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Z-PACK* SL100 Interconnection System

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 ±0.13 [±.005] 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 requirement for application of the Z-PACK Stripline 100 (SL100) Interconnection System. These connectors significantly reduce signal crosstalk in high-speed, sub-nanosecond applications through the use of a ground plane between each column of signal contacts. The system consist of 50 ohm controlled impedance connectors with 2.54-mm [.100-in.] spacing.

The SL100 connectors are available in modular right-angle plugs, right-angle receptacles, and vertical plugs. The right-angle receptacles and vertical plugs may have modular or integral (one-piece) housings. The modular right-angle plugs and receptacles are available with solder tines and consist of 60 and 80 signal position modules pre-assembled on aluminum stiffeners for the correct size. Modular vertical plugs with solder tines or ACTION PIN* press-fit tines are shipped in 60 and 80 signal position modules which the customer joins together on the printed circuit (pc) board for the correct size.

CAUTION

On modular receptacles there is no ground plane between adjoining modules. Because of this, an integral plug cannot be mated to it or contact damage will occur. A modular plug will mate to an integral receptacle but there will be no ground connection between modules.

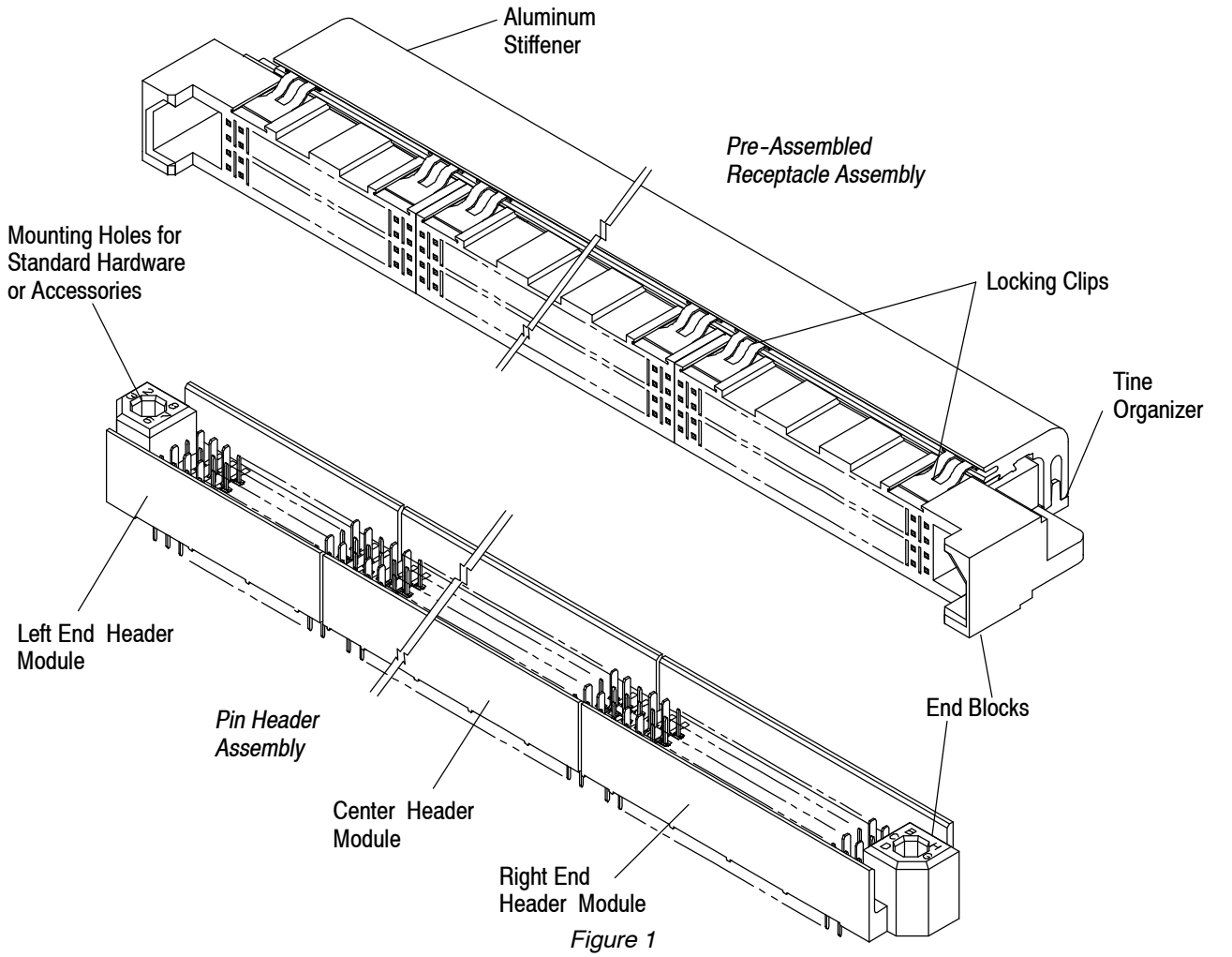


Figure 1

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When corresponding with TE Connectivity Personnel, use the terminology provided on this specification to help facilitate your inquiry for information. Basic terms and features of components are provided in 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 to current application specification requirements
- New logo

2.2. Customer Assistance

Reference Part Number 646236 and Product Code 5690 are representative numbers of Z-PACK SL100 Interconnection System. 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 specific products 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. Report

Electrical Performance Report 82353 (Strip Line 100) is available through normal literature distribution channels and provides important information on electrical modeling of Z-PACK SL100 connectors under a variety of circumstances.

2.5. Specifications

Product Specification 108-1244 is available to provide test and performance results.

2.6. Manuals

Manual 402-40 is available upon request and can be used as a guide in soldering. This manual provides information on various flux types and characteristics along with the commercial designation and flux removal procedures. A checklist is included in the manual as a guide for information on soldering problems.

2.7. Instructional Material

The following list includes available instruction sheets (408-series) that provide assembly procedures for product, operation, maintenance and repair of tooling, as well as setup and operation procedures of applicators; and customer manuals (409-series) that provide setup, operation, and maintenance of machines.

