



**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  $\pm 0.13$  mm [ $\pm .005$  in.] 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 the SMPM Male Thru-Hole Printed Circuit (PC) Board Mount Connector. These connectors are placed into pc boards manually or by pick-and-place equipment. This connector consists of a male SMPM interface design with four posts and one center contact tail that is intended to be thru-hole mounted to a pc board.

When corresponding with TE Connectivity 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.

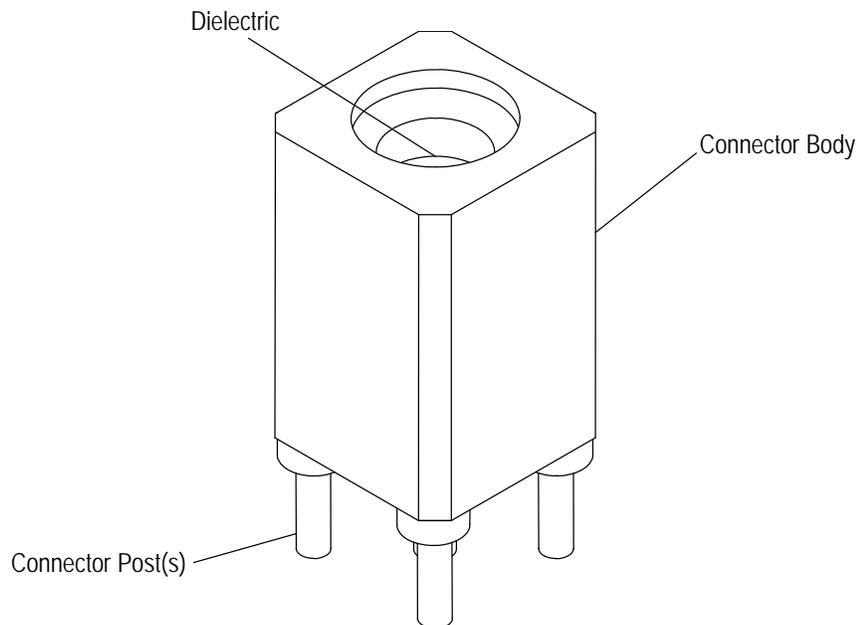


Figure 1

## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

Revisions to this application specification include:

- Updated document to corporate requirements
- Changed text in Section 1, INTRODUCTION
- Changed Design Objective to Product Specification in Paragraph 2.4

### 2.2. Customer Assistance

Reference Product Base Part Number 1757644 and Product Code K595 are representative of the SMPM Male Thru-Hole PC Board Mount Connector. Use of these numbers will identify the product line and help you to obtain product and tooling information. Such information can be obtained through a local TE Representative, by visiting our website at [www.te.com](http://www.te.com), or by calling PRODUCT INFORMATION or the TOOLING ASSISTANCE CENTER at the numbers at the bottom of page 1.

### 2.3. Drawings

Customer Drawings for each product part number 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 technical documentation supplied by TE.

### 2.4. Specifications

Product Specification 108-2242 covers expected test and performance requirements.

### 2.5. Manuals

Manual 402-40 is available from the service network. This manual provides information on various flux types and characteristics along with the commercial designation and flux removal procedures. A checklist is included in the manual as a guide for information on soldering problems.

### 2.6. Instructional Material

The following list includes available instruction sheets (408-series) that provide assembly procedures for product, operation, maintenance and repair of tooling; and customer manuals (409-series) that provide setup, operation, and maintenance of machines.

<u>Document Number</u>	<u>Document Title</u>
408-6923	Manual Arbor Frame Assembly 58024-1
409-5567	10/20 Ton "H" Frame Power Unit Machine No. 803880-6
409-5626	SM-3 Machine No. 814700-[ ]

## 3. REQUIREMENTS

### 3.1. Storage

#### A. Ultraviolet Light

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

#### B. Shelf Life

The connectors 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 connectors 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. Printed Circuit Boards

#### A. Material and Thickness

The pc board material shall be glass epoxy (FR-4, G-10). PC board thickness shall be 1.57 ±0.18 mm [.062 ±.007 in.]. Contact Product Information or the Tooling Assistance Center number listed at the bottom of page 1 for suitability of other pc board materials and thicknesses.

