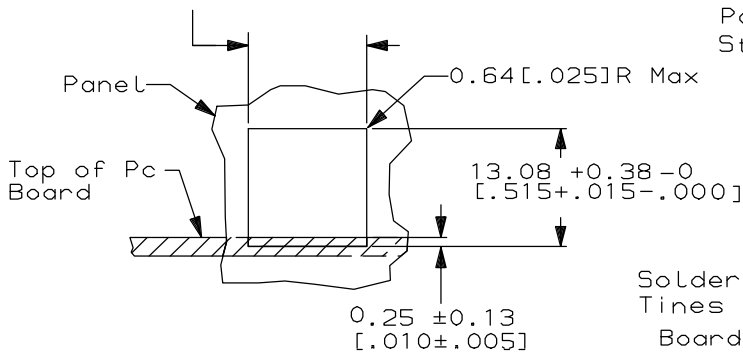
4 Pos 11.81 [.465] ■  
 4 Pos 13.84 [.545]  
 6 Pos 13.84 [.545]  
 8 Pos 15.88 [.625]  
 +0.38 - 0 [+ .015 - .000] Typ



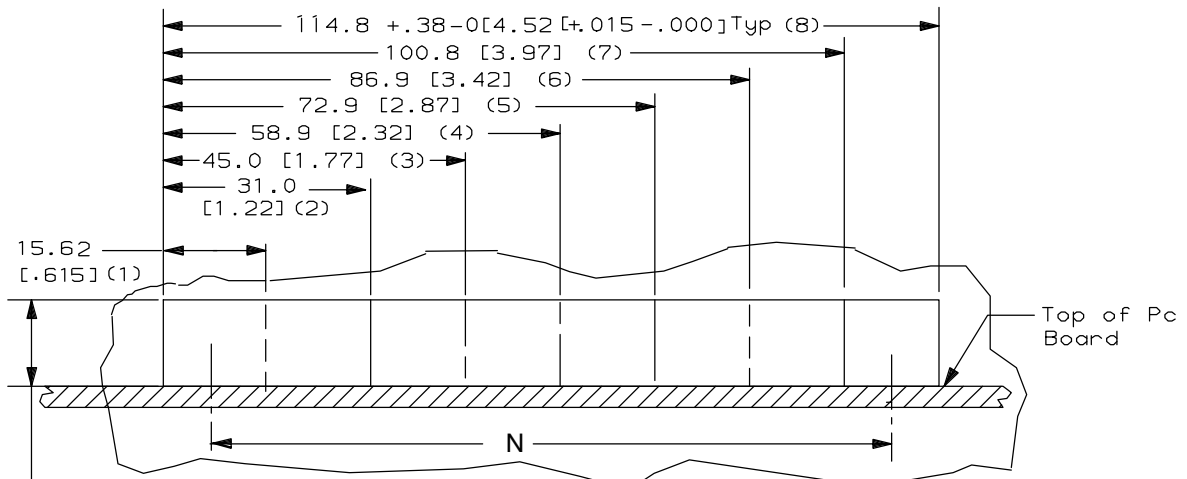
■ Handset jack; all others are line jacks.

**Unshielded 4 Position Handset, and 4, 6, and 8 Position Line Top-Entry Jacks**

4 Pos 13.60 [.535]  
 6 Pos 13.60 [.535]  
 8 Pos 15.62 [.615]  
 +0.38 - 0 [+ .015 - .000] Typ



**Unshielded 4, 6, and 8 Position Line Low-Profile Side-Entry Jacks**

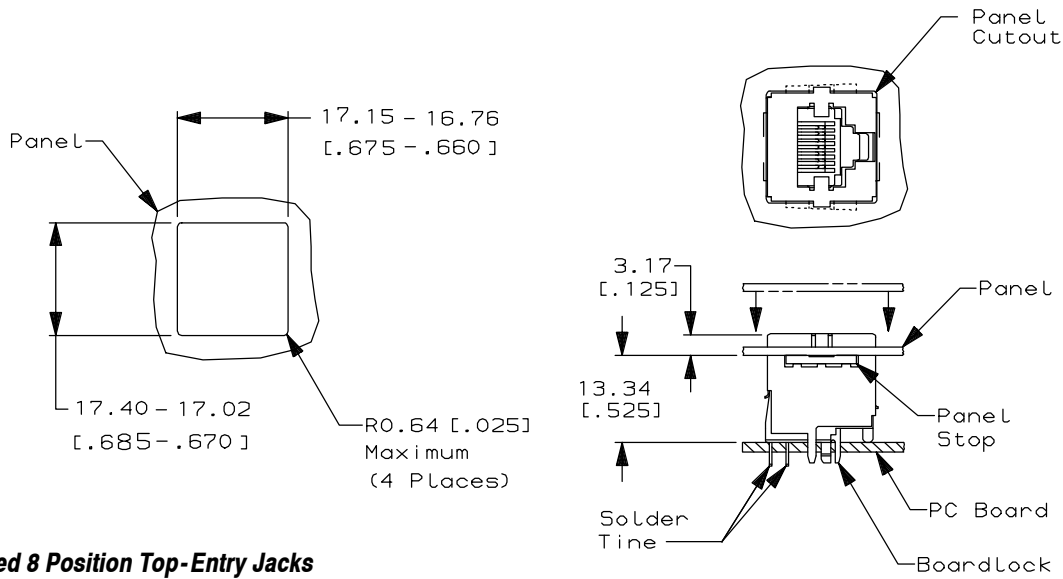


13.84 + 0.38 - 0 [.545 + .015 - .000]