Document Number	Document Title
408-4012	Contact Replacement Tool Kit 768784-1
408-2636-1	Impact Tool 380392-8
408-9675	Seating Tools 854423-[ ] for Z-PACK Strip Line 100 Pin Headers
408-9704	Pliers Kit 854904-1
408-9709	Alignment Tools 314725-1, -2, -3 for Z-PACK Strip Line 100 Connectors
409-5567	10/20 Ton “H” Frame Power Unit Machine No. 803880-6
409-5626	SM-3 Machine No. 814700-[ ]

3. REQUIREMENTS

3.1. Storage

A. Ultraviolet Light

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

B. Shelf Life

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

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C. Chemical Exposure

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

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

NOTE

Where the above environmental conditions exist, phosphor-bronze contacts are recommended instead of brass if available.

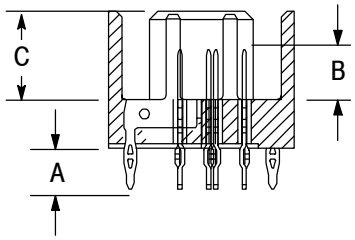
3.2. Product Materials and Selection Criteria

All Z-PACK SL100 connector housings are constructed of high-temperature liquid crystal polymer (LCP) thermoplastic, UL94V-O rated.

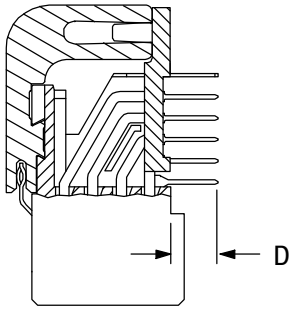
Standard receptacle, pin signal and ground contacts are phosphor bronze plated with gold or gold flash over palladium nickel at the mating interface and tin-lead on the tine. Longer tine length may have gold or gold flash over palladium nickel on the tines also. See Figure 2.

AVAILABLE CONNECTOR SIZES●

INTEGRAL CONNECTORS	MODULAR CONNECTORS
60-240 In Multiples of 20	120 - 820 in Multiples of 20



Z-PACK Stripline 100 Connectors



●***NOTE:*** Not all sizes are tooled. Contact the Product Information or the Tooling Assistance Center numbers listed at the bottom of page 1 for more information.

CONN.	TINE PLATING	PIN TINE LENGTH "A"	SIGNAL PIN POST HEIGHT "B"	POWER/GROUND BLADE HEIGHT "C"	RECEPTACLE TINE LENGTH "D"
SL100	Tin-Lead	3.7 [.145]	4.5 [.175] 6.0 [.237]	6.0 [.237]	3.12 [.123] 3.7 [.145] 4.95 [.195]
	Gold or Gold Flash over Palladium Nickel	10.8 [.425]■▲			

■Headers with tines of this length are intended for mating with cable connectors.
▲ACTION PIN contacts only.

Figure 2

3.3. PC Board Requirements

A. PC Board Thickness

Connectors are available with two types of contacts, each accommodating one pc board thickness.

1. Headers with ACTION PIN contacts require a minimum pc board thickness of 1.5 [.059].

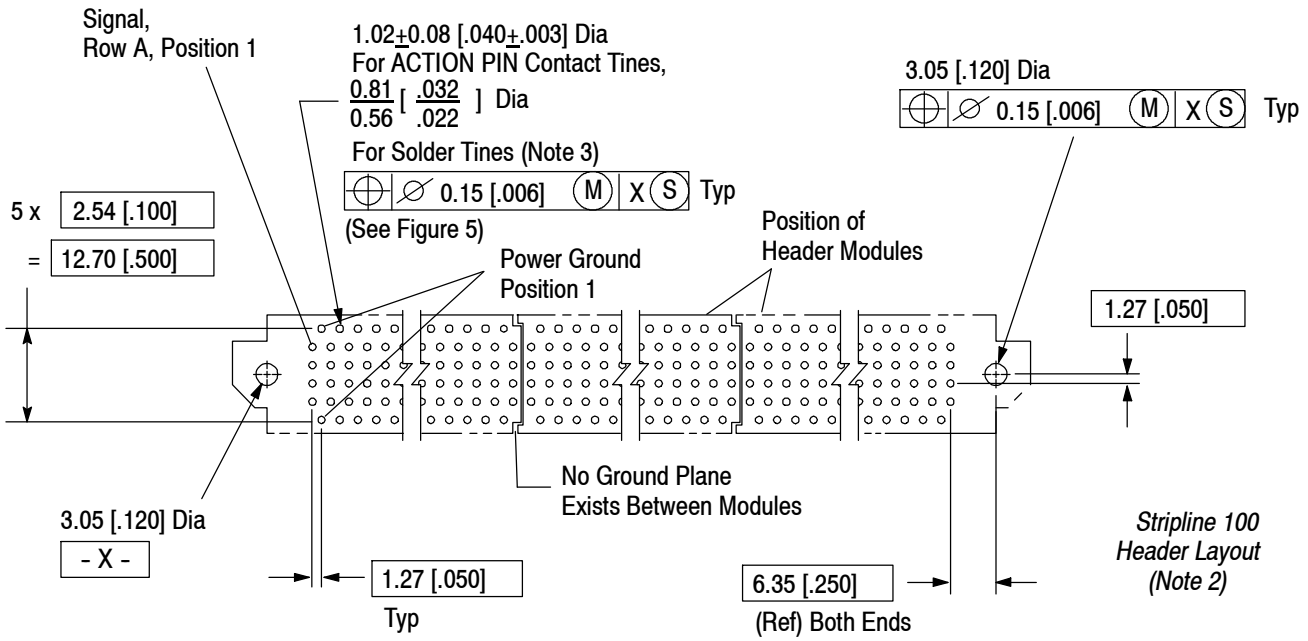
2. Headers with solder tines, and all receptacles, typically are used in pc boards with a thickness allowing a minimum of 1.0 [.040] tine protruding through the pc board bottom.

