PCB Terminal Block – SMD Connection

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°. Figures and illustrations are for identification only and are not drawn to scale

1. SCOPE

This specification covers the requirements for application of Terminal block – SMD, Mount 180°.

This SMD Terminal Block is designed to terminate solid and stranded 16-30 AWG wire for 5.00 mm centerline spacing,18-28 AWG for 3.81 mm centerline spacing & 16-28 AWG for 3.5 mm centerline spacing.

When corresponding with TE 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.

The PCB terminal blocks are available in following variants:

- Circuit Positions – 2 to 12 positions.
- Solder Method – Surface Mount Device (SMD)
- Packaging – Tape and Reel
- Mounting – Vertical

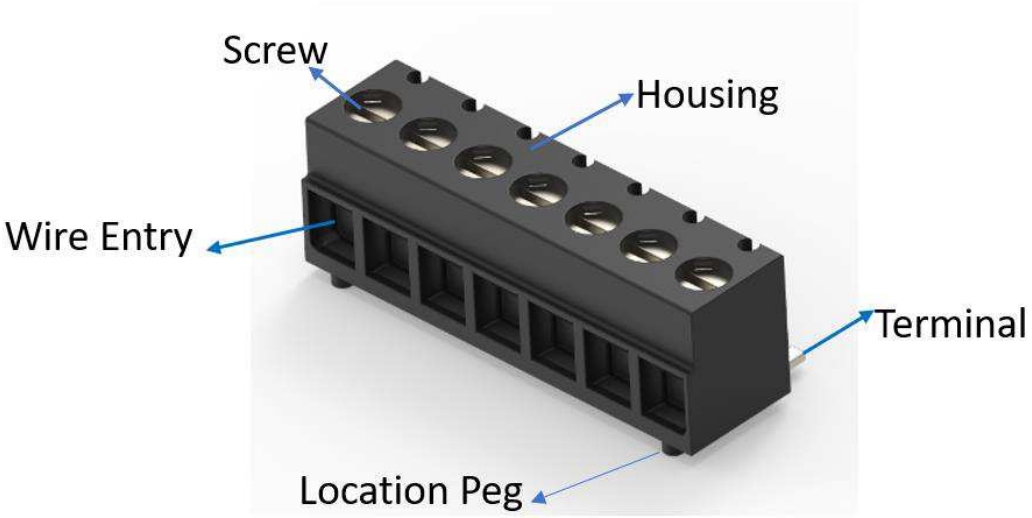

Figure 1

PRELIMINARY

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| Indicates Change

TOOLING ASSISTANCE CENTER 1-800-722-1111
PRODUCT INFORMATION 1-800-522-6752

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2. REFERRENCE DOCUMENTS

2.1. Revision Summary

This paragraph is reserved for a revision summary covering the most recent additions and changes made to this specification which include the following:

- Revision 1 → Initial Release.

2.2. Customer Assistance

Reference base number 2383938 and product code 7742 are representative numbers of Stacking Connector Board Mount. Use of these numbers will identify the product line and expedite your inquiries through a service network established to help you obtain product information. Such information can be obtained through a local TE Representative or, after purchase, by calling the Product Information Center number at the bottom of page 1.

2.3. Drawings

Drawings for each connector 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

108-160231	-	Product Specification, PCB Terminal Block – SMD
TEC-109-11-11-1	-	Solderability Specification provides test procedures and solderability evaluations for these connectors.
109-201	-	Component heat resistance to lead-free reflow soldering

Manuals

Manual 402-40 is available upon request and can be used as a guide in 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. Product Materials

SMD Mount Terminal Block Housings are made of High Temp Polyamide, UL 94 V0 and contacts are made of copper alloy with Tin over Nickel Plating.

3.2. Storage

A. Ultraviolet Light

Prolonged exposure to ultraviolet light may deteriorate the chemical composition of the connector material.

B. Shelf Life

The connectors are packaged and shipped in Tape and Reel. To prevent damage to these connectors, they should remain in the package until ready for installation. Also, to prevent possible storage contamination, the connectors should be used on a first in, first out basis

C. Chemical Exposure

Do not store connectors near any chemical listed below as they may cause stress corrosion cracks in the contacts.

Alkalis	Ammonia	Citrates	Phosphates Citrates	Sulfur compounds
Amines	Carbonates	Nitrites	Sulfur Nitrites	Tartrates

D. Environment

It is recommended to transport and store connectors in a dark environment having a temperature between -5° and 40°C [23° and 104°F] and a maximum relative humidity (RH) of 70%. In high-humidity environments, it might be necessary to store the connectors in a dry location to prevent too much moisture absorption.

3.3. PC Board Layout

PCB thickness

Use a PC board with a Maximum thickness of 2.4 mm. Customer drawings provide a complete definition of PC board layout.

