

**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  $\pm 0.13$  [ $\pm 0.005$ ] 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 Unshielded PC Card and Shielded Card Bus Receptacle Connectors designed for surface and straddle mount printed circuit (pc) boards used in customer designed card frames. The pc card connectors have 68 solder tines arranged either in two rows of 34 tines with 1.27 [.050] between the tines in each row, or one row of 68 tines with 0.635 [.025] between tines. The card bus connectors have an additional row of eight ground tines. The surface mount connectors are designed to be positioned on the board by robotic equipment and the straddle mount are designed to be positioned on the pc board by hand or robotic equipment.

The solder tines of surface mount connectors are designed to be soldered to the same side of a pc board. Solder tines of two row connectors are offset from each other by 0.635 [.025]. Straddle mount connectors have two opposing rows of solder tines directly opposite each other and are designed to be edge mounted to a pc board.

The terms used throughout this specification should be used when corresponding with TE Connectivity Personnel to facilitate assistance. The basic types and features of these assemblies are provided in Figure 1.

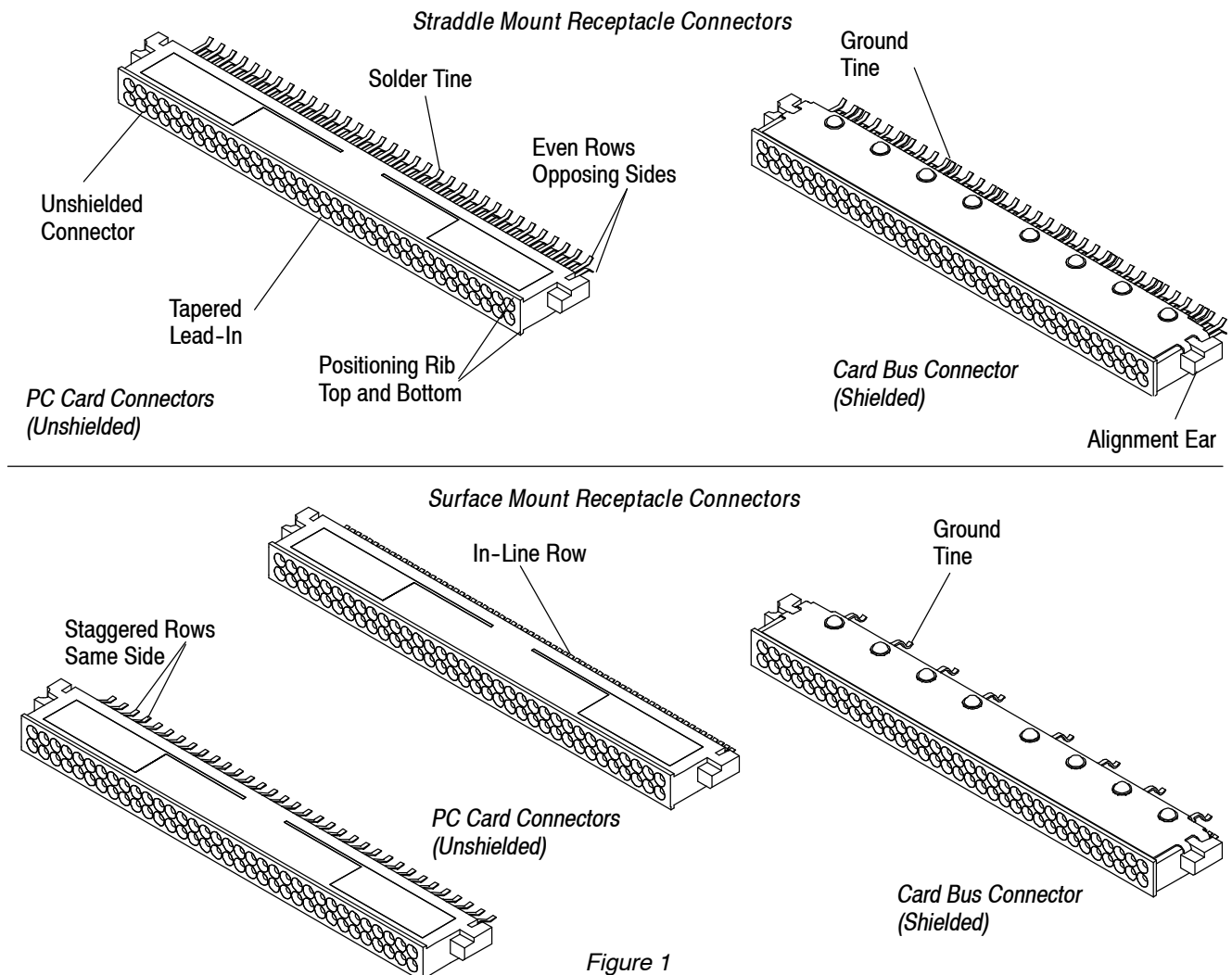


Figure 1

## 2. REFERENCE MATERIAL

### 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:

- Updated document to corporate requirements
- New logo

### 2.2. Customer Assistance

Reference Part Number 146229 and Product Code 3232 are representative numbers for Unshielded PC Card and Shielded Card Bus Receptacle 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 the Tooling Assistance Center or Product Information number at the bottom of page 1.

### 2.3. Drawings

Customer Drawings for product part numbers 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 other technical documentation supplied by TE.

### 2.4. 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 provided in the manual as a guide for information on soldering problems.

### 2.5. Specifications

#### A. Product Specification

Product Specification 108-1469 covers test and performance requirements and is available upon request.

#### B. Industry Specifications

The connectors have been designed to industry standard specifications: PC Card Standard of Personal Computer Memory Card International Association (PCMCIA), Japan Electronics Industry Development Association (JEIDA), and Electronic Industries Association (EIA) -700 AOAB.

## 3. REQUIREMENTS

### 3.1. Storage

To prevent contamination, deformation, and overstress of the contact solder tines, and to prevent damage to the plastic components, the connectors should remain in the protective package until they are ready to be used. Also, to prevent possible storage contamination and ensure maximum solderability, the connectors should be used on a first in, first out basis. This product, under normal storage and handling conditions, is designed for a one-year shelf life. The connectors are packaged in continuous reels and plastic tubes. See Figure 2.

