

**Class 1**

**RJ45 Jack with Integrated Magnetics**

**1. INTRODUCTION**

This specification covers the requirements for application of RJ45 Jack with integrated Magnetics designed to be mounted to a pc board. The Jacks are available in low-profile, vertical, single-port or multi-port configuration in 6, 8, 10 or 12 positions with 8 contacts, shielded designs to accommodate specific application requirements. This specification pertains to all shielded jacks with 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.

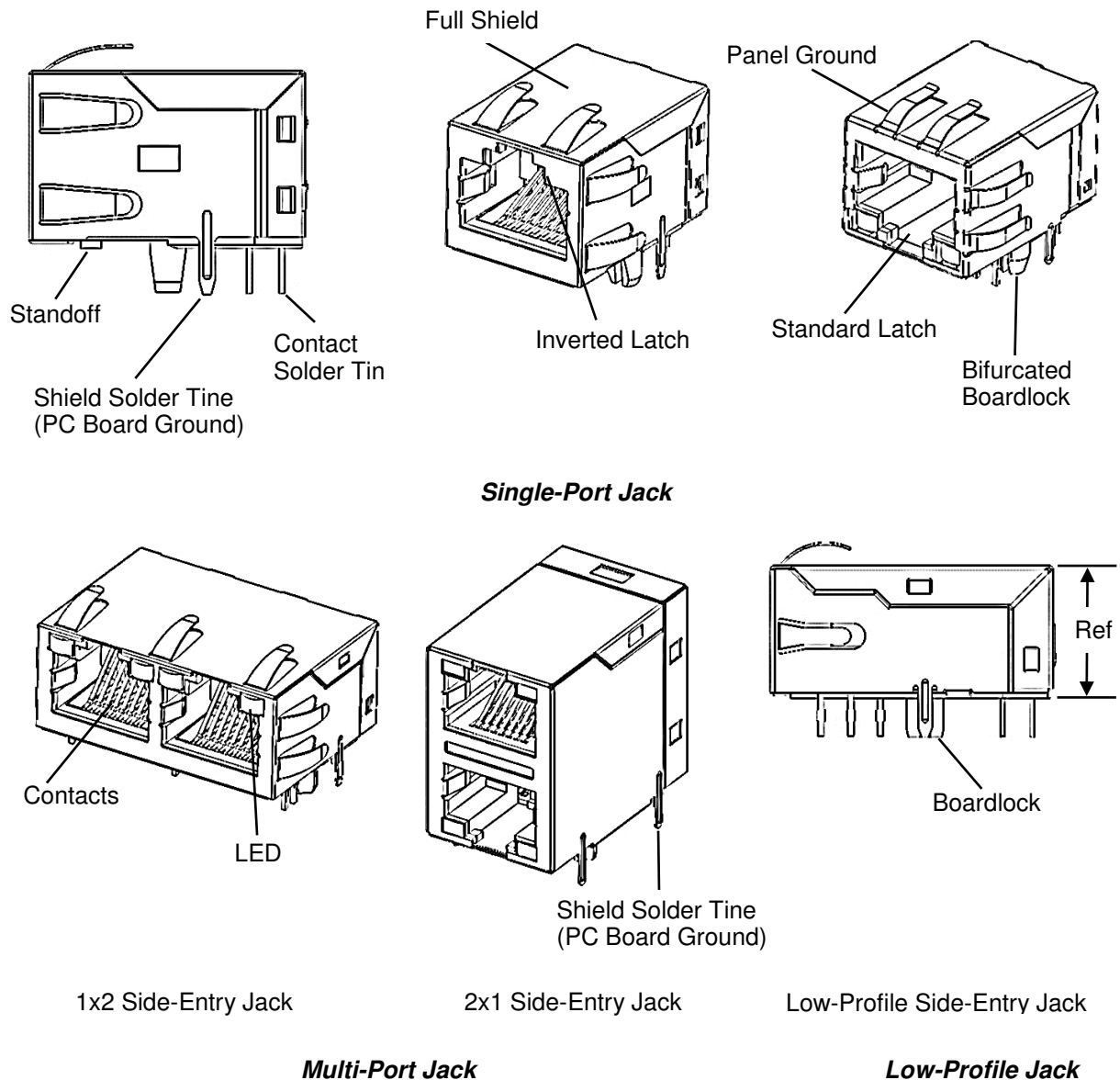


Figure 1: Basic terms and features of components

## 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.

### 2.2. Customer Assistance

Reference Part Numbers 2301994, 2301995, 2301996, 2301997 and Product Code K842 identify the pc board mounted RJ45 jacks with integrated magnetics. 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.

List of applicable parts:

See Product specification 108-94552.

### 2.4. Product Specifications

Product Specifications 108-94552 (RJ45 Jack with integrated Magnetics) covers test and performance requirements.

### 2.5. Soldering specification

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. Safety

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

### 3.2. Material

The RJ45 Jack with integrated Magnetics housing is made of high temperature thermoplastic, UL94-V-0. The contacts are made of copper alloy under plated with nickel and plated with gold finish; solder tines are plated with tin over nickel. Board locks are made of LCP. The shield is made of brass plated with nickel.

### 3.3. Storage

#### A. Ultraviolet Light

Prolonged exposure to ultraviolet light may deteriorate the chemical composition used in the RJ45 Jack with integrated Magnetics material.

#### B. Shelf Life

RJ45 Jack with integrated Magnetics 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 and degrade shield appearance.

#### C. Chemical Exposure

Do not store RJ45 Jack with integrated Magnetics 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

**D. Soldering ability over time**

To ensure a good solderability of RJ45 Jack with magnetics, conditions below should be followed:

Table 1: Storage time and conditions

Packaging type	Condition	Maximal storage time
Tray	Original and unopened package, at temperature $\leq 30^{\circ}\text{C}$	1 year
Reel		

If storage time exceeds one year, a complete quality check on function & mechanical before shipment should be done.

**3.4. Line driver diagram**

The RJ45 Jack with integrated Magnetics use two architectural options for 1000Base-T line drivers to connect with the PHY chip: current-mode and voltage mode. See Figure 2 and 3.

