NOTE
All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters. Unless otherwise specified, dimensions have a tolerance of ±0.13 and angles have a tolerance of ±2°. Figures are not drawn to scale.

1. INTRODUCTION

This specification covers the requirements for application of the Sliver 2.0 connector series that contains 56, 84, and 140 positions. The connectors consist of a housing with solderable metal hold downs and vertical or right-angle surface-mount contacts having a 0.6mm pitch between centerlines. The connector features a paddle card entry slot that accepts 1.57±0.13 thick integrated circuit card, overmold to hold the contacts in place, and alignment posts and hold downs for stability and placement of the connector on the pc board. The connector also uses a shell to align and hold a cabled plug in position once mated. The has some gathering of a plug, and paddle card capabilities, but is not intended for blind mate applications.

The connector is supplied in tape-mounted form for manual or robotic machine placement.

Basic terms and features of this product are provided in Figure 1.

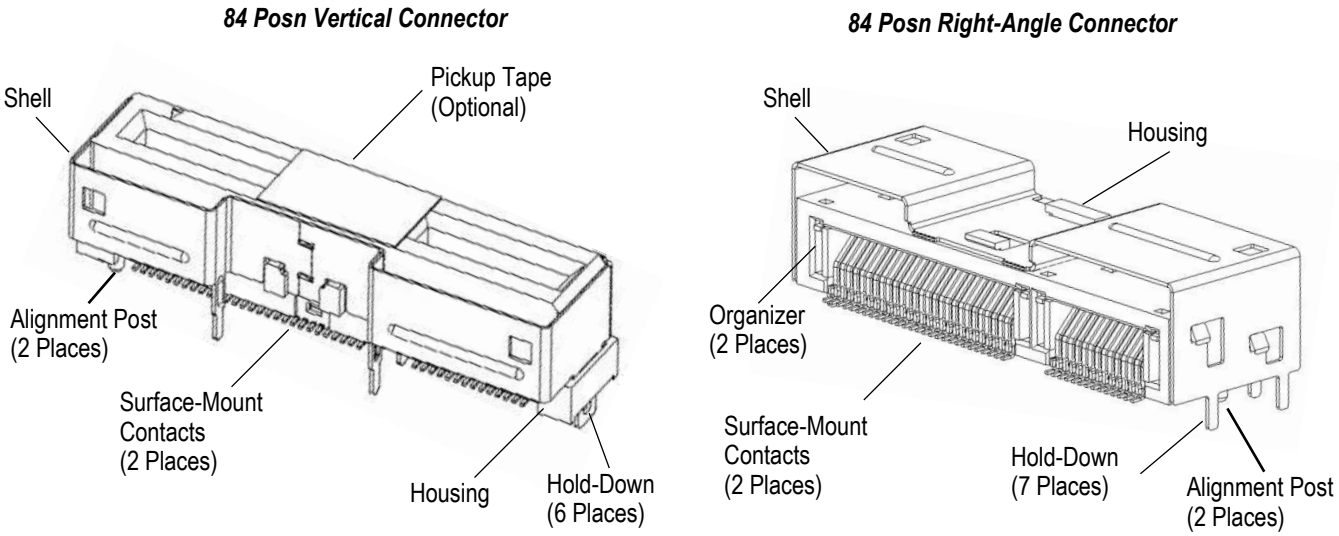


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

Revisions to this application specification include:

- Initial release

2.2. Customer Assistance

Reference Product Base Part Number 2331813 (vertical) and 2331814 (right angle) and Product Code L370 are representative of 84-position Sliver pc board connectors. Use of these numbers will identify the product line and help you to obtain product and tooling information when visiting www.te.com or calling the number at the bottom of this page.

2.3. Customer Drawings

Customer drawings for product part numbers are available from www.te.com. Information contained in the customer drawing takes priority.

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2.4. Manual

Manual 402-40 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.

2.5. Specifications

Product Specification 108-130021 provides expected product performance and test results.