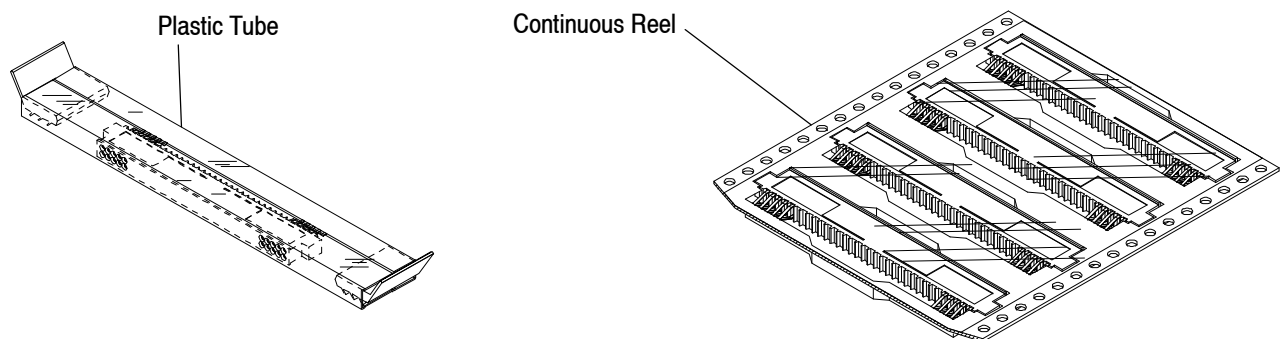


Figure 2

### 3.2. Connector Characteristics

The connectors are intended to be used in custom manufactured card frames that are designed to support the connector and pc board. Each component of the connector has design features to ensure proper functioning within the card frame. For the dimensional limits required for the card frame, see the Customer Drawing for the specific connector.

#### A. Housing

The housings have alignment ears that stabilize the assembly inside the card frame, positioning ribs across the top and bottom of the mating face that provide a means of holding the connector inside the card frame, and tapered lead-in contact cavities in the mating face that facilitate mating with pin contacts. See Figure 1.

**NOTE**

*The bottom surface of the alignment ears on the surface mount connectors is a design feature to be used to support the connector during soldering, as indicated in Figure 5. Multi-out panel arrangements may be used with this procedure.*

#### B. Contact

The surface mount solder tines have a semi-gull wing design to facilitate good depression in the solder paste when the connector is placed on the pc board pads. The straddle mount connectors have a lead-in angle to facilitate placement of connector on edge of pc board. See Figure 3.

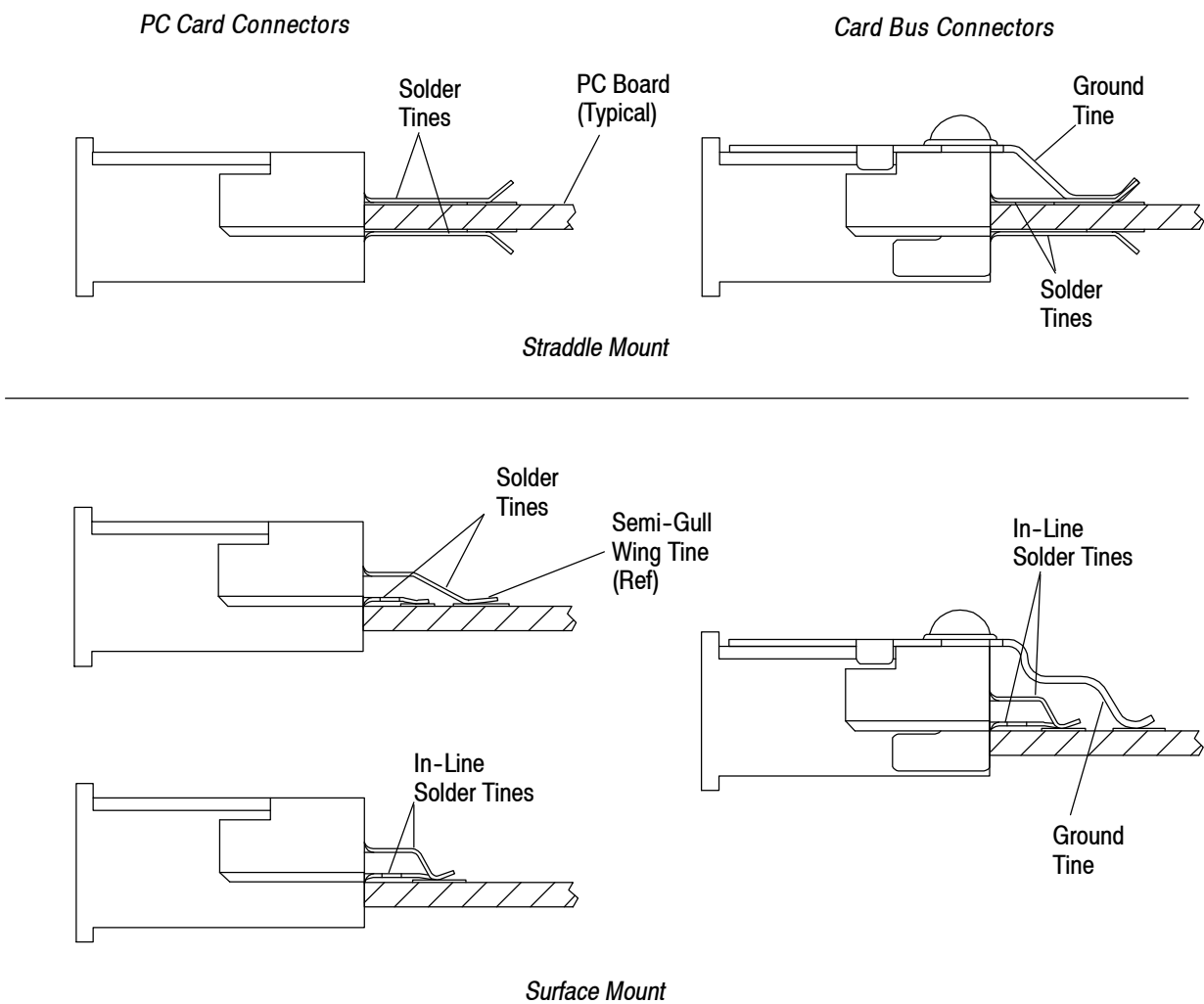


Figure 3

### 3.3. PC Board

#### A. Material

The recommended material for the pc board is FR-4 or G-10.

#### B. Thickness

The recommended pc board thickness is 0.5 [.020].

**NOTE**

Other materials and thicknesses may be suitable if required for your application and environment conditions. Call the Product Information number at the bottom of page 1 for assistance in determining suitable substitutes.

#### C. Layout

The pc board layout provided is a duplication of the layouts presented on the connector customer drawings. The dimensions include the maximum and minimum tolerances. See Figure 4.