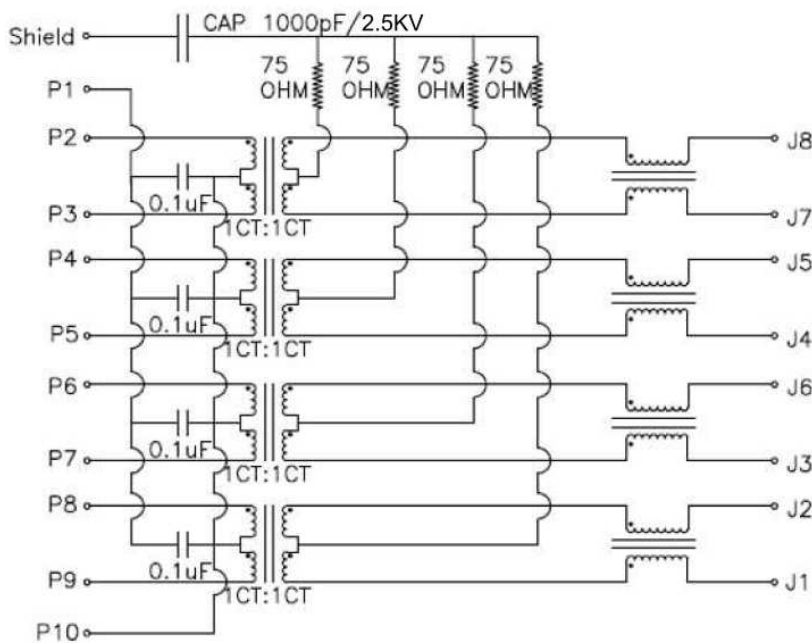


Figure 2: Current-mode driven circuit

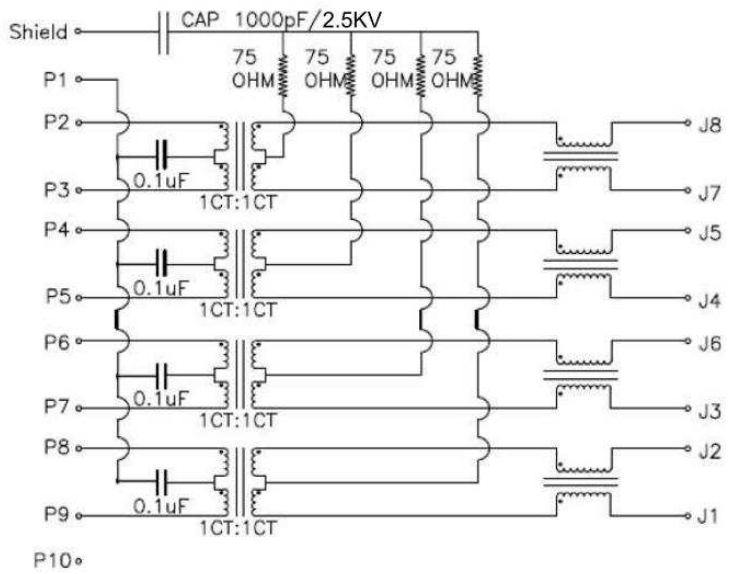


Figure 3: Voltage-mode driven circuit

**3.5. PC Board Layout**

The solder tine hole layout for all 6, 8, 10, and 12 position single- and multi-port jacks is typical for all jacks with comparable positions. 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.

The mounting holes must be precisely located to ensure proper placement and optimum continuity for circuits after soldering. The holes must be drilled to specific dimensions to prevent stubbing during placement of the RJ45 Jack with integrated Magnetics on the pc board.

**A. Single-Port shielded Mag Jack**

The hole patterns that apply to all single-port jacks are provided in the following figures.

