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All numerical values are in metric units. 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 IEEE 1394 Serial Bus Connectors. The plug kit may be purchased assembled or unassembled. The socket assemblies are available in through hole configurations only. Contacts are gold plated on 2 mm centerlines. The cable plug connector will accept 30-28 AWG and 24-22 AWG wire. The system is a 6-position connector with a 4-signal and 2-power conductors. This product conforms to IEEE 1394-1995 standards.

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.

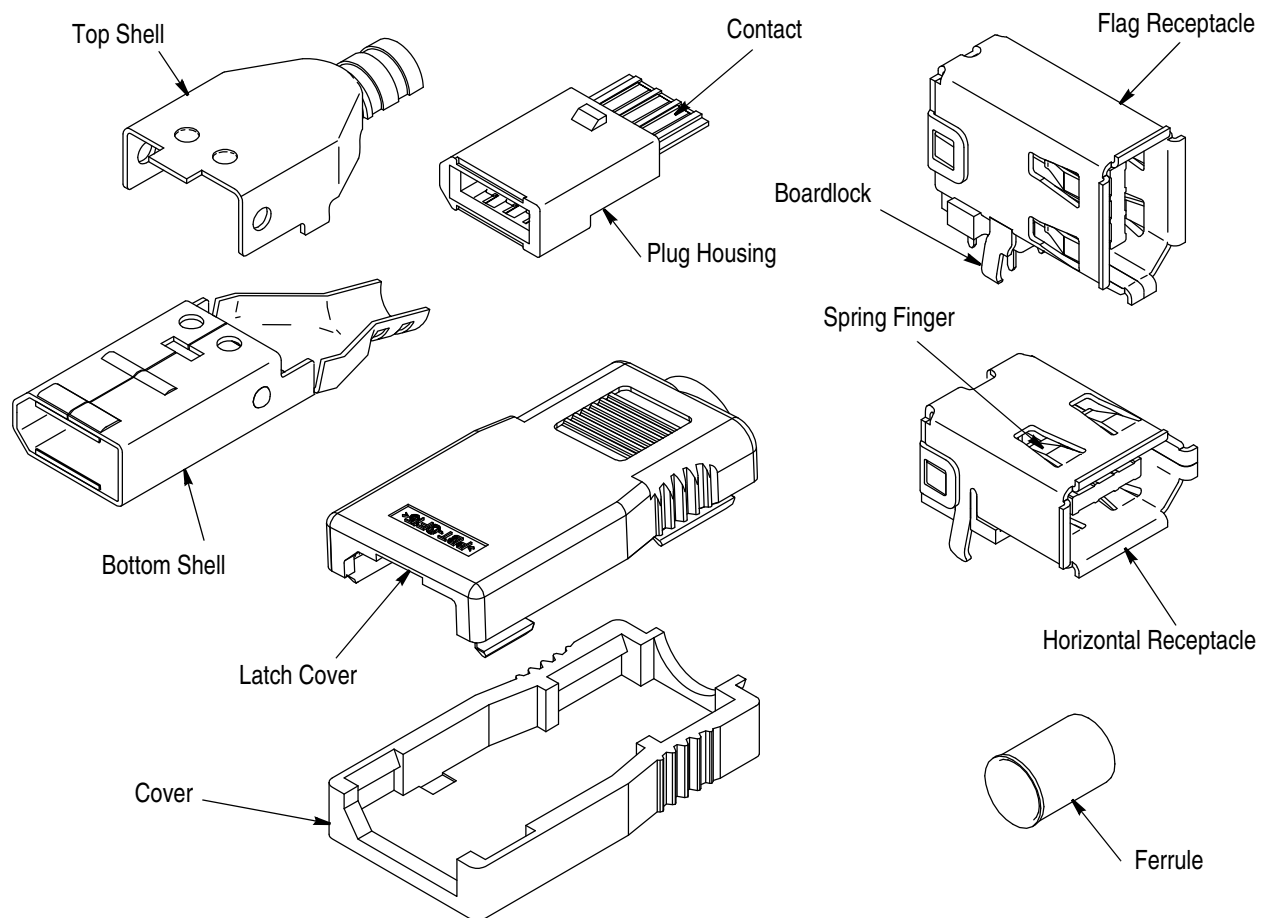


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

Revisions to this application specification include:

- New logo

2.2. Customer Assistance

Reference Product Base Part Number 787956 and Product Code 2391 are representative of IEEE 1394 Serial Bus Connectors. Use of these numbers will identify the product line and help you to obtain product and tooling information. Such information can be obtained through a local Representative, by visiting our website at www.te.com, or by calling PRODUCT INFORMATION or the TOOLING ASSISTANCE CENTER at the numbers at the bottom of page 1.

2.3. Drawings

Customer Drawings for the connectors 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 technical documentation supplied by TE.

2.4. Specifications

Product Specification 108-1606 provides product performance requirements and test information.

2.5. 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.

2.6. Instructional Material

The following list includes available instruction sheets (408-series) that provide assembly procedures for product, operation, maintenance and repair of tooling.