#### Straddle Mount Connector Layouts

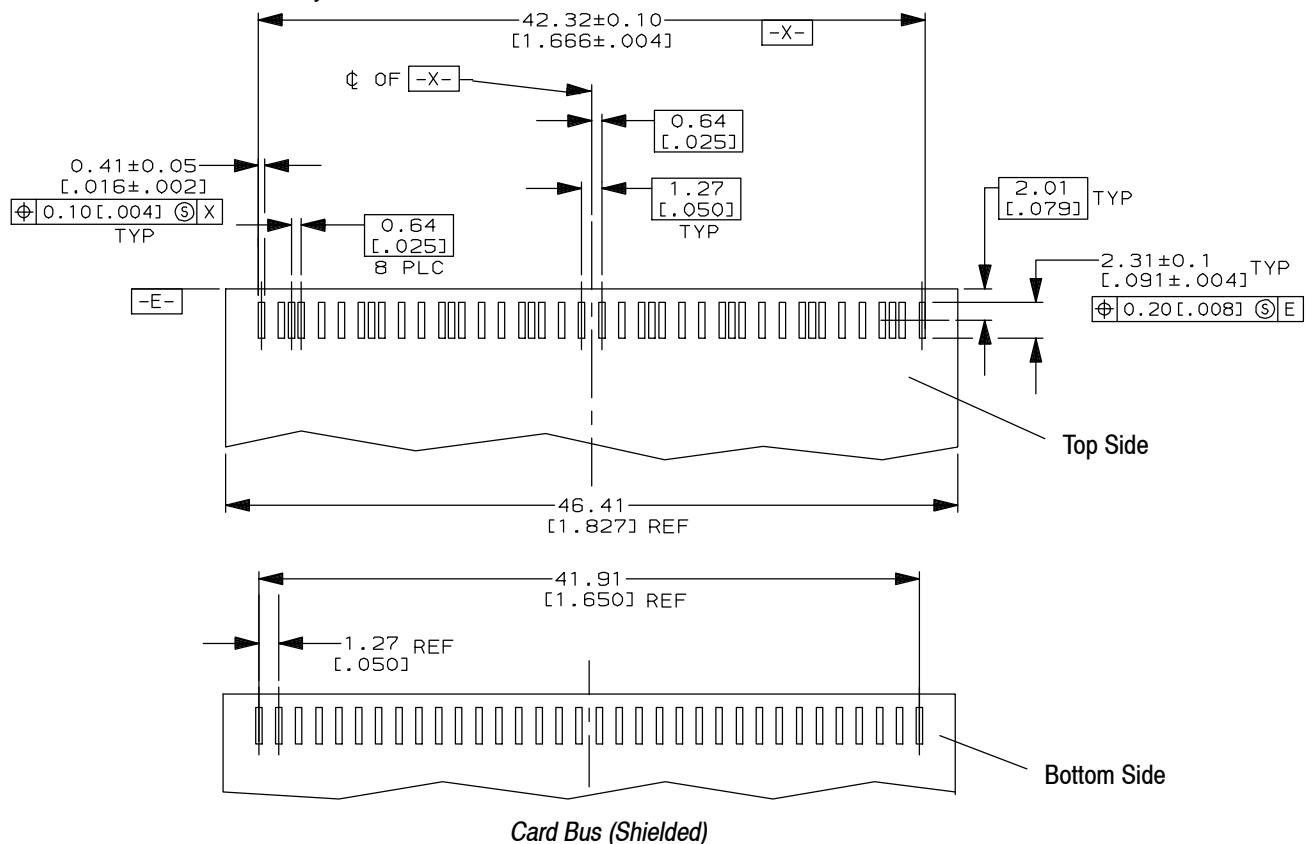
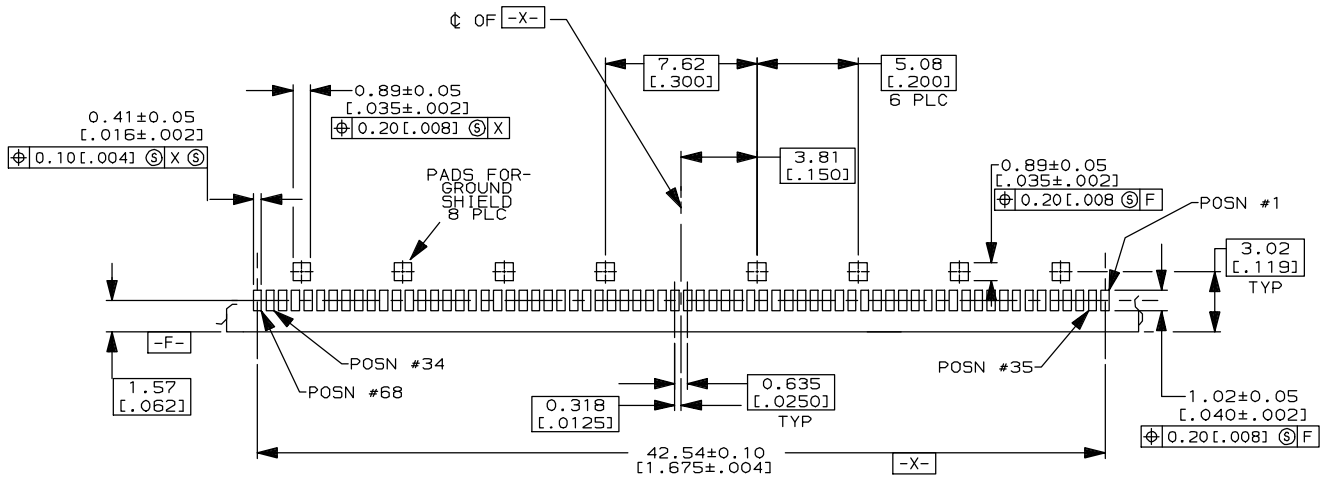
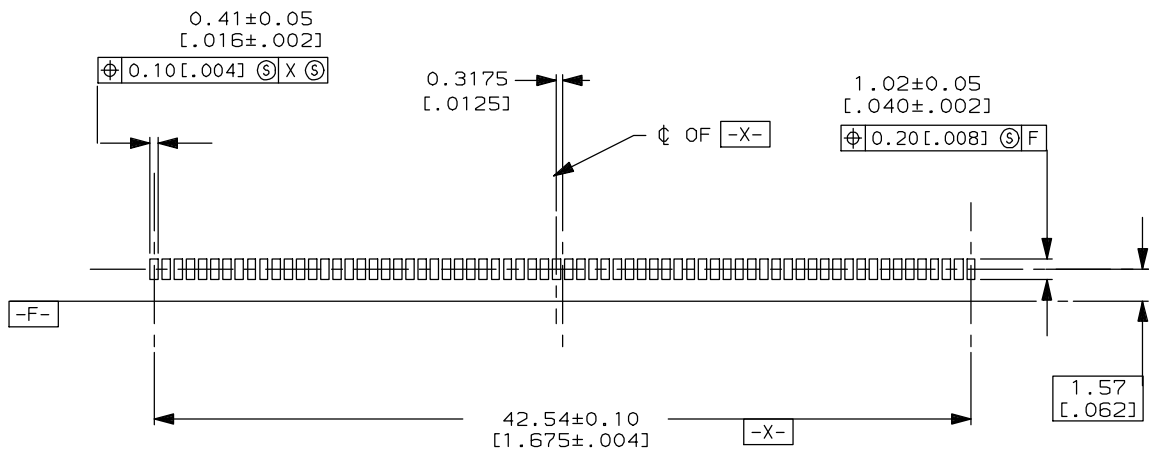


