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 mm and angles have a tolerance of ±2°. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers the requirements for application of STRADA MZConn3 pc board connectors used to provide a 3-piece modular high-speed differential, single-ended power connection between stacked parallel pc boards. The connectors consist of a mating receptacle assembly, interposer assembly, and mounting receptacle assembly. The connectors are available with 100, 180, 200, and 300 positions (size) with stack height range of 15 through 40.

When corresponding with TE Connectivity (TE) 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.

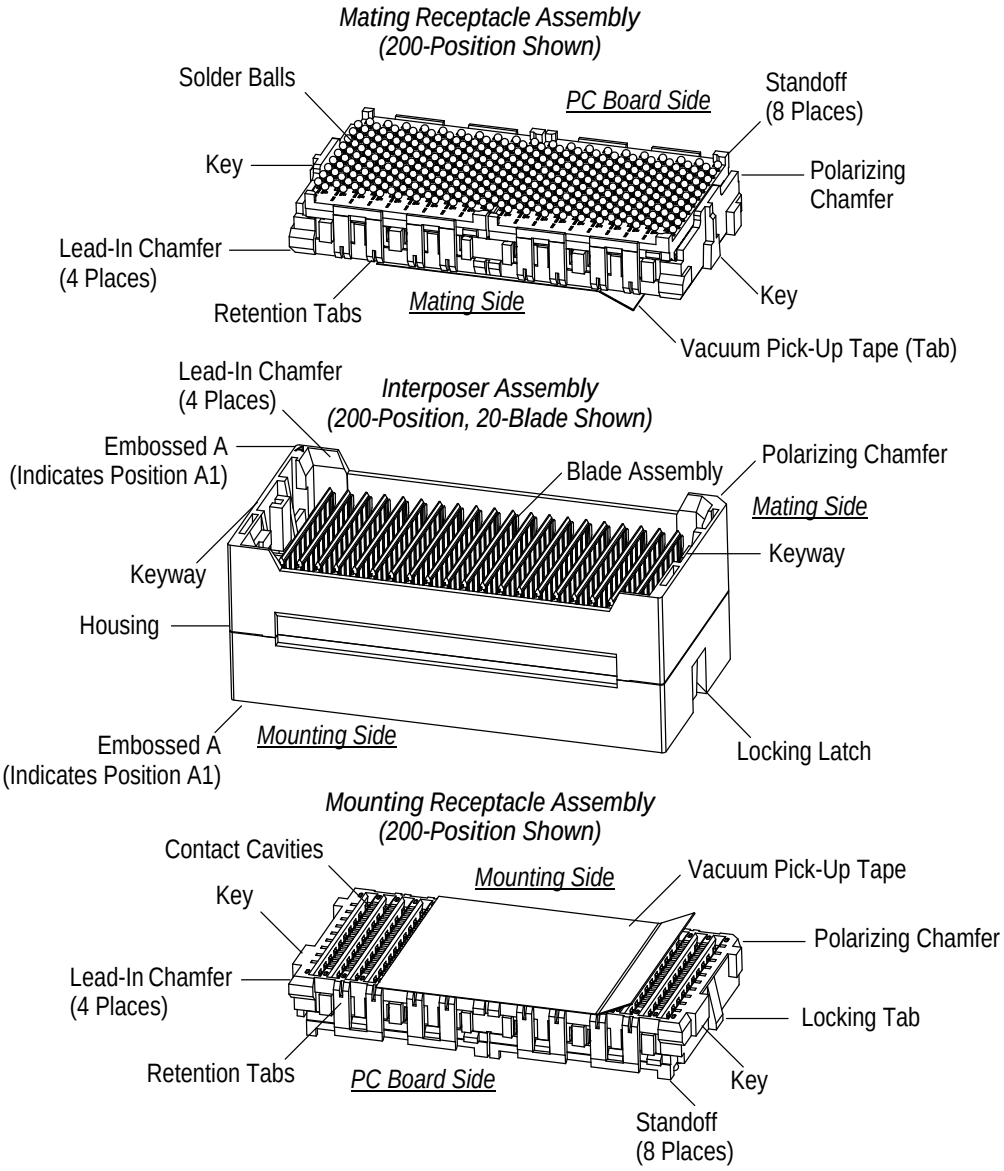


Figure 1

The receptacle assemblies are placed onto respective pc boards using solder balls having a staggered ball grid array (BGA) with 1.51.75 pitch. The receptacle assembly is designed with close-edge coupling to dedicated ground contacts on each side of the signal contacts to provide impedance matching between contact pairs. Each receptacle assembly has a vacuum pick-up tape used for placement by automated equipment with vacuum pick-up. The receptacle assemblies are packaged in anti-static hard trays designed for automatic machine placement. The receptacle assemblies feature stand-offs to facilitate pc board cleaning after the soldering operation.

The interposer assembly features blade assemblies that each contain 10 signal contacts with 90% of those having integrated ground contacts. The stack height between pc boards is achieved by mating the interposer assembly between the receptacle assemblies. The height of the interposer assembly is selected to achieve the needed height between the pc boards.

One corner of the interposer assembly and of each receptacle assembly is chamfered to ensure correct orientation for mating. Further assurance of proper mating is provided by keying (keys and keyways).

The lead-in chamfers (4 places on each connector) guide the connectors together; and the retention tabs around the outside perimeter of each receptacle assembly catch onto the chamfer edge around the inside of the interposer assembly. A locking feature ensures that the interposer assembly is fully mating with the mounting receptacle assembly. The mating side and mounting side of the interposer assembly has an embossed “A” at the corner opposite the polarizing chamfer to indicate Position A1.

Commercially-available spacers must be mounted to the pc board to provide load support and intermate retention for the connectors.

1.1. Solder Ball Composition

The receptacle assemblies are available with eutectic tin-lead or lead-free solder balls.

SOLDER BALL	ALLOY TYPE - Tin (Sn) Silver (Ag) Lead (Pb)
Lead-Free	96.5 Sn/3 Ag/37 Pb
Eutectic Tin-Lead	63 Sn/37 Pb

1.2. Specifics

CONNECTOR SPECIFIC		CONNECTOR SIZE			
		100	180	200	300
Length:	Interposer Assembly	24.0	41.50	41.50	59.0
Number of Standoffs:	Receptacle Assembly	4	8	8	12
Quantity of Signal Contacts		100	180	200	300
Quantity of Ground Contacts		90	162	180	270
Width:	Interposer Assembly	21			
Height:	Interposer Assembly	15, 17, 20, 25, 26, 28, 30, 32, 35, 38, 40			
	Receptacle Assembly	6			

Figure 2

1.3. Electrical Performance

TEST	1:1 DIFFERENTIAL PAIR	1:1 SINGLE-ENDED CONNECTION
Impedance at 100 ps (10% to 90%)	100 Ohms	50 Ohms
Bandwidth (3 dB)	5+ GHz	5 GHz
Multi-Active NEXT at 100 ps (10% to 90%)	< 3%	< 3%

Figure 3

2. REFERENCE MATERIAL

2.1. Revision Summary

- New logo

2.2. Customer Assistance

Reference Product Base Part Number 2057663 and Product Code L624 are representative of STRADA MZConn3 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 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 PRODUCT INFORMATION at the number at the bottom of page 1.

