

**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  $\pm 0.13$  mm 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 Nanopitch I/O Connector to a printed circuit (pc) board. These connectors interconnect with Nanopitch I/O cables to host printed circuit (pc) boards used in the communications industry and peripheral component interconnect (PCI) applications.

The connector consists of a housing with surface mount contacts on 0.5mm centerlines and a shield. The alignment posts provide stability for placement of the connector on the host pc board. The connector is available with vertical or right angel, 42pins or 80pins contacts.

The connector is supplied in tape-mounted form for manual or high-speed automatic machine placement (typically vacuum pick and place).

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.

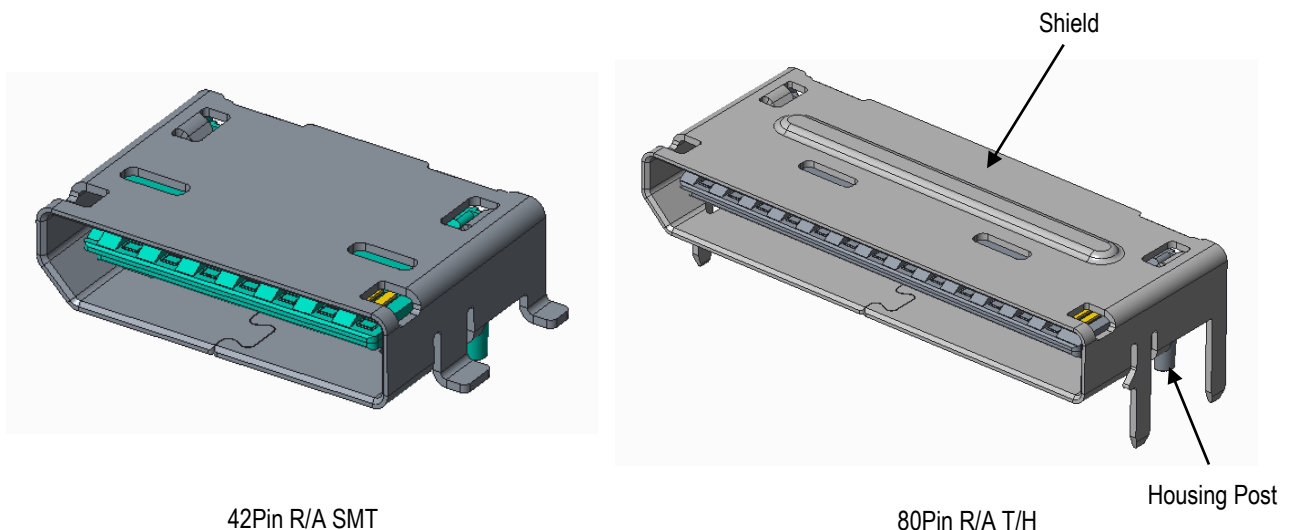


Figure 1

**2. REFERENCE MATERIAL**

**2.1. Revision Summary**

- Initial release.

**2.2. Customer Service**

**PRELIMINARY**

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Reference product base part numbers 2308577,2308578,2312148,2312741 and product code L323 are representative of the Nanopitch I/O Connectors. Use of these numbers will identify the product line and expedite your inquiries through a service network established to help you obtain product and tooling information. Such information can be obtained through a local TE Representative or, after purchase, by calling Product Information at the number at the bottom of page 1.

### **2.3. Drawings**

Customer drawings for product part numbers are available from the service network. If there is a conflict between the information contained in the customer drawings and this specification or with any other technical documentation supplied, call the Product Information number at the bottom of page 1.

### **2.4. Specifications**

Product Specification 108-60118 provides product performance and test information for the Nanopitch I/O Connectors.

## **3. REQUIREMENTS**

### **3.1. Safety**

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

### **3.2. Limitations**

These connectors are designed to operate in a temperature range of -40° to 80°C [-40° to 176°F]. The panel requirements given in this document are specifically configured for products used in the communications industry.