2.6. Instructional Material

Instruction sheets (408-series) provide product assembly instructions or tooling setup and operation procedures. Instructional material that pertains to this product is:

408-9816 Handling Reeled Product

2.7. Standards

The standard that pertains to this product is:

EIA-364-52, “Solderability of Contact Terminations Test Procedure for Electrical Connectors and Sockets”

3. REQUIREMENTS

3.1. Safety

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

3.2. Operating Temperature

The connector is designed to operate in a temperature range of -55° to 85°C [-67° to 185°F].

3.3. Material

The housing is made of liquid crystal polymer (LCP) thermoplastic, UL 94-V-0. The contacts are made of copper alloy underplated with nickel, plated with tin on the solder tails, and plated with gold or gold equivalent at the interface area. The shells are made of copper alloy underplated with nickel, plated with tin over the entire shell for the vertical connectors, and only tin over the tails for the right angle. The metal hold downs are made from a copper alloy underplate with nickel and plated with tin all over.

3.4. Storage

A. Ultraviolet Light

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

B. Shelf Life

The product should remain in the shipping containers until ready for use to prevent deformation to components. The product should be used on a first in, first out basis to avoid storage contamination that could adversely affect performance.

C. Chemical Exposure

Do not store product near any chemical listed below as they may cause stress corrosion cracking in the material.

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

3.5. PC Board

A. Material and Thickness

The pc board material shall be glass epoxy (FR-4 or G-10). The pc board thickness shall be a minimum of 1.5mm.

NOTE
Call the number at the bottom of page 1 for suitability of other pc board materials.

B. Tolerance

Maximum allowable bow of the board shall be 0.08 over the length of the connector. The coplanarity of the pc board circuit pads must be 0.03.

C. Circuit Pads

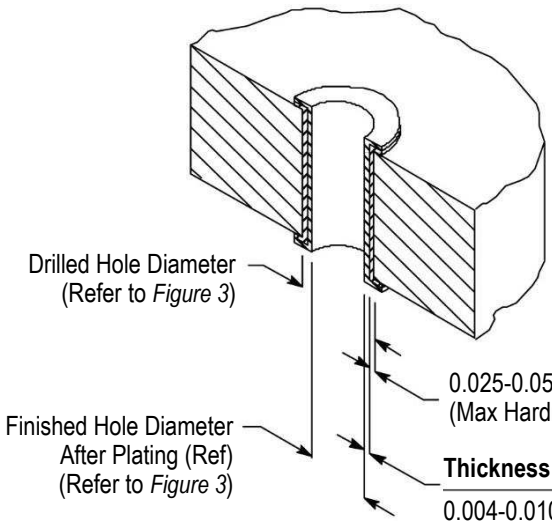
The circuit pads must be solderable in accordance with EIA-364-52.

D. Hole Dimensions

Holes for the metal hold-downs must be drilled and plated through. Recommended drilled hole diameters and plating type and thickness and finished hole size are given in Figure 2.

NOTE
The finished hole diameter for the alignment posts is provided on the connector customer drawing.

Recommended Hole Dimensions and Plating



Thickness	Plating
0.004-0.010	Hot Air Solder Leveling (HASL) Tin-Lead (SnPb)
0.0005 (Min)	Immersion Tin (Sn)
0.0002-0.0005	Organic Solderability Preservative (OSP)
0.004-0.0076 0.0001-0.0005	Nickel (Ni) Immersion Gold (Au)
0.0001-0.0005	Immersion Silver (Ag)

Figure 2

E. Layout

All holes and circuit pads must be precisely located on the pc board. The pc board layout must be designed using the dimensions provided on the customer drawing for the specific connector. A reference sample of the recommended pc board layout is given in *Figure 3*.