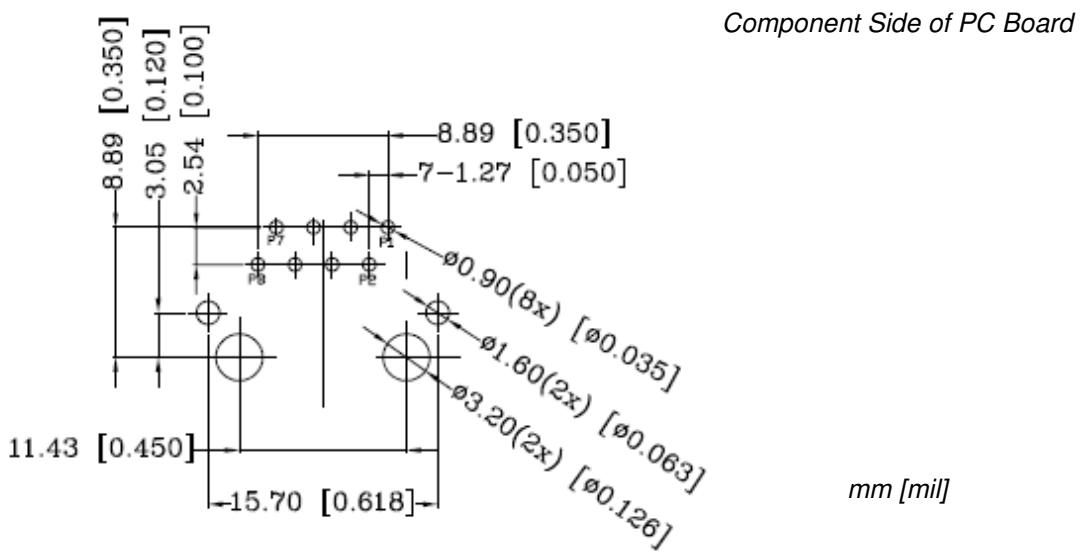


Figure 4: 8 Position Jack without LED

Component Side of PC Board

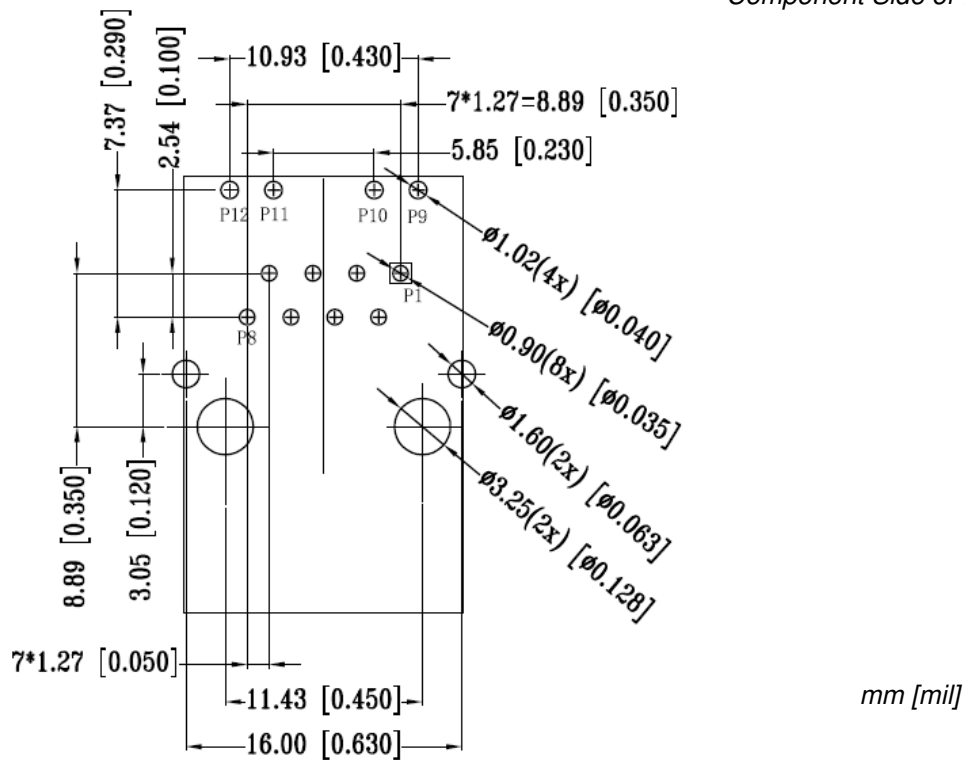


Figure 5: 8 Position Jack with LED

Component Side of PC Board

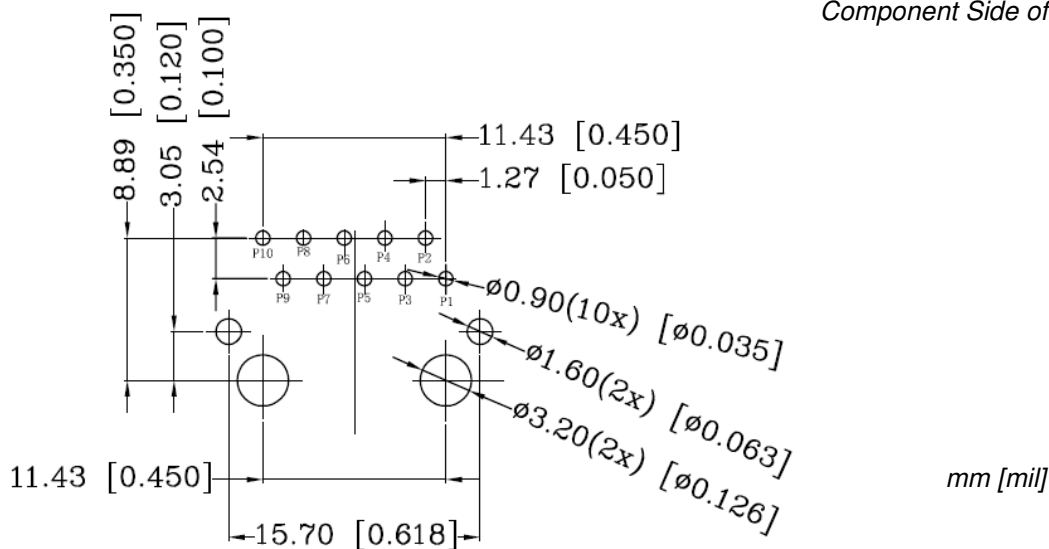


Figure 6: 10 Position Jack without LED

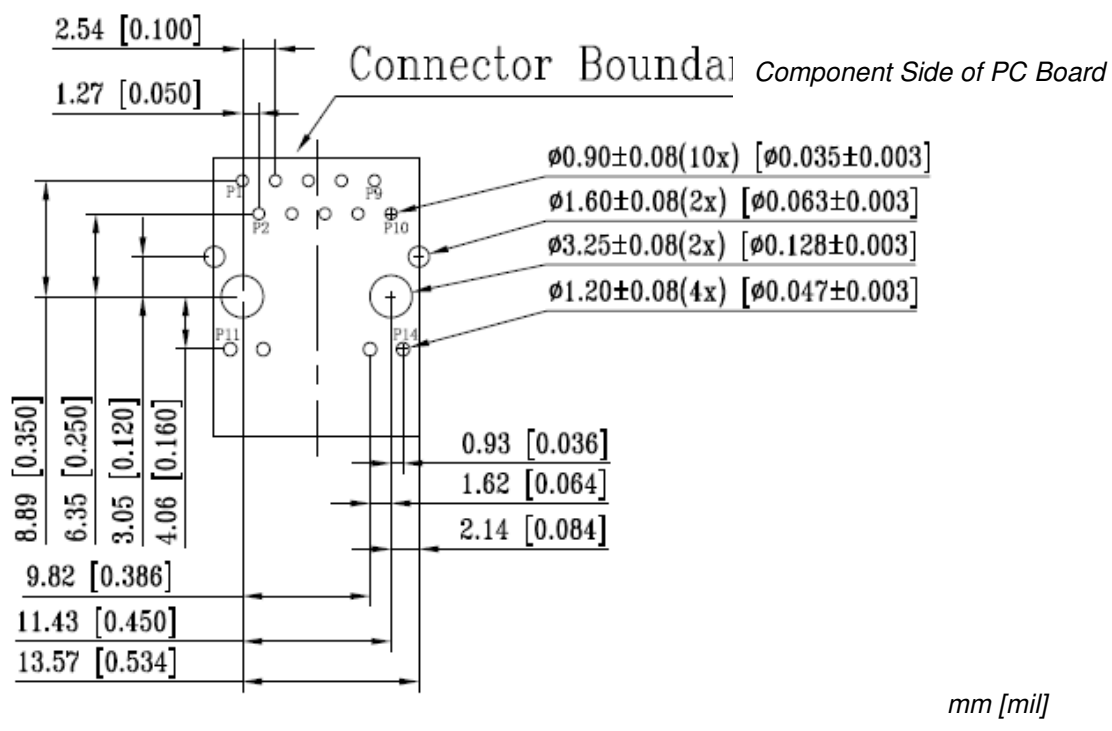


Figure 7: 10 Position Jack with LED

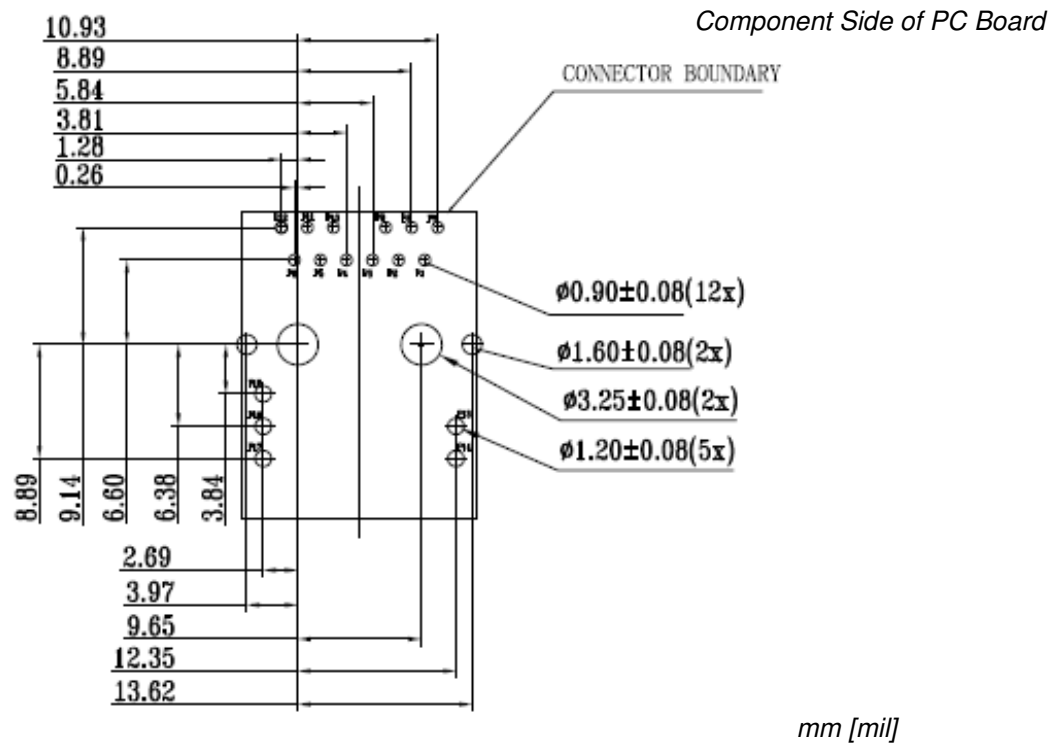


Figure 8: 12 Position Jack with LED (Low Profile)

**B. Multi-Port shielded Mag Jack**

The hole patterns that apply to all Multi-port jacks are provided in the following figures.