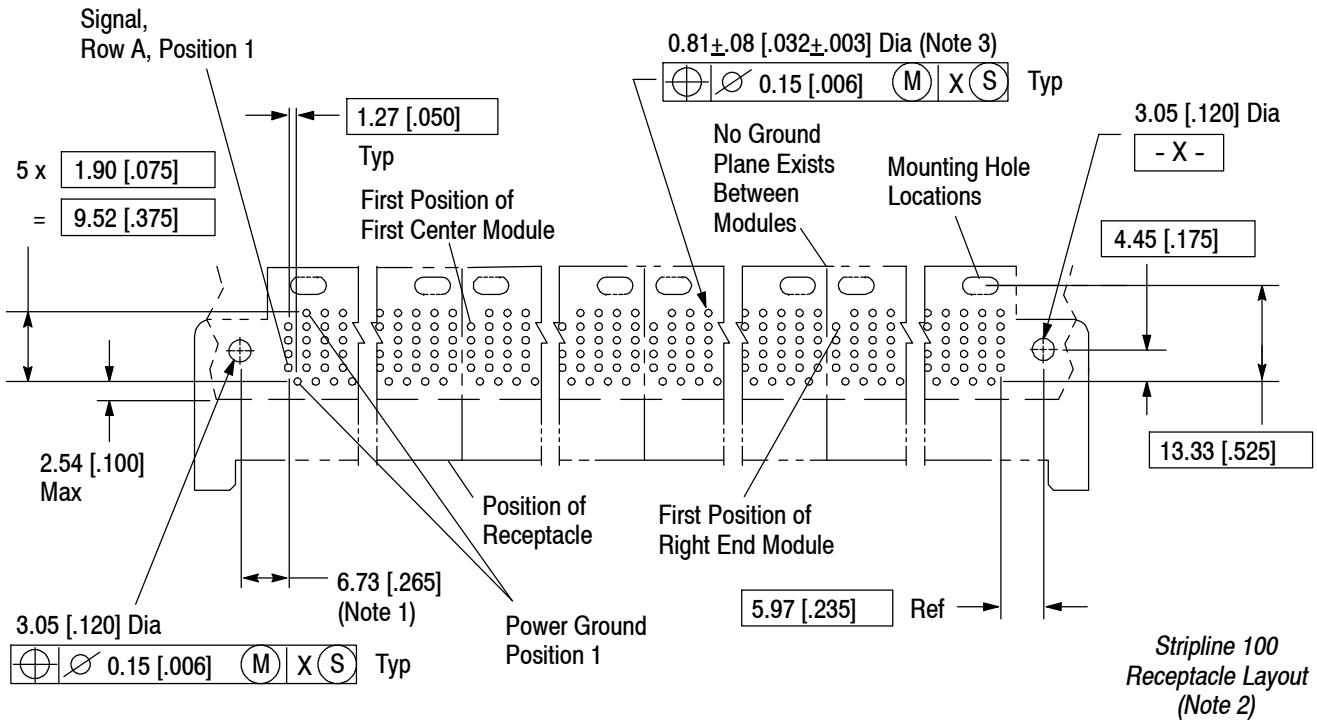
B. PC Board Circuit Pattern Layout

Figure 3 shows pc board layouts for placement of Z-PACK SL100 headers and receptacles.

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NOTE: Component Side Views Shown





NOTES: (1.) See Figure 12 for hole offsets and mating alignment dimensions.
(2.) Overall length and other dimensions specific to particular connectors are given on the appropriate customer drawings.
(3.) For applications where special concern exists toward ease of connector insertion into the pc board, thru-hole size should be biased toward the high end of the tolerance envelope. For applications using IR or vapor phase soldering techniques in conjunction with solder paste, thru-hole size should be biased toward the low end of the tolerance envelope, ensuring solder fill.

Figure 3

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3.4. PC Board Holes for ACTION PIN Contacts

The holes in the pc board for ACTION PIN contacts must be drilled and plated through to specific dimensions. See Figure 4.

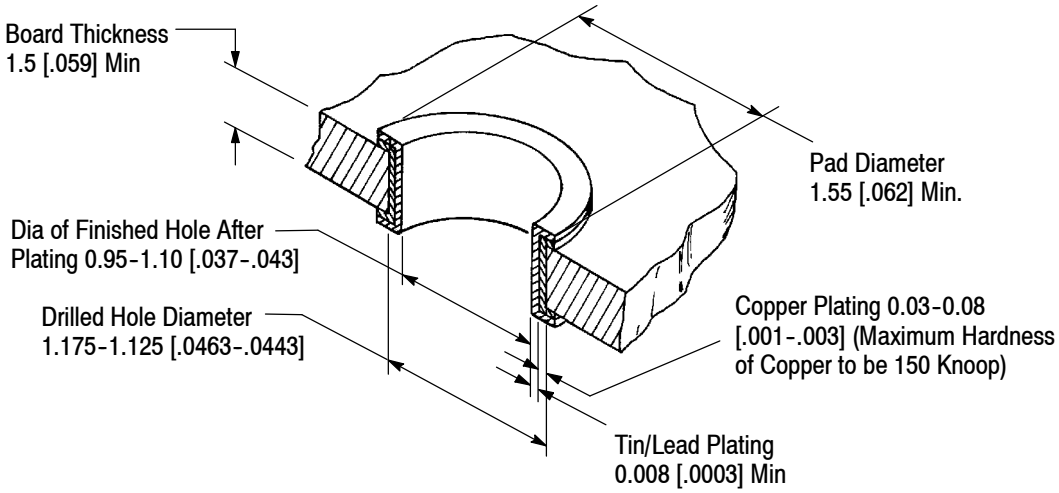


Figure 4

3.5. PC Board Holes for Solder Tine Contacts

Information for the holes in the pc board for solder tine contacts are provided in Figure 5.

