

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 $\pm 2^\circ$. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers the requirements for application of Micro-MaTch miniature SMD pc board connectors. These connectors are available in female-on-board (FOB), female-in-board (FIB), and male-on-board (MOB) with a top-entry or bottom-entry mating face. The female connectors are used in wire-to-board and board-to-board interconnections, and the male connector is used for board-to-board interconnections. Each connector housing contains solder contacts with a 1.27 staggered pitch mating interface pattern having a row-to-row spacing of 1.5 on centerlines. The FOB and MOB connectors are available in 4 to 24 positions; the FIB connector is available in 4 to 20 positions.

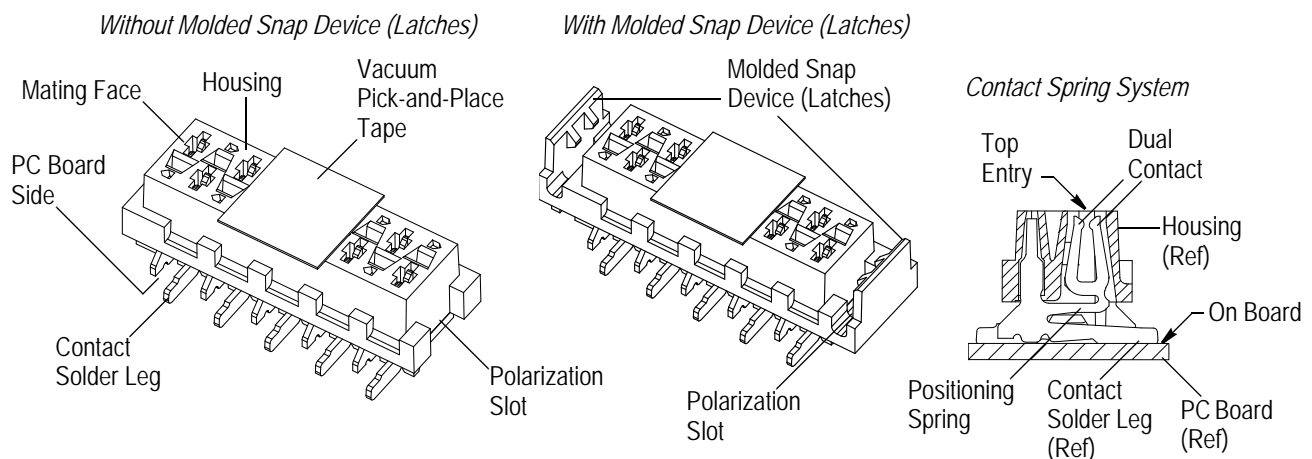
NOTE



These connectors also mate with free-hanging Micro-MaTch miniature connectors. Free-hanging interconnections are not covered in this specification.

When corresponding with 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.

Female-On-Board (FOB) Top-Entry Connectors



Female-In-Board (FIB) Bottom-Entry Connector

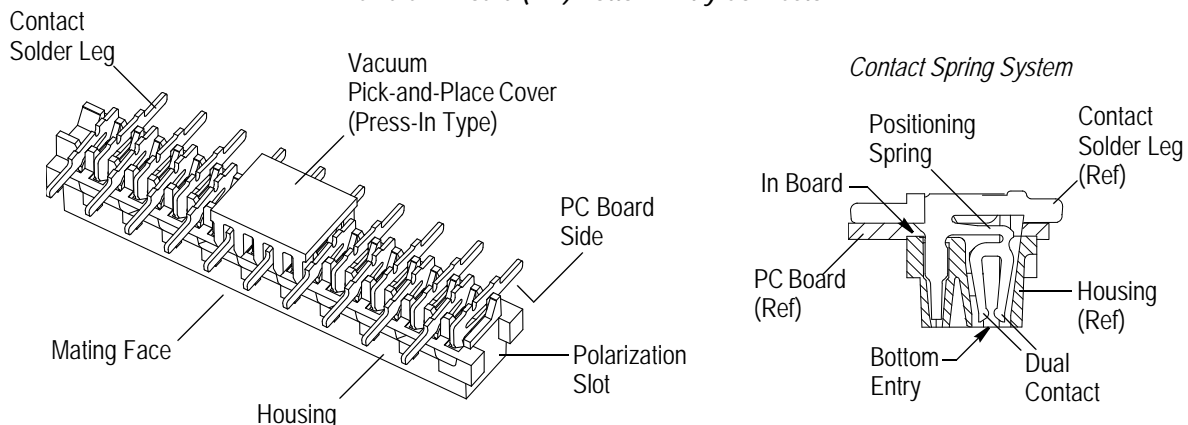


Figure 1 (Cont'd)