<u>Document Number</u>	<u>Document Title</u>
408-4027	Crimping Die Assembly 58537-1
408-7424	Checking Terminal Crimp Height or Gaging Die Closure
408-9930	PRO-CRIMPER* II Hand Crimping Tool Frame Assembly 354940-1

3. REQUIREMENTS

3.1. Storage

A. Ultraviolet Light

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

B. Shelf Life

To prevent damage to the connectors, they should remain in the shipping containers until ready for installation. Also, to prevent possible storage contamination, these products should be used on a first in, first out basis.

C. Chemical Exposure

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

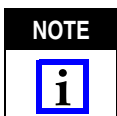
Alkalies	Ammonia	Citrates	Phosphates	Citrates	Sulfur Compounds
Amines	Carbonates	Nitrites	Sulfur Nitrites		Tartrates

3.2. Cable Selection and Preparation

The plug connectors accept braided cable while the discrete wire within the cable is used in the individual plug contacts in the connector assembly.

A. Cable Selection

Select the cable diameter and discrete wire size according to your production requirements.



Make sure the ferrules are placed over the cable jacket prior to stripping the cable and discrete wires.

B. Cable Preparation

Strip the cable and discrete wire to the dimensions shown in Figure 2.



Remove any plastic filler or foil underneath the cable jacket and discard. Also **DO NOT** nick, cut, or scrape the conductors or the braided cable shield during the stripping operation.

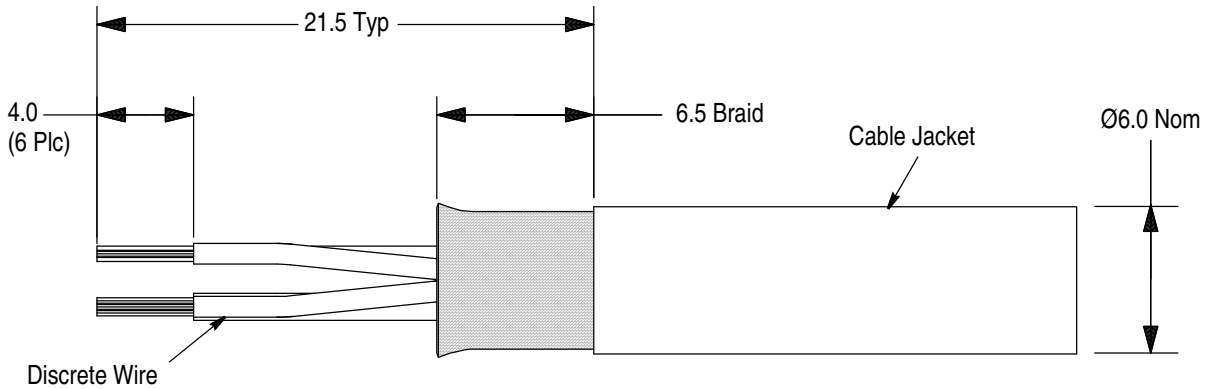


Figure 2

3.3. Discrete Wire Application

The discrete wires must be hand soldered to the plug assembly. The soldering process is done prior to the plug assembly being placed into the bottom shell. See Figure 5.

A. Flux Selection

Contact solder tines 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 pc board. Additionally, the flux must be compatible with the manufacturing, health, and safety requirements. Call one of the phone numbers 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 3.

FLUX TYPE	ACTIVITY	RESIDUE	COMMERCIAL DESIGNATION	
			KESTER	ALPHA
Type RMA (Mildly Active)	Mild	Noncorrosive	186	611

KESTER and ALPHA are trademarks of their respective owners.

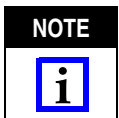
Figure 3

B. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Cleaning methods depend on the type of flux used. Consult the supplier of solder and flux for recommended cleaning solvents. The following are common cleaning solvents that can be used on these connectors for 10 minutes at room temperature without any adverse effects on contacts or housing. See Figure 4.



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.



If you have a particular solvent that is not listed, contact the PRODUCT INFORMATION 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 4

C. Drying

When drying the cleaned plug assemblies, make certain that the temperature limitations of 15° to 85°C [59° to 185°F] are not exceeded.



Excessive temperatures may cause connector degradation.