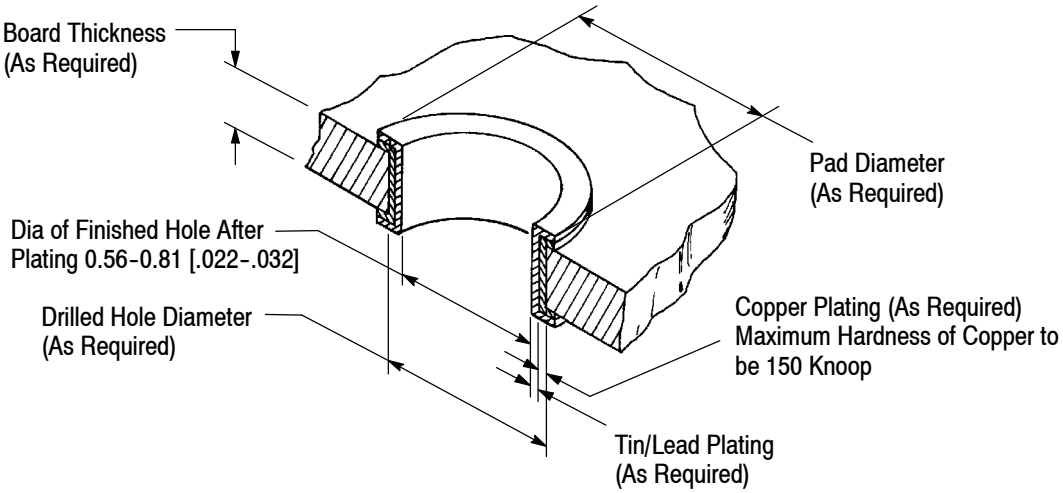


Figure 5

3.6. Connector Seating

A. Seating Headers

Stripline 100 headers with ACTION PIN contacts are seated after board insertion using Seating Tools 854423-[ ]. These tools may be used in the application machines listed in Section 5, TOOLING, or with a suitable machine capable of supplying a controllable downward force of 178N [40 lb] *per contact* over the length of the header. Headers with solder tines are self-seating. See Figure 6.

B. Aligning and Seating Receptacles

Z-PACK receptacles are self-seating, but may require the use of a solder tine alignment tool to prevent lateral bending of tines. See Figure 6. These tools are especially needed when seating receptacles having more than 300 contact positions, or when smaller through-holes are used for soldering purposes. Use Alignment Tool 314725 in accordance to the Instruction Sheet (408-9709) packaged with that tool.

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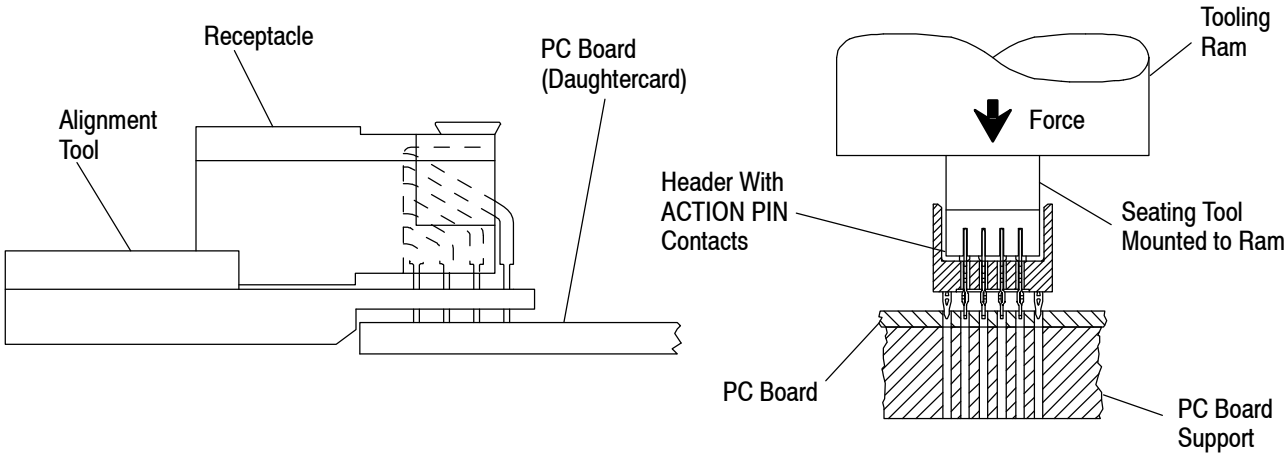


Figure 6

3.7. Soldering

NOTE

Manual 402-40 provides some guidelines for establishing soldering practices. Refer to Paragraph 2.6, Manuals.

A. Fluxing

The contact solder tines and, if applicable, attaching hardware must be fluxed prior to soldering with a mildly active, rosin base flux. Selection of the flux will depend on the type of pc board and other components mounted on the board. Additionally, the flux must be compatible with the wave solder line, manufacturing, health, and safety requirements. Call the Product Information number at the bottom of page 1 for consideration of other types of flux. Some fluxes that are compatible with these connectors are provided in Figure 7.

FLUX TYPE	ACTIVITY	RESIDUE	COMMERCIAL DESIGNATION	
			KESTER	ALPHA
Type RMA (Mildly Activated)	Mild	Noncorrosive	185/197	611
Center (Activated)	Medium	May be Corrosive	1544, 1545, 1547	711, 809, 811

Figure 7

B. Techniques

It is recommended that the connector be soldered using convection, vapor phase (VPR), double sided non-focused infrared (IR), or equivalent soldering technique provided the temperatures and exposure time are within the ranges specified in Figure 8. TE recommends using a Corpane Batch Vapor Phase (Model VVP 10 BU) and Vitronics IR (Model SMD 718) equipment.

SOLDERING PROCESS	TEMPERATURE		TIME (At Max Temp)
	CELSIUS	FAHRENHEIT	
VAPOR PHASE SOLDERING	215	419	5 Minutes
INFRARED REFLOW SOLDERING	230	446	5 Minutes
CONVECTION	230	446	5 Minutes

Figure 8

C. Connector Capacity

Connectors will withstand the maximum temperature time limits specified in Figure 8. Higher temperatures can be withstood for short periods of time as indicated in Figure 8 for the IR reflow.

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D. Reflow Parameters

Due to the many variables involved with the reflow process (ie, component density, orientation, etc), we recommend that the user conduct trial runs under actual manufacturing conditions to ensure product and process compatibility.

E. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder paste and flux for recommended cleaning solvents. The following is a listing of common cleaning solvents that will not affect the connectors. The connectors will be unaffected by any of these solvents for 5 minutes at 105°C [221°F]. See Figure 9.

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

CAUTION

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

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 9

DANGER

Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. 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 Product Information number at the bottom of page 1.

F. Drying

Air drying of cleaned connectors is recommended. Temperature for the connectors should not exceed -55 to 105°C [-67 to 221°F]. Degradation of the housings could result from extreme temperatures.

3.8. Standard Hardware Mounting Requirements

A. Integral Receptacles

Integral receptacles may be mounted using commercially available screws and nuts, rivets, or other fasteners. The recommended screw size for receptacle end blocks is No. 2 UNC.

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B. Modular Receptacles

Modular receptacles are to be mounted at the aluminum stiffener. Use No. 2 thread-forming screws, type AB threads. Use at least one screw for each module in the receptacle being mounted. Screw length should equal the pc board thickness plus 5.0 [.197].

