

**Terminating D-602-0288/-0289 Subminiature
SolderTact® Contacts to Twisted-Pair Cable****1. Purpose and Scope**

This engineering standard contains the termination procedures, inspection requirements, and rework procedures for D-602-0288 and D-602-0289 Subminiature SolderTacts contacts. These contacts accommodate twisted-pair cable with insulation diameter of 0.025 to 0.054 inch and with stranded or solid, tin or silver plated conductors, AWG sizes 24, 26, 28 and 30. Other applications may be possible, but must be evaluated by Raychem Technical Services.

2. References

AA-400	SuperHeater Instructions
CV-5300	MiniGun Instructions
IR-1044	Heating Tool Instructions
AD-1319	Holding Fixture Instructions

3. Application Equipment and Tools

AA-400	SuperHeater hot air heater with mini SolderSleeve tip
CV-5300	MiniGun hot air heater with MG-1 reflector.
CV-5700	MiniGun hot air heater with MG-7 reflector (replaced by CV-5300).
IR-1044	Two-station infrared heater with AT-1044-11 tooling set (No. 9).
AD-1319	Holding fixture.
AT-1319-12	Adapter.
AD-1481-H	Holding fixture.
AD-1298	Trimmer for twisted pair cable.
AD-1576	Wire bending tool.

4. Materials

Solder:	Sn63 per QQ-S-571
Flux:	Type RMA per MIL-F-14256 (Alpha No.611)
Flux thinner:	Isopropyl alcohol

5.0 Termination Procedures**5.1 Cable Preparation**

Note: Pretinning is required for stranded conductors and for unplated copper conductors.

1. Untwist and straighten the wires for a length of approximately 1.0 inch (Figure 5-1).

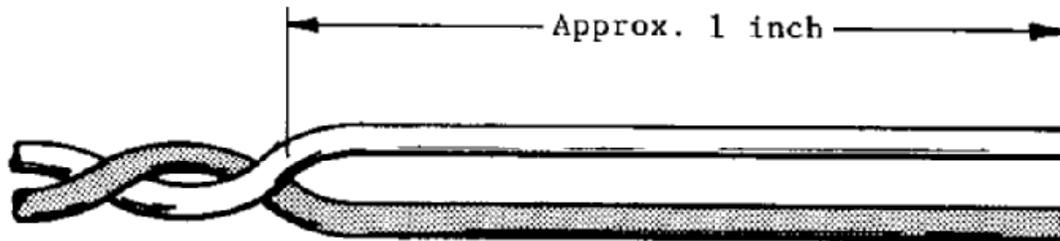


Figure 5-1. Preparation for Stripping

2. Strip both wires approximately 0.5 inch (Figure 5-2).



Figure 5-2. Wire Stripping Dimensions

3. Make sure that stranded conductors are twisted into their normal lay.
 - Retwist and smooth the strands with fingers, if necessary.
4. Pretin stranded wire and unplated solid wire (Figure 5-3).
 - Flux the conductors for half of their exposed length using a 1:1 mixture of RMA (Alpha #611) flux and isopropyl alcohol.
 - Dip the conductors to within 1/16 of the insulation in molten Sn63 solder at $500^{\circ} \pm 20^{\circ}\text{C}$ for 4 to 6 seconds.

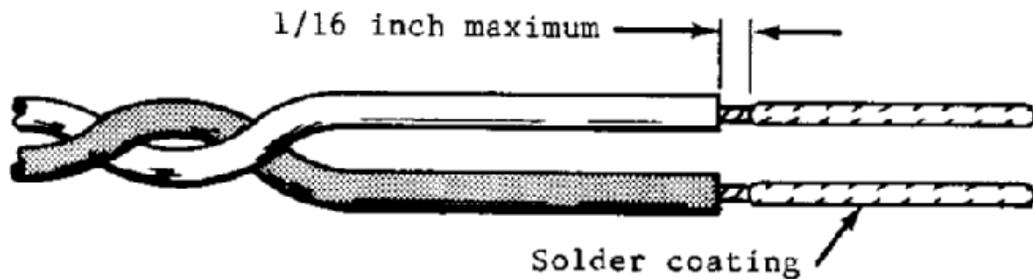


Figure 5-3. Pretinning Wires

5. Remove flux residue using isopropyl alcohol.

WARNING

Isopropyl alcohol is a volatile, flammable liquid which may cause burns if ignited. Do not use near open flames or electrical sparks.