Figure 4 (cont'd)

Surface Mount In-Line Solder Tine Connector Layouts



Card Bus (Shielded)



PC Card (Unshielded)

Figure 4 (cont'd)

## Surface Mount Staggered Solder Tine Connector Layouts

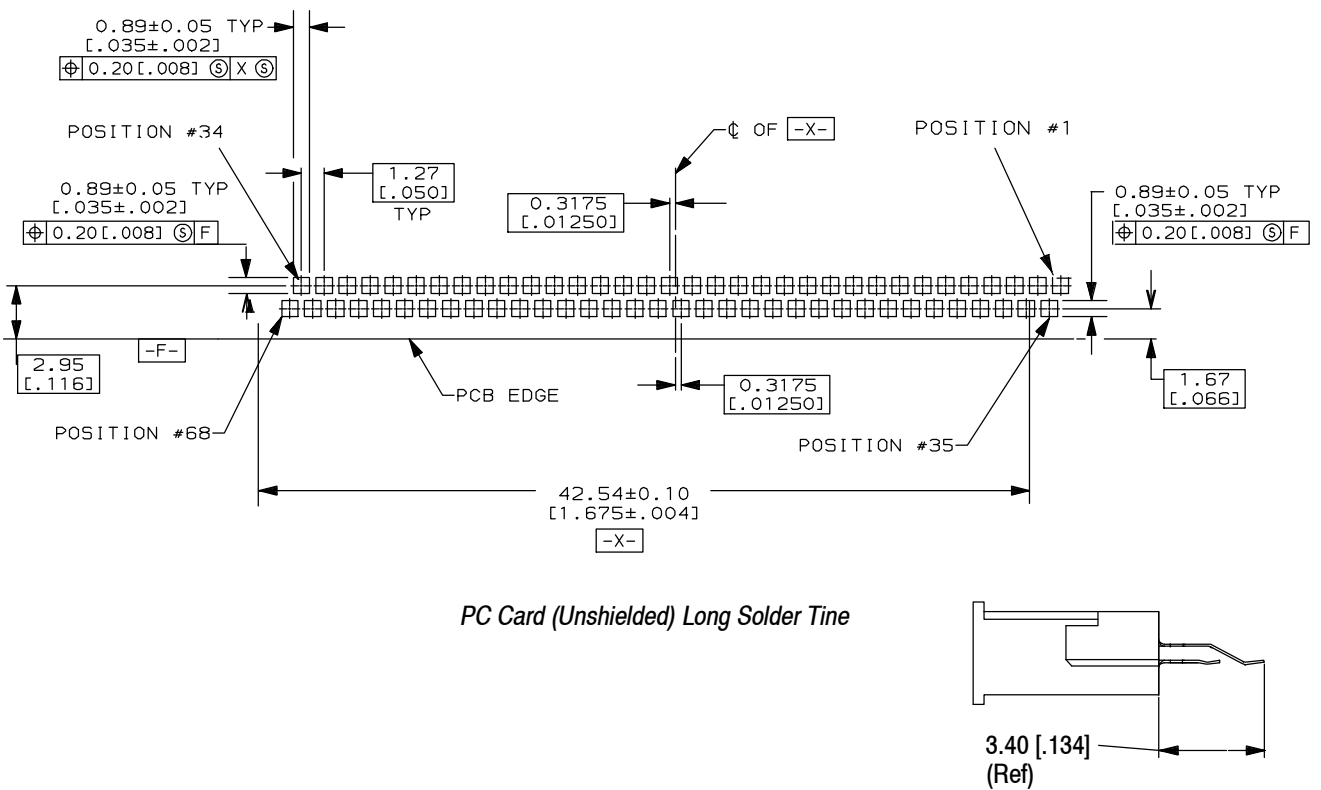
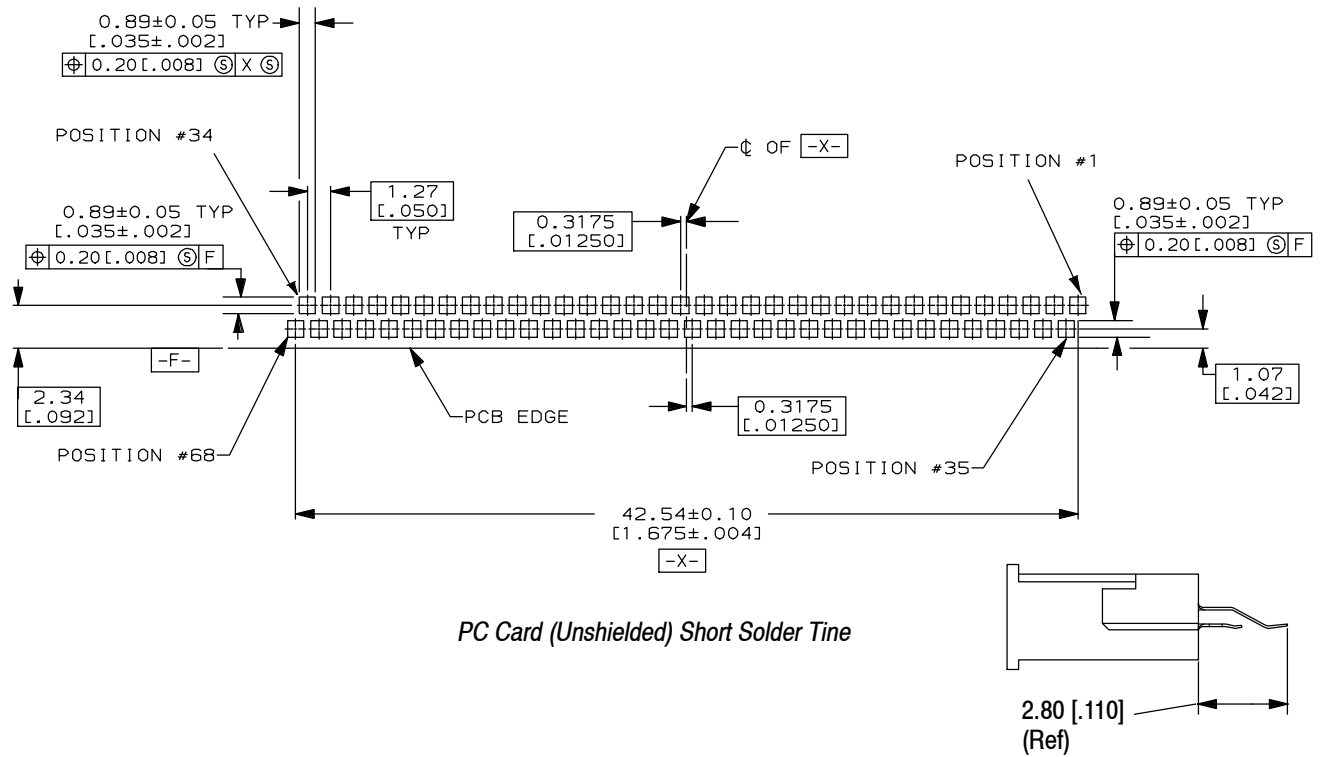