Male-On-Board (MOB) Connector

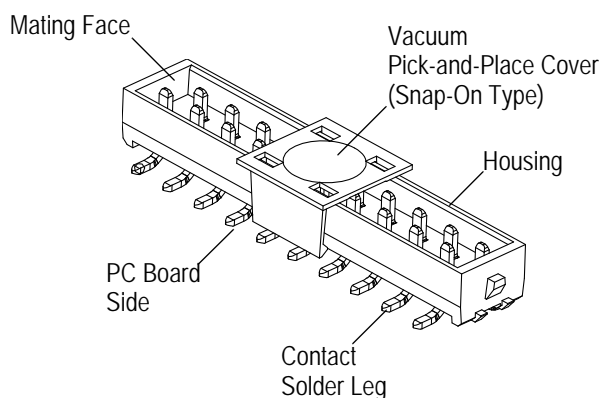


Figure 1 (End)

These connectors feature a contact spring system. Each contact in the female connector features a solder leg, dual prong at the mating face, and positioning spring that absorbs movement caused by vibrations and thermal expansion between the female and male mated pair.

Polarization for mating these connectors is accomplished by the orientation of the connectors on the pc board and the design of the housing. The female connector features a polarization slot designed to allow the connector to be mated with a free-hanging male connector in only one way. The female connectors are available with or without a molded snap device (latches). The molded snap device (latches) is designed to provide an audible "click" when mating the free-hanging male connector.

These connectors can be positioned on the pc board by using an automatic machine. The connectors are available with a vacuum pick-and-place device for automatic placement of connectors on the pc board. The device extends over the sides of the connector housing to enable removal of the device.

2. REFERENCE MATERIAL

2.1. Revision Summary

Initial release of application specification

2.2. Customer Assistance

Reference Product Base Part Numbers 188274 and 338728 and Product Codes 0283 and 0284 are representative of Micro-MaTch miniature SMD pc board 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 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, the information contained in the Customer Drawings takes priority.

2.4. Specifications

Application Specifications (114-series) provide product description and application requirements. Specifications available which pertain to this product are:

114-19016 Micro-MaTch Miniature Male-On-Wire and Paddle Board Flat Ribbon Cable Connectors

114-19051 Micro-MaTch Miniature Crimp-On Snap-In (COSI) Free-Hanging Connectors

Product Specification 108-19052 provides product performance and test information.

Workmanship Specification 101-21 provides solder fillet requirements and inspection criteria.

2.5. Instructional Material

Instruction Sheets (408-series) provide product assembly instructions or tooling setup and operation procedures and Customer Manuals (409-series) provide machine setup and operating procedures. There are no documents available that pertain to this product.

2.6. Standards and Publications

Standards and publications developed by the International Electrotechnical Commission (IEC) and Electronic Industries Alliance (EIA) provide industry test and performance requirements. Documents available which pertain to this product are:

EIA-481, "8-mm through 200-mm Embossed Carrier Taping and 8-mm and 12-mm Punched Carrier Taping of Surface Mount Components for Automatic Handling"

IEC 60326-3, "Printed Boards: Part 3: Design and Use of Printed Boards"

2.7. Sample Box

Micro-MaTch Sample Box 1377074-1 is an aid in visualizing the variety of applications. The box contains samples of all connector types, leads, pc boards, and a CD-ROM. The CD-ROM shows an animation of the contact spring system, possible interconnection combinations, and includes CAD models of the connectors in IGES file format.

3. REQUIREMENTS

3.1. Safety

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

3.2. Packaging

The connectors are packaged in boxed reels on embossed pocket carrier tape that conforms to EIA-481, "8-mm Through 200-mm Embossed Carrier Taping and 8-mm and 12-mm Punched Carrier Taping of Surface Mount Components for Automatic Handling."

3.3. Storage

A. Reel Products

Coil-wound reels must be stored horizontally and traverse-wound reels vertically.