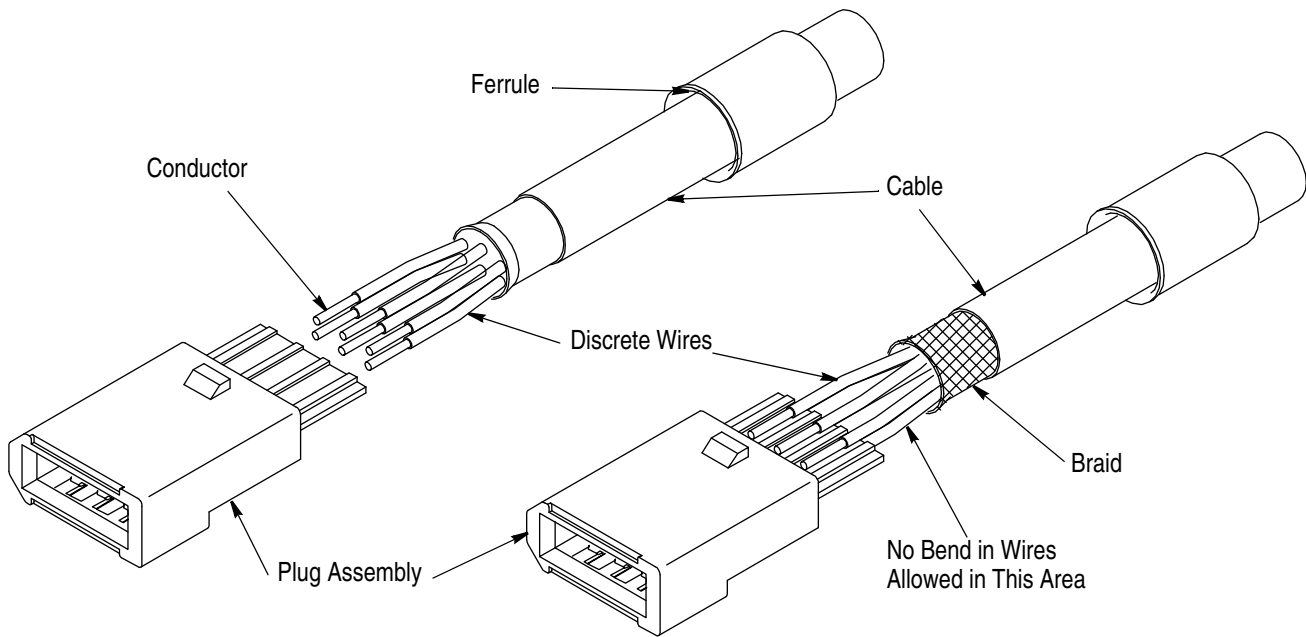


Figure 5

D. Checking Soldered Connector

All solder joints should conform to those specified in Workmanship Specification 101-21.

3.4. Assembly of Plug Kit

A. Plug Assembly

The plug assembly must be inserted in the back of the bottom shell and bottomed. Refer to Figure 6.

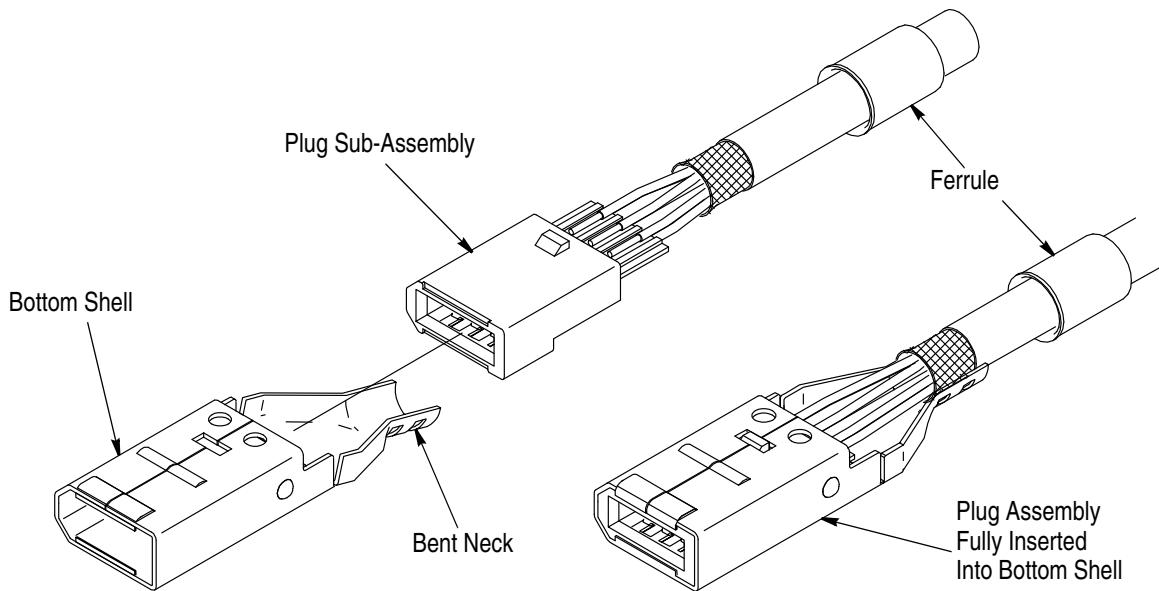


Figure 6

B. Bottom Shell

Visually check to make sure the braid is aligned with the small neck of the bottom shell for proper assembly. See Figure 7.

NOTE

Make sure the bend in the neck of the bottom shell is straight prior to completing the mating with the top shell.



C. Top Shell

Align the top shell with the bottom shell as shown in Figure 7. When pressed fully together, the top and bottom shells will have an audible and tactile click to ensure full mating.