Recommended PC Board Layout

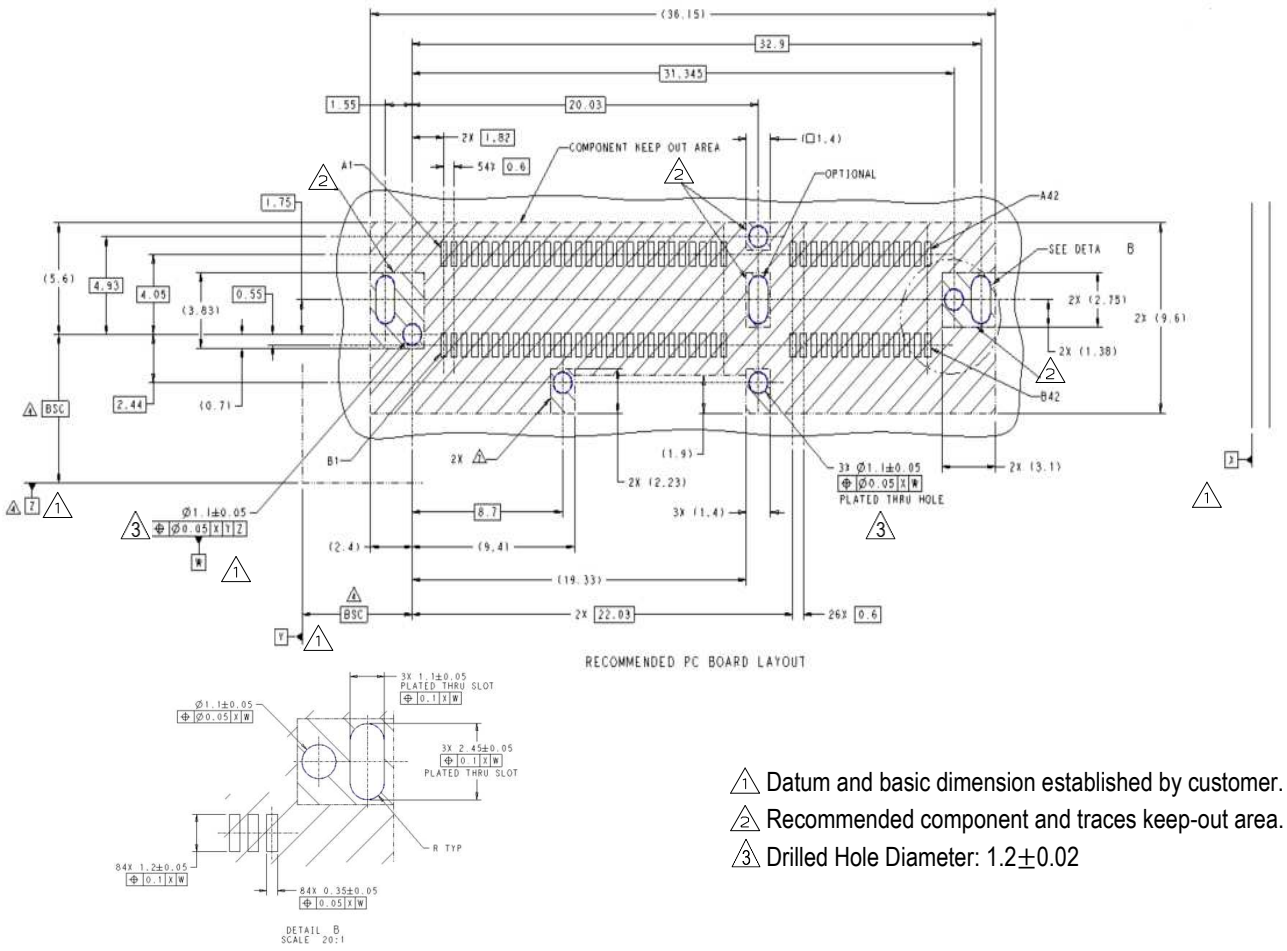


Figure 3

F. Guidance for Paddle Card

The connector solution must have guidance hardware for the cad edge PCB to be within the X, Y, and Z direction constraints. It is recommended that the connector housing is not used as a hard stop for the card edge PCB. The hardware provides a rough alignment to the housing's mating interface, and a Z direction position, as well as support in the X, and Y directions. *Please reference SFF-TA-1002 document for guidance dimensions.*

3.6. Soldering

A. Process

The connector must be soldered using non-focused infrared (IR) reflow or equivalent soldering technique. Reflow temperature and time may vary depending on the size of the pc board and placement of other components. This connector can be subjected to the reflow temperature and approximate time specified in Figure 4.