B. Ultraviolet Light

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

C. Environment

These connectors have a moisture sensitivity level (MSL) of 3 (168 hours). A storage location temperature between 20° and 35°C [60° and 95°F] and relative humidity (RH) between 5 and 10% is recommended.

It may be required to store connectors under dry location in a high-humidity environment to prevent blistering of the housing material during the solder process as a result of too much moisture absorption.

D. Shelf Life

The connectors should remain in the shipping containers until ready for use to prevent deformation to the contacts and damage to the vacuum (pick-and-place) tape. The connectors should be used on a first in, first out basis to avoid any contamination and ensure maximum contact solderability.

E. Chemical Exposure

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

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

3.4. PC Board

A. Material and Thickness

The pc board material shall be glass epoxy (FR-4). There is no required thickness.

B. Layout

The pads on the pc board must be precisely located to ensure proper placement and optimum performance of the connectors. The pc board layout must be designed using the dimensions provided on the Customer Drawing for the specific connector. Reference samples of the recommended pc board layouts are shown in Figure 2.

For board-to-board interconnections, it is recommended to apply 1 pc board connector pair—more than 2 pc boards is not recommended—to connect 2 pc boards; otherwise, certain tolerances associated with surface mount soldering may cause mating mismatch. Flexible connectors, such as connector assemblies with flat ribbon cable, can be used without risk of mating mismatch.

*Sample Recommended PC Board Layouts
(Connector Side)*

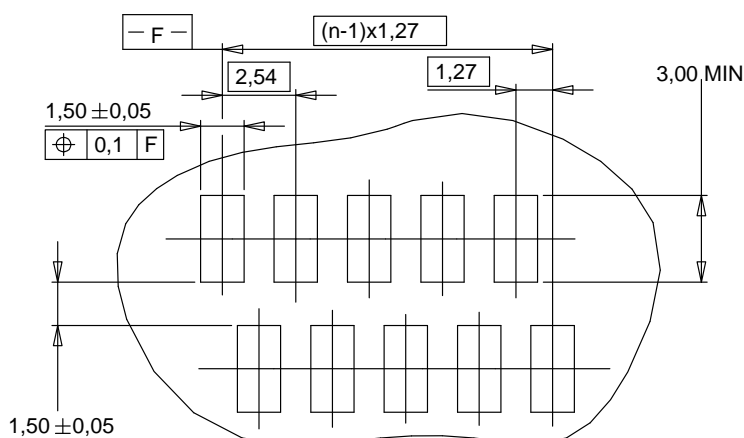


Figure 2

3.5. Connector Spacing

Care must be used to avoid interference between adjacent connectors and other components. The minimum allowable distance between connectors must be determined before seating the connectors to ensure proper mating.

3.6. Soldering

A. Process

These connectors can be soldered using a full convection reflow system or infrared reflow (IR) system and a controlled temperature/time diagram (solder profile). Convection can be applied with either air or nitrogen atmosphere. Nitrogen may prevent color degradation of the components.



If an IR system is used, it must heat the air only and must not impinge on the connector housing.

It is recommended to remove the connector from the moisture soak and store at room temperature for 15 minutes. Connectors must be on the top of the pc board when traveling through the oven. The connectors must not be upside-down. The connector can be subjected to 3 cycles of the solder profile no longer than 4 hours after removal from the temperature and humidity exposure. Each cycle must have gently slopes in the curve.

The recommended conditions for the solder profile are as follows:



Before setting the solder profile, minimum values shall be determined for suitability for all SMD components on the pc board. Maximum values stated must not be exceeded.

- Average ramp rate: 3°C [37.4°F] per second (max)
- Preheat temperature: 150°C [302°F] (min) to 200°C [392°F] (max)
- Preheat time: 60 to 180 seconds



Pre-heat time must be sufficient enough to allow a timely release of moisture from the housing material, which may reduce risk of blistering.

- Ramp to peak: 3°C [37.4°F] per second (max)
- Time over liquidus (217°C [422°F]): 60 to 150 seconds
- Peak temperature: 260+0/-5°C [500+0/-41°F]
- Time within 5°C [41°F] of peak: 20 to 40 seconds
- Ramp cool down: 6°C [42.8°F] per second (max)
- Time within 25°C [77°F] to peak: 8 minutes (max)



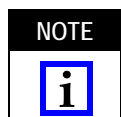
Connectors must be allowed to cool to ambient temperature between cycles.



