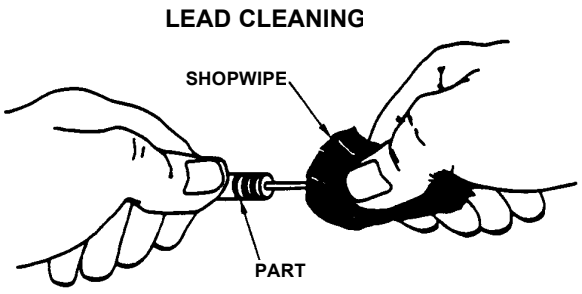
AXIAL LEAD (Straight Through/Clinch — Resistor, Diode, Polarized Capacitor)

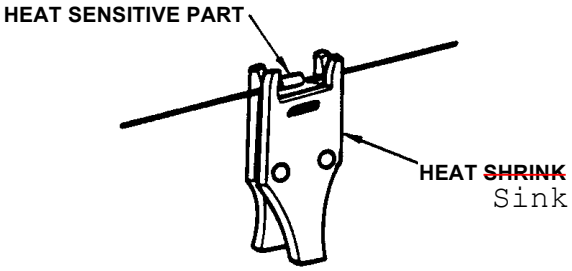
STEP 1. PREPARE THE LEAD

- *All part leads should be tinned and formed before mounting the part.*

  — *Paragraph 8.1-6c*



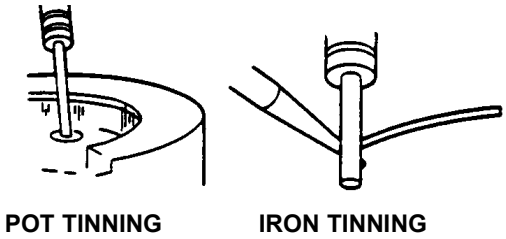
Prepare the part lead by wiping it with a shopwipe and solvent to remove the oxides.



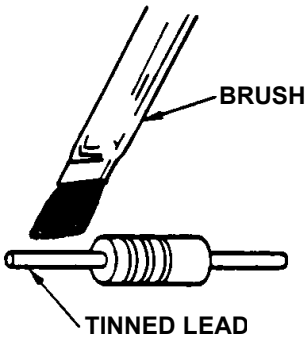
Attach a heat sink to those parts that require it.

If necessary, apply flux to the surface to be tinned.

Tin the lead either in the solder pot or by use of the soldering iron.



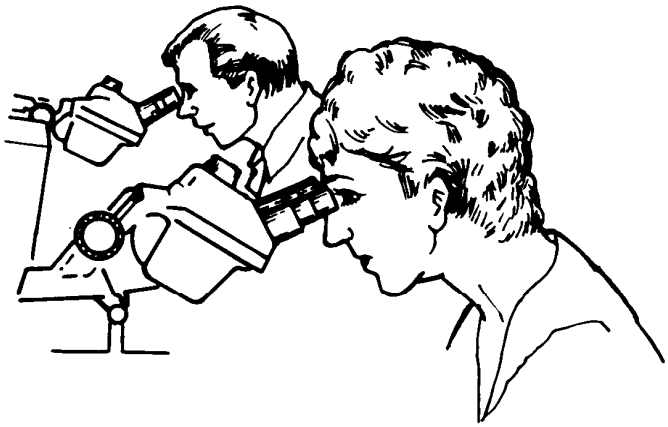
Clean the tinned lead with an acid brush, using the approved solvent and a shopwipe.



AXIAL LEAD (Straight Through/Clinch — Resistor, Diode, Polarized Capacitor)

1a. Inspect the lead tinning.