**Unshielded 8 Position Multi-Port Jacks**

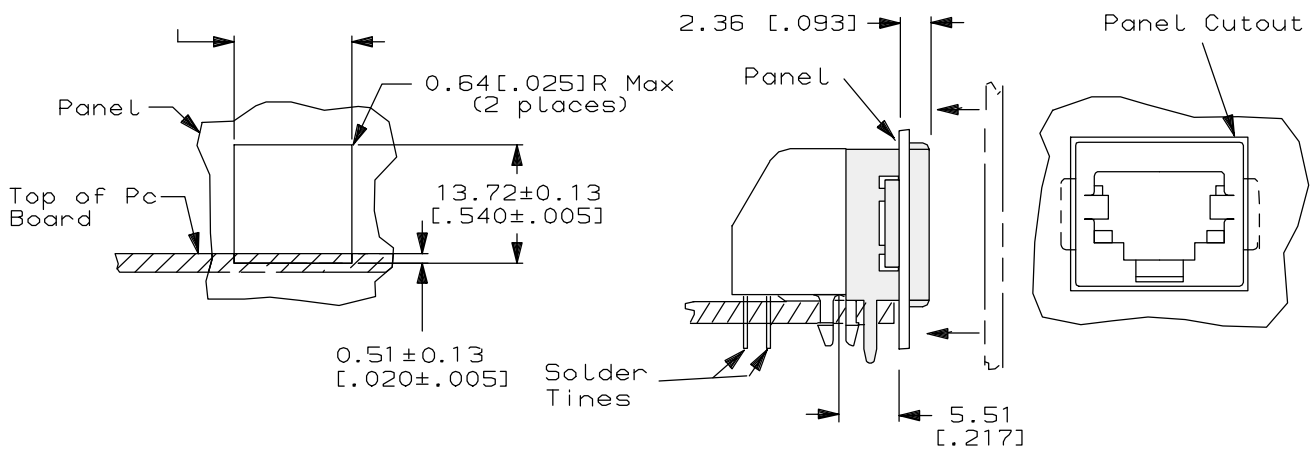
Figure 2 (cont'd)

(Number in parenthesis) = Number of Ports

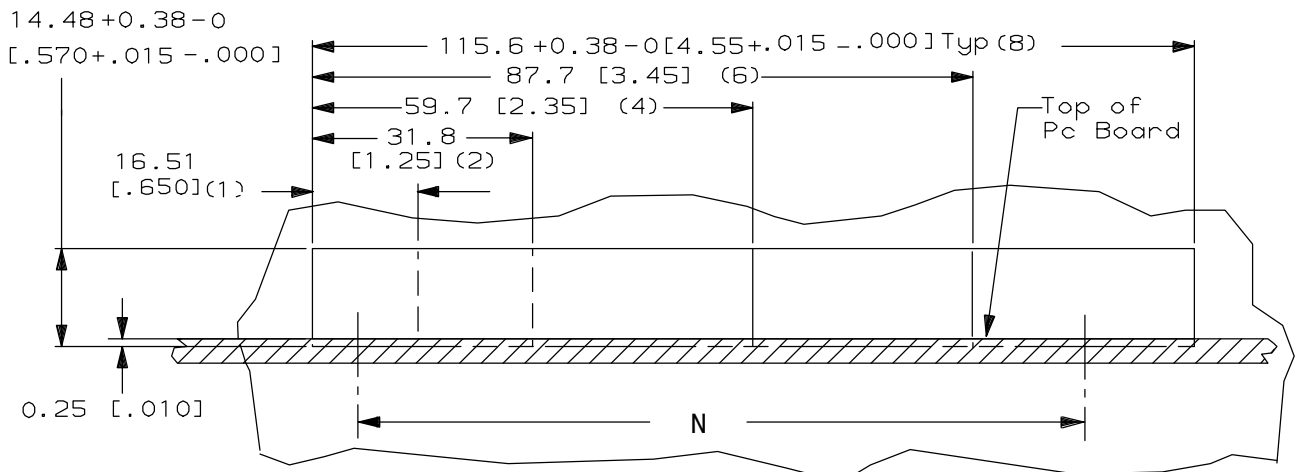


**Shielded 8 Position Top-Entry Jacks**

6 Pos 14.22 [.560]  
8 Pos 16.26 [.640] +0.38 - 0 [+ .015 - .000] Typ



**Shielded 6 and 8 Position Side-Entry Low-Profile Jacks**



**Shielded 8 Position Multi-Port Modular Jacks**

(Number in parenthesis) = Number of Ports

Figure 2 (end)

### 3.3. PC Board Layout

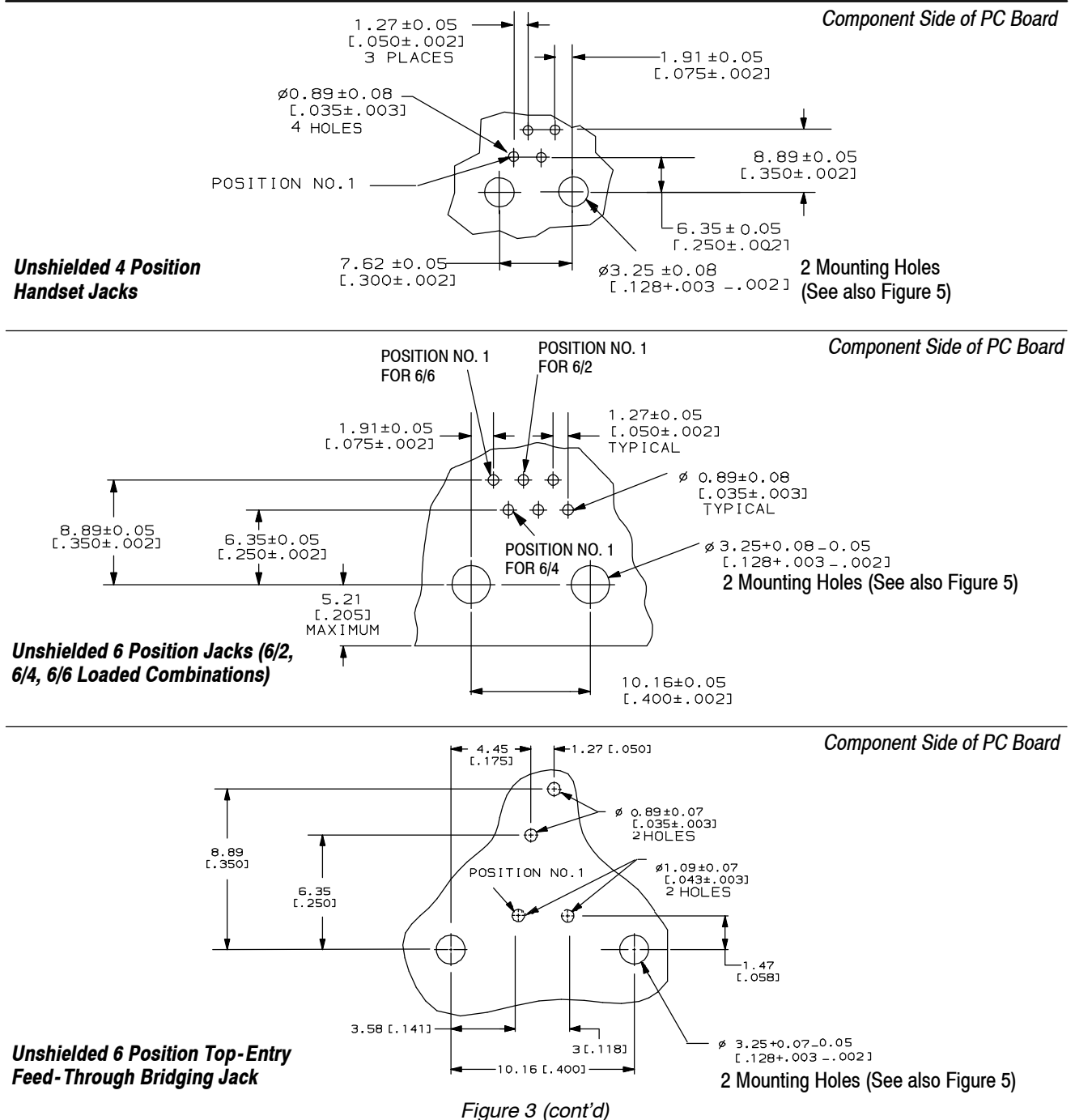
The solder time hole layout for all 4, 6, and 8 position single-port jacks is typical for all jacks with comparable positions, and each port of a multi-port jack is identical to the hole pattern for comparable single-port jacks. The mounting hole location will depend of the number of ports and contact positions. The pc board layout views shown represent the **component side** of the pc board.