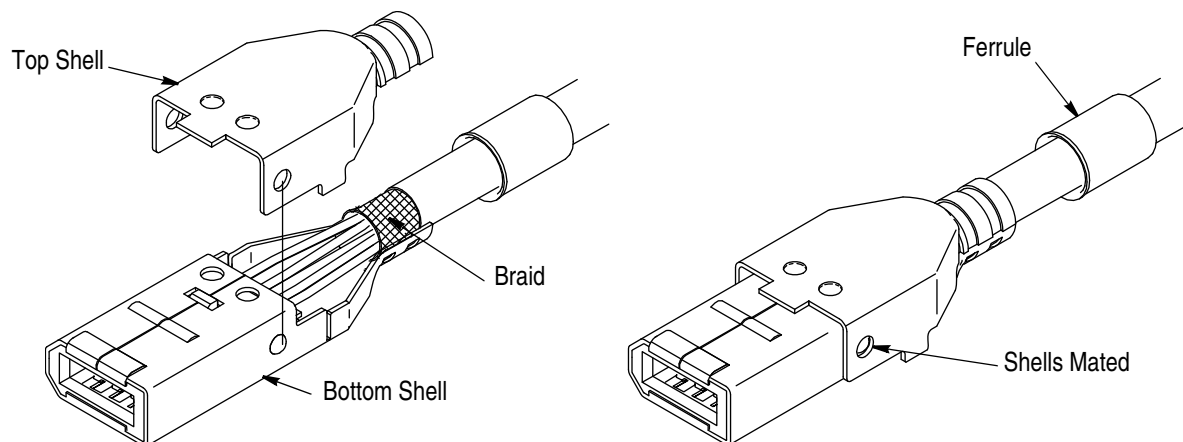


Figure 7

3.5. Terminating Ferrules

Slide the ferrule down onto the neck of the assembled top and bottom shell. See Figure 8. Crimp the ferrule according to the information and directions provided in Instruction Sheet 408-4027. Check to make sure the bellmouth does not exceed the dimensions shown in Figure 8.

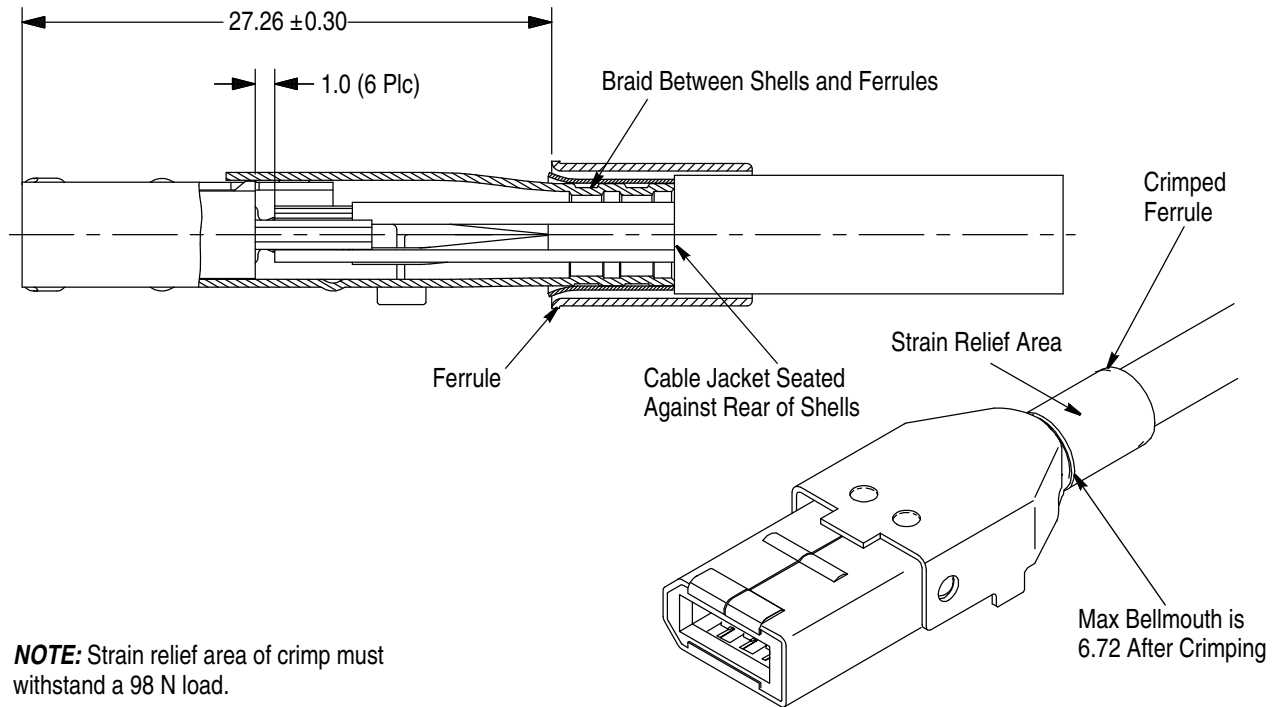


Figure 8

3.6. Cover Installation

Align the cover and mated shells so the top shell tab is at the front of the cutout in the latch cover. See Figure 9. Snap the bottom cover to the latch cover. When pressed fully together, the latch cover and cover will have an audible and tactile click to ensure full mating. The shells must not protrude further than the dimensions shown in Figure 9.