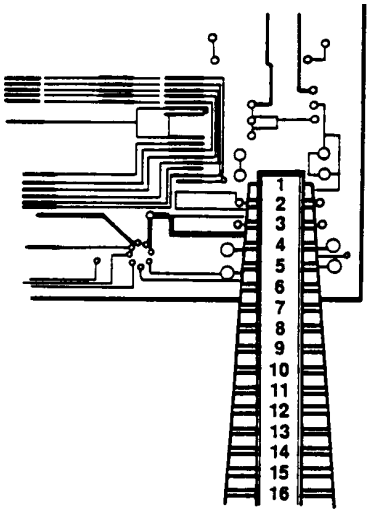
- *Hot tinning of solid conductors and part leads should not extend closer than 0.5mm (0.020 inch) to part bodies, end seals, or insulation unless the part configuration and mounting configuration dictate it.*
  — *Paragraph 7.2-5a*
- *Conductor tinning personnel shall ensure that the tinned surfaces exhibit 100% coverage.*
  — *Paragraph 7.2-6*



STEP 2. BEND THE LEAD

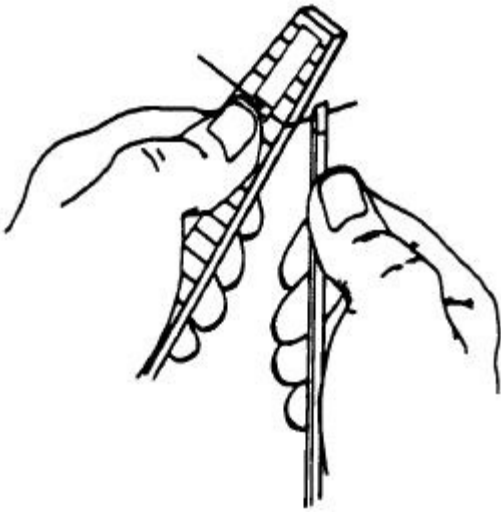
2a. With a Lead Bending Tool

To find the correct measurement, place the bending tool between the holes into which the part is to be inserted.



Position the part into the proper slot for bending.

While holding the part body in the slot of the bender, use an orange stick to bend the lead.



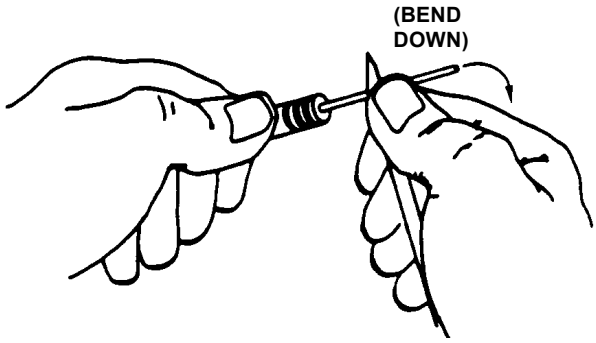
2b. With Orange Stick

Hold the part in one hand. With an orange stick (sharpened to a point) held against the lead to be bent, place the thumb of the other hand on top of the wire. Now bend the lead to the proper angle as needed.

- *The minimum distance from the part body or seal to the start of the bend of a part lead shall be 2 lead diameters for round leads and 0.51 mm (0.020 in.) for ribbon leads.*
- *The stress relief shall not be less than the lead diameter or ribbon thickness.*
- *Where the lead is welded the minimum distance is measured from the weld.*

— Paragraph 8.1-6a

LEAD BENDING WITH ORANGE STICK

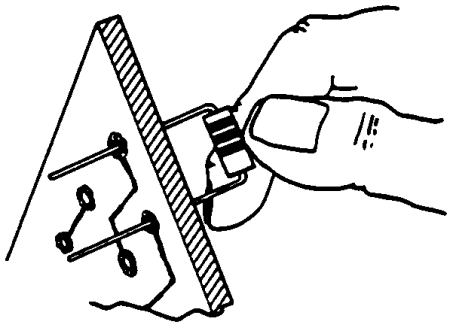


STEP 3. INSERT THE PART

Insert the leads into the holes of the PWB, and gently push the part until it bottoms against the PWB.