3.4. Wire Preparation, and Installation

A. Strip length

The wire must be stripped to the proper dimension to ensure correct insertion depth in the connector. Excessive conductor will be exposed if the strip length is too long and entrapment of the insulation or improper termination will result if the strip length is too short. Refer respective customer drawing of the connector for recommended strip lengths.

B. Installation

Screwdrivers must be used to open and close the screw clamps. The wire must be inserted into the wire hole until the insulation is even, with the housing at the wire hole opening. The screw must be hand tightened with recommended tightening torque provided in respective customer drawings of the connectors.
Pull back on the wire to be sure, it is secure and check there are no wire strands outside the terminal block.

3.5. Physical Characteristics

The terminal block connectors consist of specially designed screw – activated mechanisms that are captivated inside the housing. When stripped wire is inserted into the connector and the screw is tightened, the screw activates a clamp which compresses the wire against the terminal. See Figure 2.

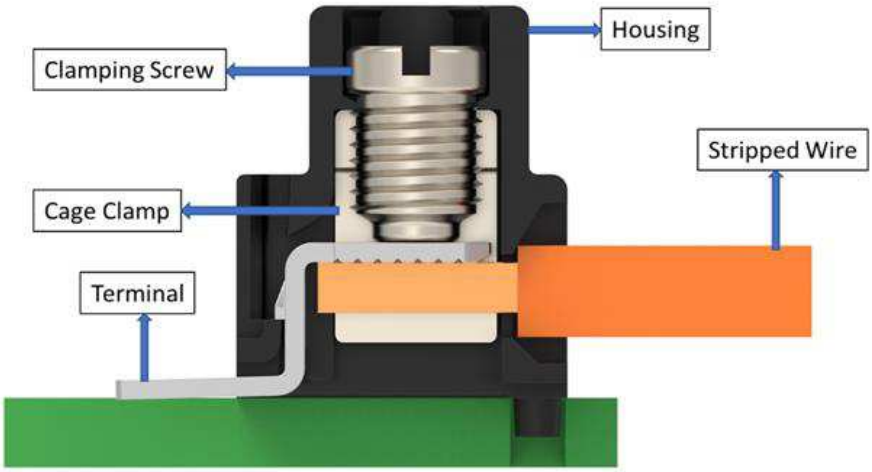

Figure 2

3.6. Processing requirements for SMD Connectors

A. Solder Volume

Enough volume of solder paste should be available to ensure an ideal solder fillet. Trials and Consultations with your Solder Paste supplier are advised to arrive at exact quantity.

B. Solder Screen

Generally, we do not recommend screen application of solder paste because of the limited volume of paste that can be deposited. If a screen application is required, we recommend removal of all screen from the contact pad areas. Consult your supplier for compatibility of screen and paste, and for application techniques.

C. Solder Mask

Solder mask is recommended between all pads. If a trace is run between adjacent pads on the solder side of the PC Board, a solder mask must be applied over the trace to prevent bridging and wicking of solder away from the contact solder tines. Liquid photo imageable or dry film solder masks are recommended.

D. Connector Placement

When placing connectors on the PC Board, the contact solder legs must be aligned with matching pads. It is imperative that the connector solder legs are sufficiently pressed into the solder paste. No hold-down is required for these connectors. Optimally, the contact solder legs should be centered on the pads.

Optimally, the connector tines should be aligned on the PC Board pads. However, mis registration is permissible for certain performance classifications as specified in IPC-S-815. See Figure 3.

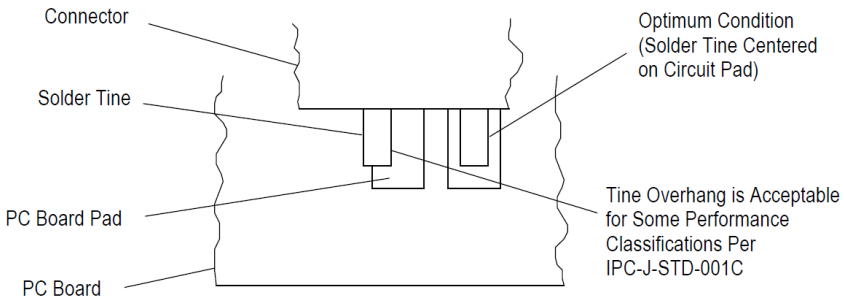

Figure 3

3.7. Soldering

Manual 402-40 provides some guidelines for establishing soldering practices

A. Fluxing

The contact solder tines and if applicable, attaching hardware 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 solder line, manufacturing, health, and safety requirements. Call the Product Information 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 Table 1.

Table 1

FLUX TYPE	ACTIVITY	RESIDUE	COMERCIAL DESIGNATION	
			KESTER ▲	ALPHA ⊞
Type RMA (Mildly Activated)	Mild	Non-Corrosive. Removal is recommended.	185/197	611
Center (Activated)	Medium	May be Corrosive	1544, 1545, 1547	711, 809, 811

▲Trademark of MacDonald & Co. ⊞ Designation of Alpha Metals Inc.