**NOTE**

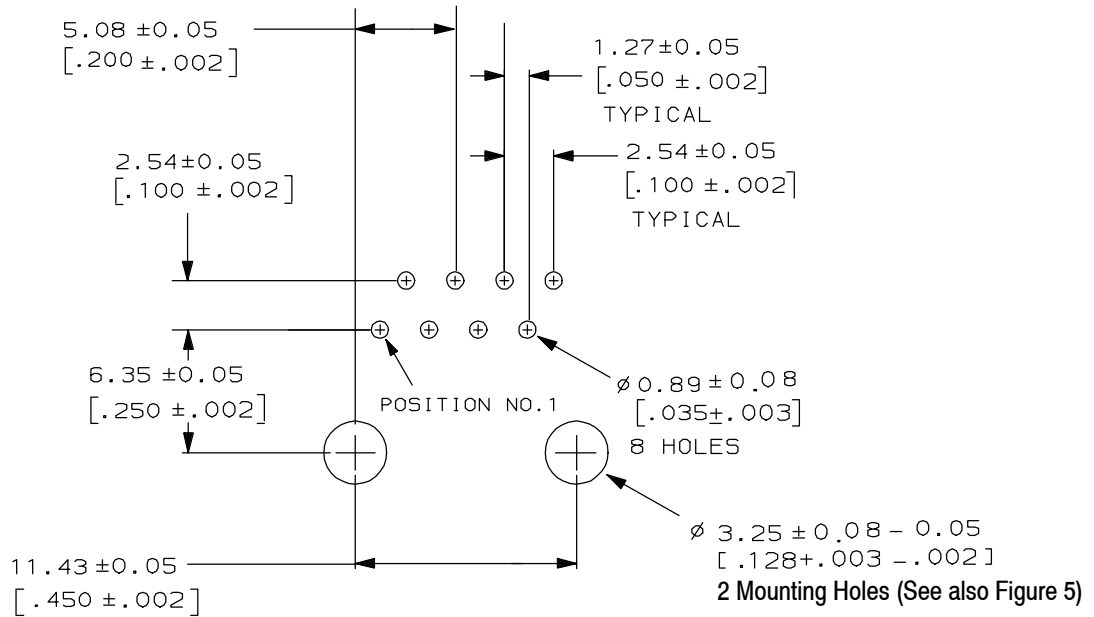
Mounting holes in pc board should be made with 3.25 mm [.128 in. (No. 30)] drill. Do NOT use a 3.18 mm [.125 in. (1/8)] drill bit.

#### A. Unshielded Jacks

The hole patterns that apply to all unshielded side-entry and top-entry jacks are provided in Figure 3.