- *Part leads shall be formed so that they may be installed into the holes in the PWB without excessive deformation that can stress the part body or end seals.*

— Paragraph 8.1-6b

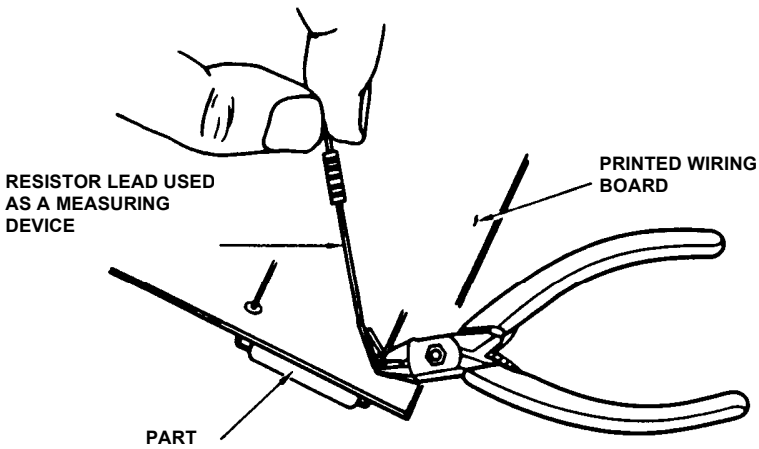


INSERT

STEP 4. TRIM THE LEAD

Turn the PWB part side down.

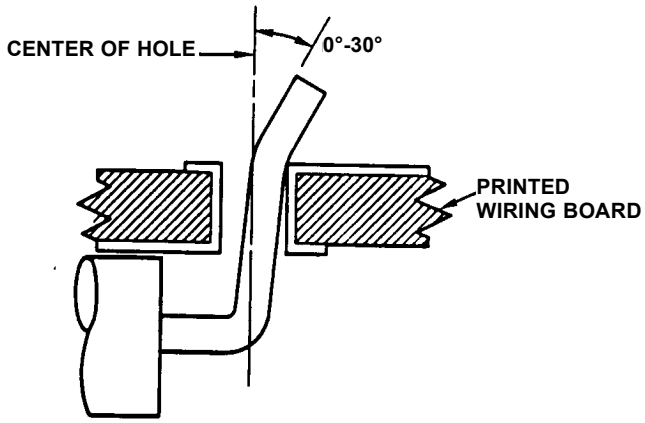
Place a measuring device on the PWB next to the lead in order to obtain the proper lead length.



Cut the lead.

- *Straight-through leads may be bent up to 30 degrees from a vertical plane to retain parts during the soldering operation.*
- *Part leads terminated straight through the PWB shall extend a minimum of 0.51 mm (0.020 in.) and a maximum of 2.29 mm (0.090 in.).*

— Paragraph 8.5-3

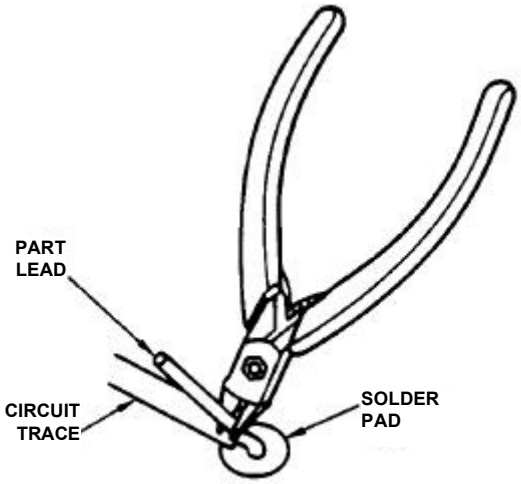


Clean the lead with a soft brush, using the approved solvent and a shopwipe.

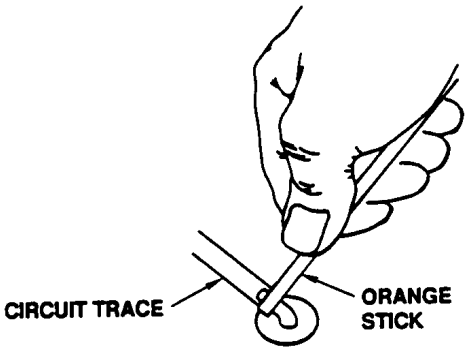
STEP 4a. CLINCH THE LEADS

Partially bend the lead in the direction of the trace.

Cut the lead.