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C. Pin Headers

Pin headers must be seated to the dimension shown in Figure 10. Accessories may be added at the connector end blocks. See Figure 10.

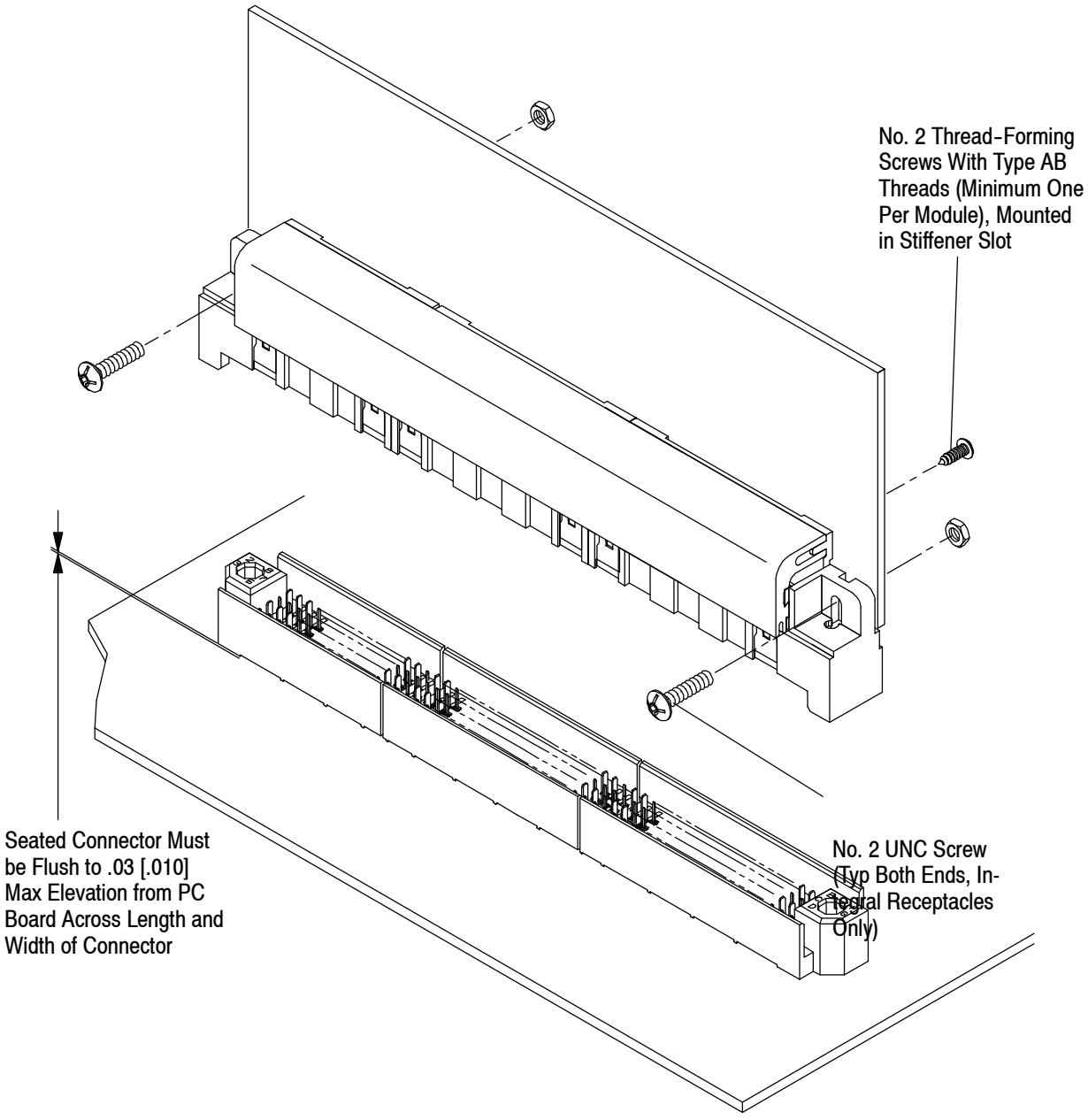
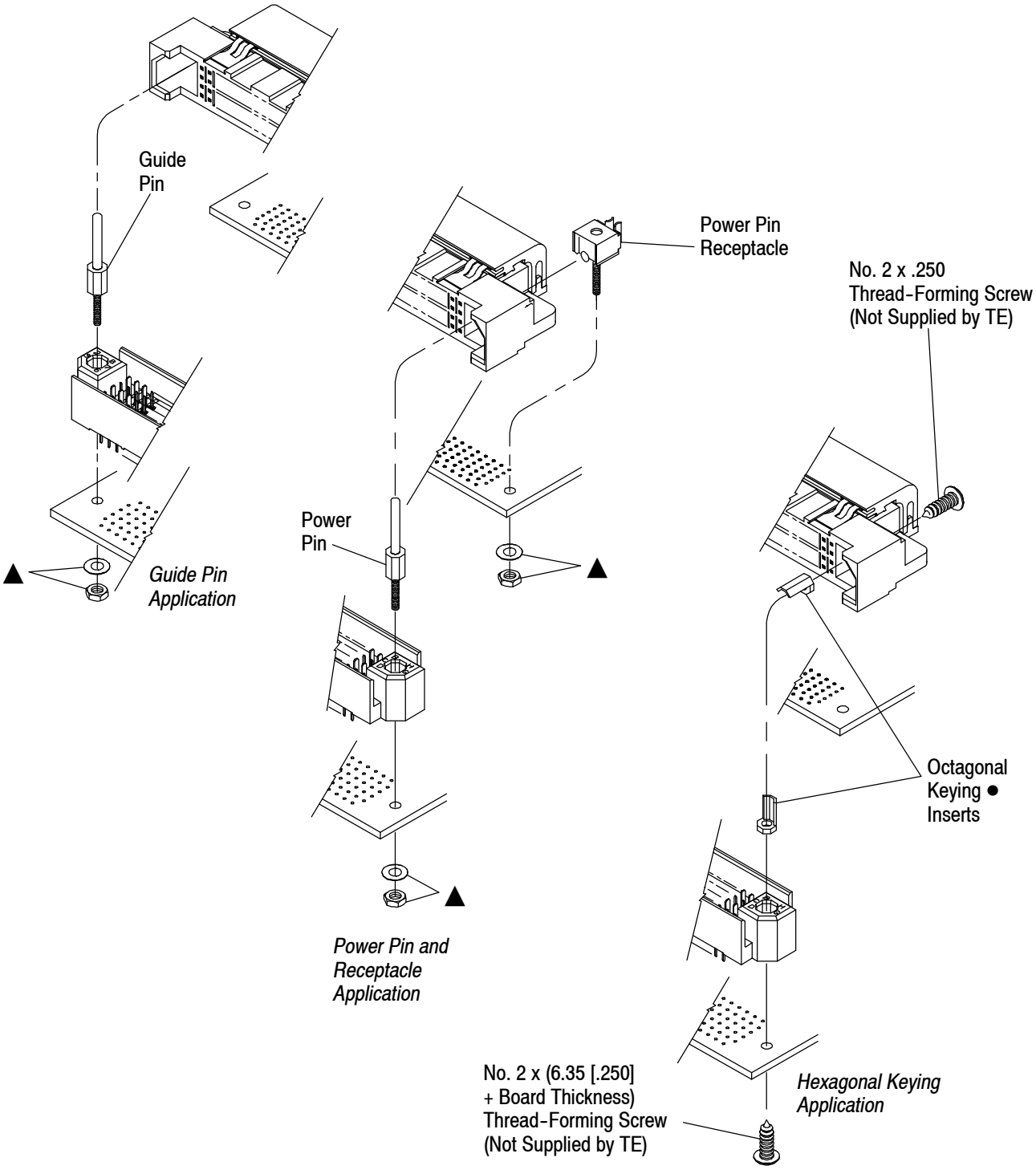