### **3.3. Materials**

The housing and contact array housing are made from molded thermoplastic, UL 94-V-0. All contact pin contacts are made from copper alloy under-plated with nickel, plated with gold at the interface area and tin on solder area. The shells are made from stainless steel plated with tin over nickel.

### **3.4. Storage**

#### **A. Ultraviolet Light**

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

#### **B. Shelf Life**

The connectors should remain in the shipping containers until ready for use to prevent deformation to the compliant pin contacts and mounting posts. The connectors should be used on a first in, first out basis to avoid storage contamination that could adversely affect signal transmission and performance.

### C. Reeled Products

Connectors are supplied in reels on carrier tapes approved in EIA-481. Coil wound reels must be stored horizontally and traverse wound reels vertically.

### D. Chemical Exposure

Do not store connectors near any chemical listed below as they may cause stress corrosion cracking in the compliant pin contacts or mounting posts.

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

## 3.5. Host PC Board

### A. Material and Thickness

The pc board material shall be glass epoxy (FR-4 or G-10). The minimum pc board thickness shall be 1.57 mm. Contact the Product Information number at the bottom of page 1 for suitability of other pc board materials.

### B. Tolerance

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

### C. Circuit Pads

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

### D. Layout

All holes and circuit pads must be precisely located on the pc board to ensure proper placement and optimum performance of the connector. Refer to the specific customer drawing for the recommended pc board layout.

## 3.6. 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 -200 to +325 (74 to 44 square micron openings, respectively).
6. Minimum viscosity of screen print shall be 5X10% cp (centipoise).
7. Minimum viscosity of stencil print shall be 7.5X10% cp (centipoise).

## 3.7. Solder Volume

Minimum solder volume (V) (before curing) for each circuit pad is calculated by multiplying the pad length (L) by the pad width (W) by the stencil thickness (T):  $0.91(L) \times 0.31(W) \times 0.13(T) = 0.037 \text{ mm}^3$  (V) for small pads and  $2.498 \text{ mm}^3$  for big pads.

**NOTE**

*Solder volume may vary depending on solder paste composition.*



### 3.8. Solder Paste Thickness

Solder paste thickness for the connector contact solder tines must be at least 0.13 mm.

### 3.9. 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. Generally, the thinner stencil will need a larger aperture to maintain the given volume of solder paste. The stencil should be 0.13 mm thick. The stencil layout must be designed using the dimension provided on the customer drawing for the specific connector.

### 3.10. 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.

**CAUTION**

*All traces must be covered by solder mask in the solder deposit area. Exposed traces could cause bridging and create a short, or wick solder away from the solder tines, producing a weak solder joint.*



### 3.11. Connector Placement

**CAUTION**

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



#### A. Registration

The connector contact solder tines must be aligned with matching circuit pads and alignment posts aligned with matching holes before placing the connector onto the host pc board.

#### B. Position

Optimally, the contact solder tines should be centered on the host pc board circuit pads. However, slight misalignment is permissible.

#### C. Seating

Because the connector alignment posts are for clearance and fit only, the force required to seat the connector is minimal. The alignment posts must be inserted into the host pc board holes prior to fully seating solder tines into solder paste. See Figure 2.

#### D. Placement by Vacuum Pickup

In order to facilitate use of a vacuum pick and place tool, the location of the centroid of the right-angle connectors is defined in the table in Figure 3.