2.4. Manuals

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

Design Objective 108-2396 provides expected product performance and test information.

2.6. Instructional Material

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

2.7. Standards and Publications

Standards and publications developed by the Electronic Industries Alliance (EIA) and Institute for Interconnecting and Packaging Electronic Circuits (IPC) provide industry test and performance requirements. Documents available which pertain to this product are:

EIA-364-1000, “TS-1000 Environmental Test Methodology for Assessing the Performance of Electrical Connectors and Sockets Used in Controlled Environment Applications”

IPC-9701, “Performance Test Methods and Qualification Requirements for Surface Mount Solder Attachments”

3. REQUIREMENTS

3.1. Safety

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

3.2. Limitations

These connectors are designed to operate in a temperature range of 40° to 105°C [-40° to 221°F].

3.3. Storage

A. Ultraviolet Light

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

B. Shelf Life

The connectors should remain in the shipping containers until ready for use to prevent deformation. The connectors 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 connectors near any chemical listed below as they may cause stress corrosion cracking in the connector.

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 or G-10). There is no required thickness for the pc board.

B. Tolerance

Maximum allowable bow of the pc board shall be 0.03 over the length of the connector.

C. Solder Pads

The pc board solder pads must be solderable in accordance with EIA 364-52. When designing pc boards for multiple connector applications, the solder pad patterns shall be within 0.10 diameter true position relative to each other. Each pad must be designed with the dimensions given in Figure 4.

Note: Not to Scale

Circuit Pad Requirements

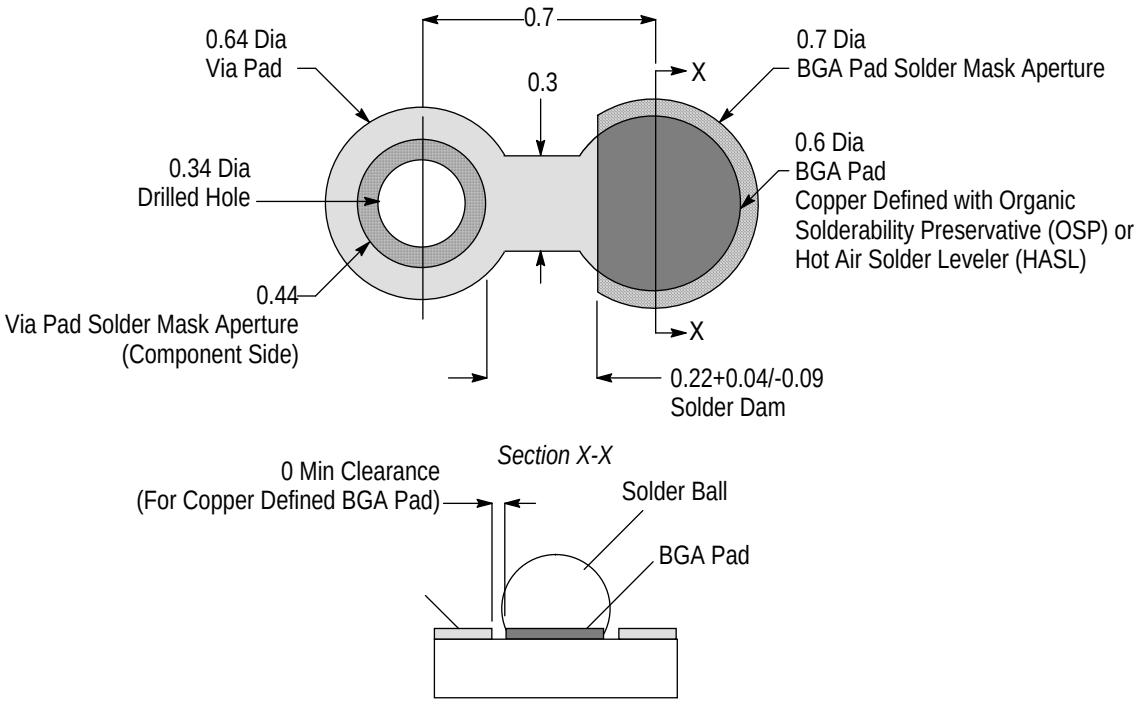


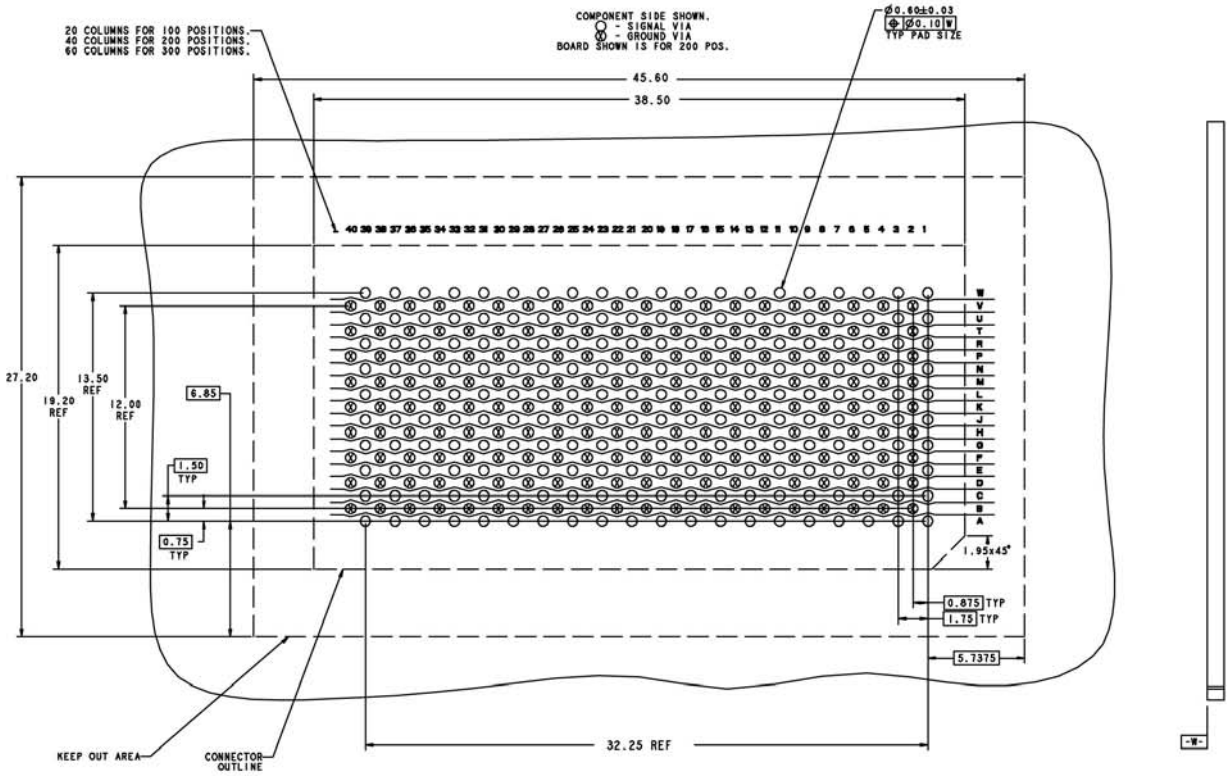
Figure 4

D. Layout

All holes in the pc board must be precisely located to ensure proper placement and optimum performance. The pc board layout must be designed using the dimensions provided on the customer drawing for the connector. Reference sample of recommended pc board layouts are shown in Figure 5.