B. Solder Paste Characteristics

1. Alloy type for tin-lead solder shall be 63 Sn/37 Pb, 60 Sn/40 Pb, or 62 Sn/36 Pb/2 Ag.

2. Alloy type for lead-free solder shall be compatible with pure tin or gold, for example, SAC305 (96.6 Sn/3 Ag/0.5 Cu) or SAC405 (95.5 Sn/4 Ag/0.5 Cu)
3. Flux incorporated in the paste shall be rosin, mildly active (RMA) type.
4. Paste will be at least 80% solids by volume.
5. Mesh designation shall be -200 to +325 (74 to 44 square micron openings, respectively).
6. Minimum viscosity of screen print shall be 5×10% cp (centipoise).
7. Minimum viscosity of stencil print shall be 7.5×10% cp (centipoise).

C. Solder Volume

Minimum solder volume (V) (before curing) for each circuit pad is calculated as follows:
1.5 (pad length) × 0.26 (pad width) × 0.125 (stencil thickness) = 0.049 mm^3 (V).

Minimum solder volume (V) for each hold-down (right angle/ vertical) is calculated as follows:
$\pi \times 0.55^2$ (radius) × 0.125 (stencil thickness) = 0.119 mm^3 (V)

Minimum solder volume (V) for each large hold-down (vertical) is calculated as follows:
$[\pi \times 0.55^2 + (1.35 \times 1.1)]$ (large solder hole) × 0.125 (stencil thickness) = 0.305 mm^3 (V)

NOTE
Solder volume may vary depending on solder paste composition.

D. Solder Paste Thickness

Solder paste thickness for the connector contact solder tines must be at least 0.125mm and no more than 0.15mm.

E. Stencil

The stencil aperture is determined by the circuit pad size and stencil thickness. It may be any shape as long as it prevents solder bridging from one pad to another. The stencil should be 0.125 thick.

The stencil should include circuit pads for the contacts and holes for the stabilizers and hold-downs. The stencil layout must be designed using the dimensions provided on the customer drawing for the specific connector.

F. Solder Mask

When soldering, solder mask is recommended between all circuit pads to minimize solder bridging between pads. The mask must not exceed the height of the pad. If a trace is run between adjacent pads on the pc board, a solder mask must be applied over the trace to prevent bridging and wicking of solder away from the connector contact solder tines. Mask most suitable is Liquid Photo Imageable.

It is recommended that component temperatures not exceed the temperatures and times given in Figure 4.

CAUTION
Excessive temperatures may cause connector housing degradation or plating deterioration.

Reflow Soldering Process Cycle
Lead-Free Solder (Maximum 260°C [500°F])