6. Trim wires as shown in Figure 5-4 or 5-5.
 - o Use the AD-1298 trimming tool for accurate strip lengths of 0.200 and 0.400 inch.

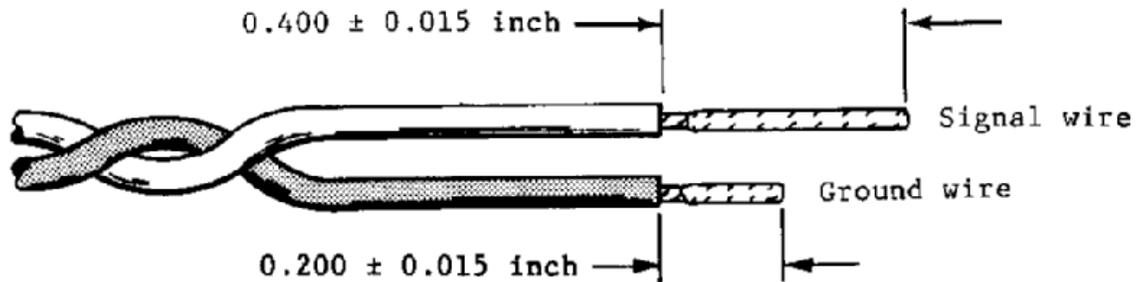


Figure 5-4. Trimming Dimensions for AWG 24 and 26 Wires

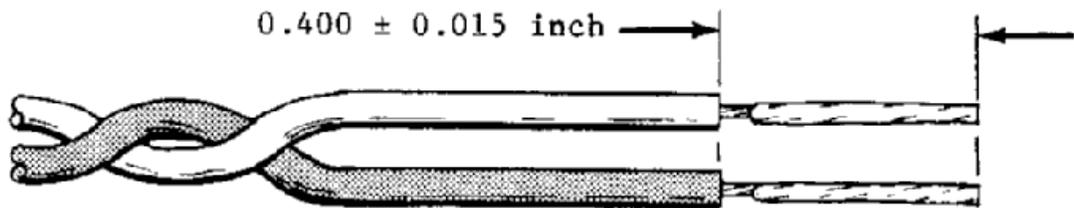


Figure 5-5. Trimming Dimensions for AWG 28 and 30 Wires

7. (AWG 28 and 30 only) Bend the ground wire as shown in Figure 5-6.
 - o Use the AD-1576 bending tool to assure that the wire is bent into the proper radius.
8. Make sure that the end of the signal wire is straight.

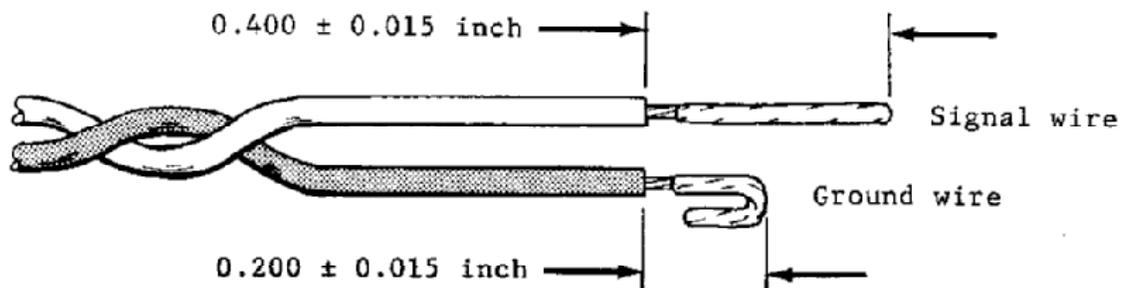


Figure 5-6. Bending Ground Wire of AWG 28 and 30 Wires

5.2 Inserting Prepared Cable Into Contact

Insert the signal wire into the inner insulating sleeve, and insert the ground wire into the space between the inner sleeve and the outer sleeve at a point opposite from the inspection windows (Figure 5-7).