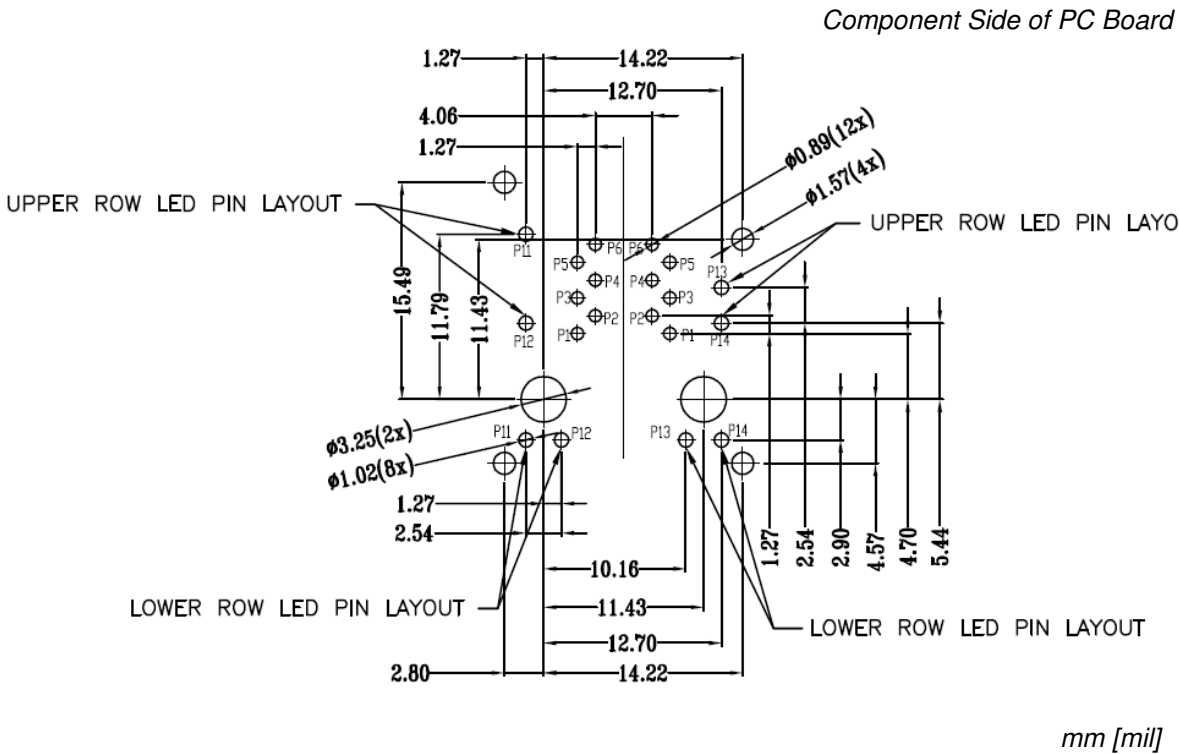


Figure 9: 6 Position Jack, 2x1p with LED

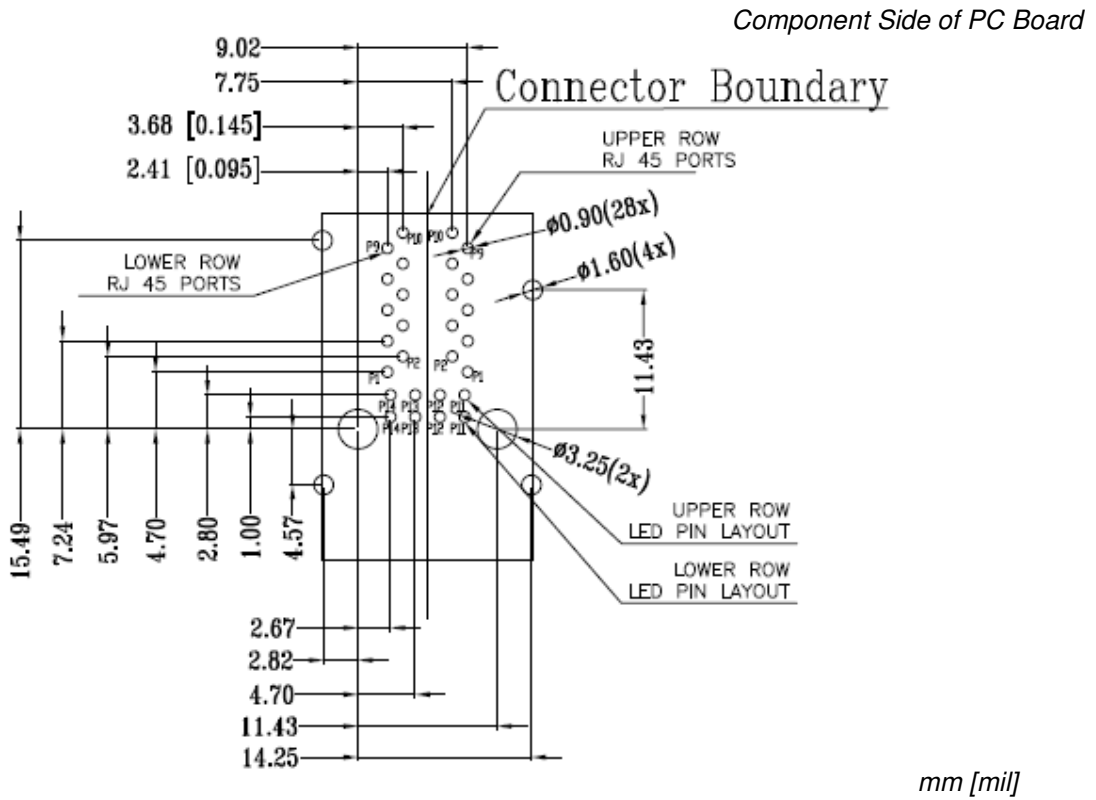
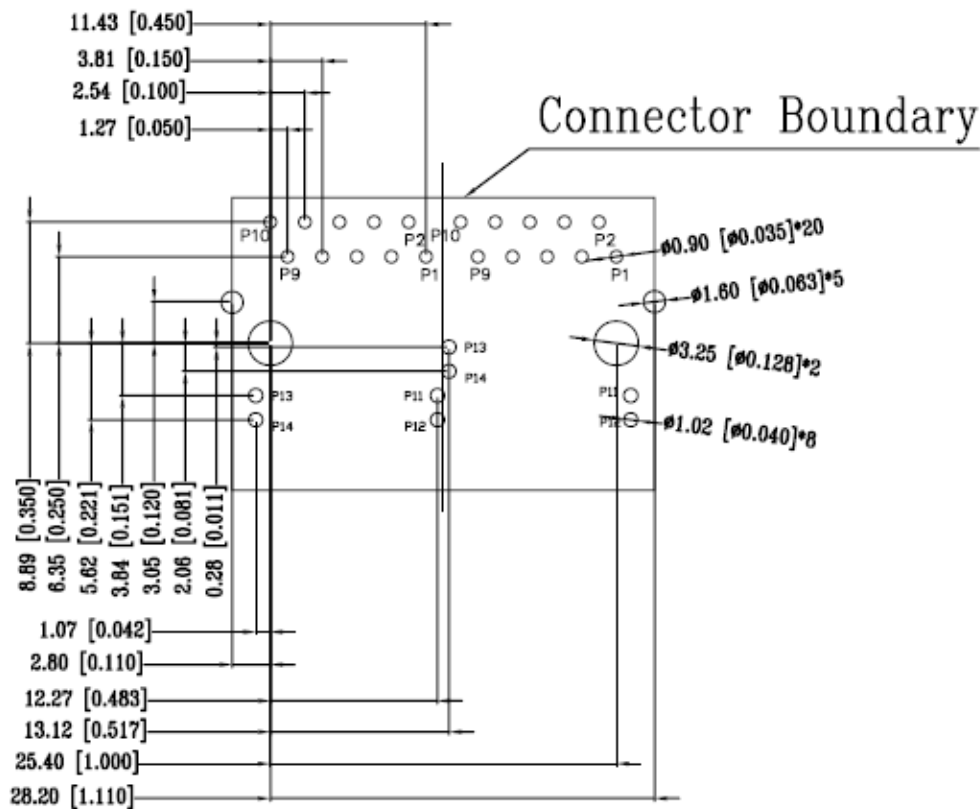
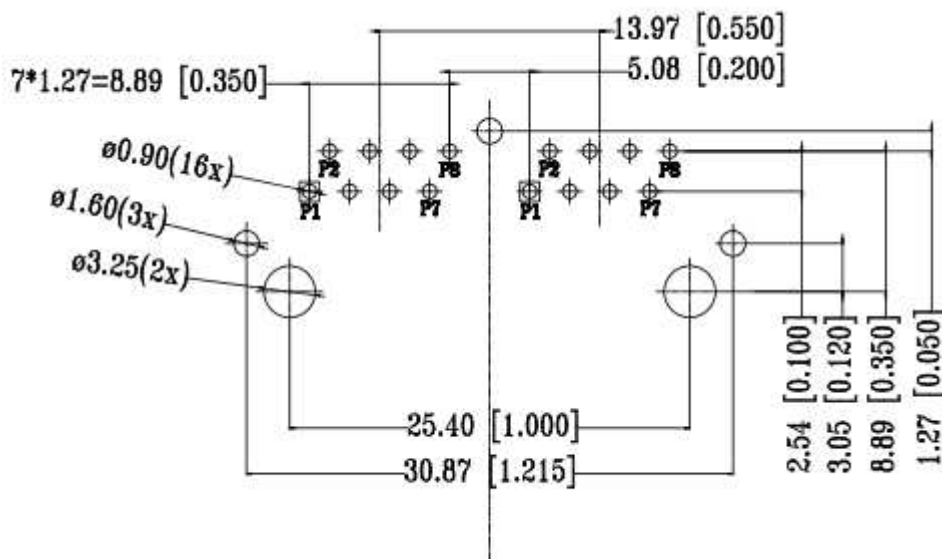