To avoid personal injury and possible damage to the connector, the vacuum pick-and-place device must NOT be removed unless the connector is fully cooled to ambient temperature.

B. Solder Paste

When determining solder paste thickness, the following requirements must be taken in consideration:



Optimum solder paste thickness shall be determined by the customer.

- co-planarity of the contacts specified on the Customer Drawing for the specific connector
- maximum co-planarity of the pc board pads
- solder paste stencil coverage on the pc board pads
- solder absorption by the pc board traces lacking solder resistance
- tin content of the solder paste that might vary during processing
- follow-up on storage and handling specified for the solder paste

C. Drying

Generally, drying these connectors is not required; however, if moisture is, or suspected to be, present in the connector, drying must be performed *prior* to soldering. Drying can be performed either in or out of the packaging pocket carrier tape at the temperature and times given in Figure 3.

CONNECTOR LOCATION	TEMPERATURE	TIME
In Packaging Pocket Carrier Tape	40°C [104°F] Max, 5% RH	14 Days
Out of Packaging Pocket Carrier Tape	125°C [257°F]	8 Days

Figure 3



Take care not to jeopardize co-planarity during handling of loose-piece connectors.

3.7. Polarization

Polarization for mating these connectors is accomplished by the orientation of the connectors on the pc board and the design of the housing. In addition, the polarization slot of the female connector is polarized to fit with the polarization post of the free-hanging male connector to ensure positive mating. The SMD male connectors do not have a polarization post.

3.8. Connector Placement

A. Registration

When placing connectors on the pc board, the contact solder legs must be aligned with matching pads. Orientation of the connector on the pc board is customer determined, which is depend on the required orientation of the mated connectors.



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

B. Position

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. See Figure 4.

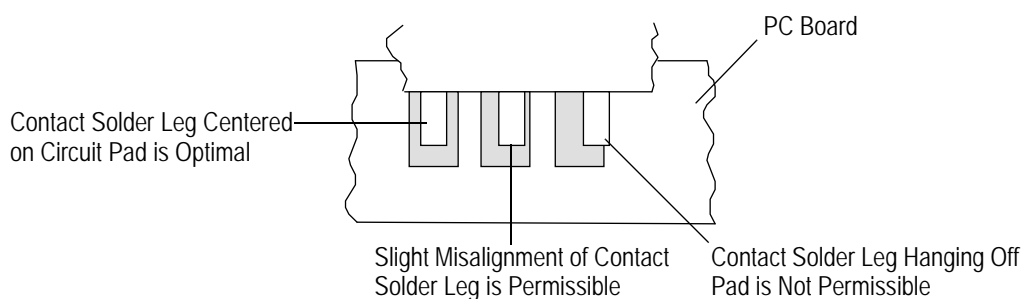


Figure 4

3.9. Checking Installed Connector

The installed connector must have solder fillets evenly formed around each contact solder leg and show no cracks in the solder joint. Proper solder fillets must show at the toe, heel, and both sides of the contact solder leg. Method of, and results of, inspection of all solder joints must comply with the criteria specified in Workmanship Specification 101-21.

The housing must not touch the pc board and each contact solder leg must be seated on the pc board as shown in Figure 5.

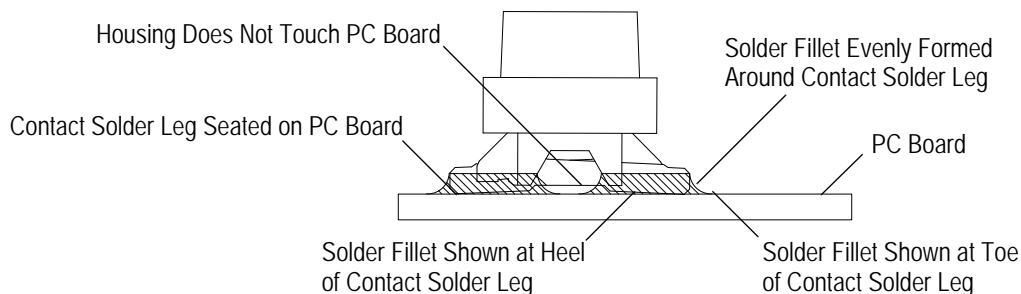


Figure 5

3.10. Mating and Unmating Connectors

A. Mating

1. The vacuum pick-and-place device of the connectors (except the FIB connector) must be removed before mating the connectors. It is not required to remove the device from the FIB connector because it is not attached to the mating face of the connector.
2. The female connector mating face and male connector mating face must be aligned, then the connectors must be pushed straight together. Refer to Figure 6.