Sample Recommended PC Board Layout

Mating Receptacle Assembly



Mounting Receptacle Assembly

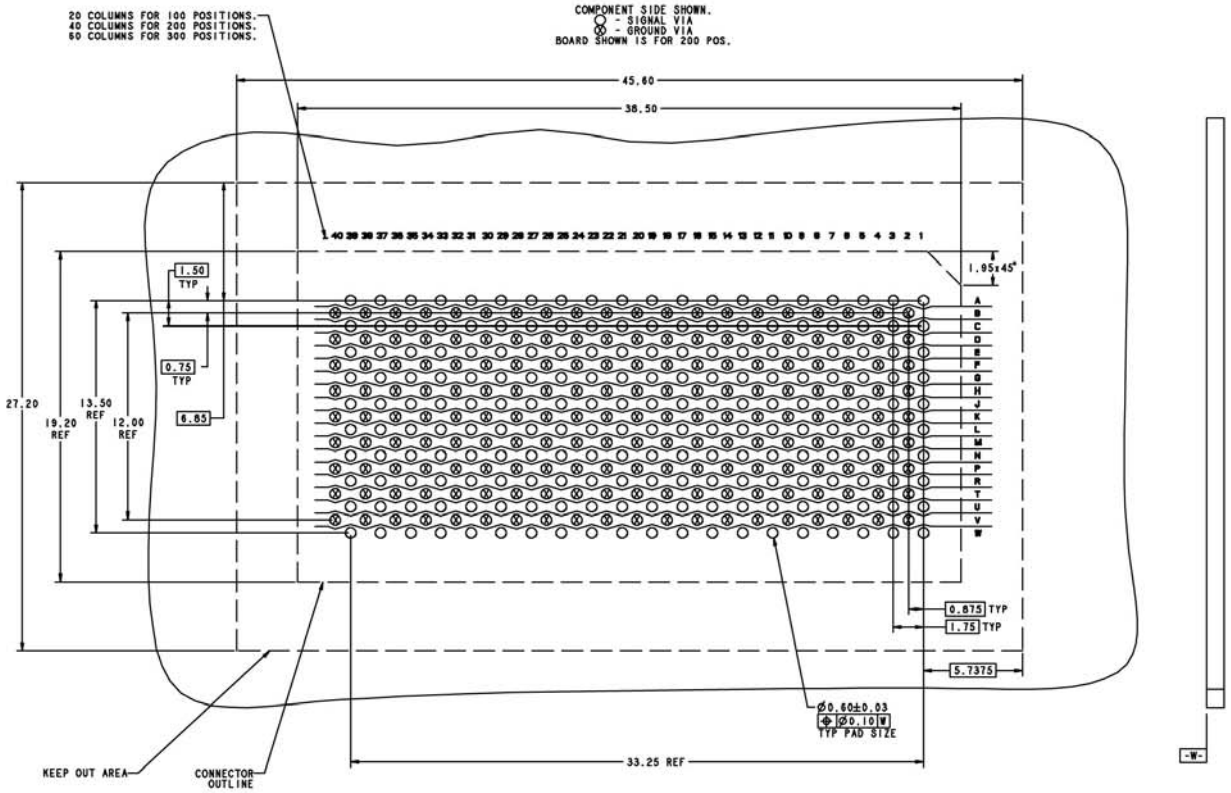


Figure 5

E. Footprint Layout

These receptacle assemblies are compatible with industry standard footprints. The recommended footprint layout is shown in Figure 6.

Recommended Footprint Layout

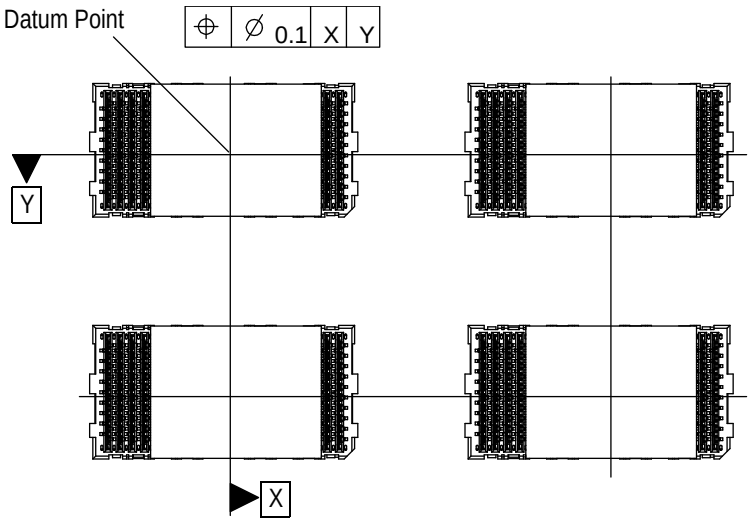


Figure 6

F. Spacer Holes

The pc board hole for each spacer must be drilled using the diameter of the hole given in Figure 7. The distance from the center of the hole to the edge of the connector outline is also given (this is not shown on the pc board layout).

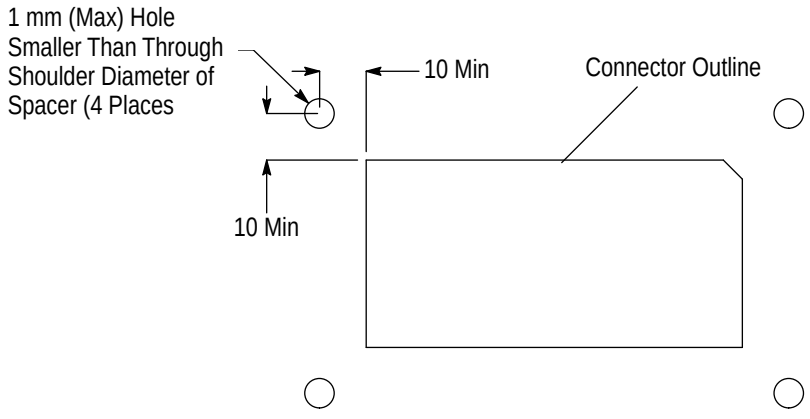


Figure 7

3.5. Receptacle Assembly Spacing and Orientation

A uniform distance must be maintained between connectors on each pc board. Connector-to-connector spacing must be maintained in order to reduce axial load stresses on the receptacle assemblies and solder joints. The receptacle assemblies must be seated on the pc board in the same orientation within the spacing given in Figure 8.