Figure 10: 10 Position Jack, 2x1p with LED



mm [mil]

Figure 11: 10 Position Jack, 1x2p with LED



mm [mil]

Figure 12: 8 position Jack, 1x2 without LED



### 3.6. PC Board Contact Tine Holes

Plated through holes should 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 12.

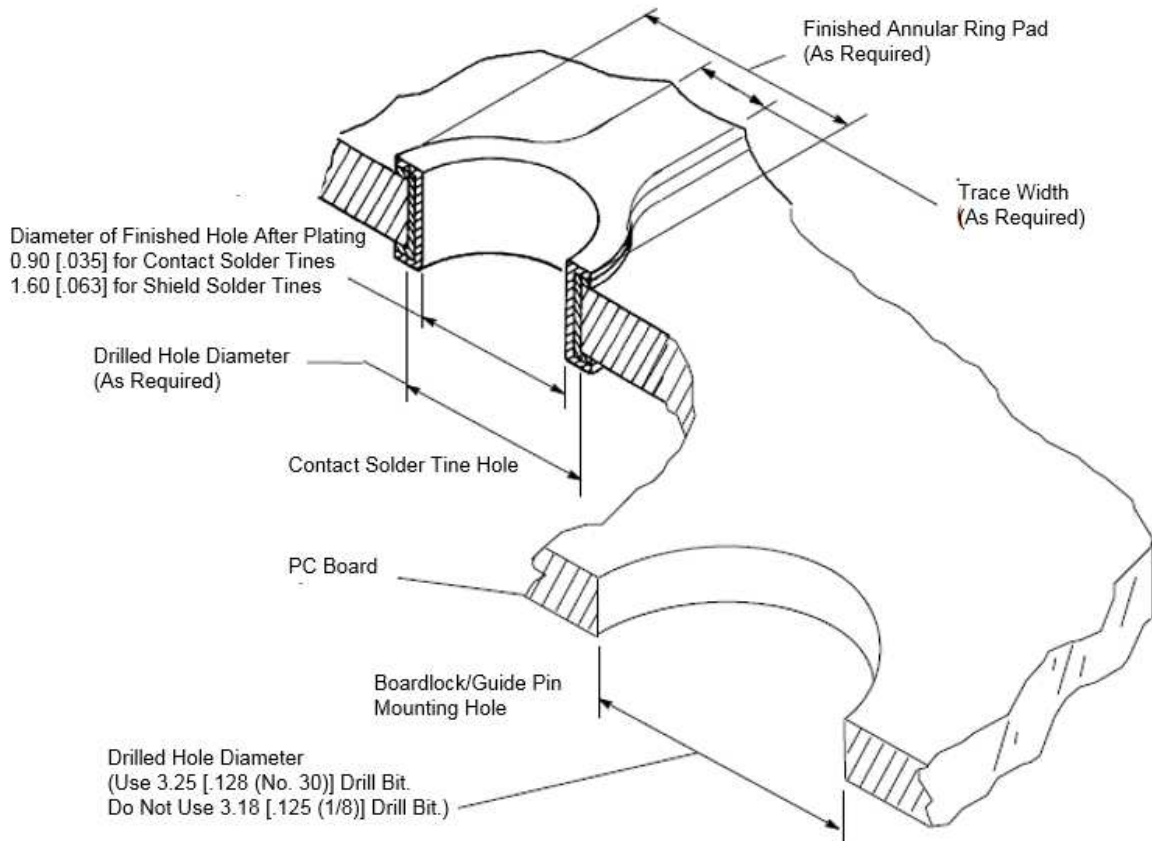


Figure 13: Contact Tine Holes dimensions in PC Board

### 3.7. Jack placement



*The Jack 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*

#### A. Alignment

The RJ45 Jack with integrated Magnetics 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.