- While pushing the wires in, rotate the contact slightly back and forth to prevent the wires from catching.
- Insert both wires until they bottom inside the contact.
- If the wires cannot be positioned correctly, remove them and check for improper strip dimensions, splayed or bent conductors, and excess solder on conductors.
- The end of the insulation of both wires must be visible through the heat-shrinkable sleeving, and both wire conductors must be visible between the wire insulation and the contact body.
- The signal conductor must be visible through the inspection hole near the middle of the contact. It may be necessary to use magnification and to move the signal wire slightly to see it.

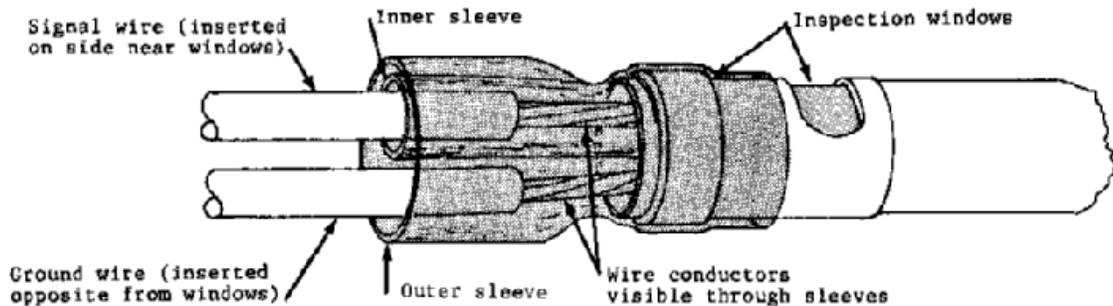


Figure 5-7. Inserting Wires into SolderTacts Contact

5.3 Heating Procedures

If using the IR-1044 semiautomatic heating tool, proceed to Paragraph 5.3.1.

If using manual heating tools, proceed to Paragraph 5.3.2.

5.3.1 Heating Procedure: IR-1044 Two Station Heater

1. Set up the IR-1044 heater according to the IR-1044 instructions.
2. Heat the contacts according to the IR-1044 instructions.
3. Inspect the completed termination as directed in Section 6.0.

5.3.2 Heating Procedure: Manual Heating Tools

- **IMPORTANT:** The AD-1319 holding fixture and adapter or the AD-1481-H repair holding fixture must be used, to prevent damage to the contacts.
1. If the AD-1319 holding fixture is to be used, install the AT-1319-12 adapter and set the dimensions as shown in Figure 5-8.

