

# Help on soldering

(<http://www.seas.upenn.edu/ece/rca/funstuff/soldering/soldering.html>)

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1. Use a good soldering iron with fine pencil tip.
  2. It is important to have a clean tip. Do not use very abrasive surfaces to clean polish the soldering iron tip. If the tip looks bent or damaged, it is worth replacing with a new tip.
  3. Please take all precautions while using soldering irons.
    - Solder on a fire resistant surface.
    - Never leave your iron plugged in and unattended.
    - Do not overload a wall outlet with too many electric appliances.
    - Never set your hot iron down on anything other than an iron stand.
    - To prevent burning your fingers, use needle nose pliers or heat resistant gloves to hold small pieces.
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Good soldering is a skill that is learnt by practice. The most important point in soldering is that both parts of the joint to be made **must** be at the same temperature. The solder will flow evenly and make a good electrical and mechanical joint **only** if both parts of the joint are at an equal high temperature. Even though it appears that there is a metal to metal contact in a joint to be made, very often there exists a film of oxide on the surface that insulates the two parts. For this reason it is no good applying the soldering iron tip to one half of the joint only and expecting this to heat the other half of the joint as well.

When the iron is hot, apply some solder to the flattened working end at the end of the bit, and wipe it on a piece of damp cloth or sponge so that the solder forms a thin film on the bit. This is tinning the bit.

Melt a little more solder on to the tip of the soldering iron, and put the tip so it contacts **both** parts of the joint. It is the molten solder on the tip of the iron that allows the heat to flow quickly from the iron into both parts of the joint. If the iron has the right amount of solder on it and is positioned correctly, then the two parts to be joined will reach the solder's melting temperature in a couple of seconds. Now apply the end of the solder to the point where both parts of the joint and the soldering iron are all touching one another. The solder will melt immediately and flow around all the parts that are at, or over, the melting part temperature. After a few seconds remove the iron from the joint. Make sure that no parts of the joint move after the soldering iron is removed until the solder is completely hard. This can take quite a few seconds with large joints. If the joint is disturbed during this cooling period it may become seriously weakened.

The hard cold solder on a properly made joint should have a smooth shiny appearance and if the wire is pulled it should not pull out of the joint. In a properly made joint the solder will bond the components very strongly indeed, since the process of soldering is similarly to brazing, and to a lesser degree welding, in that the solder actually forms a molecular bond with the surfaces of the joint.

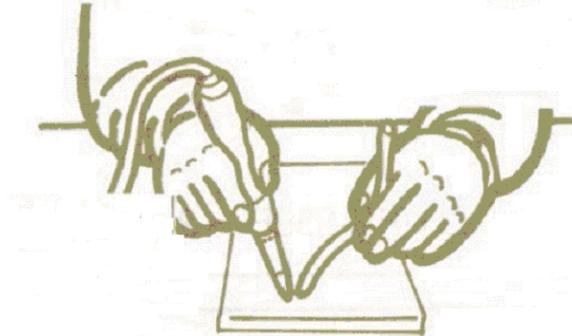
It is important to use the right amount of solder, both on the iron and on the joint. Too little solder on the iron will result in poor heat transfer to the joint, too much and you will suffer from the solder forming strings as the iron is removed, causing splashes and bridges to other contacts. Too little solder applied to the joint will give the joint a

half finished appearance: a good bond where the soldering iron has been, and no solder at all on the other part of the joint.

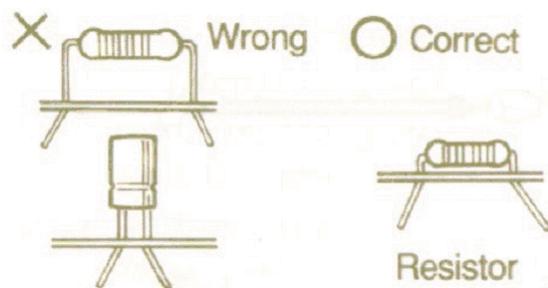
Remember it is much more difficult to correct a poorly made joint than it is to make the joint properly in the first place. Anyone can learn to solder, it just takes practice. (<http://www.irational.org/sic/radio/solder.html>)

## Procedure

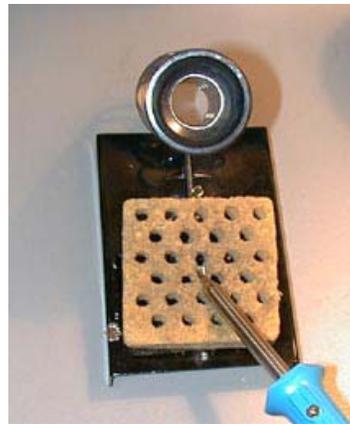
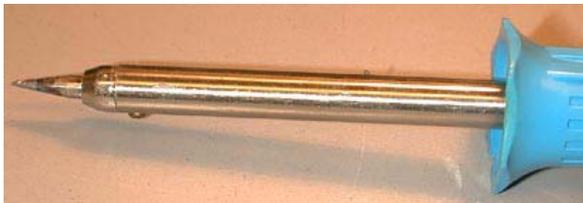
1. Handling of soldering iron.  
Melt the solder a little at a time. Hold the iron as though it were a pen.