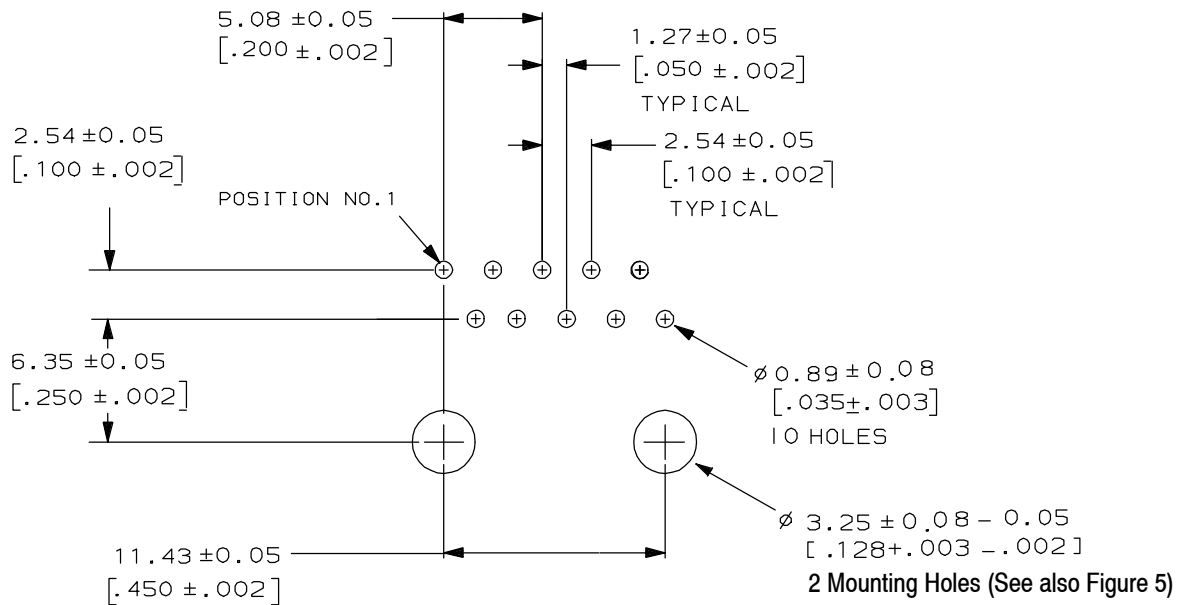


Component Side of PC Board



**Unshielded 8 Position Jacks**

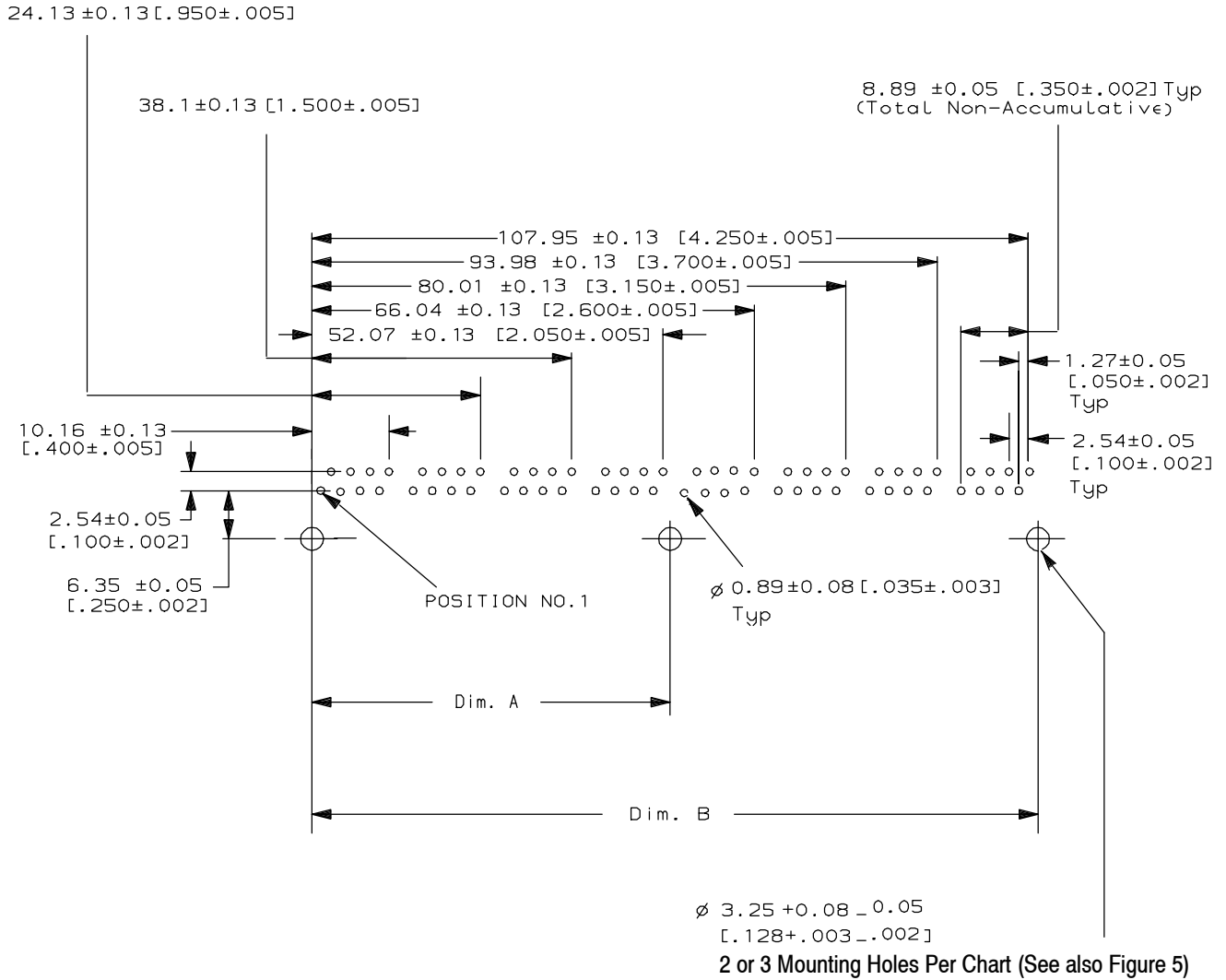
Component Side of PC Board



**Unshielded 10 Position Jacks**

Figure 3 (cont'd)

Component Side of PC Board



MOUNTING HOLE LOCATIONS		
NUMBER OF PORTS	DIM. A	DIM. B
1	Not Required	11.4 [0.45]
2	Not Required	25.4 [1.00]
3	Not Required	39.4 [1.55]
4	Not Required	53.3 [2.10]
5	Not Required	67.3 [2.65]
6	Not Required	81.3 [3.20]
7	Not Required	95.2 [3.75]
8	54.61 [2.15]	109.2 [4.30]

Unshielded 8 Position Multi-Port Jacks

Figure 3 (end)



### B. Shielded Jacks

The hole patterns that apply to all shielded side-entry and top-entry jacks are provided in Figure 4. All pc board layout views shown represent the **component side** of the pc board.