Figure 4 (end)

**CAUTION** The surface mount connectors must be supported during the soldering process to ensure the solder tines remain embedded in the solder paste and in touch with the solder pads. This may be done with mechanical fixtures that you may have in your system, or by allowing extra pc board material to support the housing as indicated in Figure 5.

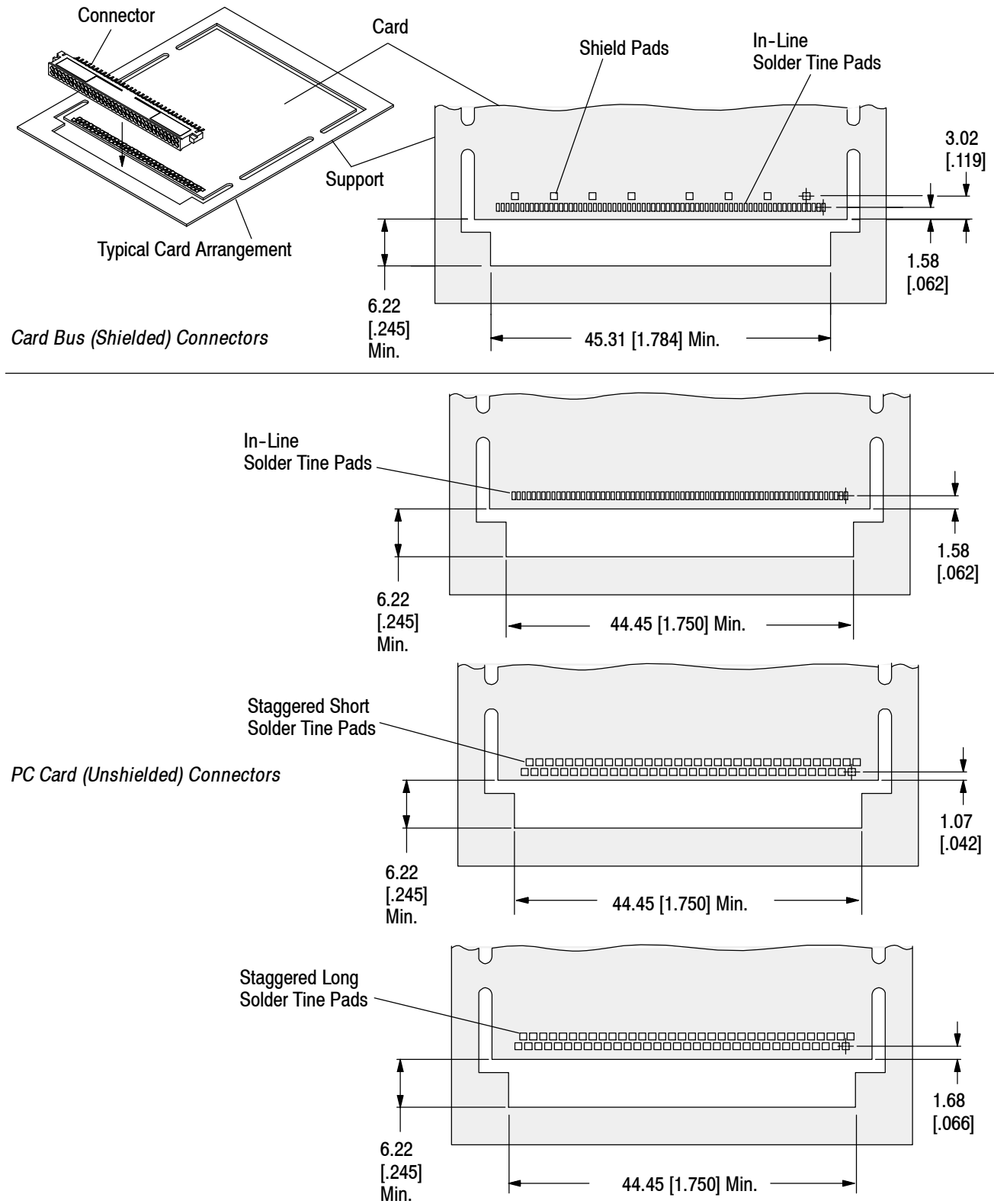


Figure 5

### 3.4. Soldering Process

The pc board pads shall be adaptable for soldering as defined in Test Specification 109-11-1, Solderability of Metallic Surfaces.

The spaces between solder traces and solder pads must be protected from solder paste, to prevent bridging and wicking. This may be done by stencil, screen, or mask. In addition to the manufacturer's requirements, we make the following suggestions and recommendations for each type.

#### A. Solder Paste Composition

1. Alloy type shall be either 63 Sn/37Pb or 60 Sn/40Pb.
2. Flux shall be RMA type.
3. Solids by weight shall be 85% minimum.
4. Mesh particle size shall be of -200 to +325 designation.
5. Minimum viscosity of screen print shall be  $5 \times 10^5$  cps.
6. Minimum viscosity of stencil print shall be  $7.5 \times 10^5$  cps.

#### B. Solder Volume

Recommended solder paste volume deposit (wet paste per solder pad) for these receptacle connectors is  $0.17 \text{ mm}^3$  [ $.0000106 \text{ in.}^3$ ] per contact solder tine.

#### NOTE

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

#### C. Stencil

The size of the aperture in the stencil will be determined by the size of the circuit and the thickness of the stencil material. Generally, the thinner stencil will require larger apertures to maintain a given volume of solder paste. Stencil thickness may range from  $0.13 \pm 0.0013$  [ $.005 \pm .0005$ ] to  $0.25 \pm 0.0013$  [ $.010 \pm .0005$ ]. Even or stepped stencils (when connector pattern is one thickness and the rest of the board is another) may be used. Normally a stencil thickness of  $0.66$  [ $.026$ ] with apertures slightly smaller than the pad layout will provide satisfactory results.