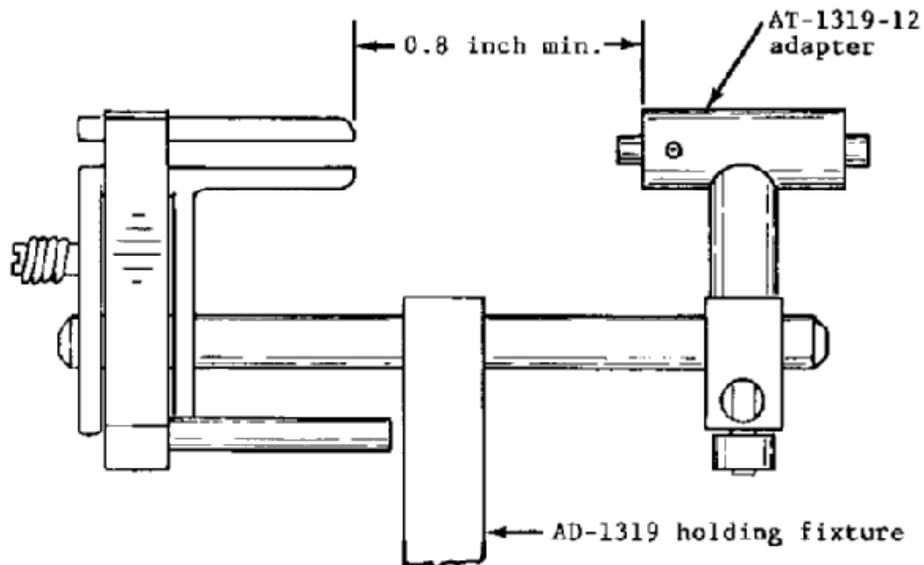


Figure 5-8. Setup Dimensions for AD-1319 Holding Fixture

2. Fixture the contact/cable assembly in the AD-1319 holding fixture (Figure 5-9) or AD-1481-H repair holding fixture (Figure 5-10).
 - Insert D-602-0288 outer pin contacts into the "P" end of the adapter or repair holding fixture.
 - Insert D-602-0289 outer socket contacts into the "S" end of the adapter or repair holding fixture.
 - Aim the inspection windows so as to face toward the hot air stream and allow the inner contact to be seen during heating.
 - The cable must remain fully inserted in the contact.
 - The contact must be fully inserted in the adapter or fixture.
 - The cable must be straight between the contact and the cable clamp of the AD-1319 holding fixture.
 - The ground conductor must be positioned away from the rear inspection window.

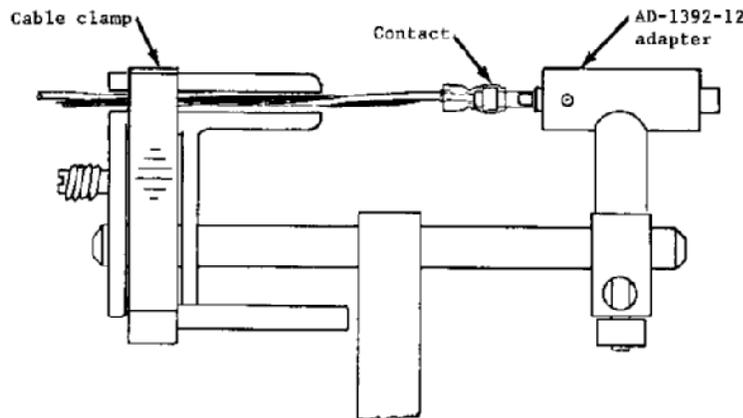


Figure 5-9. Contact Inserted into AD-1392-12 Adapter

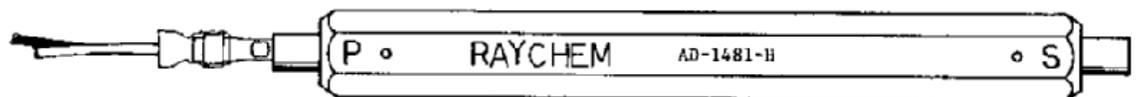


Figure 5-10. Contact Inserted into AD-1481-H Repair Holding Fixture

3. Heat the contact using one of the heating tools listed G Section 3.0.
 - Use the appropriate reflector listed in Section 3.0.
 - Allow the heating tool to warm up before contacts are heated.
 - AA-400 SuperHeater: At least 30 seconds.
 - CV-5300 MiniGun: At least 2 minutes.
 - Position the contact in the heating tool reflector as shown in Figure 5-11, so that the inspection window nearest the middle of the contact is centered in the reflector.
 - Direct hot air at the inspection window nearest the middle of the contact until the solder preform for the signal wire has melted and flowed. The solder preform in the inspection windows at the rear of the contact should have melted and flowed by this time; if it has not, direct hot air at the rear inspection window until the solder preform melts and flows.
 - **IMPORTANT.** Allow solder to solidify before disturbing the contact or cable.
4. Inspect the completed termination (Section 6.0).