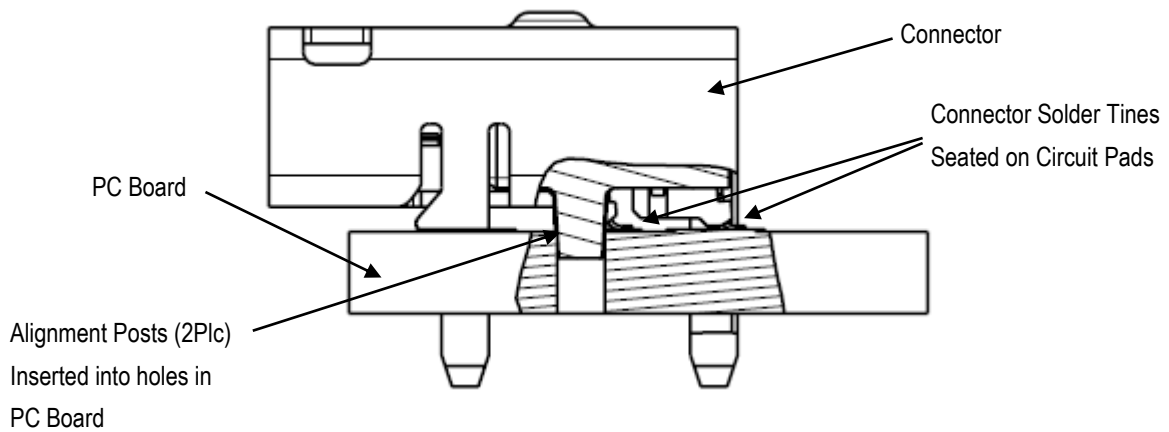


Figure 2

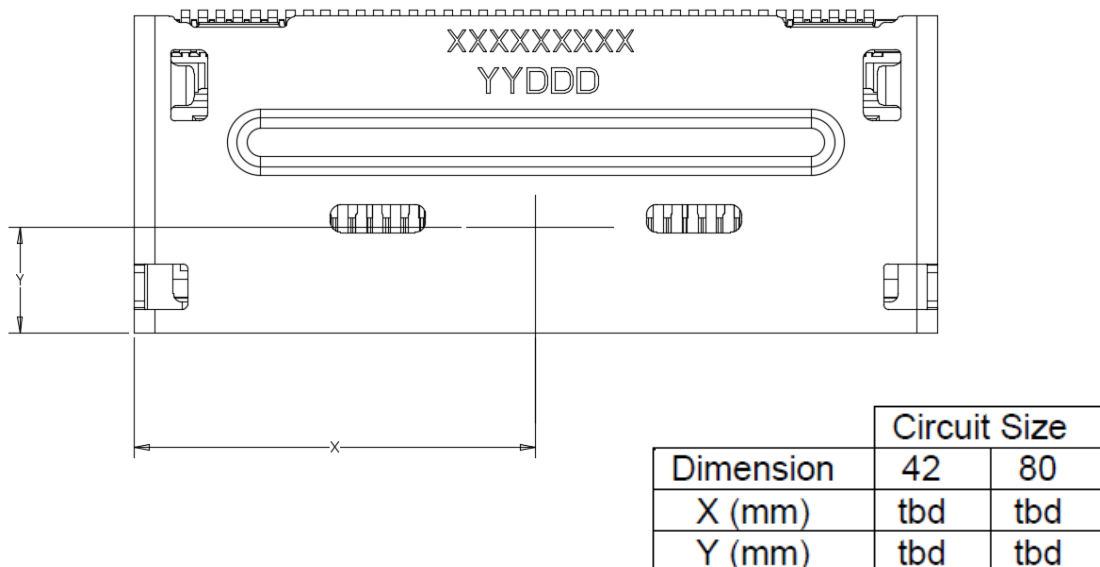
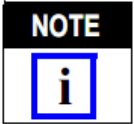


Figure 3

### 3.12. Soldering

#### A. Process

The connector must be soldered using non-focused infrared (IR) reflow or equivalent soldering technique. When mounting to both sides of the host pc board, adhesive must be applied to the alignment posts to retain the inverted part while going through the second pass reflow process. (Other options are mechanical retention with pallets or thermal shields to prevent the solder from turning to a liquid state.) Reflow temperature and time may vary depending on the size of the host pc board and placement of other components. The reflow temperature and approximate time to which the connector can be subjected is specified in Figure 4.