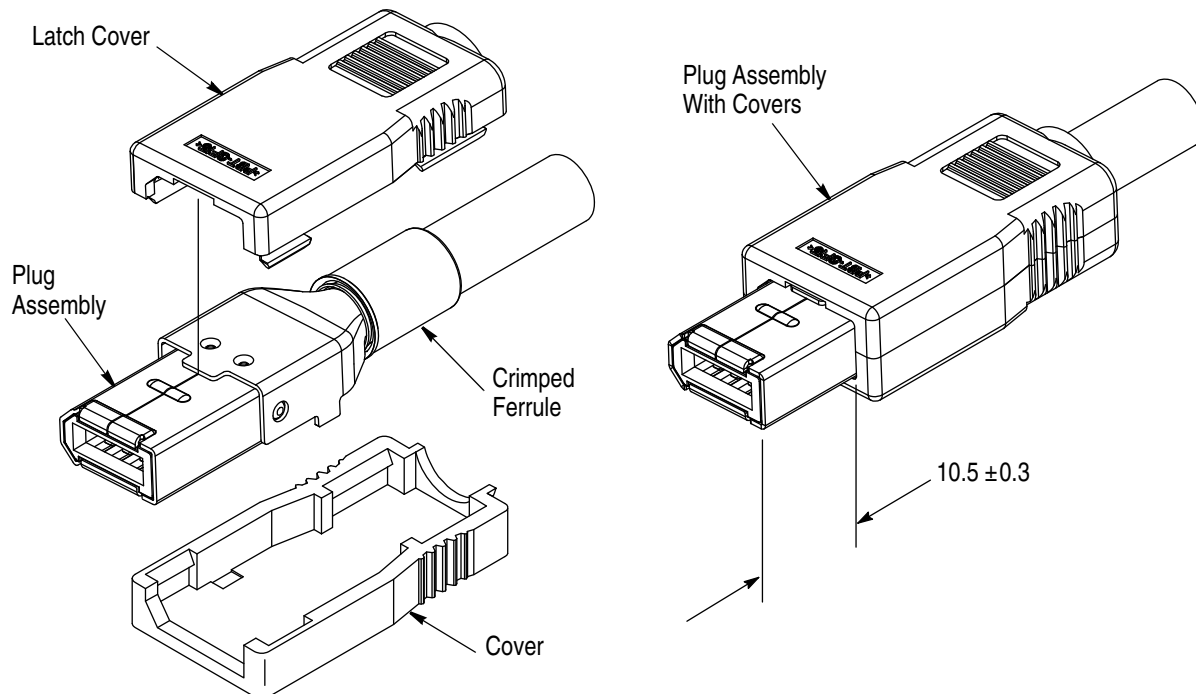


Figure 9

3.7. IEEE 1394 Serial Bus Socket Assembly Connectors

These pc board connectors are supplied with pre-installed contacts that have right-angle solder tines and boardlocks. They are designed to mate with plug connectors that have solder-type contacts inserted into a six-position housing.

3.8. PC Board

A. Material and Thickness

1. Pc board material will be glass epoxy (FR-4, G-10).
2. Pc board thickness shall be 1.57 ± 0.15 mm.

Contact the PRODUCT INFORMATION CENTER or the TOOLING ASSISTANCE CENTER number listed at the bottom of page 1 for suitability of other pc board materials or thicknesses.

B. Tolerance

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

C. PC Board Layout

The mounting and contact holes in the pc board must be precisely located to ensure proper placement and optimum performance of the connector. Design the pc board using the dimensions provided in Figure 10. The layout shows the top (connector) side of the pc board.

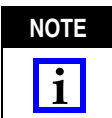


Figure 10 represents a typical pc board layout for this product. For dimensions and hole pattern layout for specific product, obtain the appropriate customer drawing through your TE Representative or refer to the telephone numbers at the bottom of page 1.