A keep-out area around the connector perimeter of 3 is generally recommended for clearance of equipment used for possible rework; however, the equipment manufacturer recommended clearance specifications must be used.

Spacing and Orientation

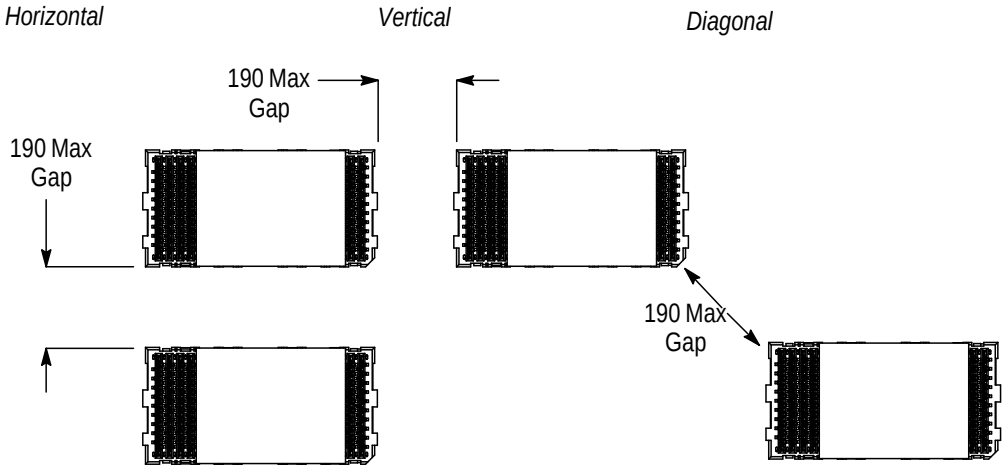


Figure 8

3.6. Pitch

A. Parallel With Offset Less Than Length of Interposer Assembly

The minimum pitch for connectors positioned parallel with an offset less than half of the length of the interposer assembly is given in Figure 9.

Connectors Positioned Parallel with Offset Less Than Half of Length of Interposer Assembly

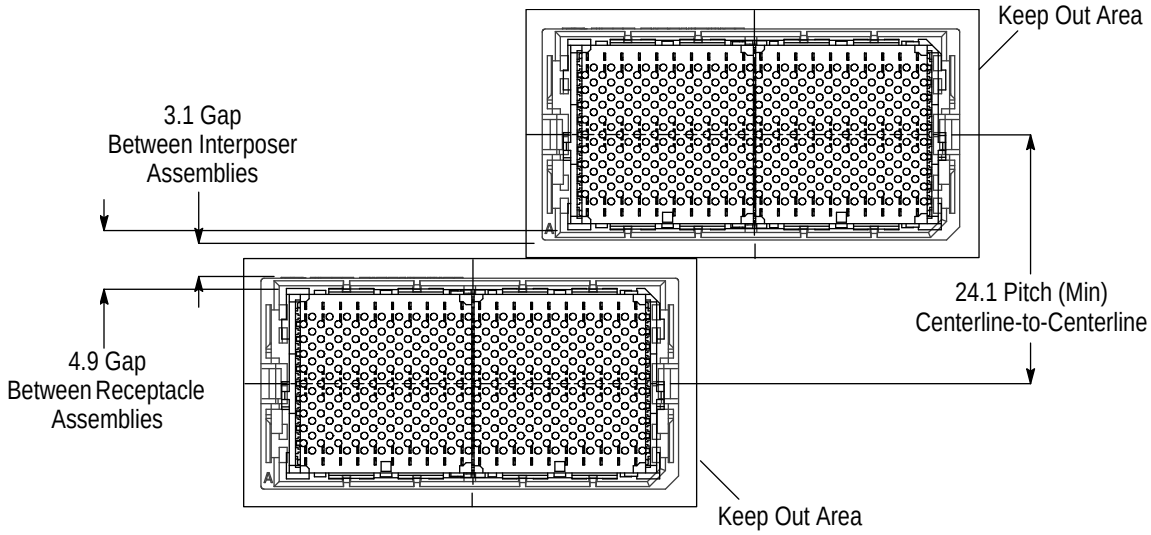


Figure 9

B. Parallel With Offset Greater Than Length of Interposer Assembly

The minimum pitch for connectors positioned parallel with an offset greater than half of the length of the interposer assembly is given in Figure 10.

Connectors Positioned Parallel with Offset Greater Than Half of Length of Interposer Assembly

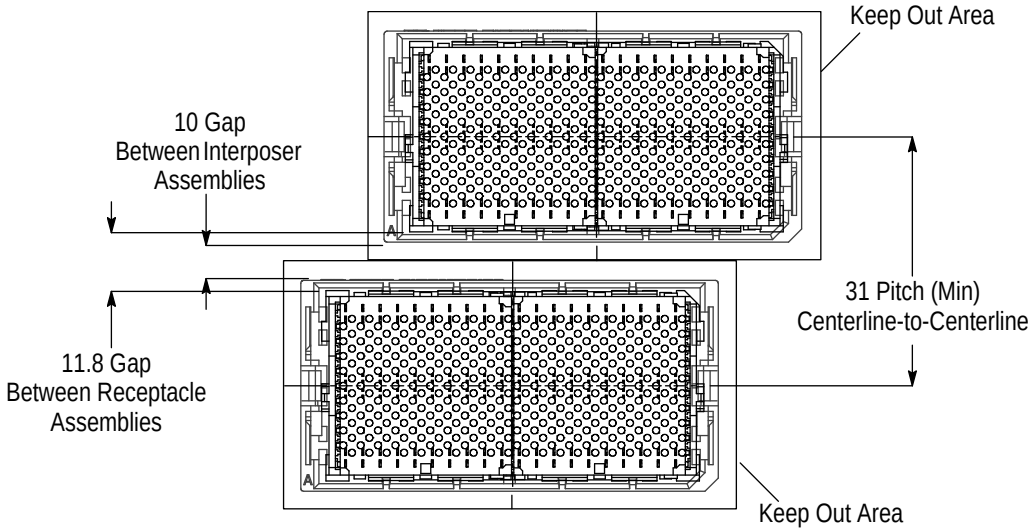
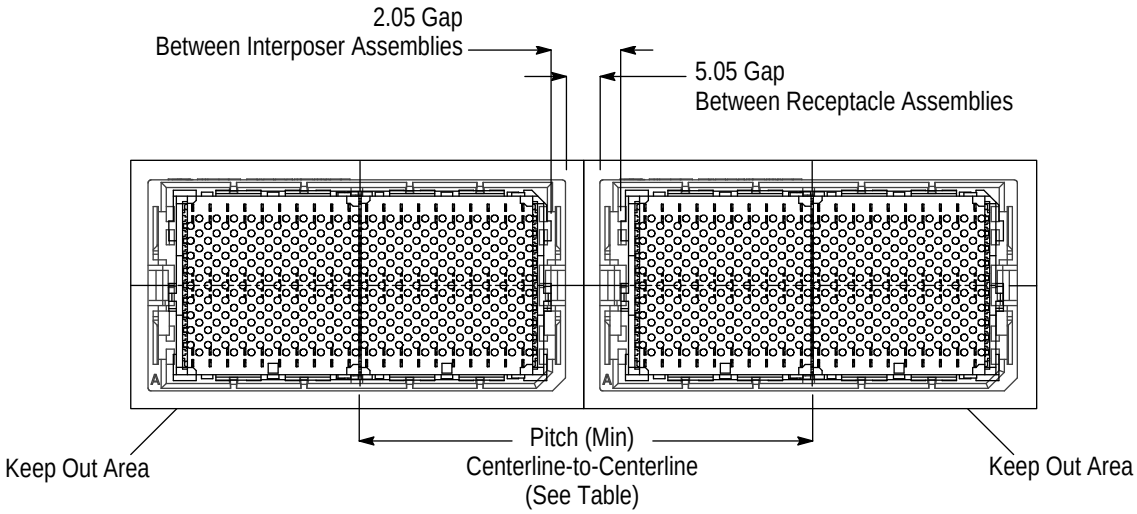