##### 1. Surface Mount Connectors

Stencils for these connectors are to be used to apply the solder paste to the pc board solder pads prior to soldering the tines to the board. Stencil layout and recommended aperture size are available immediately upon request.

##### 2. Straddle Mount Connectors

Stencils for these connectors are to be applied with an overlap of the solder mask. They may be used to pre-deposit solder prior to placement of the connector on the pc board pads for a reheated and reflow solder application. Care must be used to prevent the solder tines from raising the stencil when the solder tines are positioned on the edge of the pc board.

#### D. Screen

We do not recommend screen application because of the limited volume of paste that can be deposited. However, if your procedure requires a screen application, we recommend the removal of all screen from the contact pad area. Consult the screen manufacturer for selection of solder paste and for additional application techniques.

#### NOTE

*Abbreviations used are:  $T_e$  = Screen emulsion thickness,  $T_w$  = Screen wave thickness,  $A_o$  = Decimal equivalent of percentage of open area, and  $T_p$  = Thickness of deposited solder paste.*

Weave thickness and percentage of open area depend on the mesh count of the solder screen. For example, an 80 mesh screen has a 49.5% open area and a nominal weave thickness  $0.20$  [ $.008$ ]. The amount of paste deposited through a solder screen depends on aperture dimensions, the wire mesh, and an applied emulsion. For an 80 mesh screen with the same aperture dimensions as used in the preceding stencil example  $\{1.02 \times 1.91$  [ $.040 \times .495$ ] =  $0.10$  [ $.004$ ], thickness of emulsion can be calculated by:

$$T_e = T_p - (T_w \cdot A_o) = 0.20 \text{ [.008]} - (0.20 \times 12.57 \text{ [.008} \times .495]) = 0.10 \text{ [.004]}$$



By varying the aperture size and/or the emulsion thickness, the recommended paste volume can be achieved.

**CAUTION** Using paste volumes in excess of those recommended could result in excessive wicking of reflowed solder up the solder tine, resulting in a reduction of tine compliance and potential solder joint failure.

### E. Mask

Masking must separate the solder pads and any traces that run between pads to prevent bridging of circuits. Liquid photo image or dry film solder masking is recommended.

## 3.5. Connector Placement

### A. Process

#### 1. Manual Placement

Manual placement of straddle mount connectors can be done with relative ease. The only concern is to be sure an even seating force is applied on all tines. We recommend that you manufacture a fixture for your production requirements that will align and hold the connector in position for soldering.

**CAUTION** Manual placement of surface mount connectors is not recommended. However, if production conditions dictate that it be done, extreme care must be used to avoid deformation of the tines and to be sure even force is applied to all tines.

#### 2. Machine Placement

Vacuum pick-and-place robotic equipment with repeatable accuracy can be used for surface mount connectors. If equipment is not capable of maintaining accuracy, the solder tines may not seat properly on the solder pads. The equipment must be adjusted to ensure even embedding of all tines in the solder paste.

### B. Seating Conditions

The housing must be parallel to the edge of the pc board with the alignment ears seated on the board. The solder tines must be embedded in the paste and seated on the pc pad. See Figure 6.

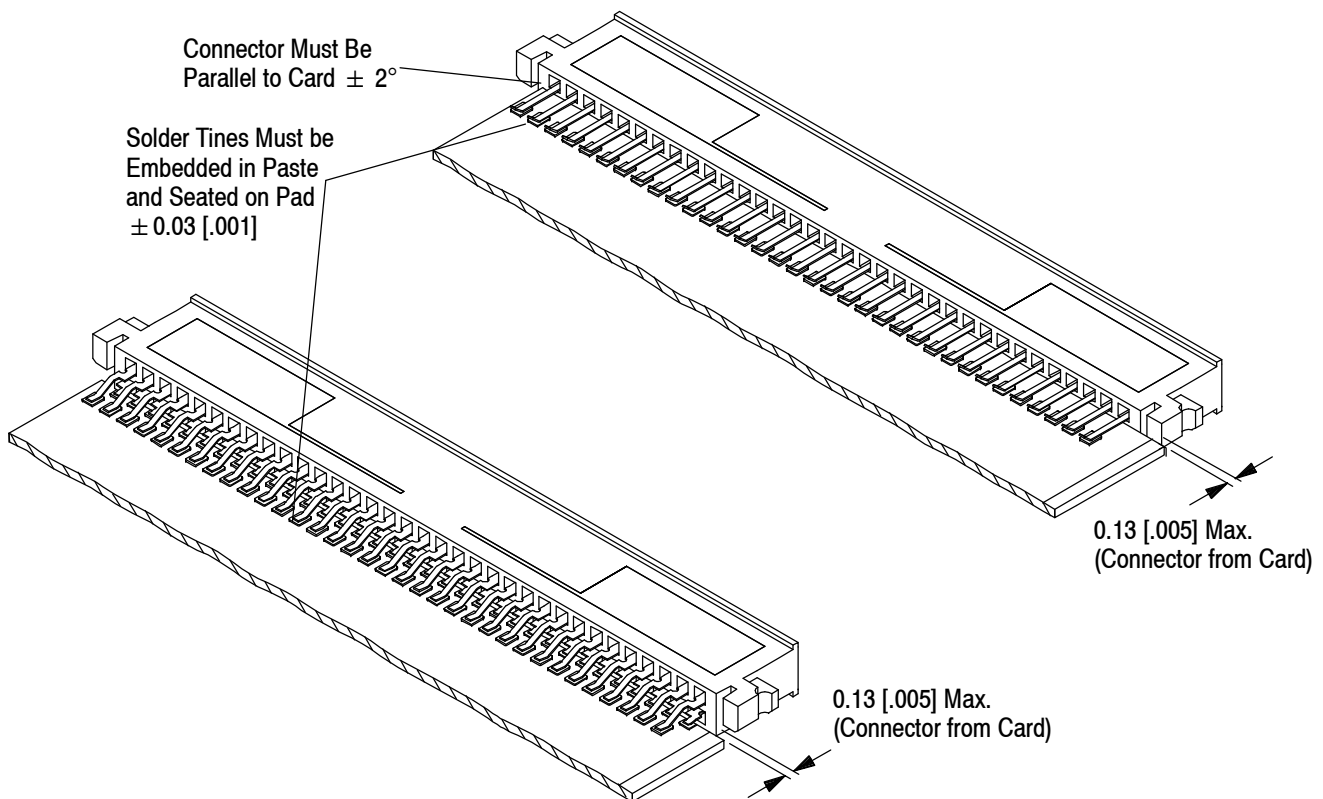


Figure 6

### 3.6. Soldering

**CAUTION** Coplanarity of the solder pad surfaces for surface mount connectors must be 0.05 [.002] maximum prior to and through the soldering process. Coplanarity of the solder pad surfaces for straddle mount connectors must be 0.10 [.004] maximum prior to and maintained during the soldering process.