#### B. Tolerance

The maximum bow of the pc board shall be 0.03 mm [.001 in.] over the length of the connector.

#### C. Layout

The mounting and contact holes in the pc board must be precisely located to ensure proper placement and optimum performance of the connector. Design the pc board using the dimensions provided in Figure 2.



**NOTE**

*The layout shown in Figure 2 applies to the connector side of the pc board.*

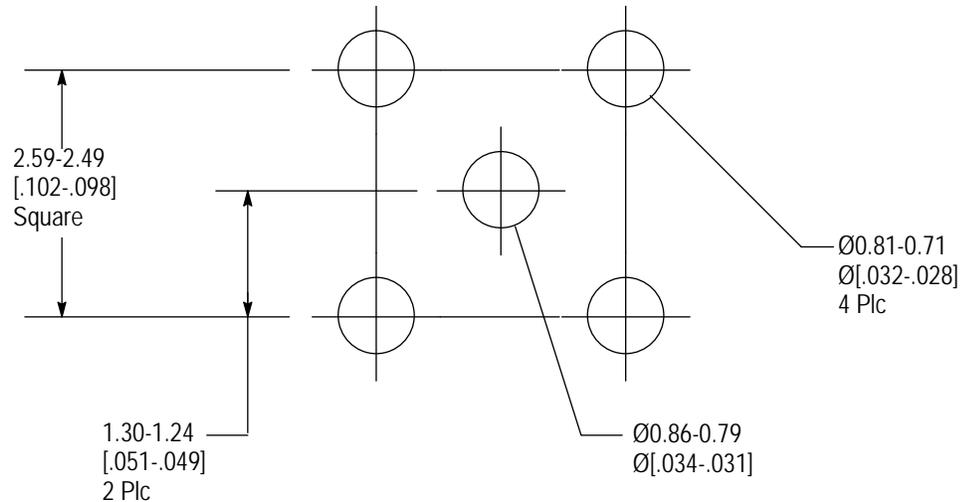


Figure 2

### 3.3. Connector Spacing

Spacing between connectors shall meet customer requirements; however, no other components may fall within the clearance envelope and no portion of the clearance envelope shall fall outside the confines of the pc board.

### 3.4. Hole Dimensions

The holes in the pc board for the contact tines must be drilled and plated through to specific dimensions. See Figure 3.