Figure 10

C. Tandem

The minimum pitch for connectors positioned in tandem is given in Figure 11.

Connectors Positioned in Tandem



CONNECTOR COMBINATION	MINIMUM PITCH
100 + 100	26.05
200 + 200	43.55
300 + 300	61.05
100 + 200	34.80
100 + 300	43.55
200 + 300	52.30

Figure 11

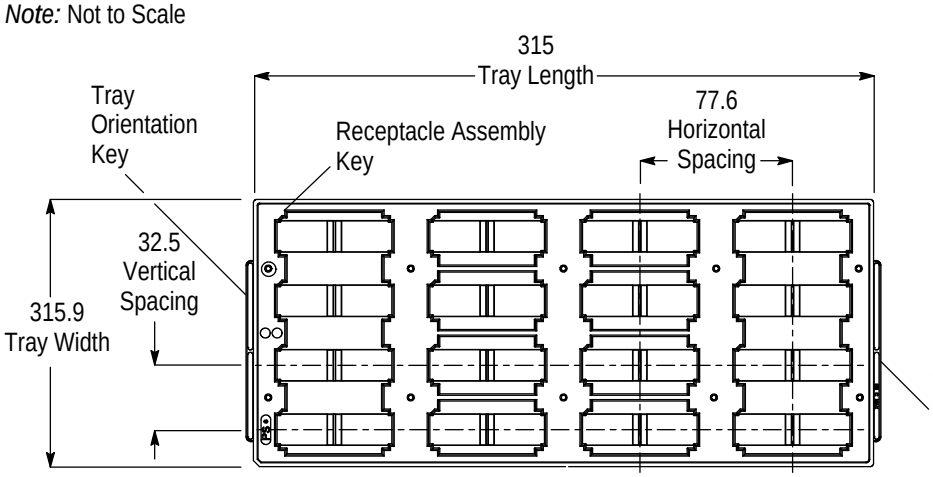
3.7. Receptacle Assembly Placement

A. Using Automatic Machine

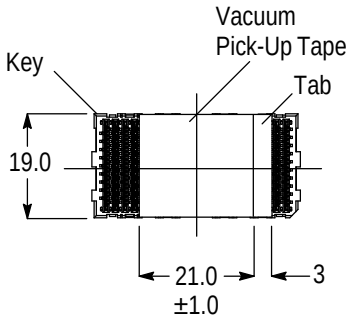
The hard tray features orientation keys to ensure tray and receptacle assembly orientation. Orientation, spacing, size, and weight of reference sample hard tray are given in Figure 12.

Sample Hard Tray
(300-Position Receptacle Assemblies Shown)

Note: Not to Scale



Receptacle Assembly in Hard Tray



CONNECTOR POSITION	TRAY WEIGHT (Grams)•
100	2.5
180	4.7
200	4.7
300	6.9

•Connectors with Eutectic Tin-Lead or Lead-Free Solder Balls

Figure 12

B. Misalignment

When placing receptacle assemblies onto the pc board, side-to-side and up-and-down misalignment is allowed to the tolerances given in Figure 13.

Misalignment

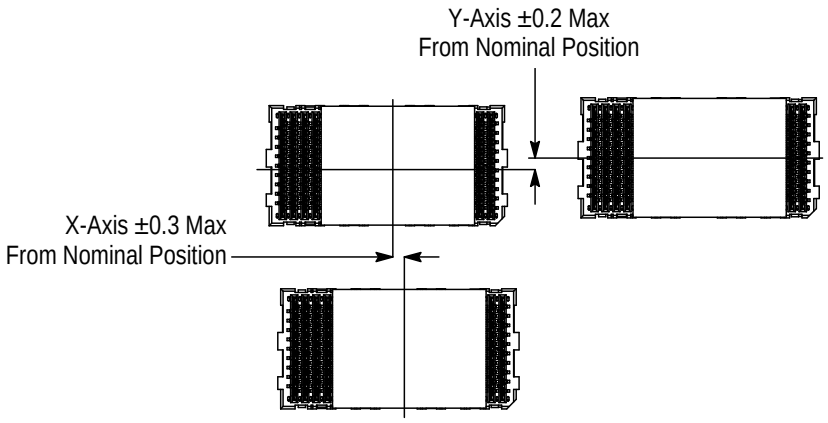


Figure 13

C. Registration

The receptacle assembly number one position must be aligned with the number one position pc board solder pad. The solder balls must be aligned with the matching solder pads before soldering the receptacle assembly onto the pc board.

The receptacle assembly must be handled only by the outer perimeter of the housing to avoid deformation, contamination, or damage to the solder balls.

D. Seating

The receptacle assembly must be placed on the pc board so that the solder balls are on top of the solder pads.

3.8. Soldering

A. Process

The receptacle assemblies must be soldered to the pc board using reflow solder process.

The interposer assembly must not be exposed to the solder process.

B. Solder Profile

Refer to the specifications provided by the supplier of the solder paste that is chosen to use with these connectors.