#### A. Guidelines

The circuit pads on the pc board shall be adaptable for soldering as defined in Test Specification 109-11-1. Initial soldering should be done by vapor phase or infrared soldering, then cleaned and turned so the mating face of the connector is upward to allow the cleaner to drain from the assembly. Repairing of soldered assemblies should be done using a fine tip soldering iron.

#### B. Temperature

The maximum temperature the connectors should be exposed to during the soldering process is 220°C [428°F] for a maximum of 3 minutes.

### 3.7. 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.

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.

**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)	TEMPERATURES (Maximum)	
NAME	TYPE		CELSIUS	FAHRENHEIT
Alpha 2110	Aqueous	1	132	270
Bioact EC-7	Solvent	5	100	212
Butyl Carbitol	Solvent	1	Room Ambient	
Isopropyl Alcohol	Solvent	5	100	212
Kester 5778	Aqueous	5	100	212
Kester 5779	Aqueous	5	100	212
Loncoterge 520	Aqueous	5	100	212
Loncoterge 530	Aqueous	5	100	212
Terpene Solvent	Solvent	5	100	212

Figure 7

### 3.8. 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]. Excessive temperatures may cause housing degradation.

Alpha, Bioact, Carbitol, Kester, and Loncoterge are trademarks of their respective owners.

### 3.9. Checking Installed Connector

The solder fillet must be free of voids and evenly formed at the tangent of the solder tine and the pc board solder pads. The solder tines must be straight with each other and aligned with the pc board solder pads. See Figure 8.

**NOTE**

*Optimally the connector solder tines should align on the center of the circuit pad. Misalignment is permissible for certain performance classifications as specified in the Institute of Printed Circuits Standard (IPC-S-815). For additional recommendations, refer to Workmanship Standard 101-21.*

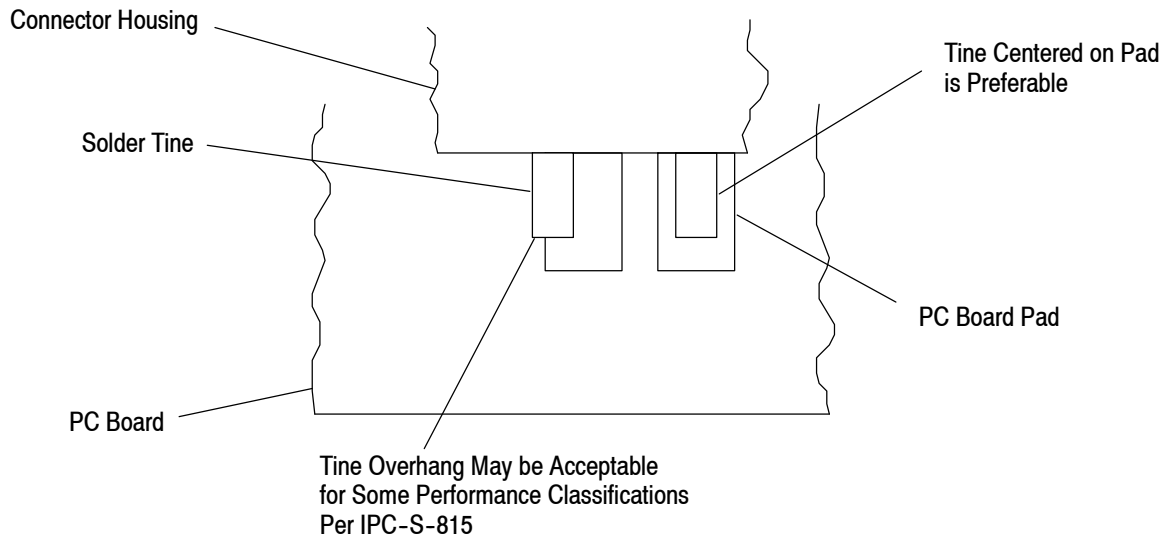


Figure 8

### 3.10. Repair

A damaged soldered connector must be removed and replaced with a new one. The connector can be removed using a hot air and solder reflow technique.

## 4. QUALIFICATIONS

The Memory Card Connectors are Listed by the following agencies.

### 4.1. Underwriters' Laboratories, Inc. (UL)

The connectors are Listed in UL File Number E28476.

### 4.2. CSA International

The connectors are Certified in File Number LR 7189-A00255.

## 5. TOOLING

Straddle mount connectors may be placed on the board manually. Surface mount connectors should be applied to the pc board with robotic equipment only.

### 5.1. Manual Placement of Straddle Mount Connectors

No tooling is required nor is it recommended that any be used when placing connectors manually on the pc board. When handling the connectors, grip the housing ends and avoid contact with the solder tines.

### 5.2. Robotic Placement of Surface Mount Connectors

Robotic placement must be done with equipment that has position accuracy tolerance of 0.05 [.002]. This includes gripper and fixture tolerances as well as equipment repeatability. The equipment must be compatible to the datum surfaces detailed on the Customer Drawings and dimension for the strip feed container. See Figure 9.

**NOTE** *It is imperative that the solder tails are sufficiently pressed into the solder paste. Also, the pc board must be supported on the bottom side to prevent bending or warpage.*