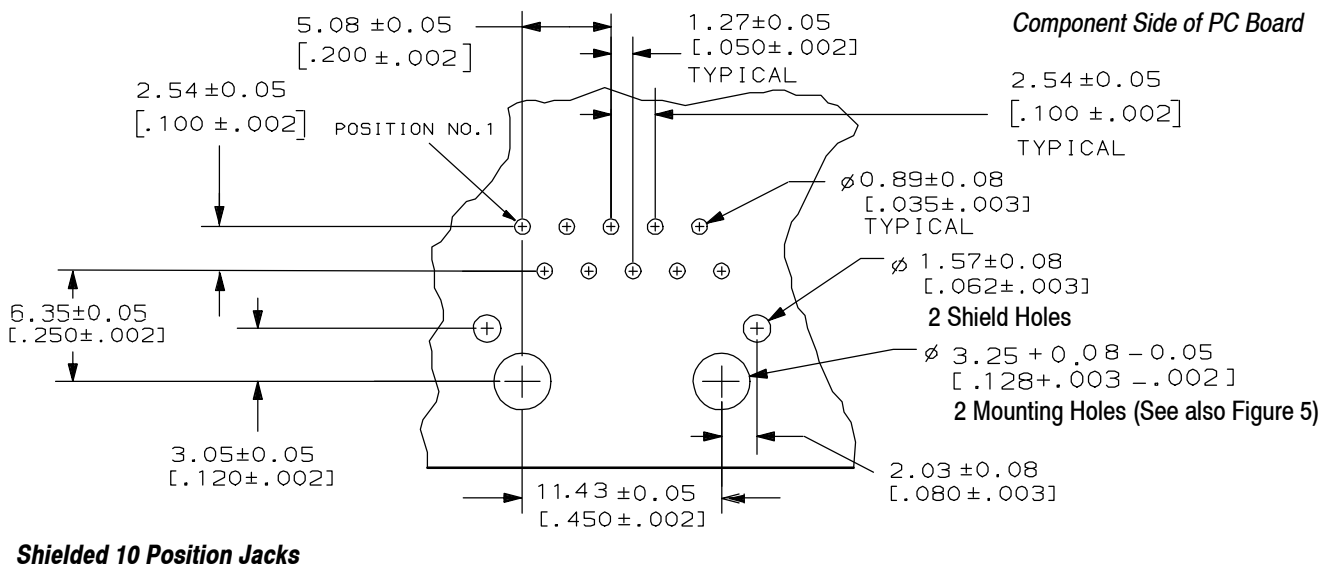
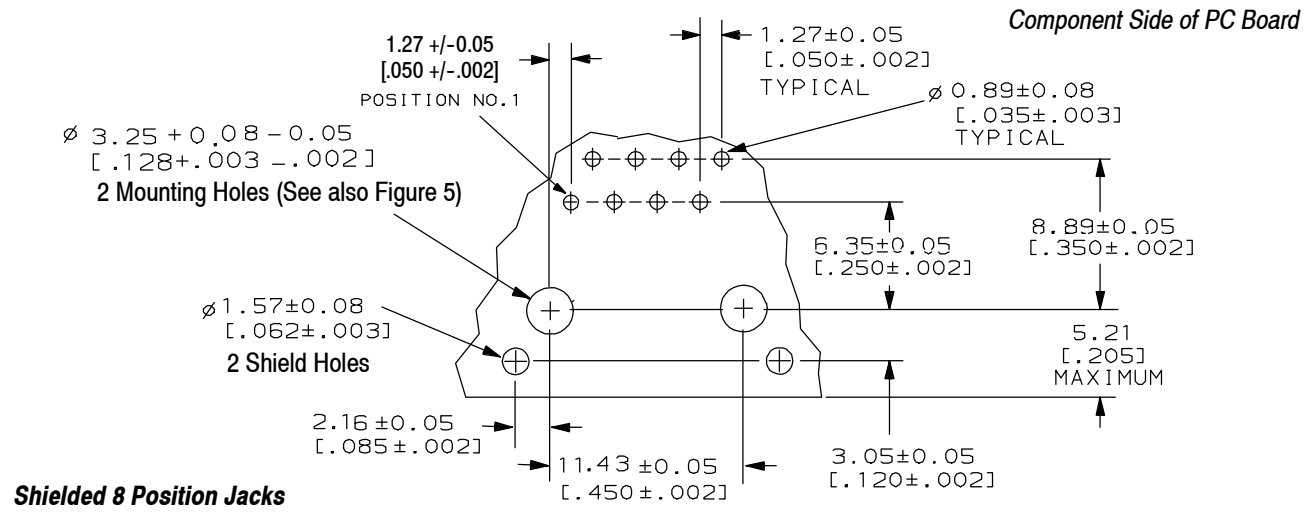
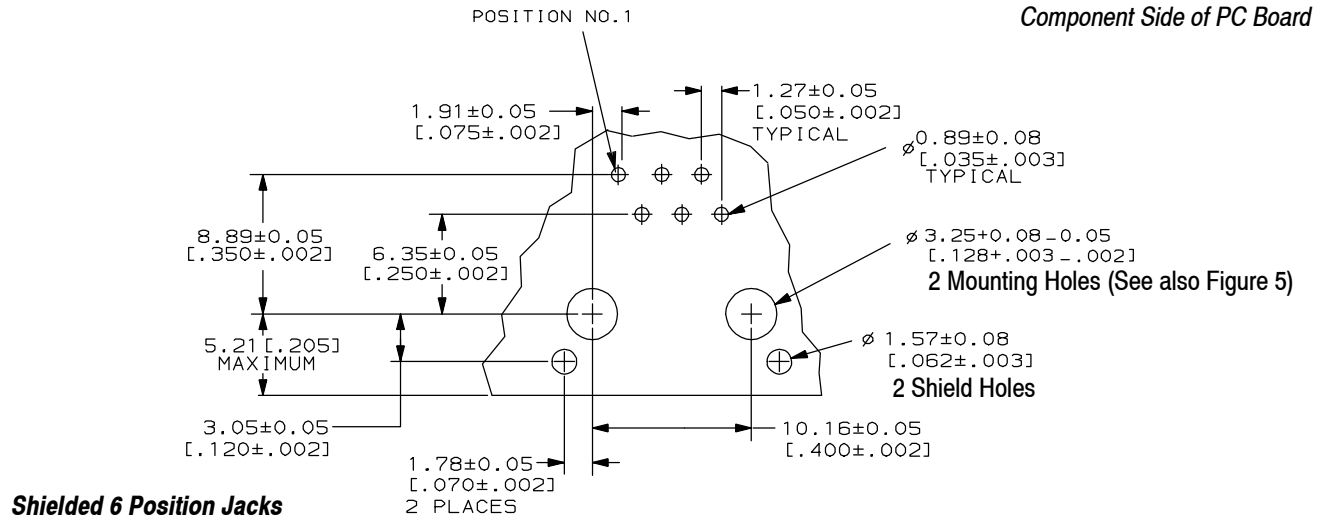
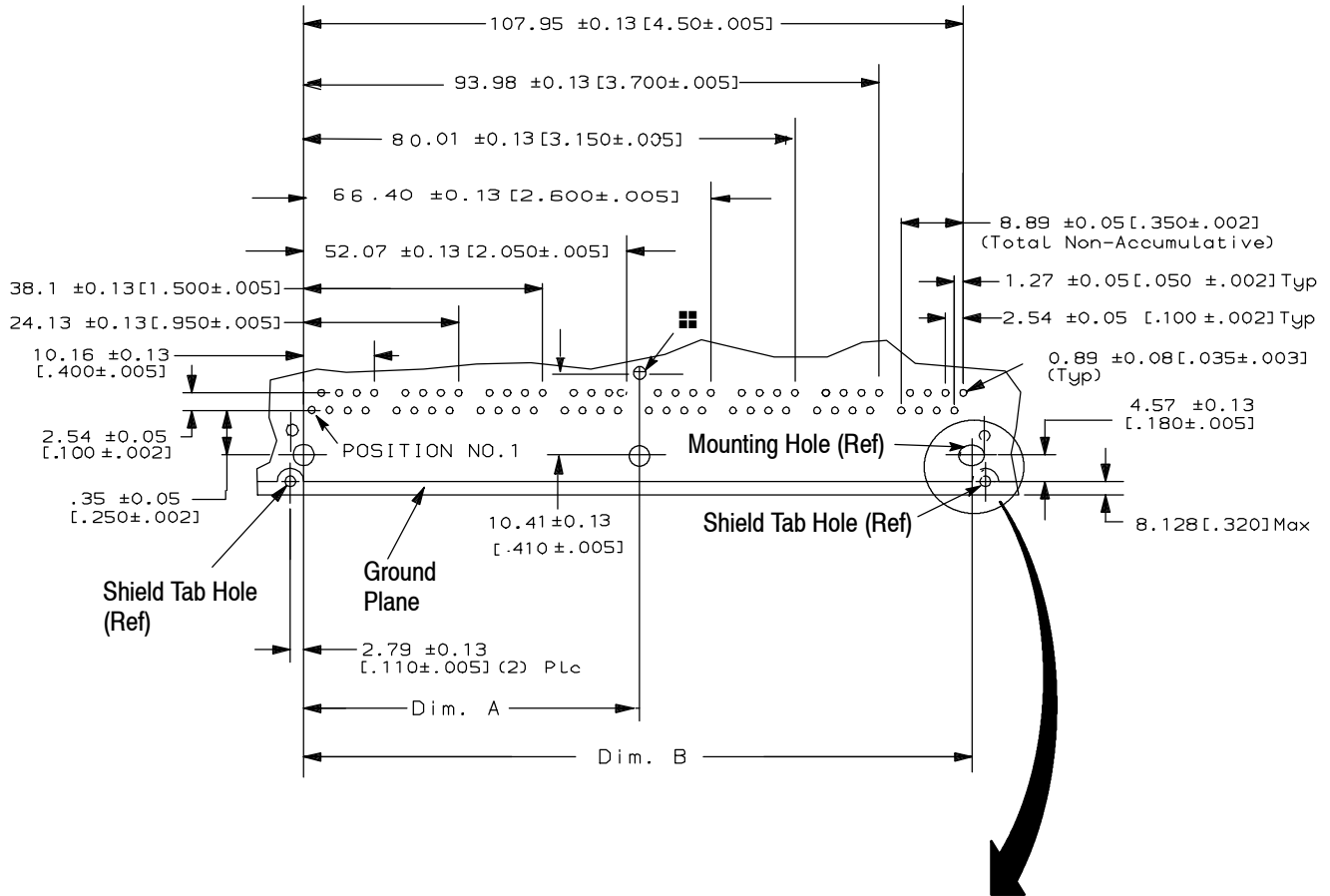