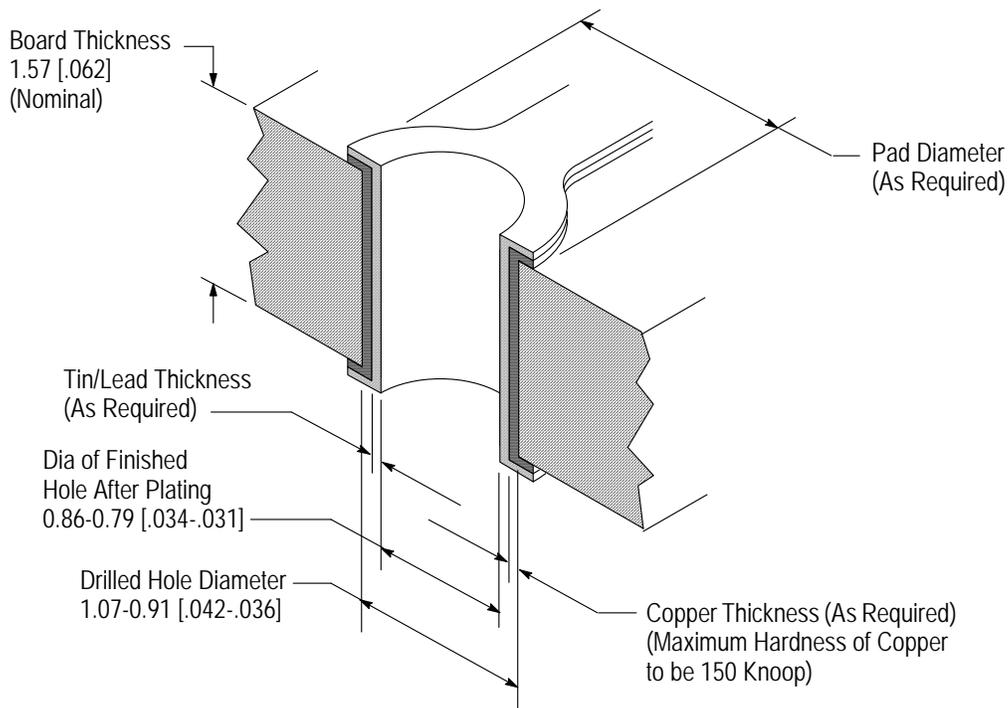


Figure 3

### 3.5. PC Board Support

A customer-supplied pc board support shall be used in conjunction with the seating tool, see Section 5, TOOLING. The board support shall meet the requirements of Figure 4. Use the dimensions given in Figure 2 to determine hole locations for the support.

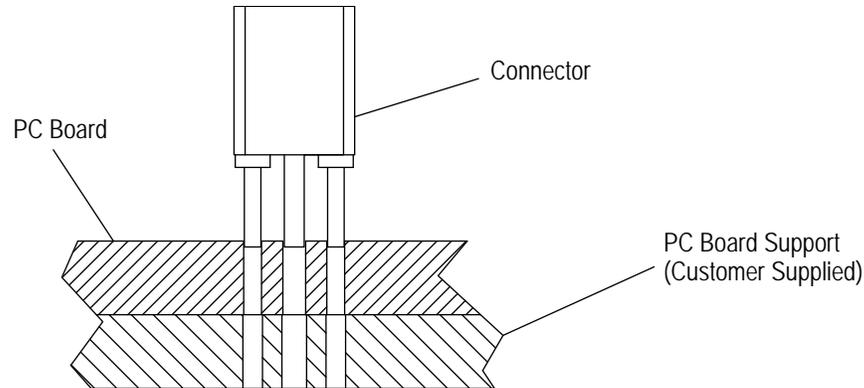


Figure 4

### 3.6. Retention Strength

The seated connector-to-board retention strength of the round base connector is a minimum of 444 N [100 lb] in a straight line at 90° to the pc board. A pulling force applied in any other direction diminishes retention strength.

### 3.7. 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 connectors are provided in Figure 5.

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

Figure 5

#### B. Soldering Guidelines

SMPM Male thru-Hole PC Board Mount Connectors can be soldered using wave, double sided non-focused infrared reflow processes (IR) or equivalent soldering techniques. The temperatures and exposure time shall be within the ranges specified in Figure 6. We recommend using SN60 or SN62 solder for these connectors.

**i** **NOTE**  
Manual 402-40 provides some guidelines for establishing soldering practices. Refer to Paragraph 2.5, Manuals.

SOLDERING PROCESS	TEMPERATURE	TIME (At Max Temperature)
Wave	260°C [500°F] (Wave Temperature)	5 Seconds
Infrared Reflow	230°C [446°F]	5 Minutes

Figure 6

KESTER and ALPHA are trademarks of their respective owners.

### 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 connectors for the time and temperature specified. See Figure 7.



**DANGER**

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.



**NOTE**

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.