#### B. Position

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. Shielding

Shielded RJ45 Jack with integrated Magnetics feature brass shells which provide continuity for EMC (Electromagnetic Compatibility) applications. When mated with corresponding shielded RJ45 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.

### 3.9. Panel Cutout

After the modular jack is secured to the pc board, the modular jack can be positioned in a cutout in a panel. Dimensions for recommended panel cutout and maximum panel thickness are shown in following figures.

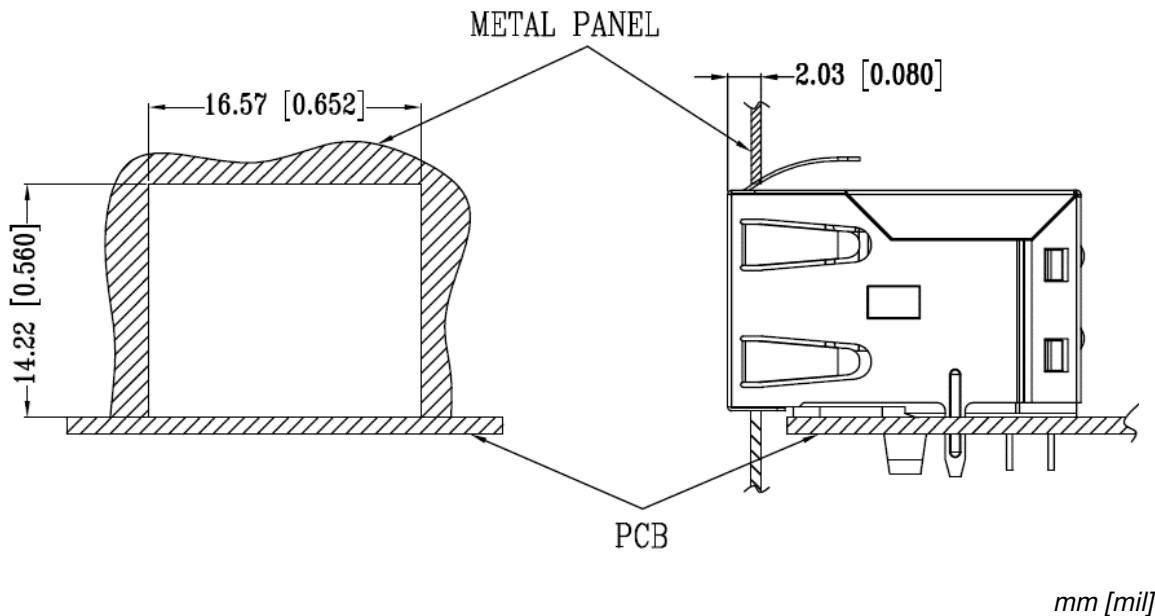


Figure 14: 8 and 10 position Jack without LEDs (2301994-1 / 2301994-3 / 2301994-4 / 2301994-5)

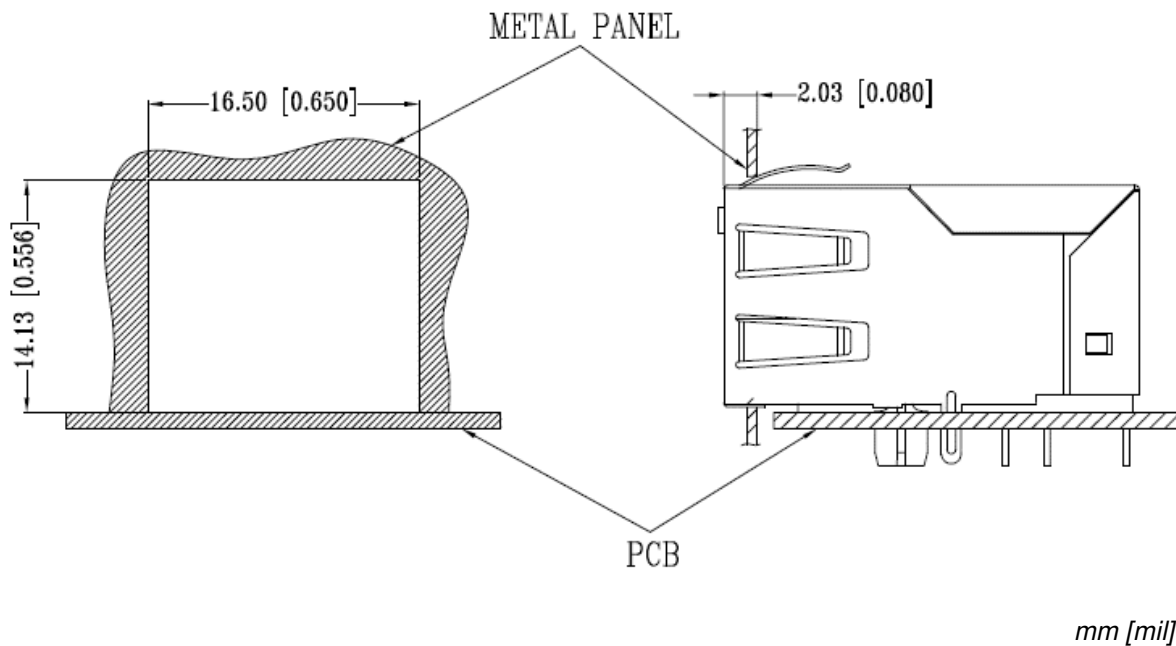
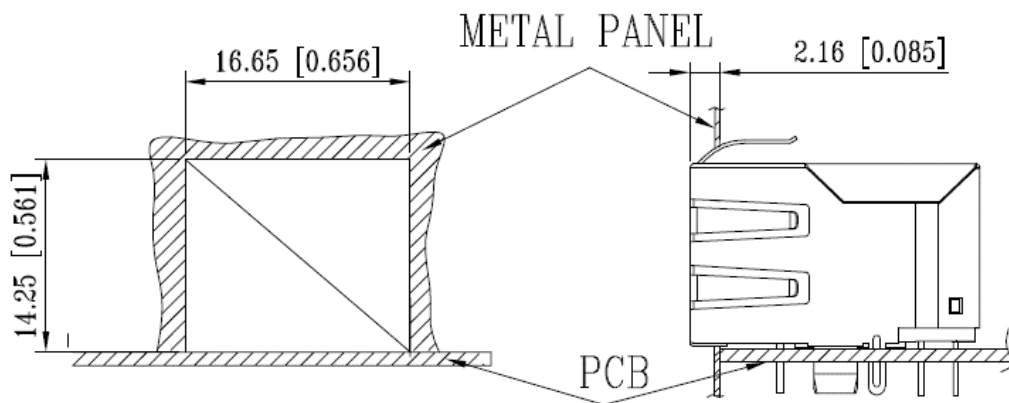
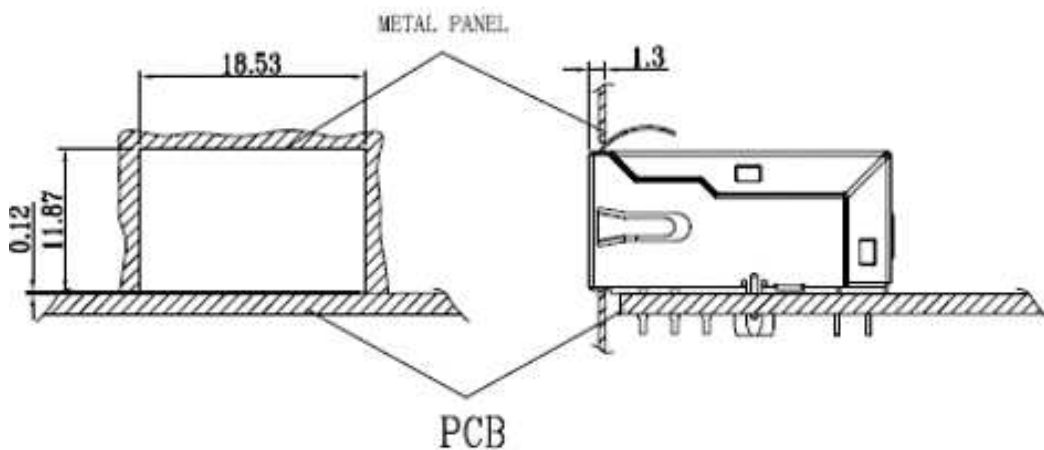