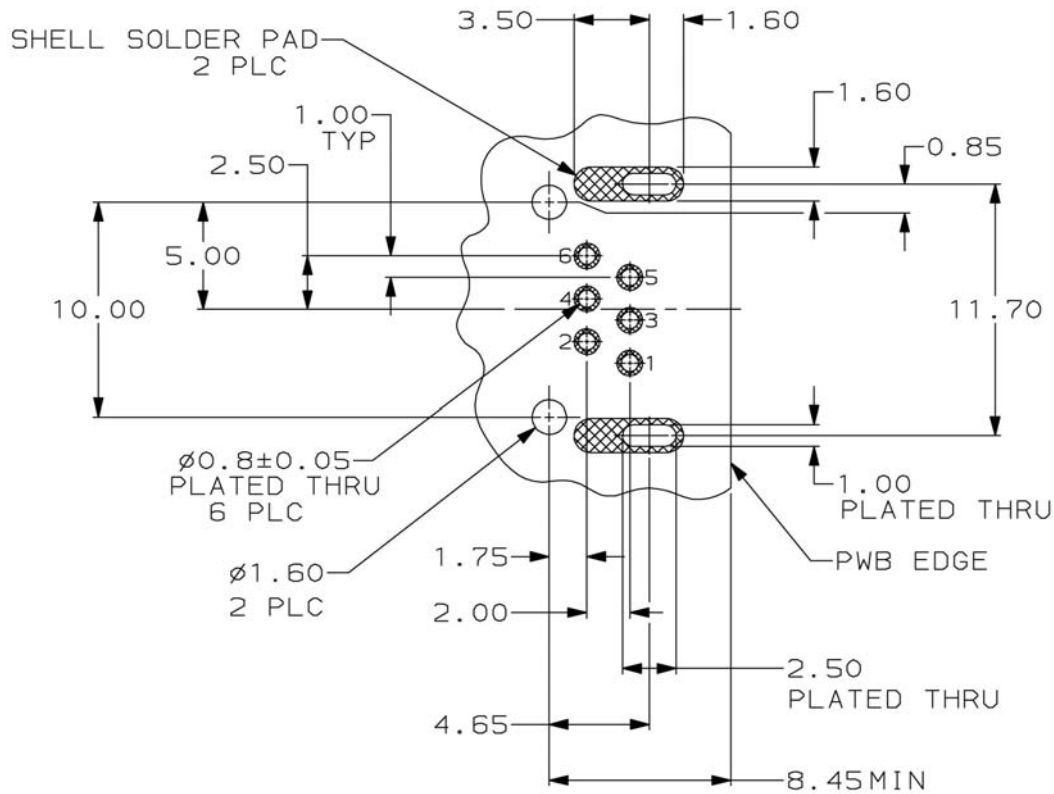


Figure 10

3.9. PC Board Contact Holes

The pc board holes for IEEE 1394 Serial Bus Socket Assembly Connector contact tines must be drilled and plated through to precise dimensions. See Figure 11.

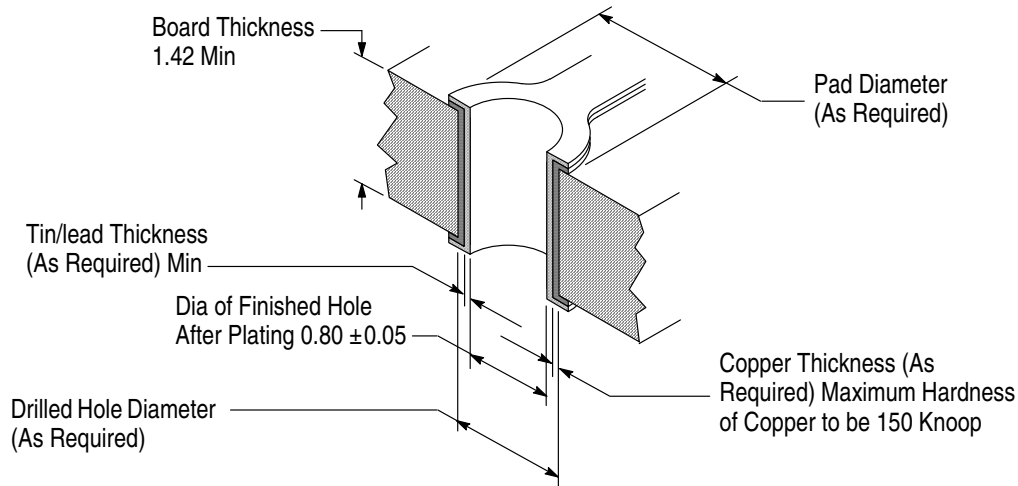


Figure 11

3.10. IEEE 1394 Serial Bus Socket Assembly Retention

Boardlocks designed into the IEEE 1394 Serial Bus Socket Assembly Connector have gripping shoulders that pass through the pc board at the same time the contact tines are inserted through the pc board. They lock into position when the housing is seated on the pc board.

3.11. PC Board Connector Placement



The connectors should be handled only by the housing to prevent deformation or other damage to the contact tines.

A. Manual Placement

Align the connector contact tines with the appropriate holes in the pc board. Start all solder tines into the board; then, when the boardlock starts to engage the pc board, press on the connector until it seats on the pc board.

B. Robotic Placement

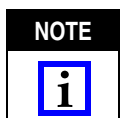
The robotic equipment must be adjusted to feed, pick up, and place connectors on the pc board with an accuracy of 0.25 mm. For information on robotic equipment, see Section 5, TOOLING.

After the connector is snapped into the pc board, the boardlocks are soldered with the connector solder tines during the soldering process.

3.12. Soldering

Refer to Paragraphs 3.3.A., B., C., and D for soldering information for these connectors.

IEEE 1394 Serial Bus Socket Assembly Connectors can be soldered using wave soldering techniques. Housing material Polybutylene Terephate (PBT) is for wave soldering and liquid crystal polyester is for vapor phase/ infrared reflow soldering. The temperatures and exposure time shall be within the ranges specified in Figure 12. We recommend using SN60 or SN62 solder for these connectors.



Manual 402-40 provides some guidelines for establishing soldering practices. Refer to Paragraph 2.5, Manuals.

SOLDERING PROCESS	WAVE TEMPERATURE	TIME (At Max Temperature)
Wave	260°C [500°F]	5 Seconds

Figure 12

3.13. Checking Installed Connector

The IEEE 1394 Serial Bus Socket Assembly Connector must be seated on the pc board to the dimensions shown in Figure 13.