Figure 10

3.9. Accessories

Guide pins for additional pre-alignment, power pins and receptacles, and octagonal keying inserts are available as shown in Figure 11. Other hardware options to meet specific needs may be available from, or designed by, TE Engineering at your request.

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● Keying inserts may not be used concurrently with the other hardware shown in this figure for the same connector pair.
▲ Use a No. 2 internal tooth lockwasher and a No. 2-56 UNC nut.

Figure 11

3.10. Mating Offsets

Figure 12 shows pc board pattern offsets and desired mated connector measurements.

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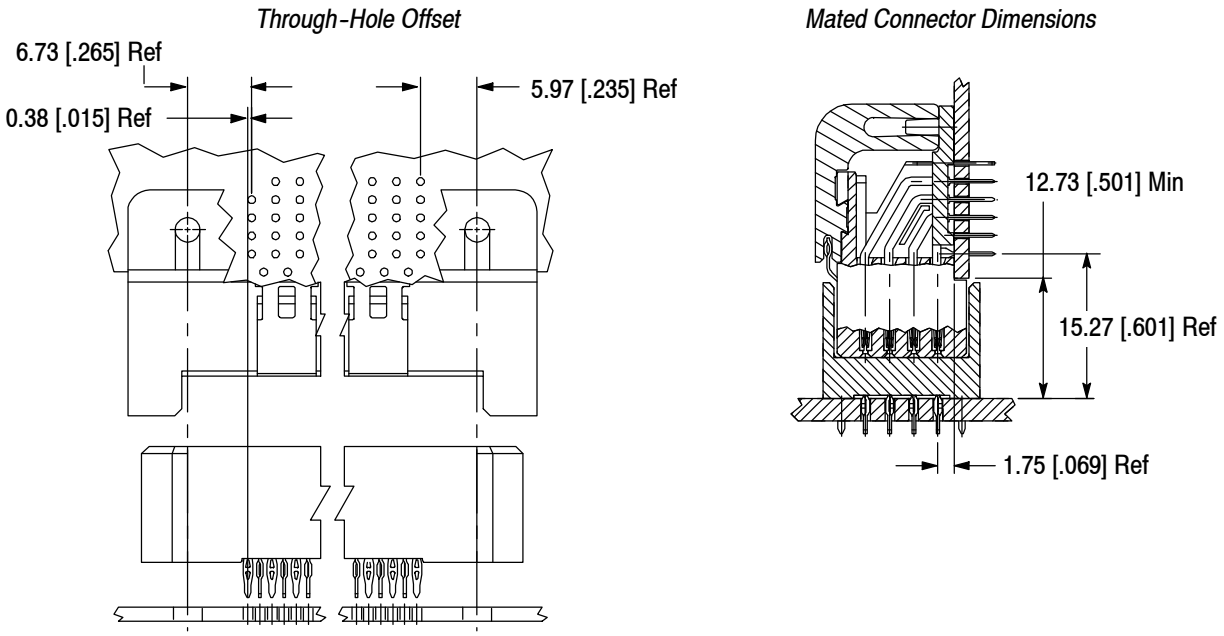


Figure 12

3.11. Repair/Replacement

A. Header Repair

Header assemblies can be repaired without removal from the pc board, in cases where only contacts are in need of replacement. Use Replacement Tool Kit 768784-1 (408-4012). The kit contains tips for removal and replacement of ACTION PIN contacts. Refer to the instruction sheet for use of the tool kit. Also, solder contacts may be removed by desoldering the individual contact and using small pliers or tweezers for extraction.

B. Receptacle Repair

Receptacle construction does not allow for replacement of individual contacts or shields. Damaged integral receptacles generally must be completely replaced. Modular receptacles, however, can be repaired by removing and replacing only the damaged module, as follows:

1. Using Pliers Kit 854904-1 (408-9704) remove all locking clips from the stiffener. From the bottom side of the pc board, remove screws holding the stiffener in place. Gently slide stiffener from modules.

2. Desolder and remove damaged module from board; clean and dry affected thru-holes as discussed in Paragraph 3.7.

3. Seat new module in proper position, and re-install stiffener and mounting screws. Solder new module using a standard soldering technique.

4. QUALIFICATIONS

Z-PACK SL100 Interconnection System has been sent to Underwriters Laboratories Inc. (UL) and CSA International for evaluation and testing.

5. TOOLING

Figure 13 provides tool part numbers and instructional material related to Z-PACK SL100 Interconnection Systems.

NOTE

Tool Engineers have designed machines for a variety of application requirements. For assistance in setting up prototype and production line equipment, contact Tool Engineering through your local TE Representative or call the Tooling Assistance Center number at the bottom of page 1.