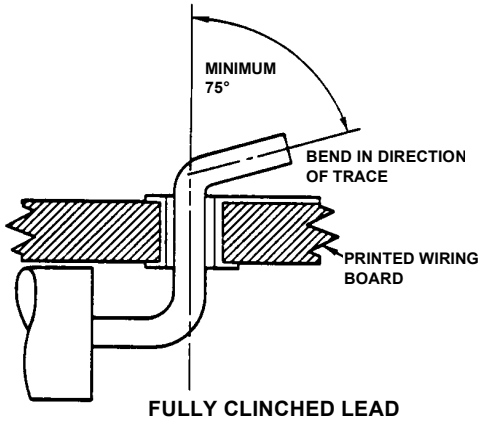


Using an orange stick, complete the bend.



- *The length of the clinched portion of the part lead shall be at least 1/2 the largest dimension of the solder pad or 0.78 mm (0.031 in.), whichever is greater.*
- *Fully clinched leads are defined as leads bent between 75 degrees and 90 degrees from a vertical line perpendicular to the PWB.*

— Paragraph 8.5-2



STEP 5. SOLDER THE LEAD

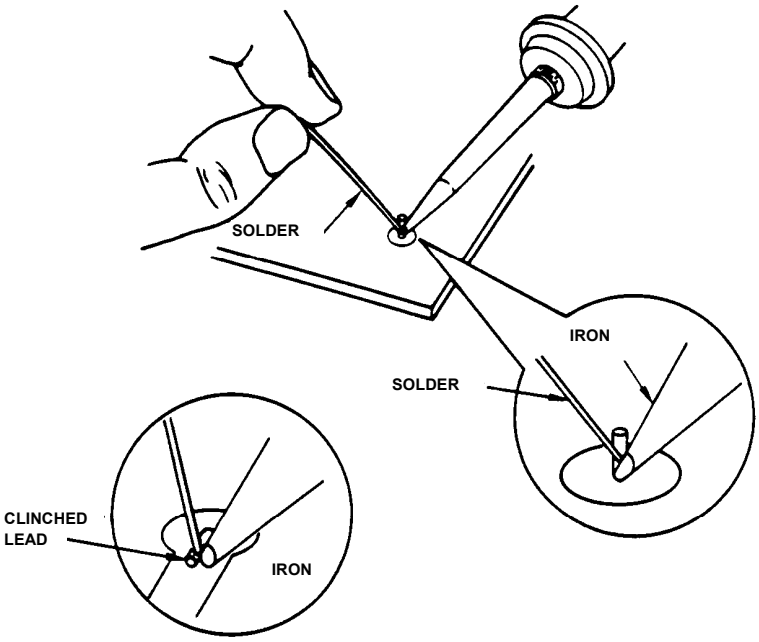
Position the soldering iron tip so as to touch both the lead and the printed wiring pad at the same time.

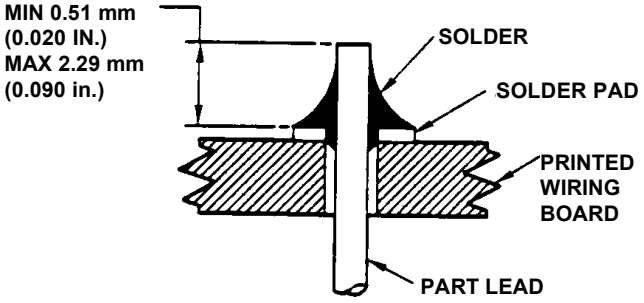
Apply solder to the junction where the iron and lead meet in order to produce a thermal (solder) bridge.

Touch the solder to the end of the cut lead to cover the exposed copper.

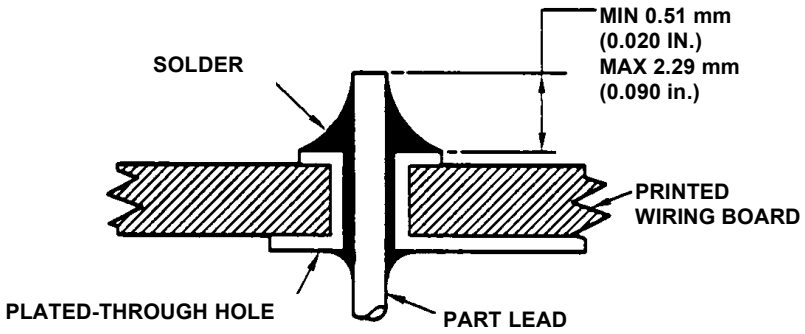
Add solder as needed to complete the soldered connection.