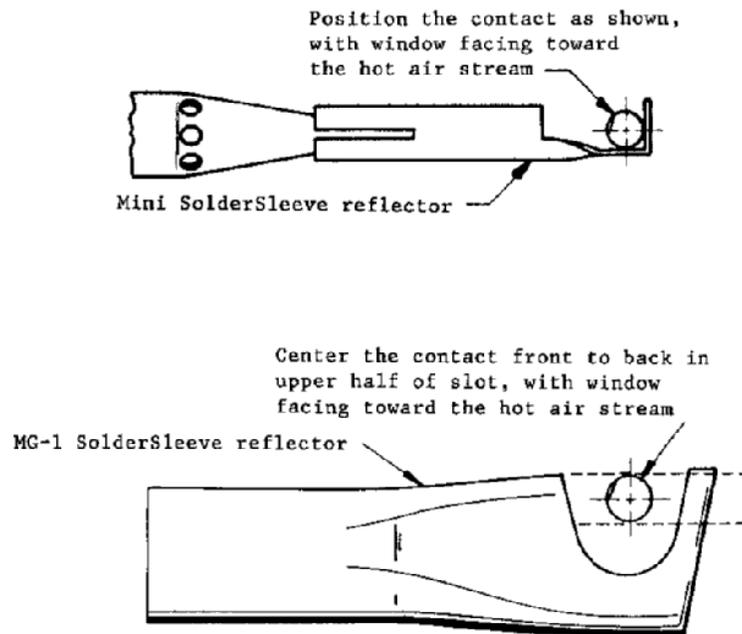


Figure 5-11. Contact Positioning in Heating Tool Reflectors

6. Inspection**6.1 Inspection for Correct Assembly**

Inspect the completed termination for correct assembly as follows (Figure 6-1).

1. The full width of the ground conductor must not be positioned in the rear inspection window. All or part of the ground conductor width must be located away from the inspection window.
2. The insulating sleeves must overlap the twisted-pair wire insulation.
3. The distance from the rear of the contact body to the ground wire insulation shall not exceed 0.120 inch.

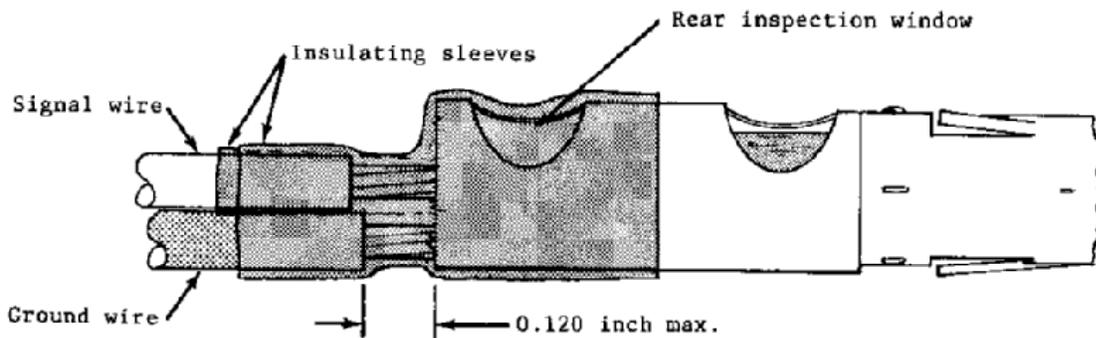
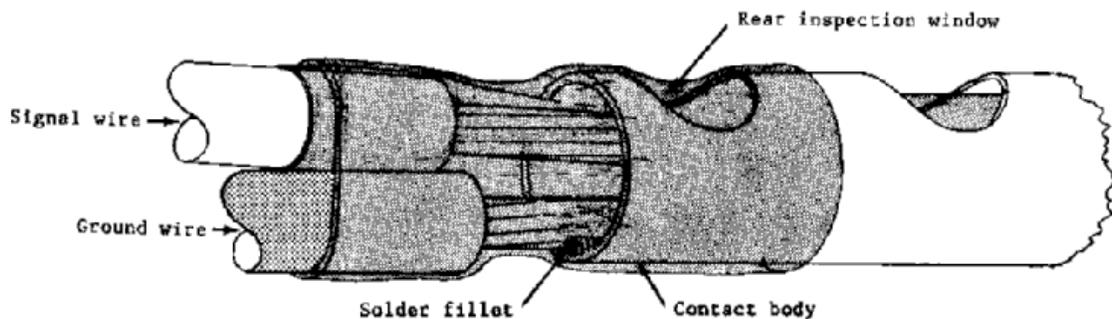