When mating a female connector having a snap device (latches) to a free-hanging male connector, there must be an audible click, which indicates that the connectors are fully mated. The latches are not designed to lock the connectors together.

NOTE

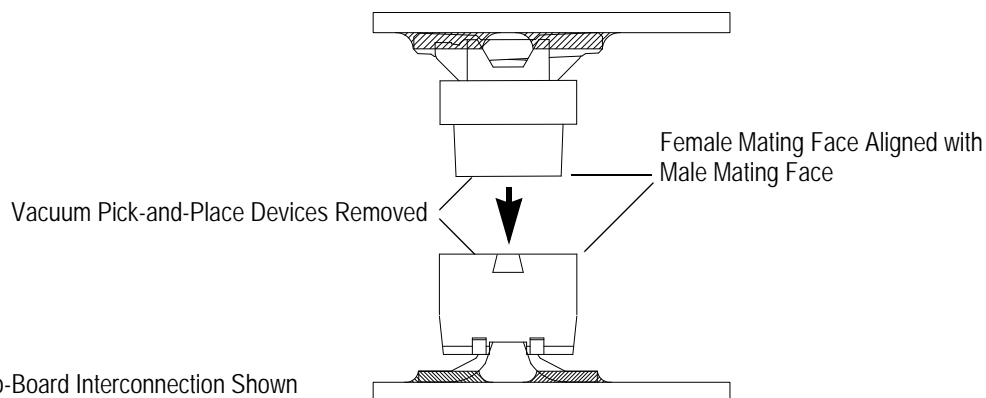


If mating with male-on-wire (MOW) ribbon cable free-hanging connector, the latches will snap onto the legs of the insulation displacement contact (IDC) cover.

If mating with crimp-on snap-in (COSI) free-hanging connector, the latches will snap over the molded bars of the COSI connector housing.

Mating Connectors

Connectors Must be Pushed Straight Together



Note: Board-to-Board Interconnection Shown

Figure 6

B. Unmating

Special care must be taken to pull mated connectors apart in a straight direction. It is recommended to grip the pc board exactly in line with the mated connectors, then pull them apart. Any deviation from a straight line will result in a rotation that may cause damage to contact solder joints or separation of the housing from the contacts. Refer to Figure 7.

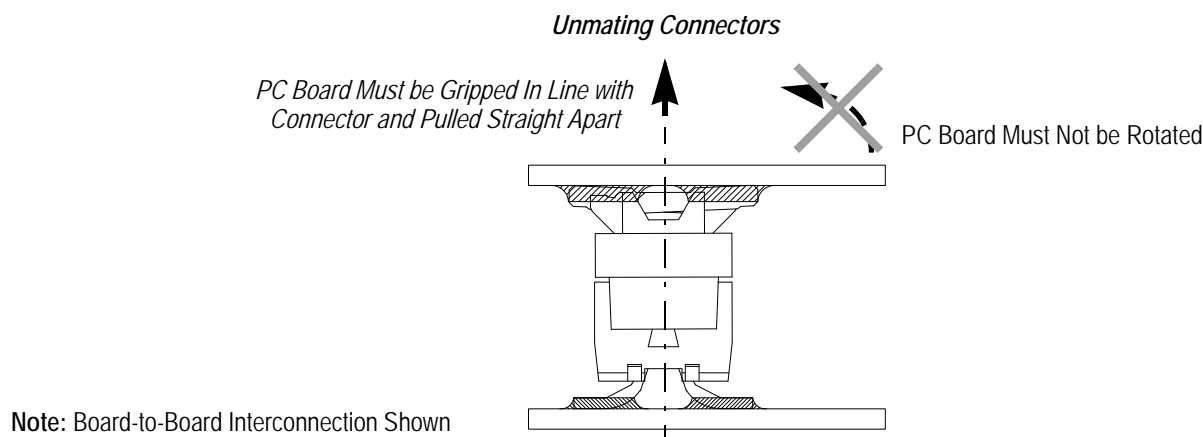


Figure 7

3.11. Connector Removal

Connectors may be removed from the pc board by standard de-soldering methods and replaced with a new connector.