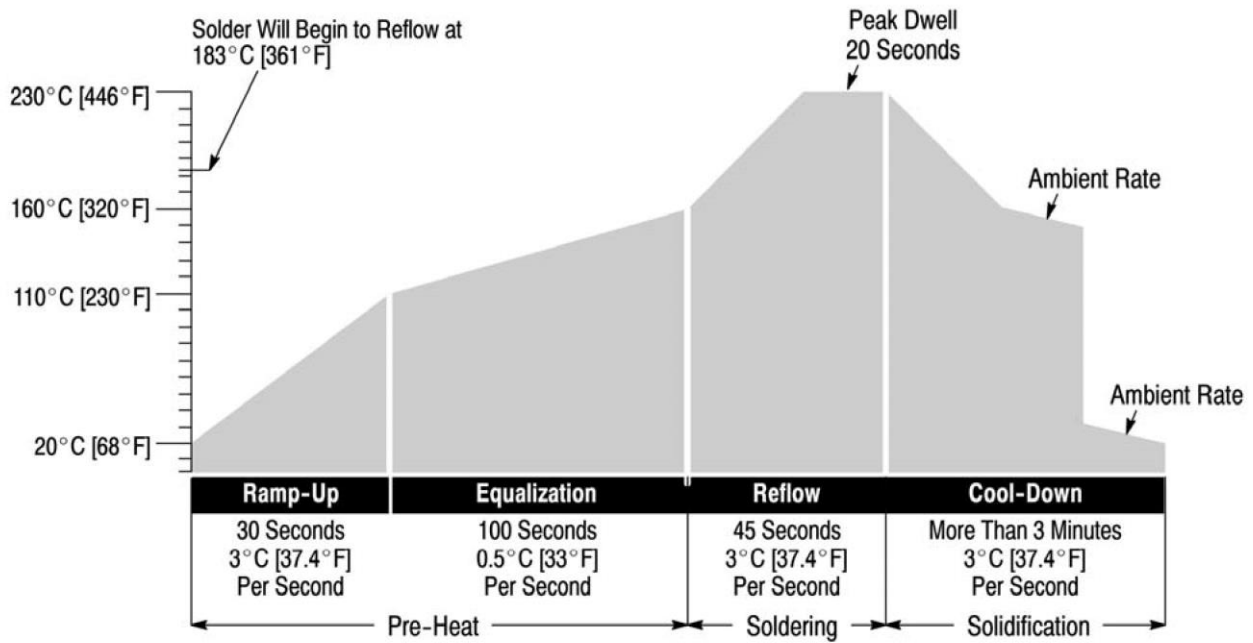
*For double-sided SMT applications, the connector must be fastened to the pc board by adhesive or other mechanical methods as it passes through the reflow process in the inverted position.*



*Excessive temperatures may cause connector housing degradation or plating deterioration. It is recommended that component temperatures not exceed 230°C [446°F] when using tin-lead solder and 260°C [500°F] when using lead-free solder.*