B. Parameters

The connectors will withstand peak temperatures of 260°C [500°F] for 10-30 sec. The connectors are tested for the reflow profile according to TEC-109-201 Condition B. Due to the many variables involved with the reflow process (i.e., component density, orientation, etc.), we recommend that the user conduct trial runs under actual manufacturing conditions to ensure product and process compatibility

C. Techniques

It is recommended that the connector be soldered using convection, vapor phase (VPR), double sided non-focused infrared (IR), or equivalent soldering technique provided the temperatures and exposure time are within 260°C for less than 30s.

D. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder paste and flux for recommended cleaning solvents. The following is a listing of common cleaning solvents that will not affect the connectors. The connectors will be unaffected by any of these solvents if they are not exposed beyond time specified in Table 2.

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.



Even when using "no clean" solder paste, it is imperative that the contact interface be kept clean of flux and residue, since it acts as an insulator. Flux may migrate under certain conditions with elevated temperatures and, therefore, cleaning is necessary even with "no clean" paste



If you have a solvent that is not listed, contact PRODUCT INFORMATION at the number at the bottom of page 1.

Table 2

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	Solvent		

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



Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. Trichloroethylene and Methylene Chloride can be used with no harmful effect 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.

3.8. Repair/Removal

Damaged wires can be removed from screw clamp connectors and replaced. If terminal block is damaged, it cannot be repaired. Connectors may be removed from the PC Board by standard de-soldering methods. Damaged connectors must be replaced.

4. QUALIFICATIONS

Board mount Terminal Block are recognized by Component program in Underwriters Laboratories Inc. (UL file no. E60677)

5. VISUAL AID

The illustration below shows typical application of Terminal Block connector SMD mount and calls out the conditions that production personnel should check to ensure a good installation.

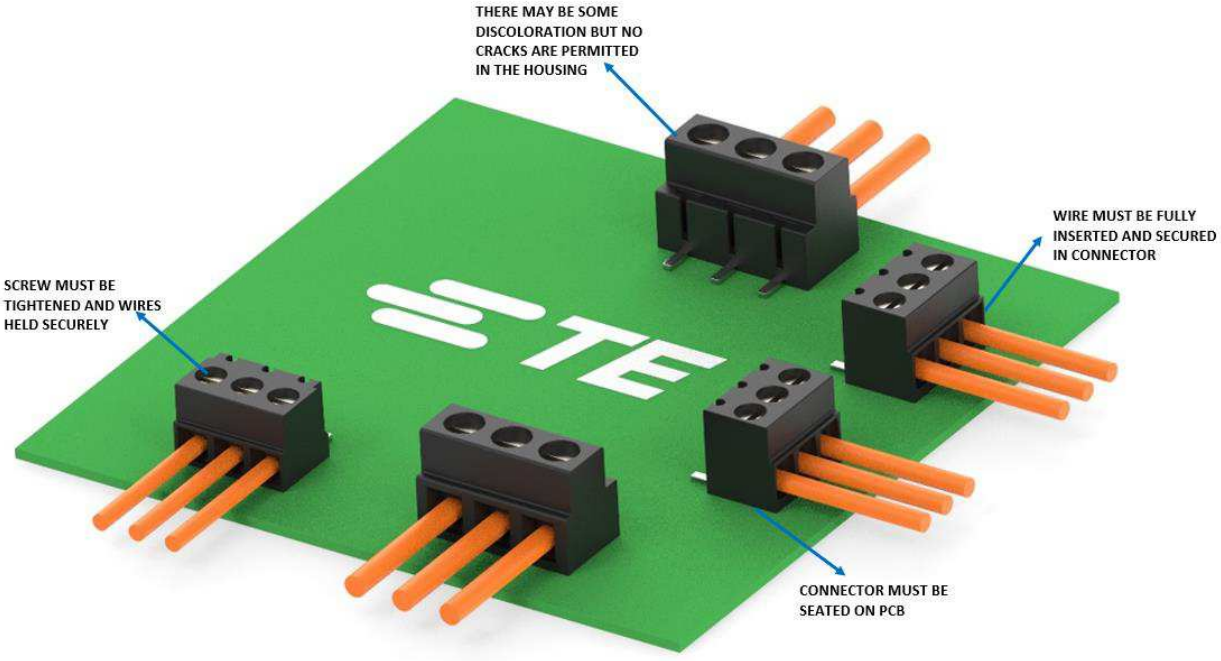

Figure 4 : VISUAL AID

6. LEGEND

Following are icons used in this document along with their meanings.

NOTE

Highlights special or important information

CAUTION

Denotes a condition which may result in product or equipment damage.

DANGER

Denotes an imminent hazard which may result in moderate or severe bodily injury.