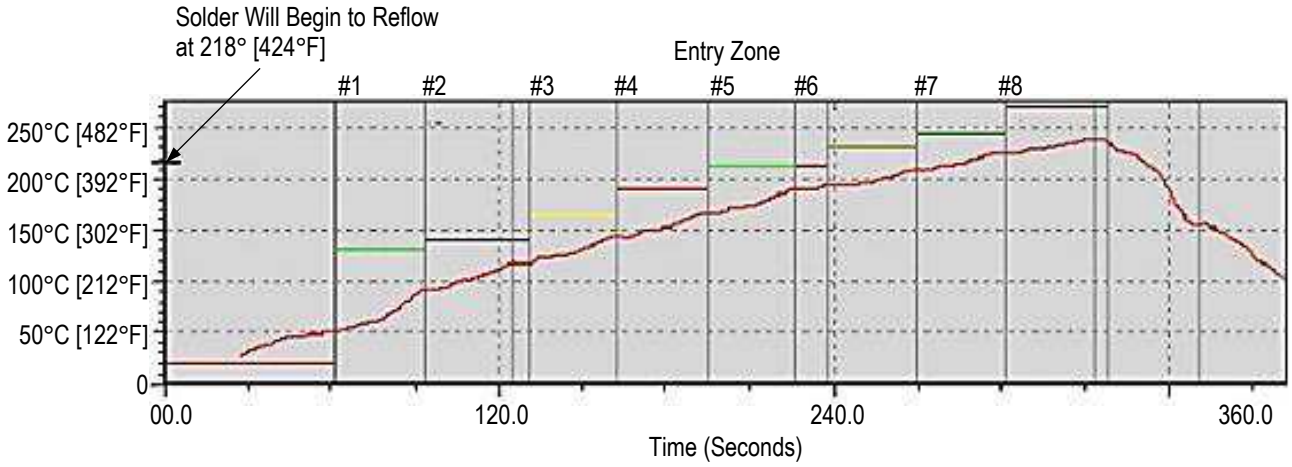


Figure 4 (Cont'd)

Reflow Soldering Process Cycle
Tin-Lead Solder (Maximum 230°C [446°F] for 20 Seconds)

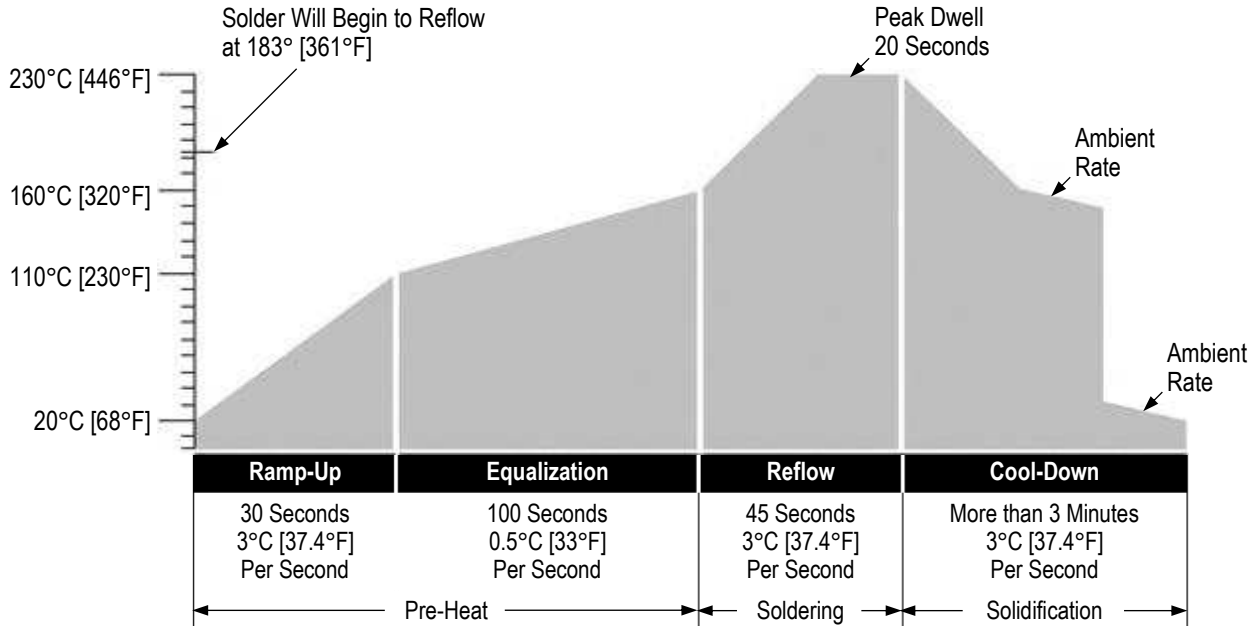


Figure 45 (End)

G. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder and flux for recommended cleaning solvents. Cleaners must be free of dissolved flux and other contaminants. It is recommended cleaning the pc board on its edge. If using aqueous cleaner, standard

equipment such as a soak-tank or an automatic in-line machine should be used. Common cleaning solvents that will not affect this connector are listed in Figure 5.

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 is not recommended because of harmful occupational and environmental effects.

CLEANER		TIME (Minutes)	TEMPERATURE (Max)
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 5

NOTE
If a cleaning solvent is not listed, call the number at the bottom of page 1 for advice.