**Reflow Soldering Process Cycle**

*Tin-Lead Solder  
(Maximum 230°C [446°F] for 20 Seconds)*



*Lead-Free Solder  
(Maximum 260°C [500°F])*

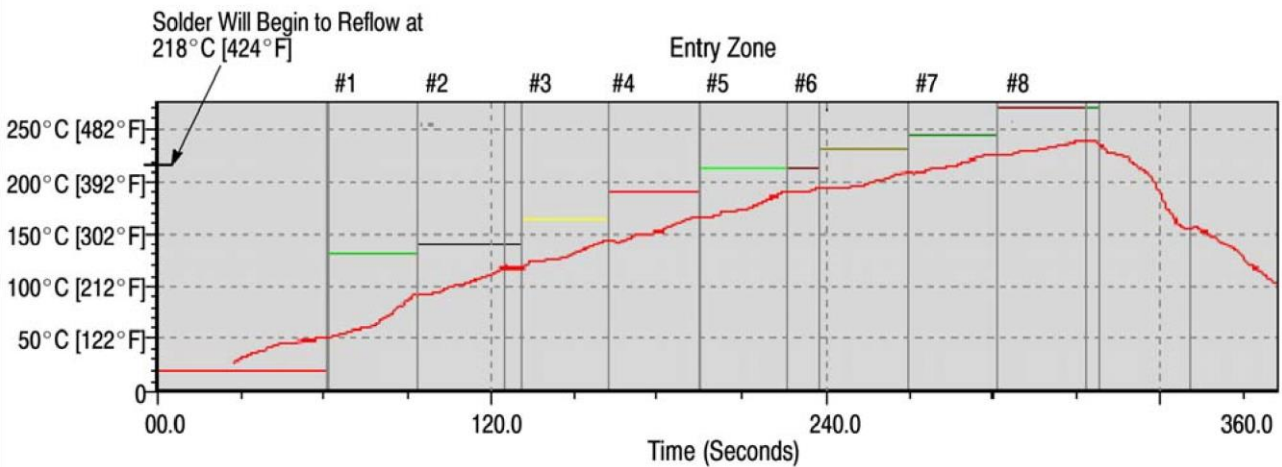


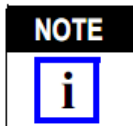
Figure 4

## B. 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 host 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 the connector for the time and temperature specified are listed in Figure 5.



*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. Both are carcinogenic (cancer-causing).*



*If a particular cleaning solvent that is not listed, contact PRODUCT INFORMATION at the 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		

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

Figure 5

## C. Drying

When drying cleaned assemblies and host pc boards, make certain that temperatures do not exceed 85°C [185°F]. Excessive temperatures may cause connector housing degradation.

### 3.13. Checking Installed Connector

All solder joints must conform to those specified in Workmanship Specification 101-21 and all other requirements specified in this document. The installed connector must have solder fillets evenly formed

around each contact solder tine. Solder must have 95% minimum coverage over the circuit pad. See Figure 6.

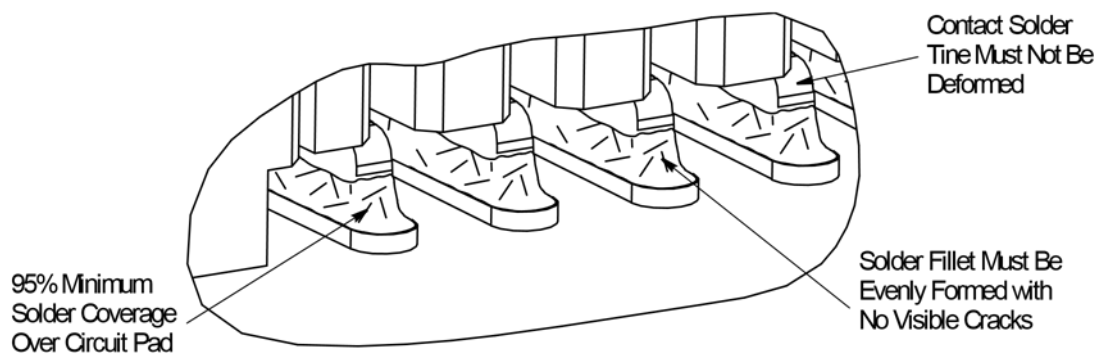


Figure 6

### 3.14. Removal and Repair

Standard de-soldering methods must be used to remove the connector from the host pc board.



*The connector must not be re-used after removal. The connector is not repairable. Any defective or damaged products must not be used.*

## 4. QUALIFICATIONS

No qualification documentation is available at the time of publication of this document.