C. 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.

Common organic cleaning solvents that will not affect these connectors are:

— -isopropyl alcohol (IPA)

— hydrochlorofluorocarbon (HCFC)

Aqueous type cleaning agents must be chosen based on the effect it will have on metals and plastics. Care should be taken not to leave any moisture on the connectors.

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

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.

D. Drying

When drying cleaned receptacle assemblies and pc boards, temperature limitations must be within -55° and 105°C [-68° and 221°F]. Excessive temperatures may cause housing degradation.

When using organic solvents or aqueous type cleaners, residual flux or cleaning agent remaining on the connectors may deteriorate electrical performance. It is critical to completely dry assemblies.

3.9. Checking Installed Receptacle Assembly

All BGA joints should be inspected by standard X-ray equipment.

3.10. Spacers

The spacers must be installed onto the pc board before the connectors are mated. One spacer must be secured at each corner of the pc board using commercially-available screws and nuts. Spacer type and size are given in Figure 14.

Spacer Type and Size

Note: Not to Scale

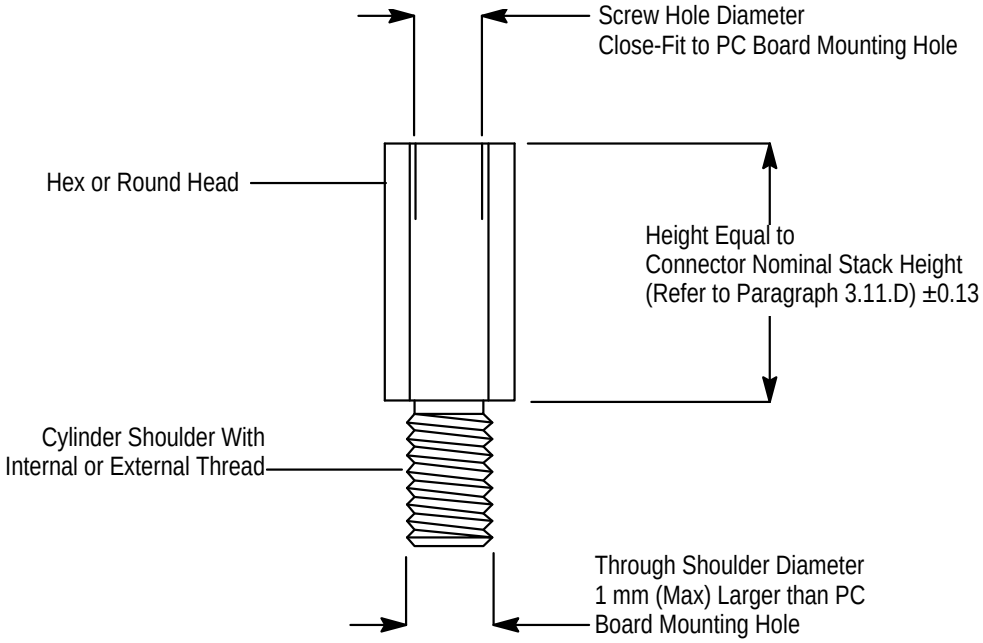


Figure 14

3.11. Mating Connectors

The vacuum pick-up tape on each receptacle assembly must be removed before mating the connectors.

A. Configuration

For multiple connector applications, all interposer assemblies must be aligned for mating to either all mating receptacle assemblies or all mounting receptacle assemblies. Refer to Figure 15.

Mating Configuration for Multiple Connector Applications

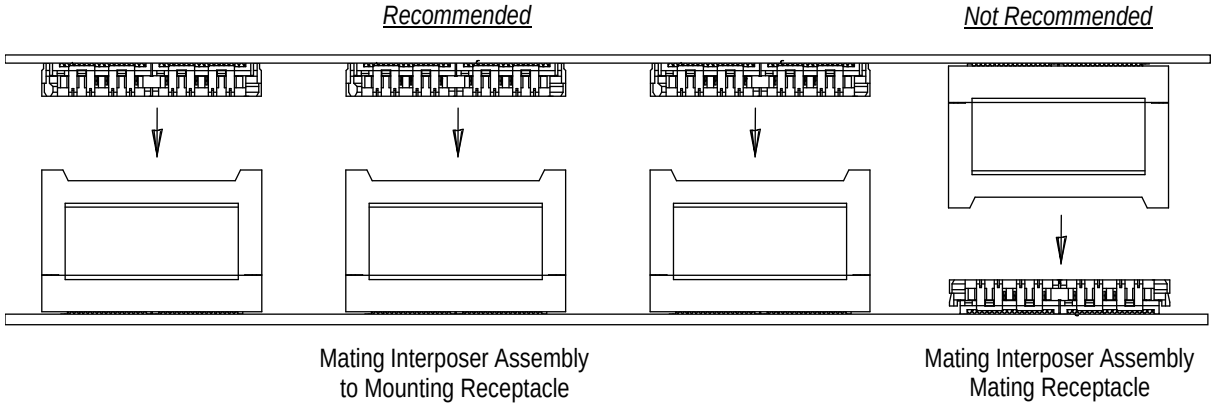


Figure 15

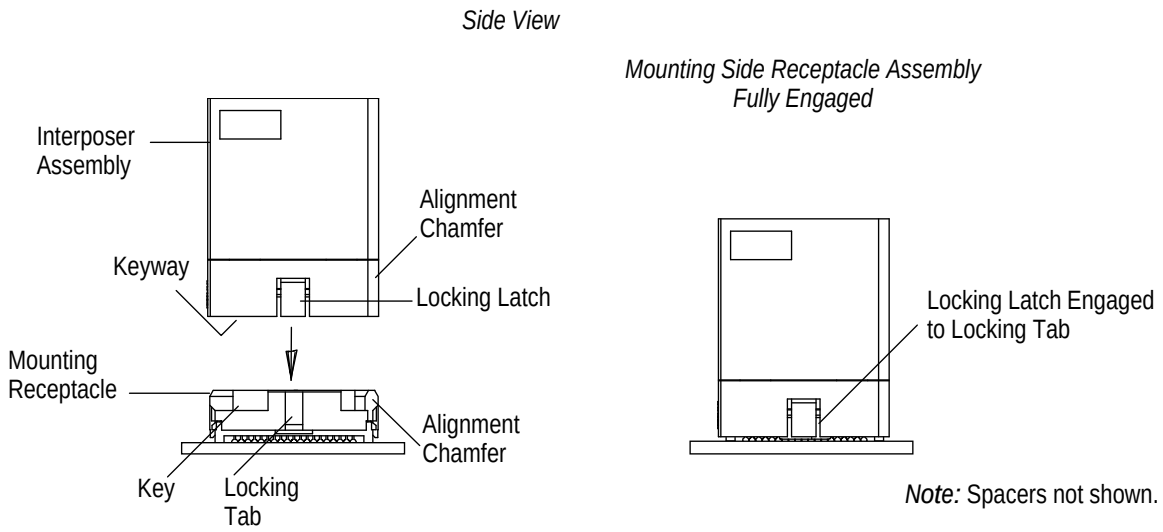
B. Polarization and Keying

The alignment chamfers must align before mating the connectors. The keys of the receptacle assemblies must be compatible with the keyways of the interposer assembly. The interposer assembly must be fully engaged with the mounting receptacle assembly before seating the mating receptacle assembly onto the interposer assembly. See Figure 16.

