



## ***Electronic parts are connected using solder***

### **The Soldering Process**

- Solder bonds metal together
- Usually copper wire and copper pads or terminals
- Metal must be hot enough to melt solder to make it “stick”
- *Always heat the metals and let them melt the solder*
- *Simply melting the solder alone makes a poor “cold joint”*

**Soldering temperatures are over 700 degrees F!**

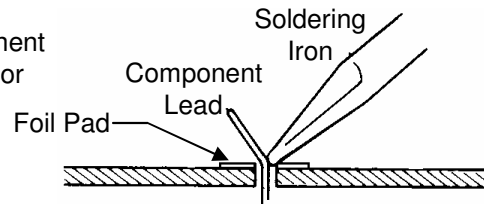
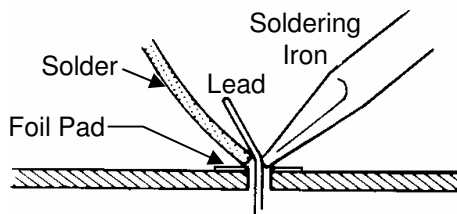
- **Be Careful**
- **Only touch the soldering iron insulated handle**
- **Never set the iron down anywhere but in its holder**
- **Wires will get hot. Hold them with a tool or not at all.**



## Soldering Procedure

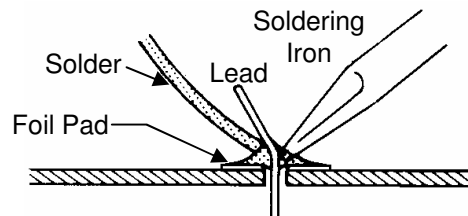
Soldering depends on all the parts being soldered getting hot enough to melt the solder. Wet the tip of the soldering iron with a little solder and position the tip to heat both the lead and the pad at the same time. Apply the solder so it is melted by the pad and the lead and not the iron directly.

1. Push the soldering iron tip against both the component lead and the foil pad on the board. Heat both for two or three seconds.



2. Then apply solder to the other side of the connection. **IMPORTANT:** Let the heated lead and the circuit board foil pad melt the solder.

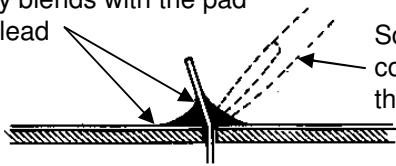
3. As the solder begins to melt, allow it to flow around the connection. Then remove the solder and the iron and let the connection cool without disturbing it.



Solder flows outward and gradually blends with the pad and the lead

### Good Solder Joint

Soldering iron positioned correctly, touching both the pad and the lead



### CAUTION

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- Wires will get hot. Hold them with a tool or not at all.

### Solder Bridge Faults

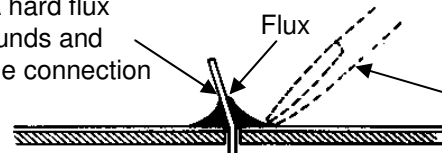
- Solder bridges can develop between adjacent leads, pads, or circuit tracks, and make unwanted connections.
- Bridges may occur if you accidentally touch an adjacent previously soldered connection, if you use too much solder, or if you "drag" the soldering iron across other tracks as you remove it from the connection.
- Always take a good look at the area around each connection before you solder it. Then, when you solder the connection, make sure the solder does not bridge outside the desired connection.
- If a solder bridge should develop, turn the board over and heat the solder between connections. The excess solder will run onto the tip of the iron and will remove the solder bridge.

Solder appears to flow inward and sit on top of pad



Soldering iron positioned incorrectly, touching only the lead

Solder does not flow onto the lead. A hard flux bead surrounds and insulates the connection



### Poor Solder Joints

Soldering iron positioned incorrectly, touching only the pad