3.12. Repair

Damaged or defective connectors must not be used. Individual solder contacts cannot be replaced.

4. QUALIFICATION

Micro-MaTch miniature SMD pc board connectors are Listed by Underwriters Laboratories Inc. (UL) in File E 28476.

5. TOOLING

For automatic machine placement, 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 datum surfaces detailed on the Customer Drawing for the specific connector to ensure reliable placement.

To enable automatic placement of connectors having the polarization feature in the desired orientation, the connectors are packaged in the pocket carrier tape in a fixed orientation. The orientation of the connector for off-reel direction is specified on the Customer Drawing for the specific connector. Refer to Figure 8.

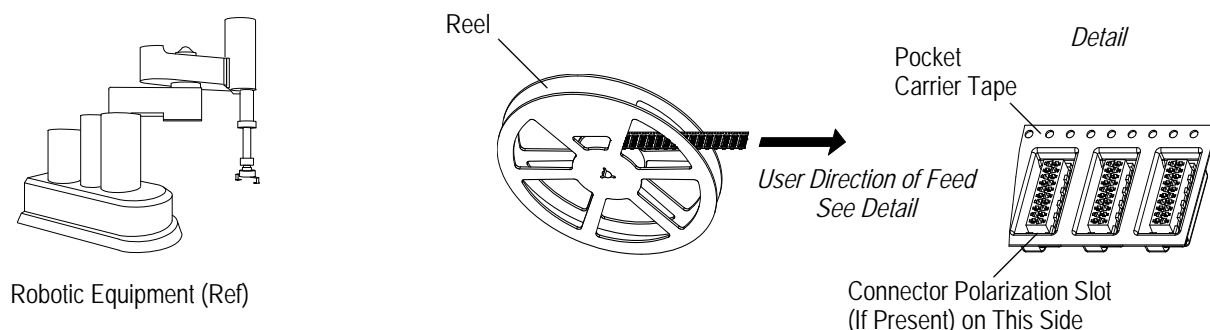


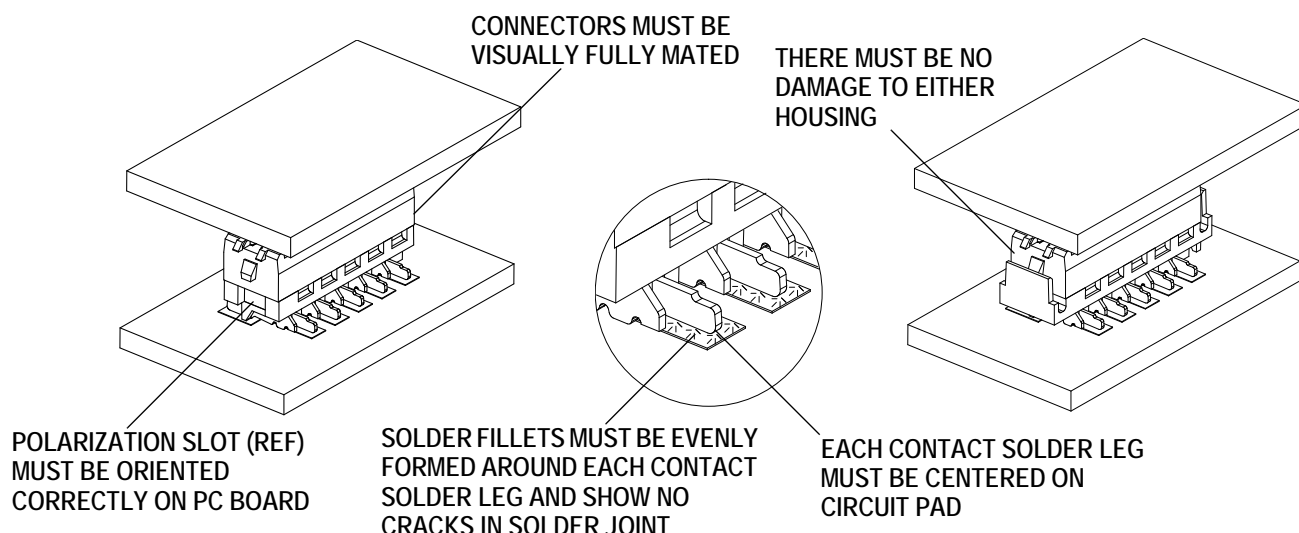
Figure 8

6. VISUAL AID

The illustration below shows a typical application of Micro-MaTch miniature SMD pc board 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.