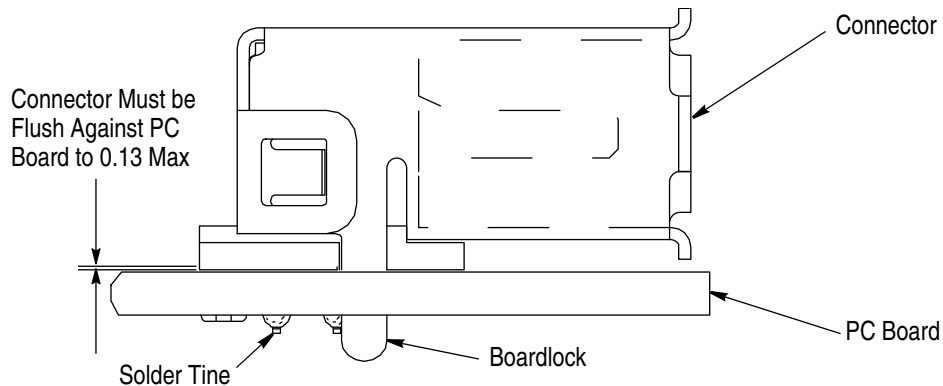


Figure 13

3.14. Polarization

IEEE 1394 Serial Bus Connectors are polarized by the configuration of the mating faces.

3.15. Shielding

These connectors feature tin-plated steel shells which provide continuity for EMC (Electro Magnetic Compatibility) applications. When mated together, shielding and grounding continuity are achieved. Use of the boardlocks provides an additional degree of electrical continuity to any ground path on the pc board.

3.16. Mating of Connectors

To ensure a proper circuit connection, the connectors must be mated as shown in Figure 14. When the plug and socket assembly are bottomed, there will be an audible and tactile click to ensure full mating. The dimension in Figure 14 is needed to ensure full mating of connectors.

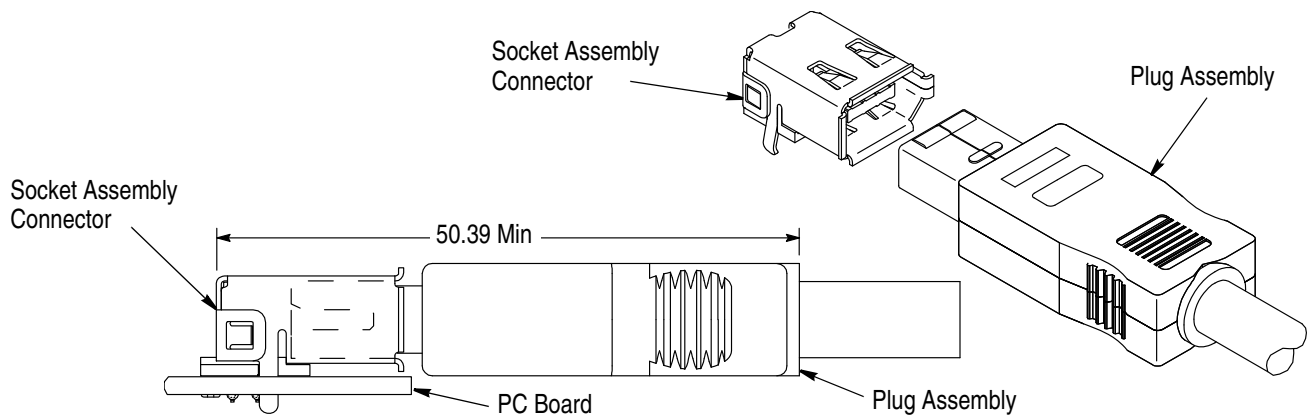
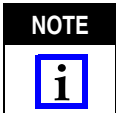


Figure 14

3.17. Connector Spacing

Care must be used to avoid interference between adjacent connectors and/or other components. The information provided in Figure 15 is to ensure proper mating.



The information provided are for manual placement of connectors. If robotic equipment is used, other space allowances will be required for the grippers.

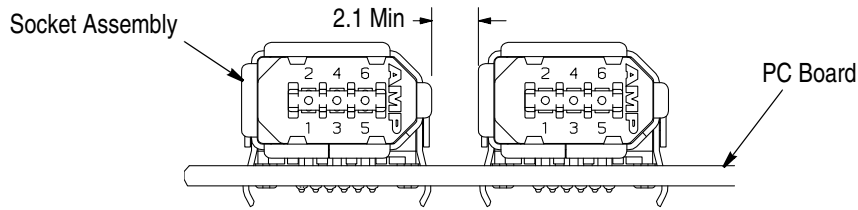


Figure 15

3.18. Unmating of Connectors

To unmate the plug and socket assembly, pull the plug assembly straight out of the socket assembly.

3.19. Repair/Removal

Damaged pc board connectors may be removed from the pc board by standard de-soldering methods. Damaged plug connectors must be de-soldered and removed; and the cable must be re-stripped and re-soldered.

4. QUALIFICATIONS

IEEE 1394 Serial Bus Connectors have been Component Recognized by Underwriters Laboratories Inc. (UL) in File No. E28476 and also CSA International by UL-CNR under the same file number.

5. TOOLING

Figure 16 provides tooling information for IEEE 1394 Serial Bus Connectors.