Figure 4 (cont'd)

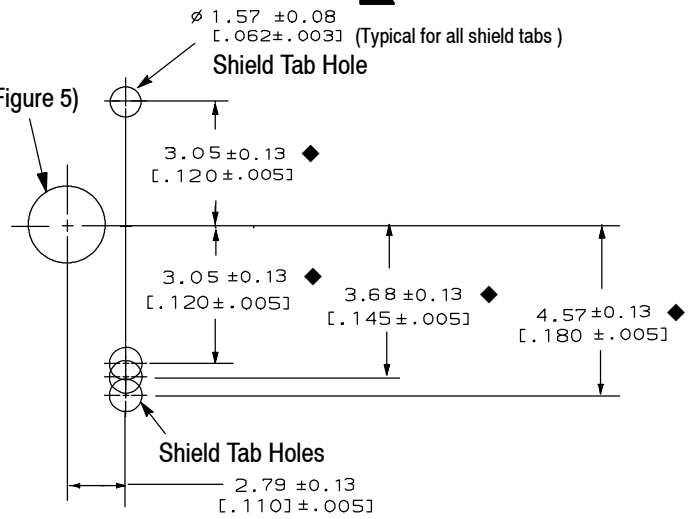
Component Side of PC Board



∅ 3.25 +0.08 -0.05 [.128+.003 -.002] 2 or 3 Mounting Holes Per Chart (See also Figure 5)

∅ 1.57 ±0.08 [.062±.003] (Typical for all shield tabs) Shield Tab Hole

MOUNTING HOLE LOCATIONS		
NUMBER OF PORTS	DIM. A	DIM. B
1	Not Required	11.4 [0.45]
2	Not Required	25.4 [1.00]
3	Not Required	39.4 [1.55]
4	Not Required	53.3 [2.10]
5	Not Required	67.3 [2.65]
6	Not Required	81.3 [3.20]
7	Not Required	95.3 [3.75]
8	54.61 [2.15]	109.2 [4.30]



Shield Tab Hole Locations for the Various Multi-Port Jack Assemblies

- Shield tab hole for assemblies with a center ground tab solder tine located at the rear of the shield.
- ◆ Hole location varies among multi-port assemblies and is determined by the dimension from the center of boardlock or guide pin mounting legs to the center of the shield tab solder tine.

Shielded 8 Position Multi-Port Jacks

Figure 4 (end)

### 3.4. PC Board Contact Tine Holes

Plated through holes must be used for contact solder tines and, when applicable, shield solder tines. The drilled hole size, plating types, and plating thickness are dependent on your application requirements. The finished hole size must be as stated to provide unrestricted insertion, proper retention in the pc board, and to ensure adequate application of solder to the tines. See Figure 5.