Figure 15: 8 position Jack with LED (2301994-2)



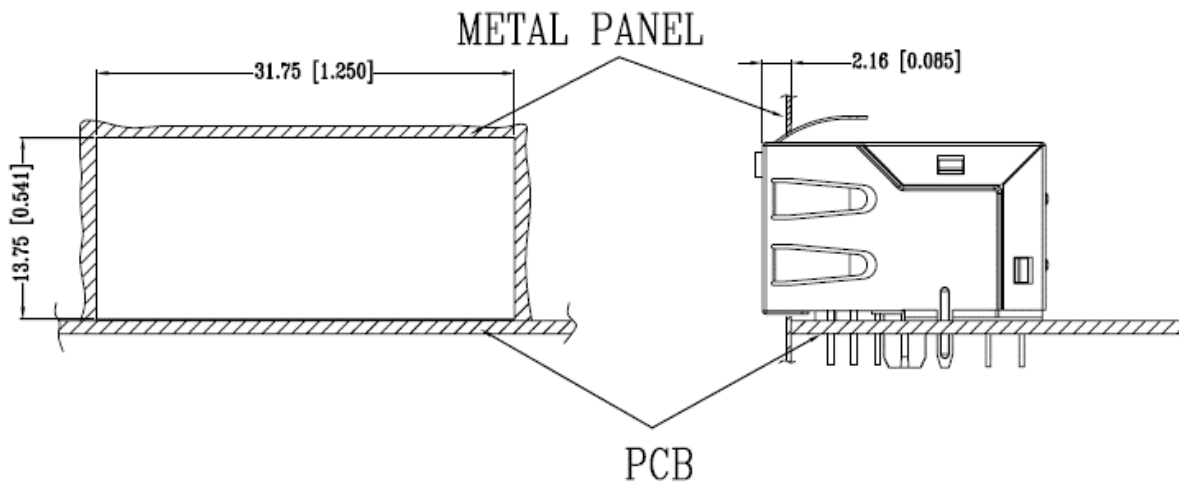
mm [mil]

Figure 16: 10 position Jack with and without LED (2301994-6 / 2301994-7 / 1-2301994-0 / 1-2301994-2)



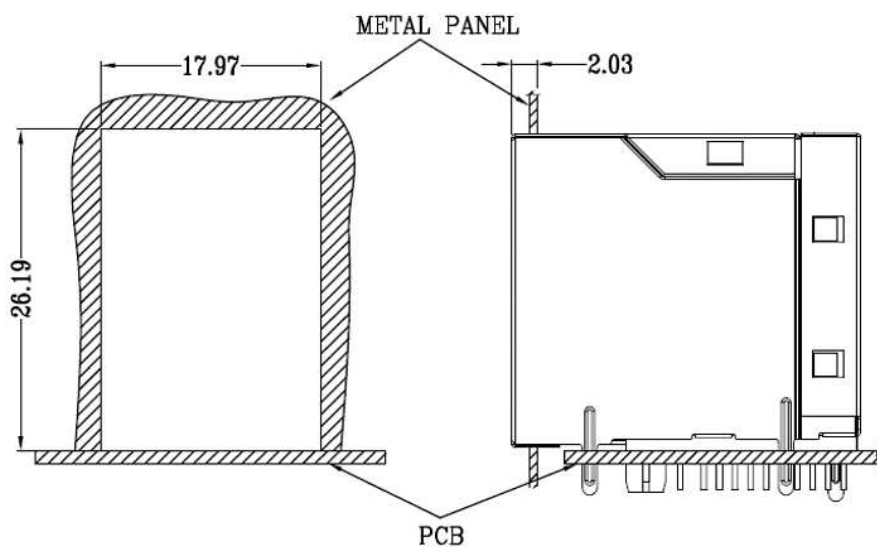
mm [mil]

Figure 17: 12 position Jack with LED (1-2301994-1)



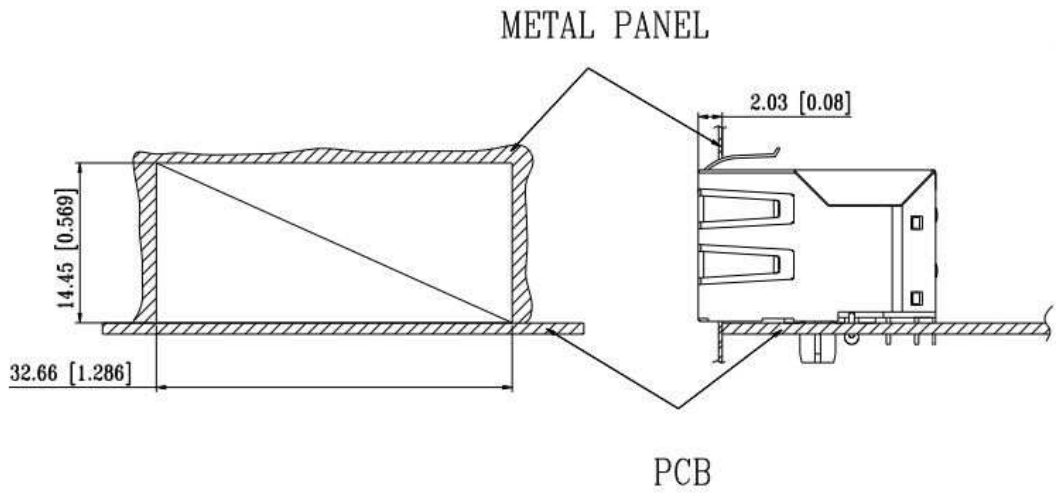
mm [mil]

Figure 18: 10 position Jack, 1x2p with LED (2301996-7)