NOTE: BOARD-TO-BOARD INTERCONNECTIONS SHOWN

FEMALE-ON-BOARD (FOB) TOP ENTRY CONNECTORS EACH MATED TO MALE-ON-BOARD (MOB) CONNECTOR



FEMALE-IN-BOARD (FIB) BOTTOM ENTRY CONNECTOR MATED TO MALE-ON-BOARD (MOB) CONNECTOR

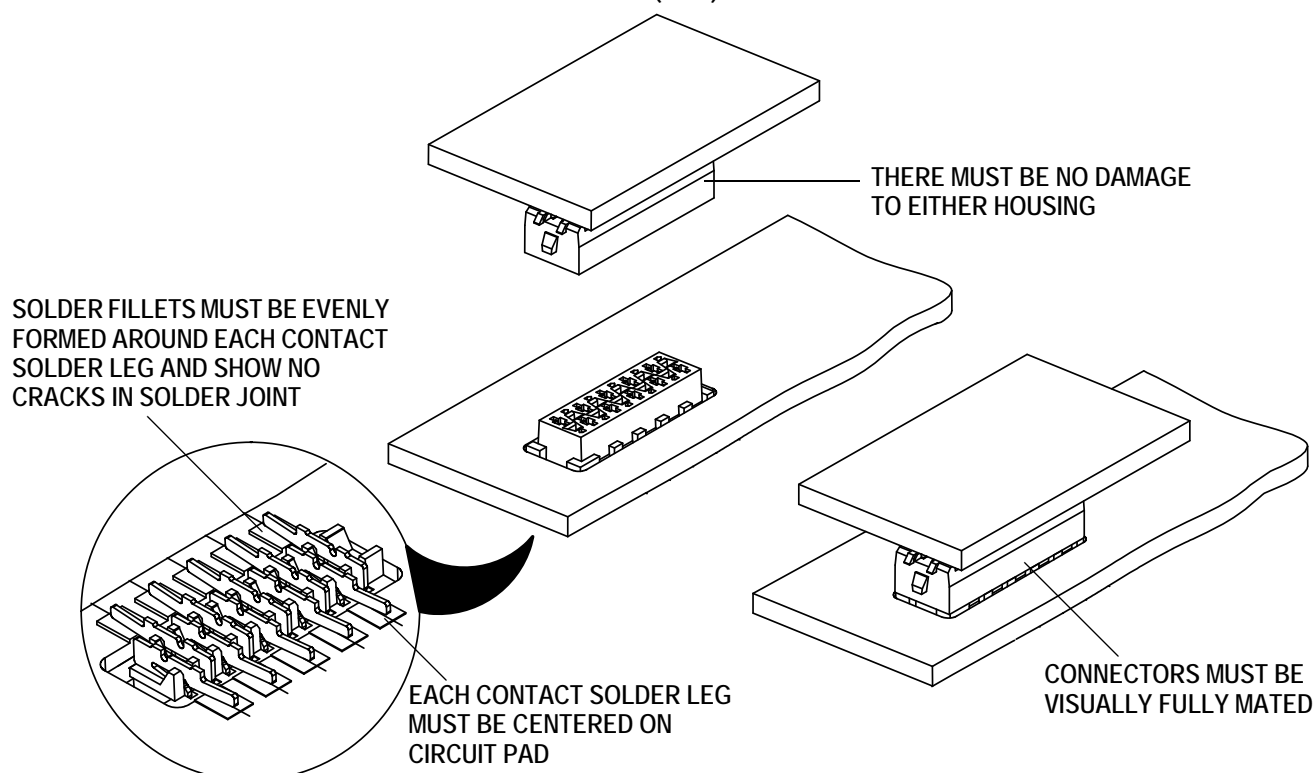


FIGURE 9. VISUAL AID