C. Engagement

The interpose assembly is fully engaged with the mounting receptacle assembly when the locking latch engages the locking tab (there will be an audible “click”). The mating receptacle assembly is fully engaged with the interposer assembly when the pc boards are parallel. See Figure 16.

Engaging Interposer Assembly with Mounting Receptacle Assembly



Engaging Mating Receptacle Assembly with Interposer Assembly

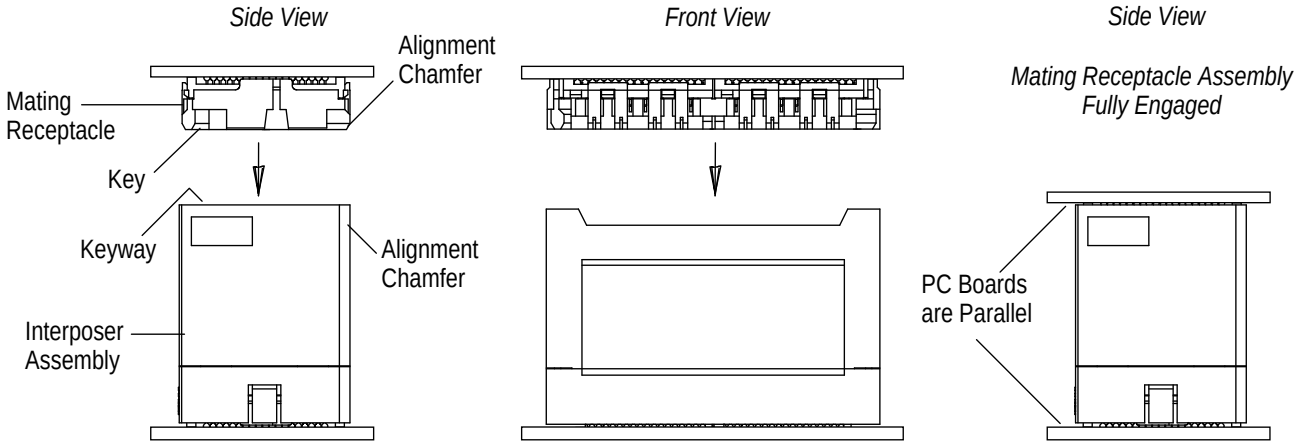


Figure 16

D. Mating Sequence

The mating sequence and wipe length is given in Figure 17.

MATING SEQUENCE				WIPE LENGTH	
CONDITION	DESCRIPTION	STACK HEIGHT		With Mounting Receptacle	With Mating Receptacle
		With Mounting Receptacle†	With Mating Receptacle‡		
Connectors Pre-Aligned	Connectors Begin to Engage	+5.65	+5.90	---	---
Connectors Fully Aligned	Connectors Fully Engage	+3.45	+3.70	---	---
Ground Contacts First Mate	Contacts Begin to Enter Contact Cavities	+2.03	+2.28	---	---
Ground Contacts Reliable Mate	Contacts Enter Contact Cavities	+1.69	+1.94	---	---
Signal Contacts First Mate	Contacts Begin to Enter Contact Cavities	+1.36	+1.61	---	---
Signal Contacts Reliable Mate	Contacts Enter Contact Cavities	+1.05	+1.30	---	---
Ground Contact Wipe	Receptacle Bottoms on Interposer	---	---	1.69	1.94
Signal Contact Wipe	Receptacle Bottoms on Interposer	---	---	1.05	1.30

†Measured from top of mounting receptacle assembly pc board to top of interposer assembly (not including interposer assembly height given in Figure 18).

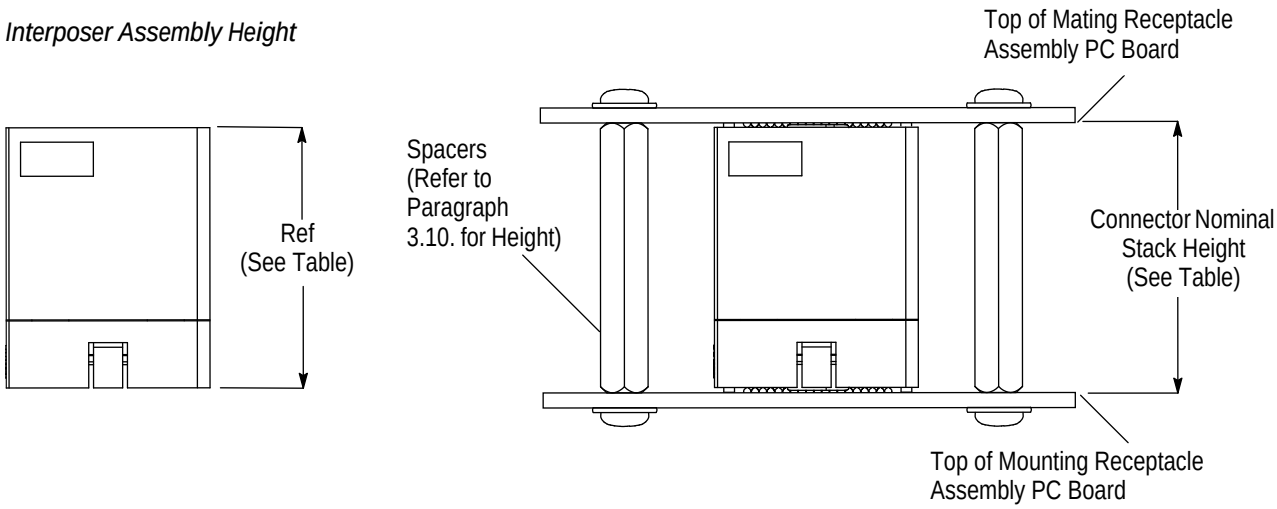
‡Measured from top of mounting receptacle assembly pc board to top of mating receptacle assembly pc board (not including connector nominal stack height given in Figure 18).

Figure 17

E. Connector Nominal Stack Height

The height of each receptacle assembly does not affect the connector stack height. The connector nominal stack height is given in Figure 18.