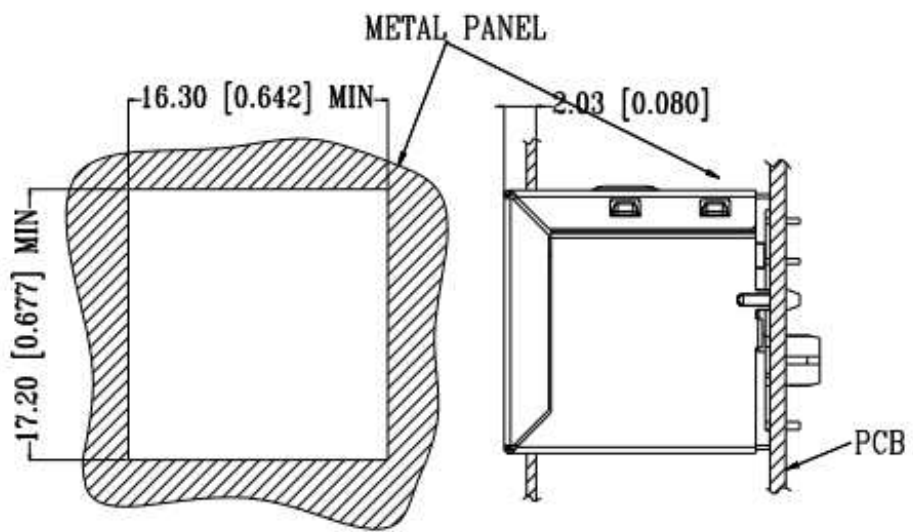
mm [mil]

Figure 19: 6 and 10 position Jack, 2x1p with LED (2301997-5 / 2301997-7)



mm [mil]

Figure 20: 8 and 10 position Jack, 1x2p with and without LED (2301996-2 / 2301996-4 / 2301994-6 / 2301994-8)



mm [mil]

Figure 21: 10 position Jack, 1x1p with LED, Vertical (2301995-4)

### 3.10. Soldering Guidelines

RJ45 Jack with integrated Magnetics can be soldered using reflow or equivalent soldering techniques according to IPC/JEDEC J-STD-020D. The temperatures and exposure time shall be within the ranges specified in table 1.

Table 2: Temperature and exposure time

SOLDERING PROCESS	TEMPERATURE		TIME (At Max Temp)
	CELSIUS	FAHRENHEIT	
Reflow Soldering	260	500	10 Seconds

### 3.11. Checking Installed Jack

The Jack must be seated on the PC Board as shown in figure 19.

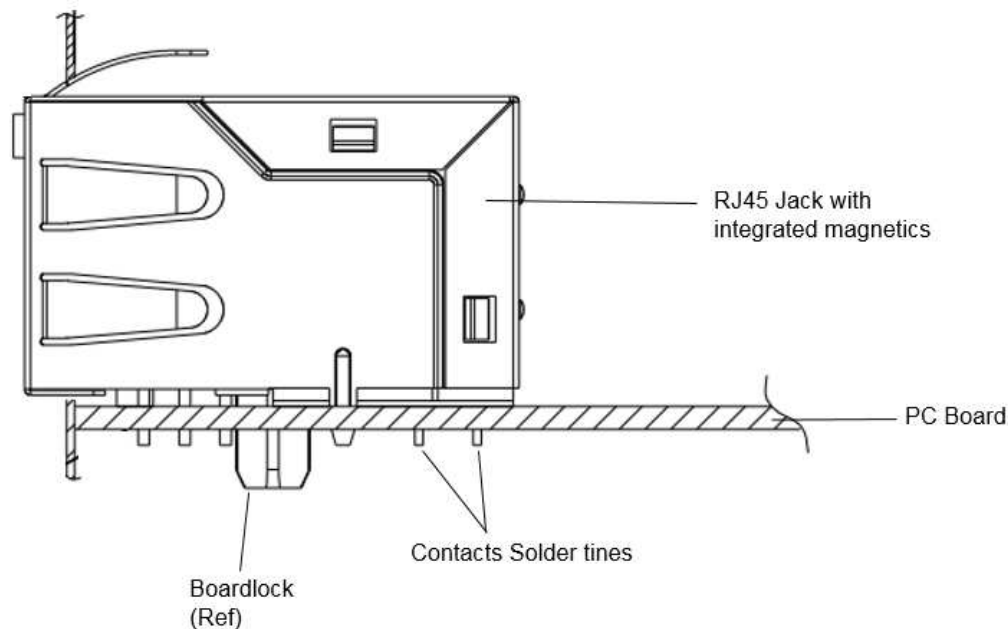


Figure 22: RJ45 Jack with integrated magnetics installed on PCB

### 3.12. 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 RJ45 Jack with integrated Magnetics, be careful not to damage other pc board components during the desoldering process.*

## 4. QUALITY

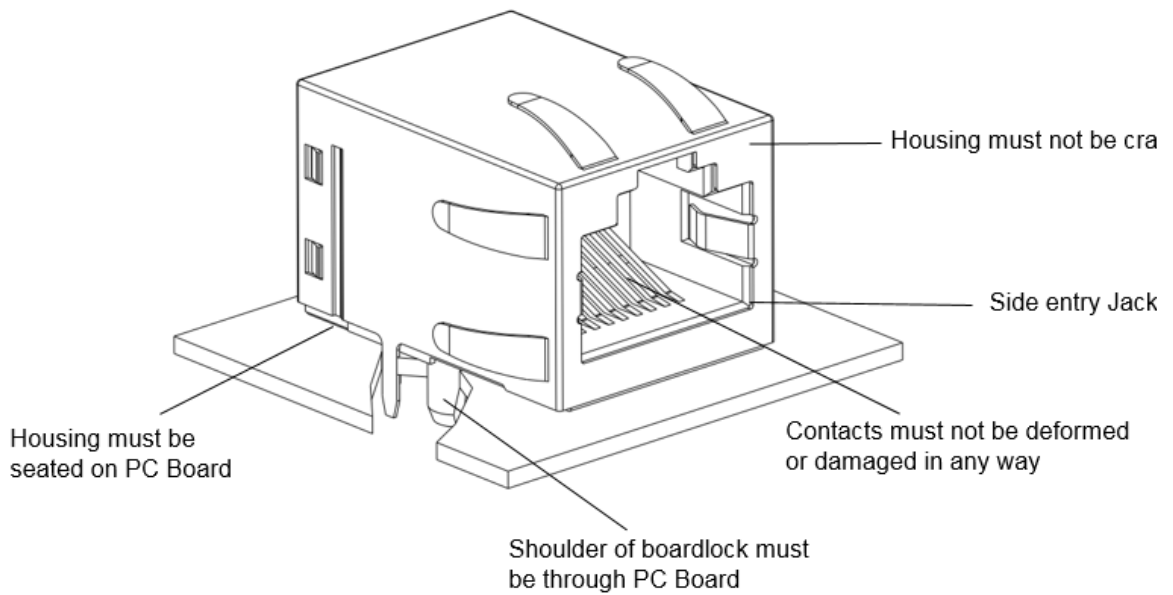
RJ45 Jack with integrated Magnetics are recognized by Underwriters Laboratories Inc. (UL) in File 81956.

**5. TOOLING**

No special tooling is required for hand placement of RJ45 Jack with magnetics 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 20 shows typical installation applications of RJ45 Jack with integrated magnetics 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 23: Visual aid*

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