CLEANER		TIME (Minutes)	TEMPERATURE (Maximum)
NAME	TYPE		
ALPHA 2110	Aqueous	1	132°C [270°F]
BIOACT EC-7	Solvent	5	100°C [212°F]
Butyl CARBITOL	Solvent	1	Ambient Room
Isopropyl Alcohol	Solvent	5	100°C [212°F]
KESTER 5778	Aqueous		
KESTER 5779	Aqueous		
LONCOTERGE 520	Aqueous		
LONCOTERGE 530	Aqueous		
Terpene	Solvent		

Figure 7

### D. Drying

When drying cleaned assemblies and printed circuit boards, make certain that temperature limitations are not exceeded: -55° to 105°C [-67° to 221°F] for standard temperature products and -55° to 215°C [-67° to 419°F] for high temperature products. Excessive temperatures may cause housing degradation.

### 3.8. Connector Seating Requirements

Seated connectors shall meet the requirements of Figure 8.

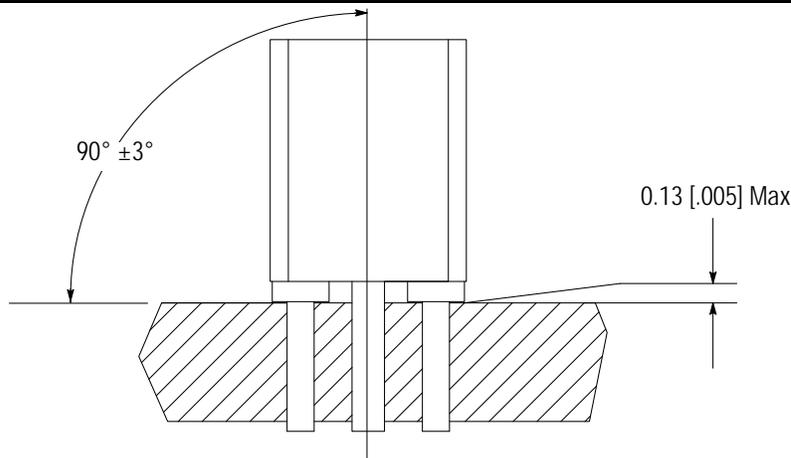


Figure 8

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

### 3.9. Repair/Replacement



**CAUTION**

*SMPM Male Thru-Hole PC Board Mount Connectors are not repairable if damaged. A damaged connector must be removed, discarded, and replaced with a new connector. Standard desoldering methods must be used to remove these connectors from the pc board.*

Holes drilled in the pc board are enlarged during the seating process, and are further enlarged by connector removal. To compensate for this enlargement when replacing a connector, the legs and posts shall be re-soldered.

### 4. QUALIFICATIONS

SMPM Male Thru-Hole PC Board Mount Connectors are not required to be agency evaluated and approved.

### 5. TOOLING

Low-volume manufacturing may be accomplished with an arbor frame manual applicator. Higher volume manufacturing may be accomplished with a SM-3 Machine or an H-Frame power unit. The SM-3 Machine or H-frame power unit can be used for simultaneous application of connectors when available seating force equals a minimum of 2224 N [500 lb] per connector. A customer supplied seating tool is required to install SMPM Male Thru-Hole PC Board Mount Connectors. See Figure 9.