NOTE



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

- **Robotic Equipment**

Robotic equipment for placement of connectors on a pc board must have a true position accuracy of 0.25 mm to ensure proper location and insertion of the contact tines. This includes gripper and fixture tolerances as well as equipment repeatability. It must use the connector datum surface to ensure reliable connector placement. If you need assistance in setting up prototype or production line equipment, contact Tooling Engineering through your local TE Representative or call the Tooling Assistance Center number at the bottom of page 1.

- **PC Board Support**

A pc board support must be used to prevent bowing of the pc board during insertion of the connectors. It should have a flat surface with holes or a channel large enough to receive the contact tines during installation.

- **Hand Tools**

Hand crimping tools that accommodate the full wire range are designed for prototype and low-volume applications such as repair of damaged contacts.

- **Crimping Die Assemblies**

Crimping Die Assemblies for crimping the contacts are available for the full wire size range. They are designed for easy installation and removal in hand crimping tool frame assemblies or applicators.

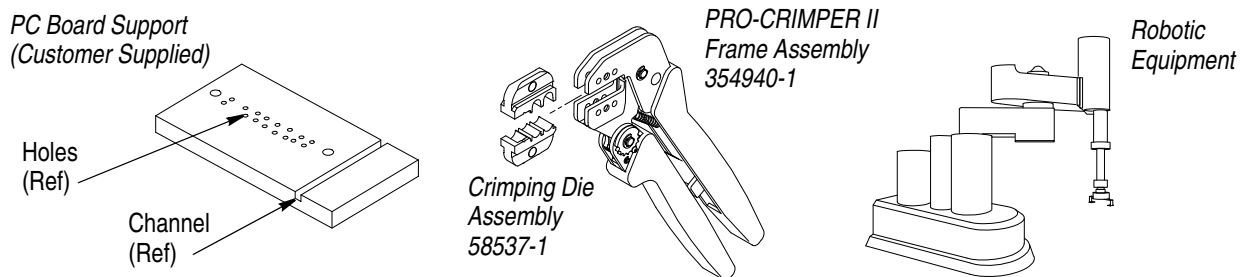


Figure 16

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.

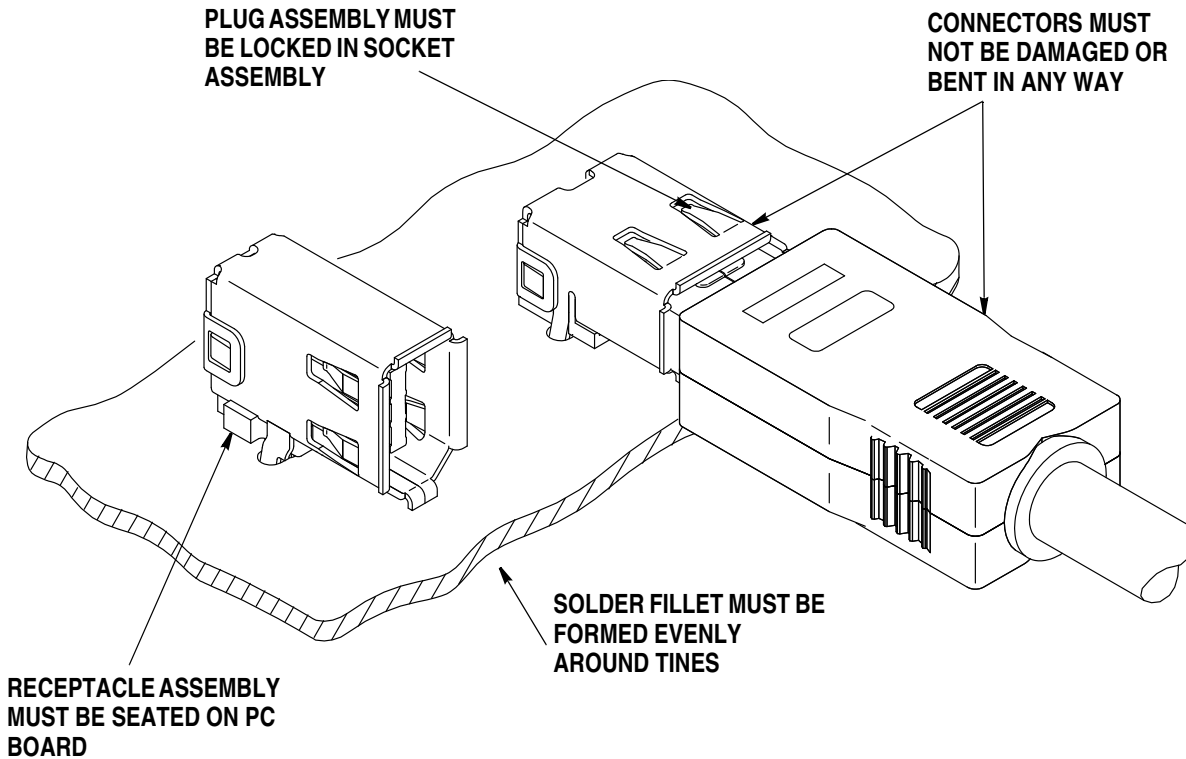


FIGURE 17. VISUAL AID