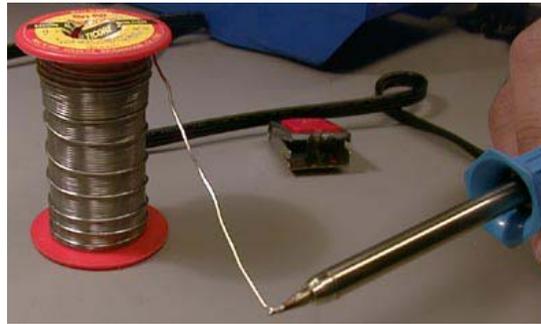
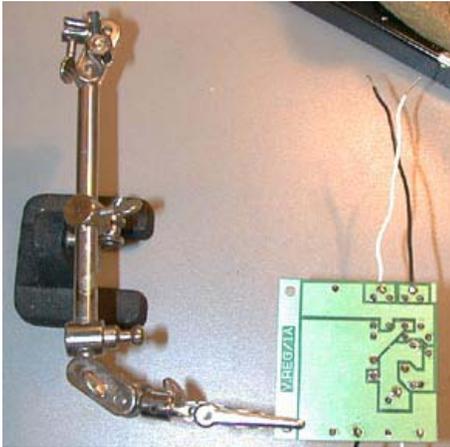
2. Correct way to install electronic parts



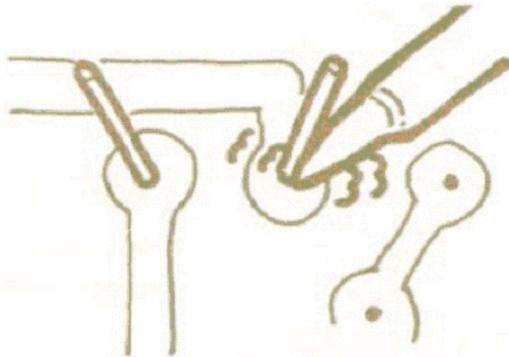
3. Make sure the tip is clean and fairly sharp. Clean the tip with wet sponge.



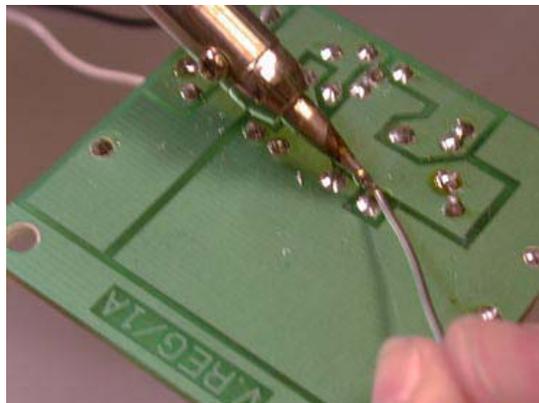
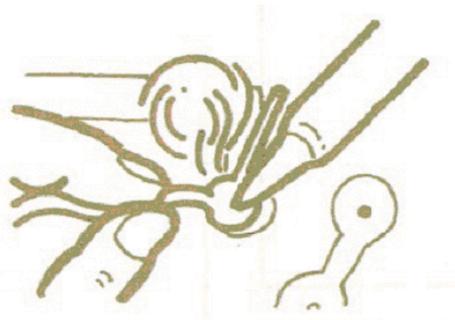
4. Use "helping hands" to hold the board. Melt little solder on the tip of the iron.



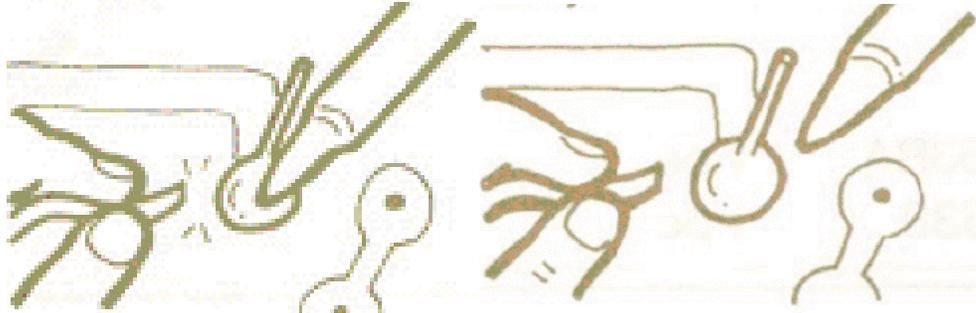
5. Preheat the area to be soldered by placing the iron tip on the leg and PCB trace for approximately 2-3 seconds. Make sure to heat both the part leg and PCB trace.



6. Keep the iron in place, bring the solder to this area and melt it for 1-2 seconds.



7. First, pull the solder away. Then, pull the iron away.



8. Cut the excessive leads with a cutter. The solder should cover both the leg and PCB trace.