H. Drying

When drying cleaned assemblies and pc boards, temperature limitations must not be exceeded: 85°C [185°F]. Excessive temperatures may cause connector housing degradation.

3.7. Connector Placement

CAUTION
Connectors should be handled only by the housing to avoid deformation, contamination, or damage to the contact solder tines.

Each contact solder tine must be seated on its pc board circuit pad. Optimally, the tines should be centered on the pc board circuit pads; however, slight misalignment is permissible.

Because the connector alignment posts are for clearance and fit only, the force required to seat the connector is minimal. The alignment posts and hold-downs must be inserted into the pc board holes. Refer to Figure 6.

No assembly is required after removal from pocket tape or tray. The connector will provide self-alignment as it is presented to the footprint with the proper orientation.

3.8. Checking Installed Connector

All solder joints must conform to the requirements specified in Workmanship Specification 101-21 and all other requirements specified in this document. The solder fillets must be evenly formed around each contact solder tine. Solder must have 95% minimum coverage over the circuit pad. Solder should attach each hold-down to the pc board.

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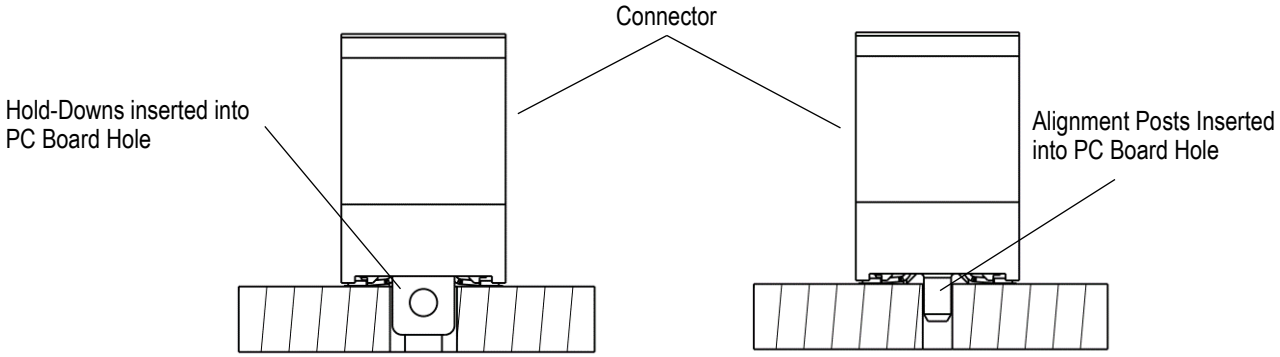


Figure 6

3.9. Removal and Repair

Standard de-soldering methods must be used to remove the connector from the pc board. The connector must not be re-used after removal. The connector is not repairable. Defective or damaged product must not be used.

4. QUALIFICATION

The Sliver 2.0 connectors are Recognized by Underwriters Laboratories Inc. (UL) in File E_____.

5. TOOLING

No tooling is required for manual placement of the connectors onto the pc board.

For automatic machine placement, the robotic equipment must have a true position accuracy tolerance sufficient to properly locate the connector. This includes gripper and fixture tolerances as well as equipment repeatability. It must use the connector datum surfaces given on the customer drawing to ensure reliable placement.

6. VISUAL AID

The illustration below shows a typical application of Vertical and Right-Angle Sliver 2.0 Cabled Receptacle Connectors. 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.