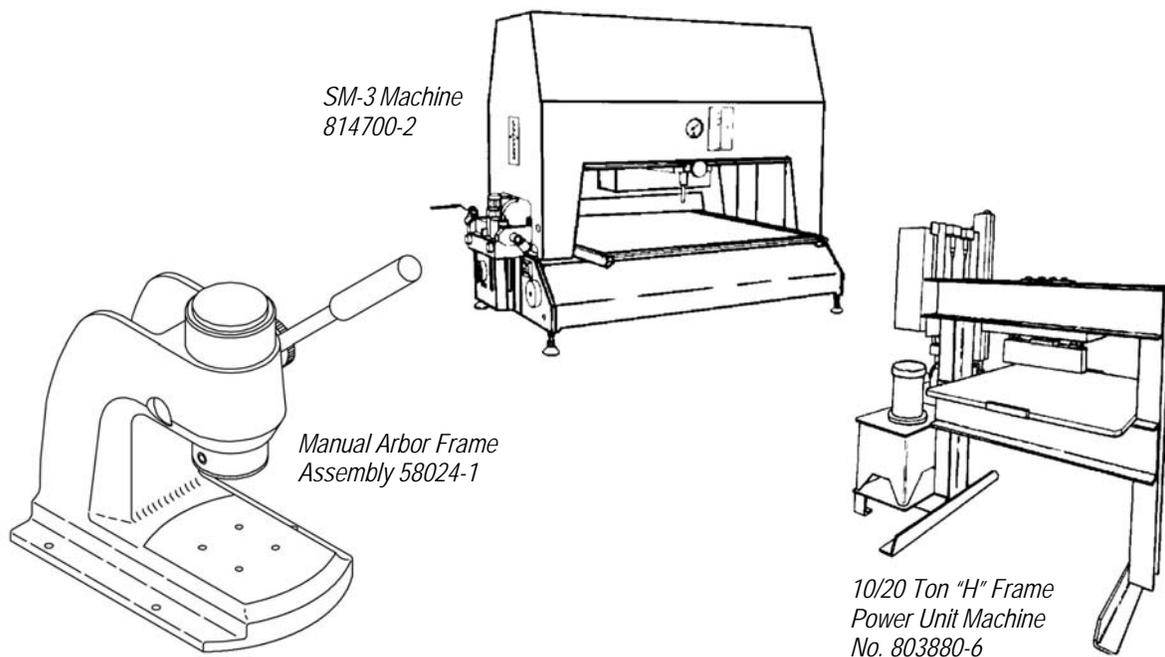
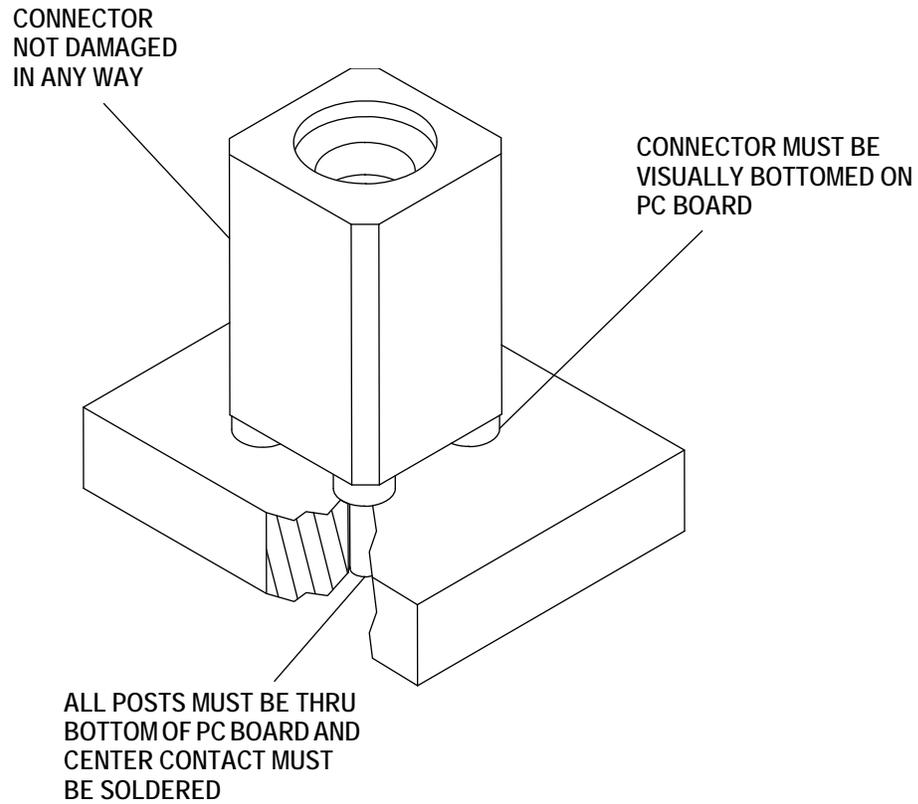


Figure 9

## 6. VISUAL AID

The illustration below shows a typical application of this product. 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 10. VISUAL AID**