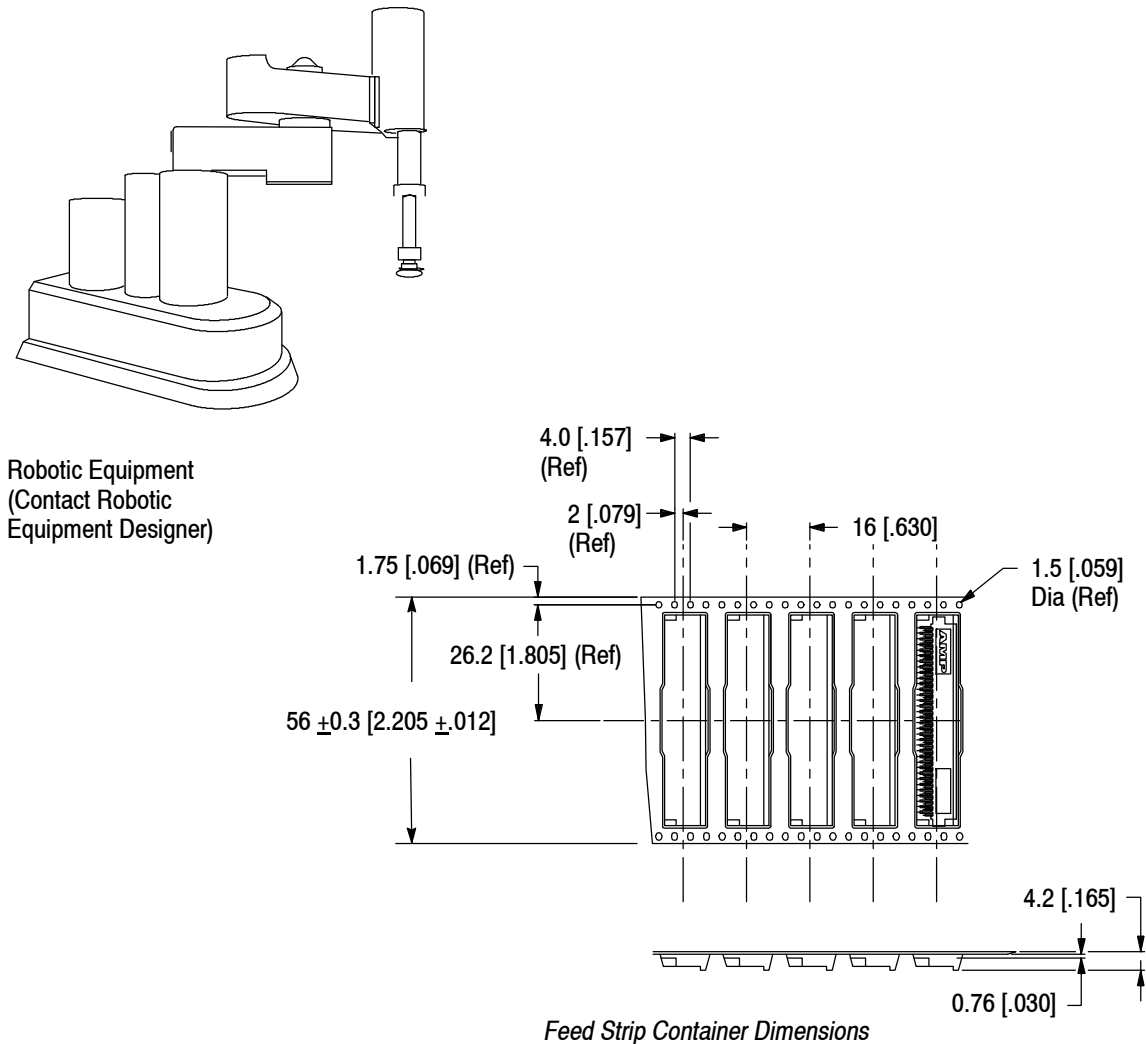
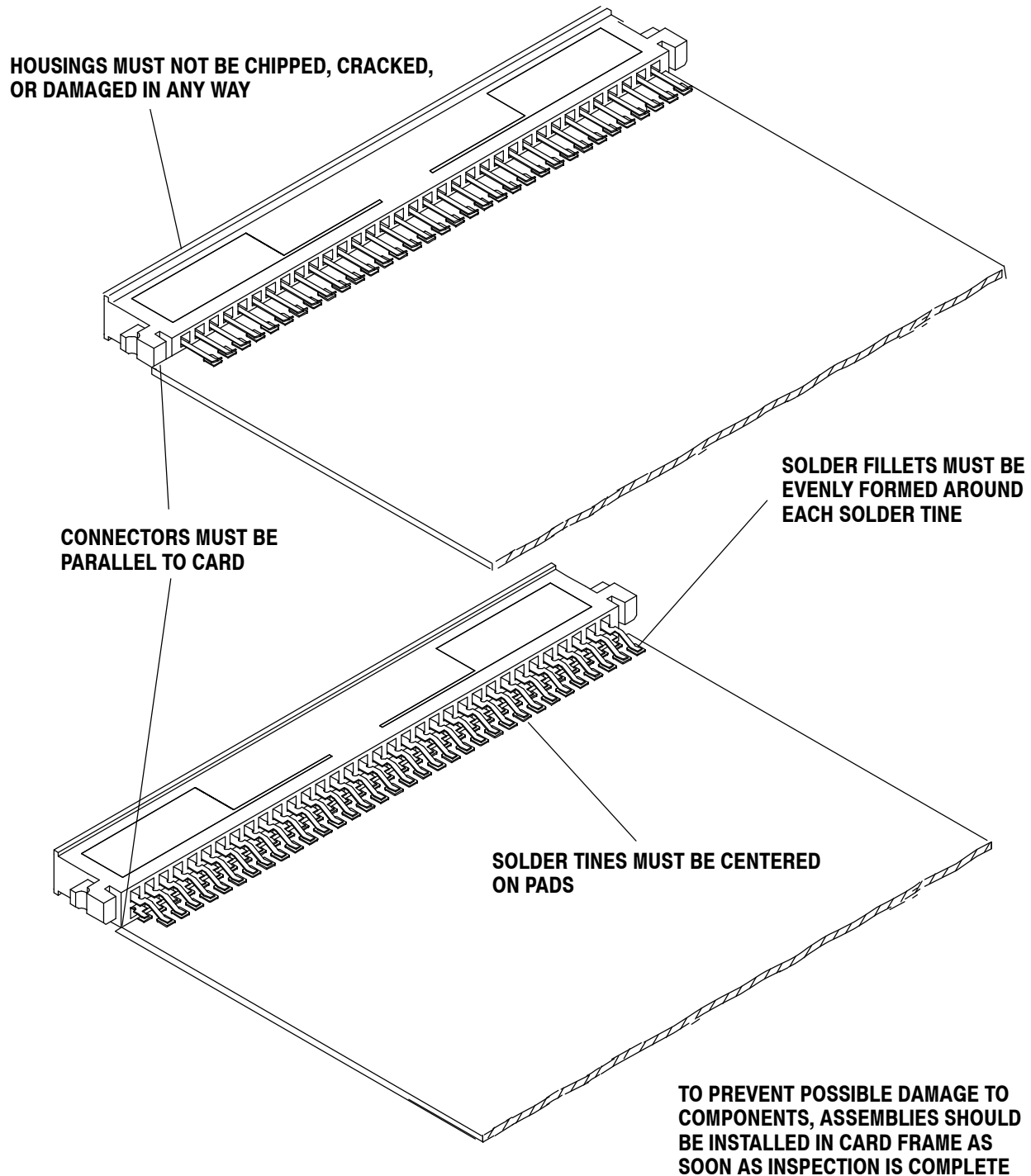


Figure 9

## 6. VISUAL AID

The following illustrations are to be used by production personnel to ensure properly applied product. The views suggest requirements for good terminations. For dimensional inspection, refer to the details in preceding pages of this specification.



**FIGURE 10. VISUAL AID**