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- **PC Board Support**

A pc board support must be used to prevent bowing of the pc board during the placement of a connector on the board. It should have flat surfaces with holes or a channel wide and deep enough to receive the contact solder tines and other attaching hardware during installation of the connector on the pc board.

- **Seating Tools**

Seating tools have been designed to push on the contact and seat the connector on the pc board. The tool will prevent contacts from backing out of the housing and prevent damage to the housing. The seating tools may be used with the power units listed or arbor frame assembly.

- **Impact Repair Tools**

Impact repair tools are designed to remove damaged contacts from housings without damaging the housing. The tools must be used with a support that is deep enough to allow full extraction of the contact.

- **Power Units**

Power units are automatic or semi–automatic machines used to assist in the application of a product. A power unit supplies the force to seat the connector onto the pc board using seating tools.

- **Alignment Tools**

Alignment tools are used to maintain the alignment of the connector contact tines during insertion into the pc board.

- **Pliers**

Pliers kit is used to insert and remove locking clips from Z–PACK SL100 modular receptacle assemblies. The clips hold the modules in place on an aluminum stiffener, and must be removed if modules need repair or replacement.

- **Arbor Frame Assembly**

Manual arbor frame assemblies are used to exert a downward force used to apply connectors to a pc board using seating tools.

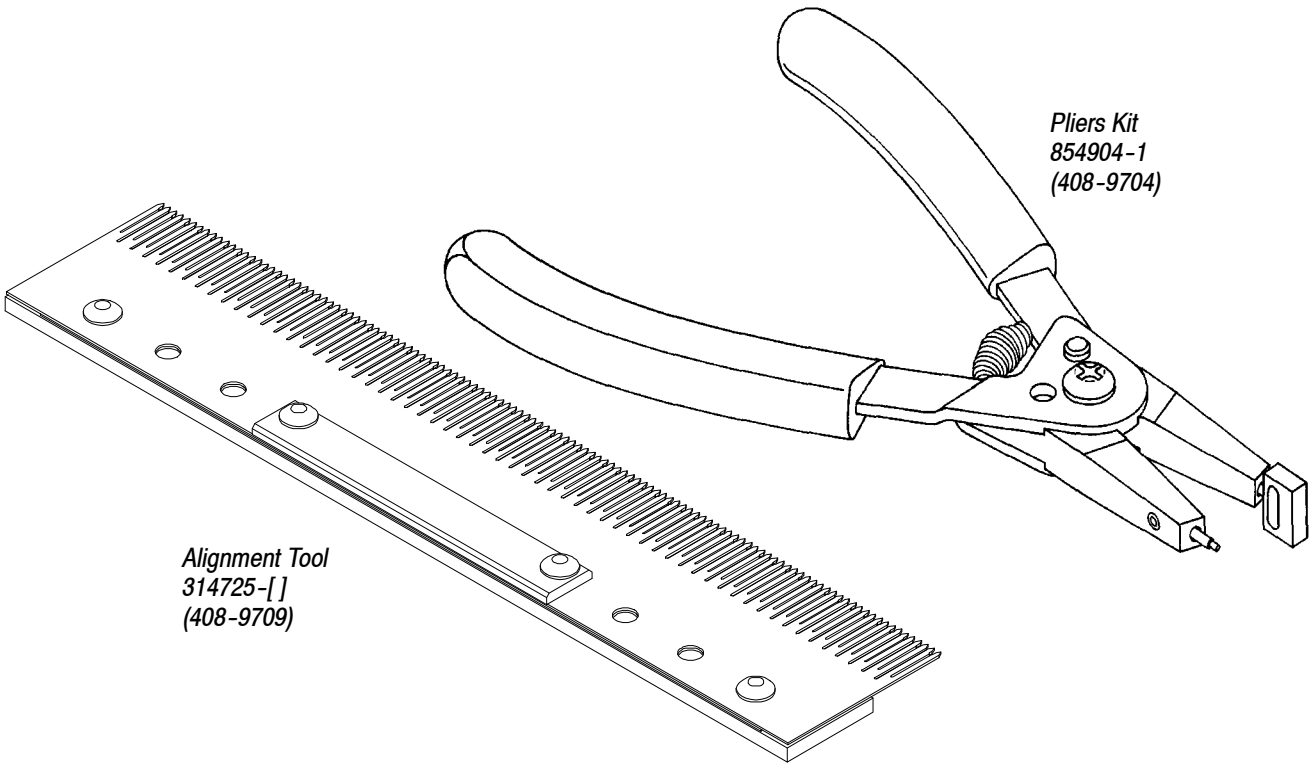


Figure 13 (cont'd)