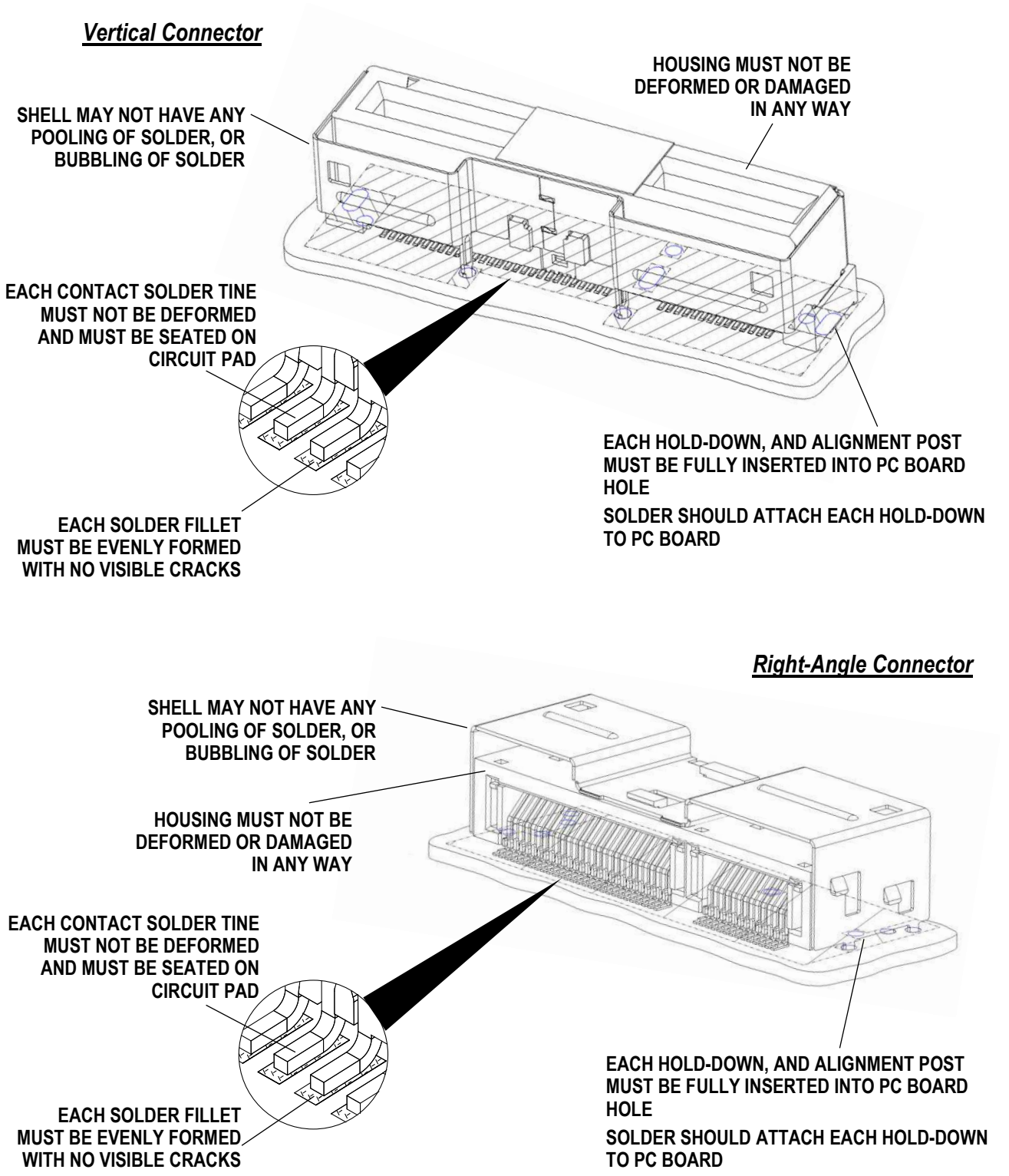


FIGURE 7. VISUAL AID

Unikeyic Electronics

Global Electronic Components Distributor

Click to view pricing, inventory, delivery, and lifecycle information:

TE Connectivity:

1969656-1 2310537-1 CPF0402B37K4E1 MPT100C18RF 1-962915-1 2005330-1 3430B2F51RTDF
917696-1 TE50BR39J 1-794222-0 2834055-1 650075-000 RH73H2A40MKTN 1393431-1 2380312-2
CRGCQ2010J3K3 SBCHE64R7K ROX05SJ18R SBCHE154R7K SMW73R0JT 141991-2 175977-2
1903112-2 2377783-2 936348-1 1743455-2 2-292161-3 3-1393225-0 3631B101LL U5254-000005-030PA