

“Bruce’s Top 25 Tips on Soldering”

The “Do’s” and “Don’ts” of Soldering

1. Do not turn on your soldering station until you are ready to use it.
2. Turn off your solder station when you leave to take a break, eat a meal, and when you quit for the day. It only takes about 20-30 seconds to several minutes (depending on the model/brand) to get up to temperature when you first turn it on. Always be sure to tin (apply fresh solder to) your tip when the iron is going to be idle in the stand.
3. Always try and use the largest tip that you can without over-extending your pad or land (“Land” is the copper portion where the solder will adhere to, along with the component lead). DO NOT allow the tip to make contact with the green (“Laminate” or the solder resist) parts of the board.
4. Use the largest size solder you can while maintaining control of solder joint (Control being to apply the correct amount of solder without excess remaining on solder joint).
5. To determine if you are maintaining control when the solder first starts to melt and you already have too much solder on the joint, you have lost control. Keep in mind 0.025” solder is about \$25 per pound roll and 0.010” solder is about \$100 per pound roll.
6. Keep your tip tinned when not in use and tin with the largest size solder you have at your workstation. It is cheaper, quicker, and does a better job.
7. If your tip will not tin, replace it! (Tip tinner is available to extend the life of an oxidized tip. Do not use the tip tinner on a new or used tip that will still tin properly). All tips eventually wear out due to heat and normal use. NEVER file a soldering tip. Once the plating gets even a pin hole in it, the molten tin will eat out the copper core of the tip very quickly.
8. On tips with heating elements built into the tips themselves, I.E. (Metcal, some of the Hakko brands, etc) NEVER use pliers to remove the tip from any of the irons, they will become damaged. Instead use the black heat resistant rubber “pot holder” supplied with those stations to remove hot tips.
9. Always tin a brand new tip with fresh solder as soon as it gets to temperature or oxidation will ruin the tip in a short period of time (15 minutes to 1 hour, depending on the brand/model of tip).

10. Clean your tip often in the metallic sponge or a wet sponge to keep the excess solder off your tip while soldering, and the oxidation minimized to allow for a better heat transfer. If you use a wet sponge, always use distilled or de-ionized water to wet your sponge. NEVER use city water or well water. When your sponge gets dirty and you have used both sides, replace it so old solder doesn't contaminate your tip when you are trying to clean it.
11. Try and always establish a heat bridge. ("Heat Bridge" is when you have a little bit of solder on your tip where it comes in contact with the termination/lead pad/land) to enhance the heat transfer between tip and solder joint.
12. Chisel tips provide a better heat transfer than conical (pointy) tips due to a greater contact area between tip and solder joint.
13. DO NOT press harder on the pad/land if you can't get solder to flow. (You can very easily cause a lifted, curled pad, or land). Just a light pressure should be sufficient if you have established a "heat bridge" and your tip is not oxidized.
14. Do not arbitrarily increase the temperature of the iron if you can't get solder flow. (You can very easily cause Measling, Delamination and/or a lifted, curled pad, or land).
15. If your tip is not oxidized and you have a "heat bridge" but solder still will not flow, try using a pre-heater (Hakko 853) to first warm up the circuit board. There may be large ground plane(s) in the board wicking the heat from your iron and not leaving enough heat to keep the metal at the solder joint hot enough to melt or flow the solder properly.
16. Solder will always flow toward the most heat.
17. ALWAYS try or whenever feasible, to feed the solder into the joint as far away from the tip as possible. This will insure a more uniform solder joint.
18. Do not solder multiple legs (DIPS, LSI's, etc.) next to each other in sequence. Soldering should skip 3 legs or so to prevent having two adjacent legs hot at the same time. This process will also reduce any chance of bridging across two adjacent legs.
19. Pulse the solder into the joint – This allows time for you to evaluate the solder quantity and quality of the joint. It also allows for fresh flux from the solder to be applied to the connection or solder joint.

20. The higher the temperature is set on your solder station, the shorter the lifespan of the tip. DO NOT leave your soldering station on the 800 degree setting for very long. This WILL shorten the life of the tip, and may cause problems during the next soldering job, if you forget to decrease the temperature of the station.

21. Rest the heel of your hand on the ESD mat, bench top, the circuit board, or something to steady your hand while soldering. Holding your hand up with no support is very tiring and hard to keep steady.

22. Be sure to position your tip to heat up both the pad/land and the lead/termination equally.

23. When using a microscope, be sure to have your soldering iron and your solder approximately in view under the microscope before you look into the microscope and then move your tools and hands into the final position while looking into the microscope.

24. When you're using desoldering wick, and you have used external flux, if the solder iron tip sticks to the wick and won't flow the solder, turn the station up to the next higher temperature range and the solder should wick up. DO NOT forget to turn you station temperature back down to normal temperature!

25. When using desoldering wick, keep your soldering pencil at a low degree angle and not too perpendicular to ensure you do not poke the tip through the wick and damage the board. Also, if the hot wick sits directly on the laminate ("green part of the board"), it can cause delamination and/or measling of the board. Industry standards dictates that Delamination ("Layers of the board are exposed or flake apart") is cause for scrapping out the board (especially a multi-layer board).