Remove the solder; remove the iron.





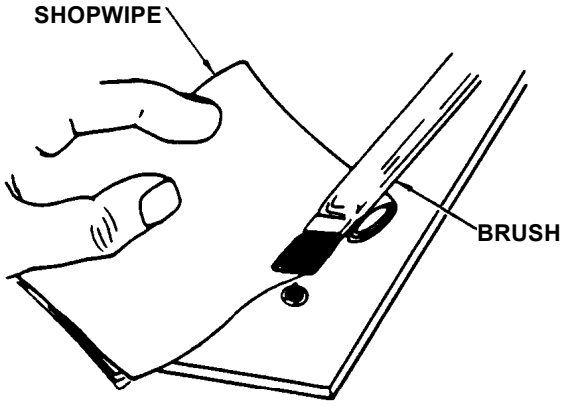
NONPLATED-THROUGH HOLE



PLATED-THROUGH HOLE

STEP 6. CLEAN THE CONNECTION

Clean the flux from both sides of the soldered connection with an acid brush, using the approved solvent and a shopwipe.

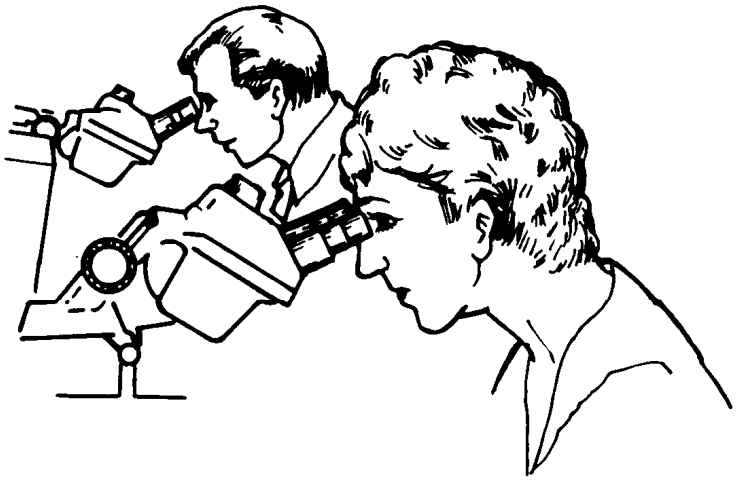


- *Ultrasonic cleaning shall not be used for cleaning assemblies that contain electronic parts.*
- *After cleaning, there shall be no visible evidence of flux residue or other contamination when examined.*

— Paragraph 10.4-2

STEP 7. INSPECTION

Inspect the solder connections under 4 X to 10 X magnification to the specified requirements.



- *The minimum distance from the part body or seal to the start of the bend of a part lead shall be 2 lead diameters for round leads and 0.51 mm (0.020 in.) for ribbon leads. The stress relief shall not be less than the lead diameter or ribbon thickness.*

— Paragraph 8.1

- *The length of the clinched portion of the part lead shall be at least 1/2 the largest dimension of the solder pad or 0.78 mm (0.031 in.), whichever is greater.*

— Paragraph 8.5-2

- *Part leads terminated straight through the PWB shall extend a minimum of 0.51 mm (0.020 in.) and a maximum of 2.29 mm (0.090 in.).*

— Paragraph 8.5-3

- *Free of flux residue and other contaminants.*
- *The surface shall be smooth and nonporous.*
- *It shall be undisturbed and have a finish that may vary from satin to bright.*
- *The solder shall wet all elements of the connection.*
- *The solder shall fillet between connection elements over the complete periphery of the connection.*
- *The lead contour shall be visible.*
- *The solder shall flow through a plated-through hole and bond to the lead and the solder pad on both sides of the PWB.*
- *A slight recessing or shrinkback of the solder onto the PTH below the solder pad is acceptable, providing the solder has wet the lead and on to the solder pad.*
- *Slight dewetting of the solder around the periphery of the pad on the part side of the PWB is not cause for rejection.*

— Paragraph 13.6

For detailed inspection criteria refer to NASA-STD-8739.3, Paragraph 13.6 and Appendix A.