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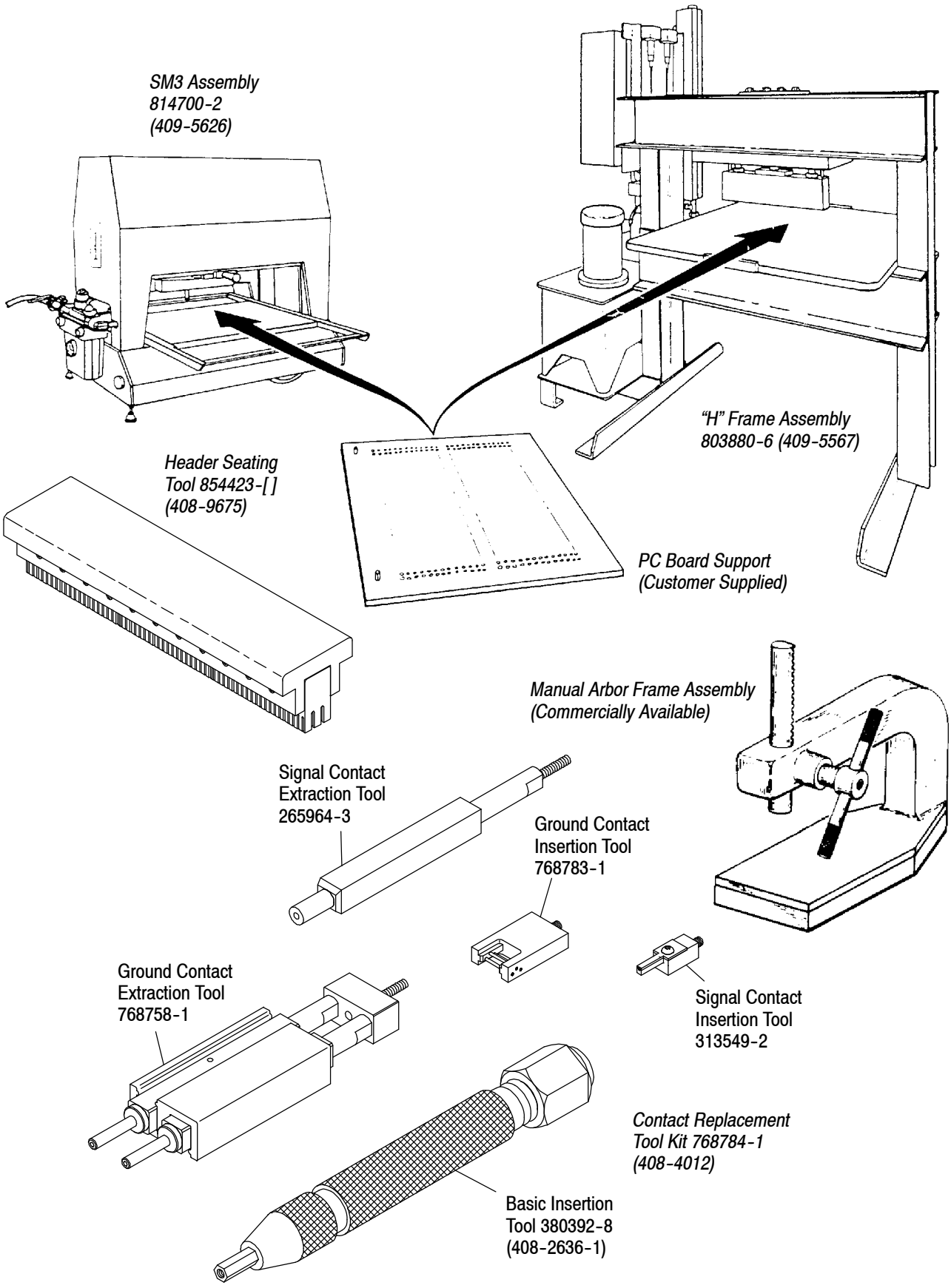


Figure 13 (end)

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6. VISUAL AID

Figure 14 shows a typical application of an Z-PACK SL100 Interconnection System. 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.

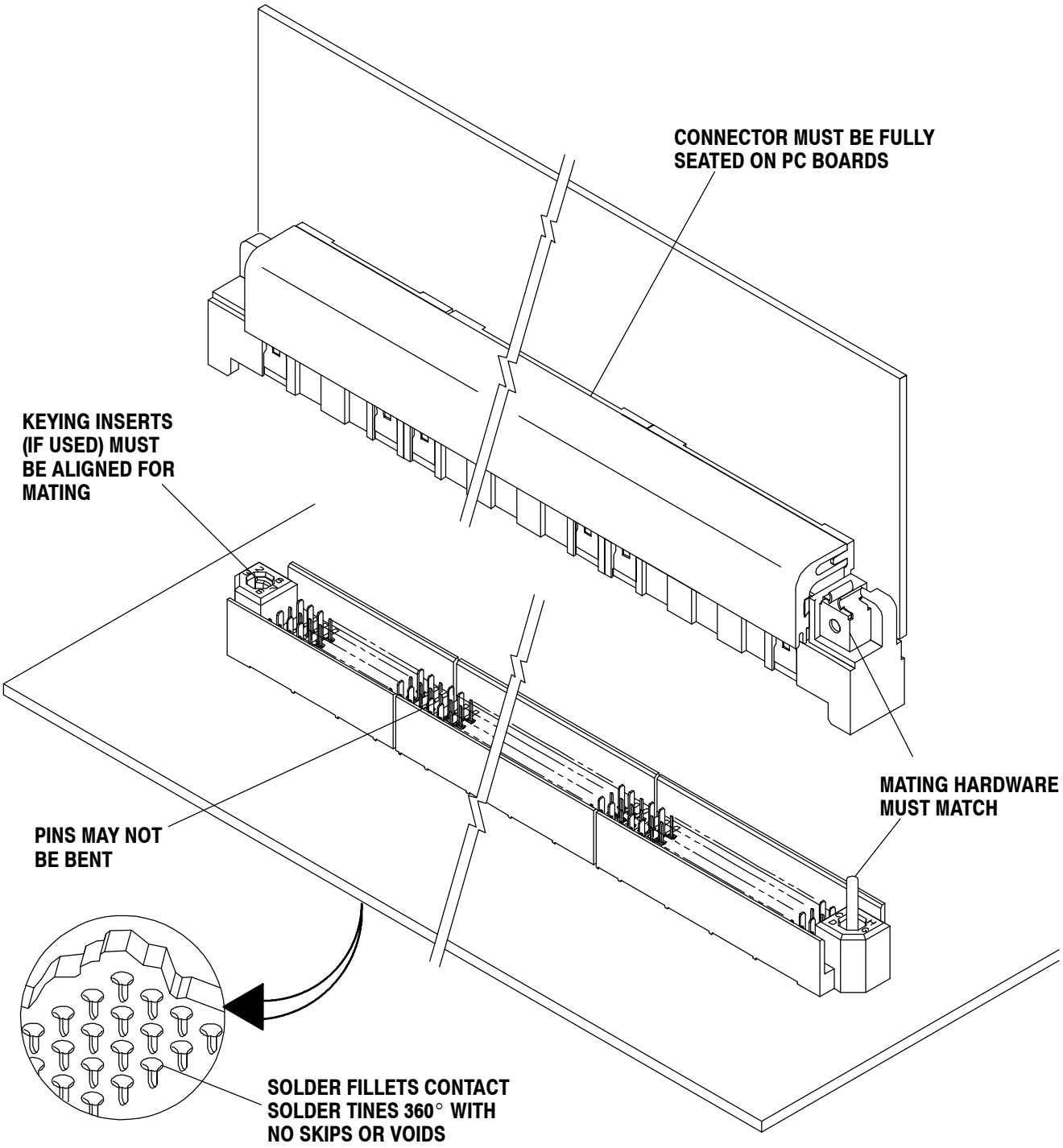


FIGURE 14. VISUAL AID

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