Figure 6-1. Inspection for Proper Assembly

6.2 Inspection for Proper Heating

1. The solder in the inspection window near the middle of the contact must be melted and flowed so that the original ring shape of the preform has disappeared, and a solder fillet is visible between the signal conductor and the inner surface of the contact.
 - Remnants of solder preform indicate underheating.
 - Lack of a solder fillet indicates overheating.
2. The solder in the inspection window near the rear of the contact must be melted and flowed so that the solder has flowed into the contact through the rear inspection window, and a solder fillet is visible between the ground conductor and the rear of the contact body (Figure 6-2).
 - The solder may leave a visible trace or shadow of its original shape around the outside of the contact body. This is acceptable as long as there are no remnants of the preform shape.
 - Remnants of solder preform indicate underheating.
 - Lack of a solder fillet indicates overheating.



3. The insulating sleeves must be shrunk over the exposed conductor between the wire insulation and the contact.
 - Complete shrinking of the sleeve ends over the wire insulation is not necessary, unless required to fit into a connector grommet.
4. The insulating sleeves must not be darkened such that the solder joints cannot be visually inspected.
 - If the sleeves are so dark that the solder joints cannot be visually inspected, the contact is overheated and must be rejected.
5. The twisted-pair cable insulation must not show signs of damage or overheating outside of the insulating sleeves.
 - Slight darkening of the insulation is acceptable.

7. Repair and Rework of Contact Terminations**7.1 Underheated Terminations**

1. Reheat underheated areas as directed in Paragraph 5.3.1 or 5.3.2.
 - Minimize heat application to areas that have been properly heated.
2. Reinspect as directed in Section 6.0.

7.2 Overheated or Improperly Assembled Terminations

1. Remove the contact from the cable as directed in Paragraph 7.3.
2. Check the cable for damage or incorrect stripping.
 - If the cable is damaged, cut off the damaged portion and restrip as directed in Paragraph 5.1.
 - If the strip length is incorrect, restrip to the required dimensions (Figure 5-2).
3. Install a new contact (Paragraphs 5.2, 5.3 and Section 6.0).

7.3 Removing Contacts from Cable

1. Slit the outer insulating sleeve full length on opposite sides of the contact using a sharp knife or razor blade.
 - **IMPORTANT:** Avoid cutting into the wire insulation.
2. Peel off the outer insulating sleeve with pliers.
3. Slit the inner insulating sleeve in the area outside of the contact body.

WARNING

Safety glasses must be worn during the following heating operation to prevent danger to eyes from hot solder.

- 4A. Using AA-400 or MiniGun. Without using the holding fixture, heat the contact until the solder melts. Then quickly pull the heated contact off the cable with pliers.
- 4B Using IR-1044. Heat the contact the same as for termination, but without closing the wire clamp. As soon as the heating lamp goes out, pull the cable out of the contact. If necessary, hold the contact with pliers while pulling the cable.