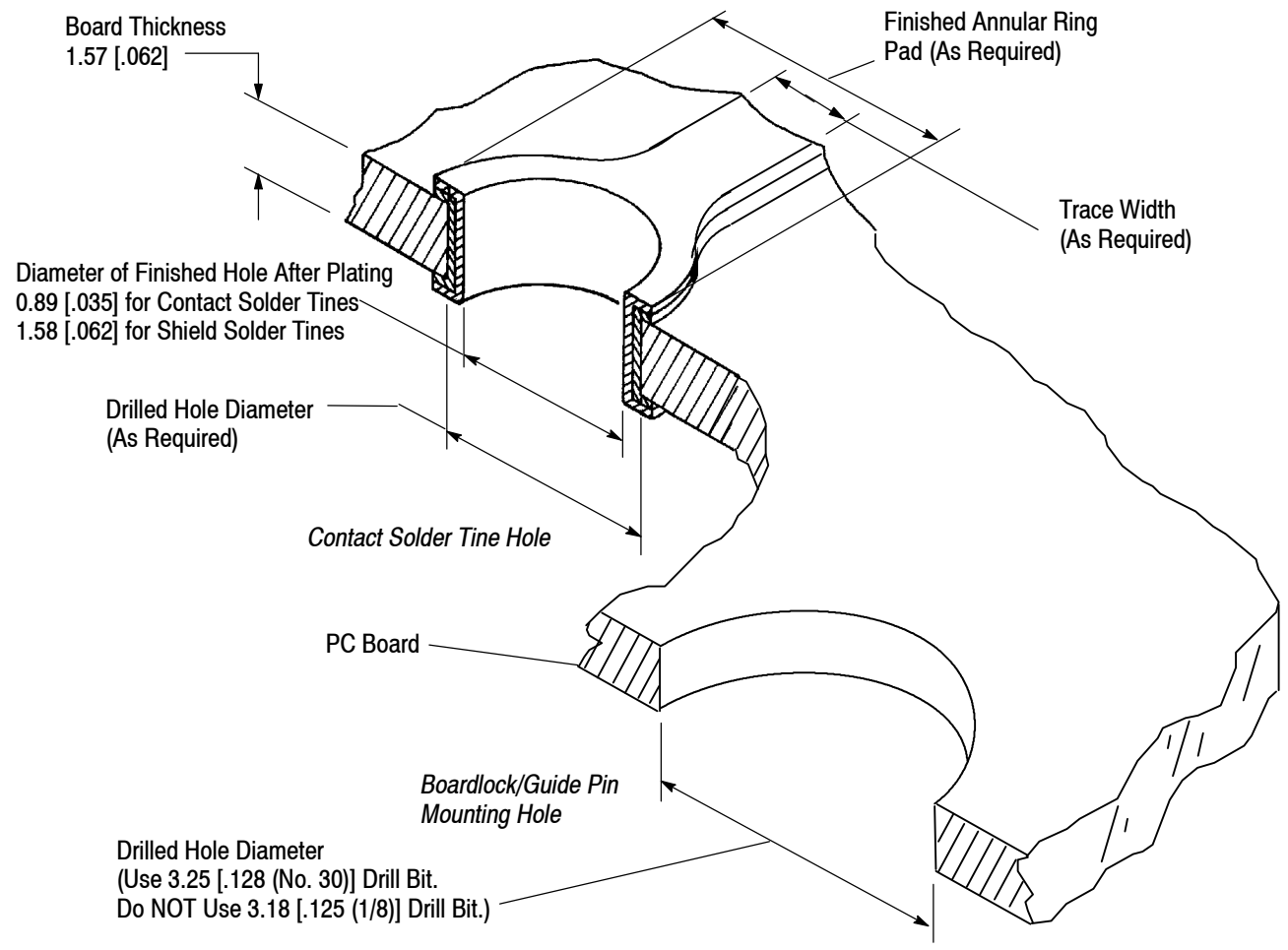


Figure 5

### 3.5. Alignment

The modular jack shall be flush and evenly seated on the pc board. A hold-down may be used to hold the jack in place during the soldering process.

### 3.6. Shielding

Shielded modular jacks feature tin/lead plated brass shells which provide continuity for EMC (Electromagnetic Compatibility) applications. When mated with corresponding shielded modular plugs, shielding and grounding continuity are achieved. When the shield solder tines are soldered to the pc board they provide electrical continuity to any ground path on the pc board and, where applicable, panel ground tabs on the shield provide electrical continuity to any ground path through the equipment panel.

### 3.7. Jack Placement



*The modular jacks should be handled only by the housing to avoid deformation, contamination, or other damage to the contact solder tines and, where applicable, shield solder tines.*

Determine which hole in the pc board is to receive the number one contact tine, then orient the jack so the number one solder tine is aligned with the hole. Start all solder tines into the board, then press on the top of the jack until it seats on the pc board.

### 3.8. Soldering

#### A. Flux Selection

Contact solder tines must be fluxed prior to soldering with a mildly active, rosin base flux. Selection of the flux will depend on the type of pc board and other components mounted on the board. Additionally, the flux must be compatible with the wave solder line, manufacturing, health, and safety requirements. Call the Product Information phone number at the bottom of page 1 for consideration of other types of flux. Some fluxes that are compatible with these modular jacks are provided in Figure 6.

FLUX TYPE	ACTIVITY	RESIDUE	COMMERCIAL DESIGNATION	
			KESTER	ALPHA
Type RMA (Mildly Activated)	Mild	Noncorrosive	186	611

Figure 6

#### B. Soldering Guidelines

Modular jacks can be soldered using wave or equivalent soldering techniques. We recommend using SN60 or SN62 solder for these connectors. The temperatures and exposure time shall be within the ranges specified in Figure 7.

#### NOTE



The unshielded, 6 position, top-entry, feed through bridging jacks must have an un-terminated plug installed to eliminate pre-load stress and prevent movement of the contacts during the wave soldering process.

SOLDERING PROCESS	TEMPERATURE (Wave)		TIME (At Max Temp)
	CELSIUS	FAHRENHEIT	
WAVE SOLDERING	260 <sup>±</sup>	500 <sup>±</sup>	5 Seconds

Figure 7

#### C. 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 modular jacks for the time and temperature specified. See Figure 8.

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 Ambient	
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

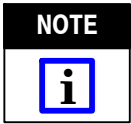
Figure 8

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.

ALPHA, BIOACT, BUTYL CARBITOL, KESTER, and LONCOTERGE are trademarks of their respective owners.



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 can be used with no harmful affect to the connectors; however TE does not recommend them because of the harmful occupational and environmental effects. Both are carcinogenic (cancer-causing) and Trichloroethylene is harmful to the earth's ozone layer.



If you have a particular solvent that is not listed, contact the Tooling Assistance Center or Product Information number at the bottom of page 1.

**D. Drying**

When drying cleaned assemblies and printed circuit boards, make certain that temperature limitations are not exceeded: -40° to 70°C [-40° to 158°F]. Excessive temperatures may cause housing degradation.

**3.9. Checking Installed Jack**

The modular jack must be seated on the pc board within the dimensions shown in Figure 9.