## 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 to ensure reliable placement.

## 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.



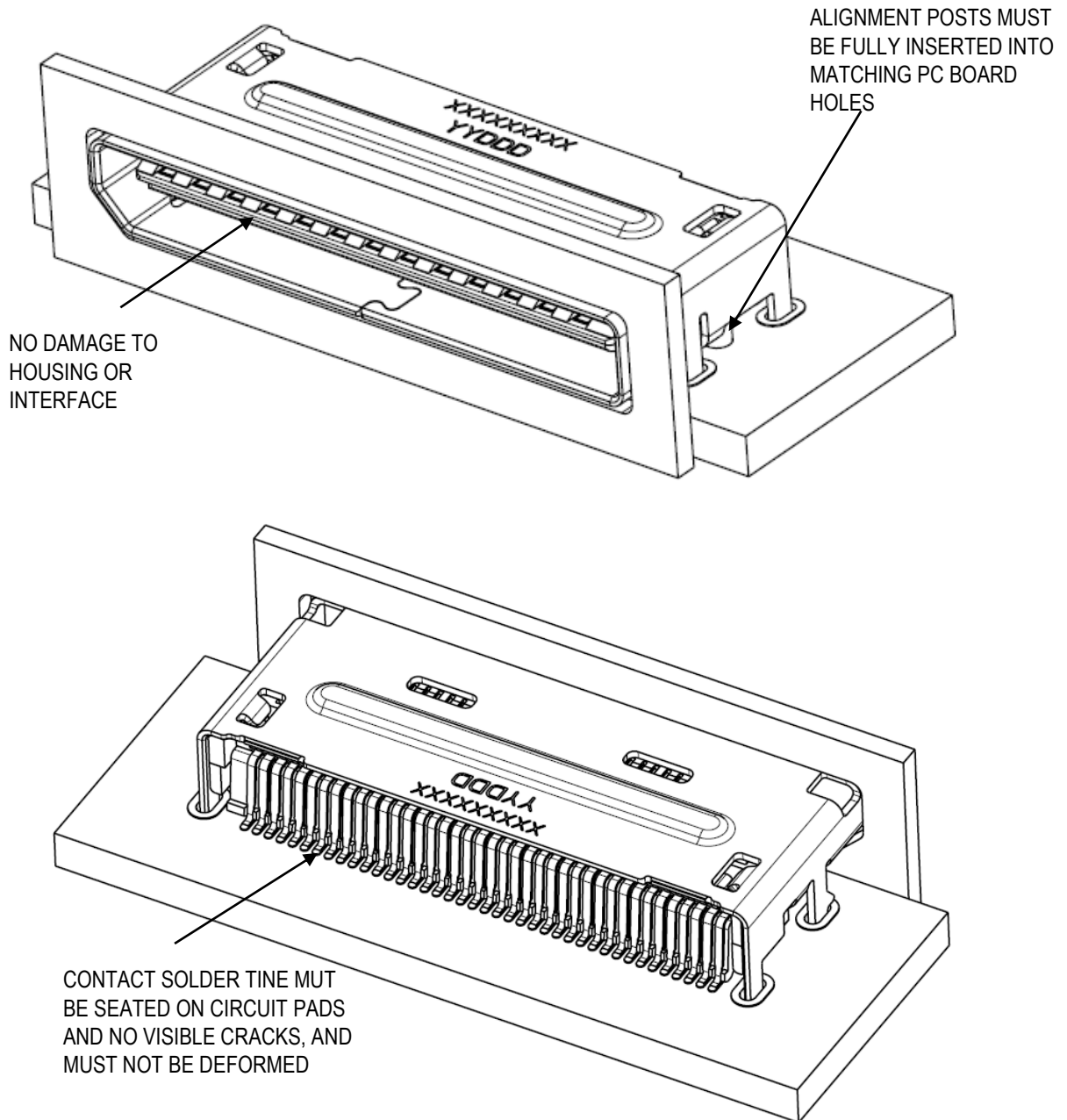


Figure 7