Fully Mated Connectors



	INTERPOSER ASSEMBLY HEIGHT										
	14.15	16.15	19.15	24.15	25.15	27.15	29.15	31.15	34.15	37.15	39.15
Connector Nominal Stack Height	15	17	20	25	26	28	30	32	35	38	40

Figure 18

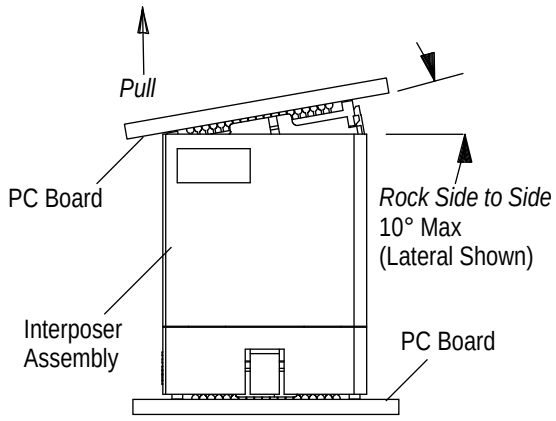
3.12. Unmating Connectors

The spacers must be removed before the connectors can be unmated.

The connectors can be unmated by pulling them straight apart or by “rocking” them from side-to-side while pulling them apart. The connectors must not be “rocked” more than 5 degrees longitudinal or 10 degrees lateral. See Figure 19.

Unmating Connectors

Receptacle Assembly from Interposer Assembly



Interposer Assembly from Receptacle Assembly

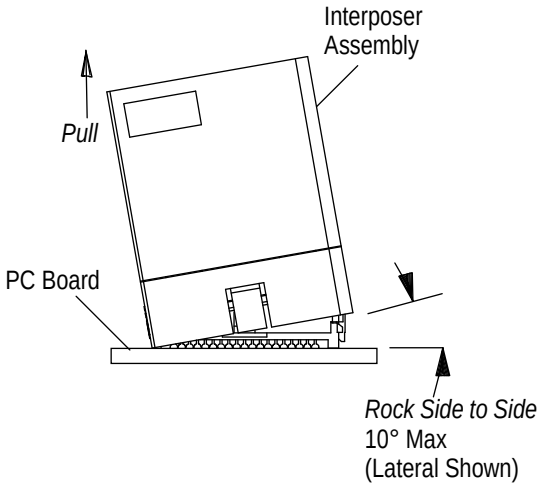


Figure 19

3.13. Removing Receptacle Assembly from PC Board

Removing the receptacle assembly from the pc board requires the following thermal processes:

— a thermocouple attached to the underside of the receptacle assembly (preferred) or next to the outer row of solder balls

— heating the receptacle assembly using the reflow nozzle by ramping the temperature from 25°C to 150°C [77°F to 302°F] with a maximum slope of 3 degrees per second using a reflow nozzel

— soaking the receptacle assembly at a temperature between 130° and 160°C [266° and 320°F] for a maximum of 2 minutes

— reflowing the solder ball grid array for 1 or 2 minutes (depending upon thermocouple placement) within a peak temperature range of 210° to 225°C [410° to 437°F] for tin-lead solder application and 230° to 240°C [446° to 464°F] for lead-free solder application (ensuring the center of the solder ball grid array reflows)

— cooling the receptacle assembly to 50°C [122°F] with a maximum ramp of 3° per second

The removed receptacle assembly must not be re-used and should be discarded after the solder has solidified.

3.14. Rework

1. The receptacle assembly must be removed from the pc board (as described in Paragraph 3.12).

2. Flux should be applied over the pc board pads and residual solder to reactivate the solder and clean the pads. After removal of the residual solder, isopropyl alcohol can be used to clean any excess flux or debris.

NOTE

A solder scavenging system that uses a hot gas non-contact nozzle to remove the solder is recommended. The nozzle should be programmed to a scavenging height of approximately 0.2 with a pre-programmed path that follows the pc board pad layout and limits excess heating to other areas of the pc board. Other hand de-soldering methods can be used; however, extra care must be taken to limit localized heating which could damage the pc board.

3. To assist in aligning the center of the new receptacle assembly with the center of the pad layout, a mark should be placed at the center of the long side of the receptacle assembly and at the center of the pad location.

4. The solder must reflow using the established auto-profile parameters.

5. The receptacle assembly must be inspected and tested.

3.15. Repair

The connectors cannot be repaired. Damaged or defective connectors MUST NOT be used.

4. QUALIFICATION

No qualifying support for STRADA MZConn3 pc board connectors was defined at the time of publication of this document.

5. TOOLING

No tooling is required for manual placement of the receptacle assemblies on the pc board; however, it is recommended using automatic machine placement. The robotic equipment must have a true position accuracy tolerance to properly locate the receptacle assemblies. This includes gripper and fixture tolerances as well as equipment repeatability. It must use the datum surfaces detailed on the customer drawing 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.

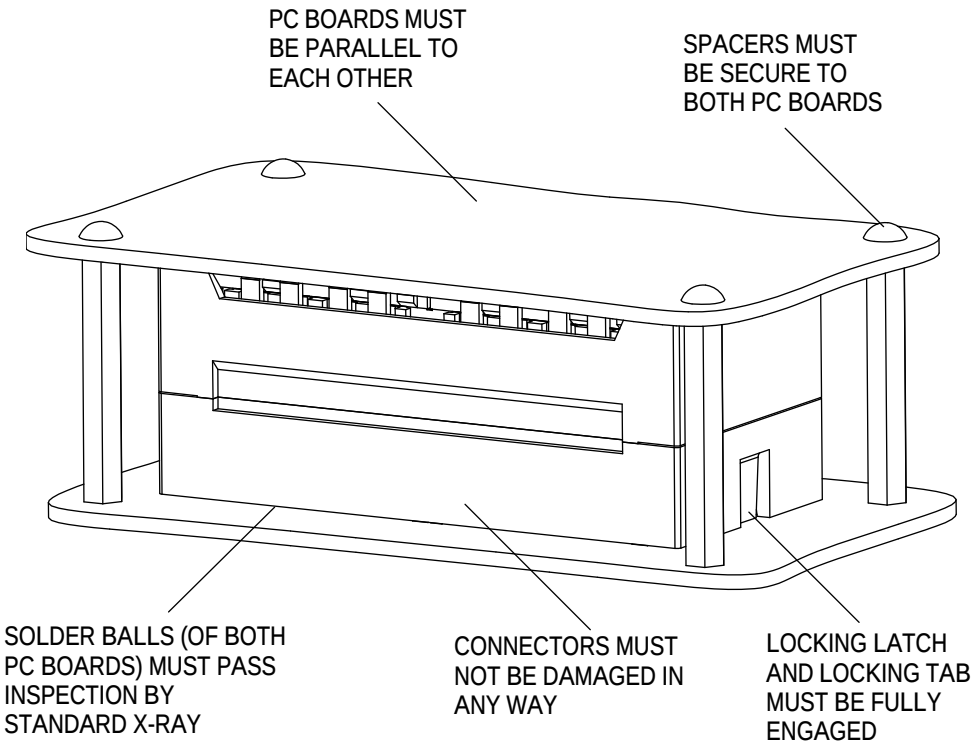


FIGURE 20. VISUAL AID