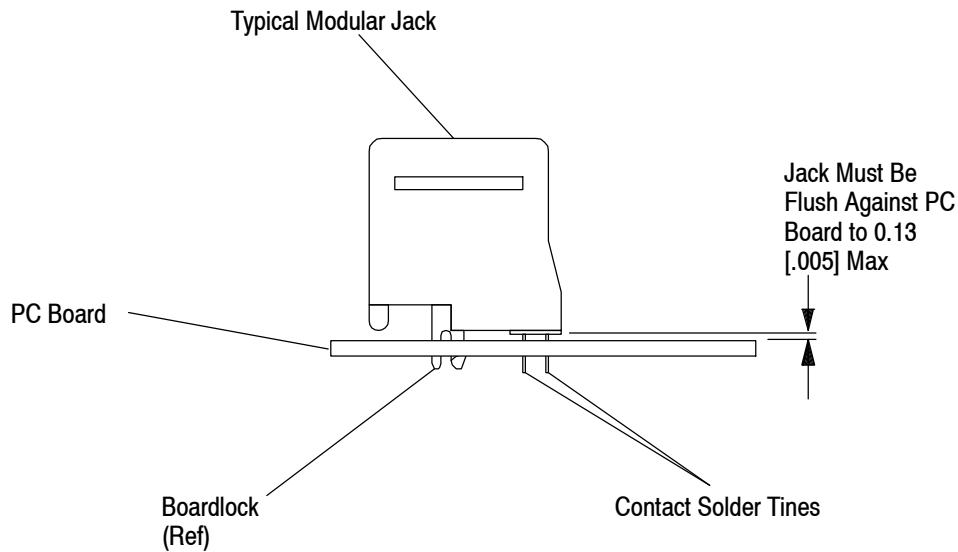


Figure 9

**3.10. Repair/Removal**

If the jack should become damaged, it must be replaced. It may be removed from the pc board by normal desoldering methods and replaced with a new jack.



When repairing or replacing a modular jack, be careful not to damage other pc board components during the desoldering process.

**4. QUALIFICATIONS**

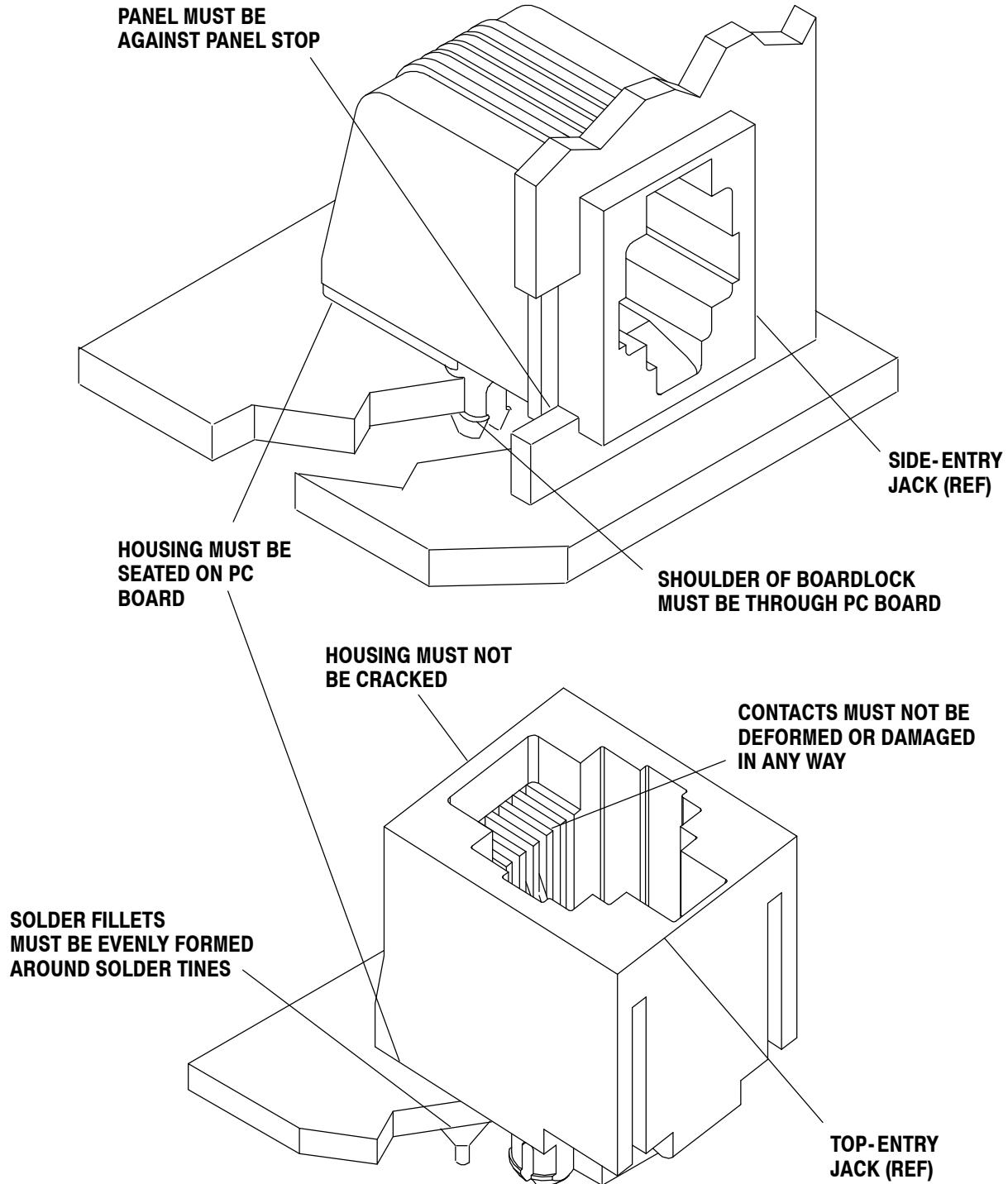
Modular Jacks are Recognized by Underwriters Laboratories Inc. (UL) in File E81956 and Certified by CSA International in File LR7189.

**5. TOOLING**

No special tooling is required for hand placement of modular jacks onto a pc board. However, a backup support that provides relief for protruding components is needed to prevent deformation of contact solder tines and, when applicable, shield solder tines.

## 6. VISUAL AID

Figure 10 shows typical installation applications of Modular Jacks and 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.



**FIGURE 10. VISUAL AID**