

Solder Tips: The Seven Habits of Highly Effective Solderers

By Bob Doetzer

In my 20+ years of working with the IPC – Association Connecting Electronics Industries as a trainer and master training center, I have seen just about everything related to soldering. Both good and bad, difficult applications and easy ones, I've seen it all. What I've learned is when soldering or reworking a printed circuit board (PCB), there are certain habits or skills that separate the rock star from the average technician. Below are seven of these traits that can help make you or your technicians soldering rock stars too:

1. Have the right tools in your tool box. This seems obvious but I have seen it violated over and over and not just at small companies with limited budgets. I have seen big companies (I won't name names) suffer this affliction as well. It seems obvious that you need the right tool for the job. After all, changing the oil in your car is not difficult but if the only tool you have is a hammer, it won't end well. The same is true for soldering and reworking PCBs. Do you only have an old solder iron? You need more tools! How about a good, well-maintained desolder tool? Hot air pencil? Thermal tweezer??? These are all essential tools for high-reliability soldering and rework for various applications. Invest in the right tool and the results can be amazing.



Using the right tool for the job is important. Weller's WT2M with WXMP iron tip is a highly flexible, compact soldering and rework station for versatile applications.

2. Be a student of the game. This also seems obvious but rarely do we take sufficient time to “sharpen our ax.” We have trained thousands of people over the years and many of them start the class thinking (and sometimes even saying out loud), “I've been soldering for 10 years, I could teach this class.” There is nothing more gratifying than to hear that same person at the end of the class say, “This was a fantastic class. I never realized how much I didn't know!” Techniques such as drag soldering, bridge fill and others are new favorites of almost everyone that goes through a training class. Our industry changes so fast. Don't just do today what you did yesterday. Evolve with the industry, learn new techniques and don't be a dinosaur.



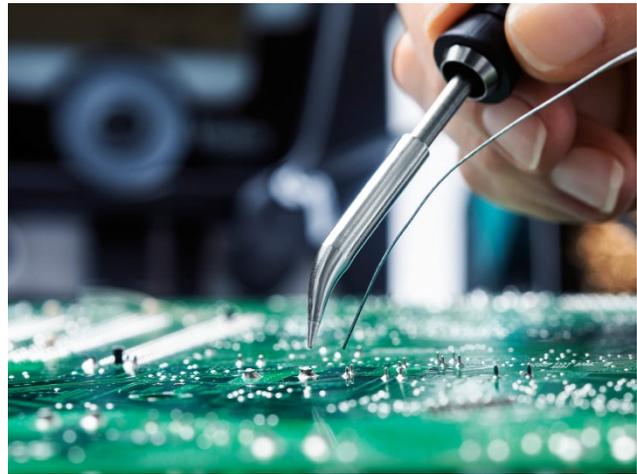
Regularly attending soldering training classes to keep up with the newest techniques is a beneficial way to keep your company relevant in today's fast-moving industry.

Dyan Reagan, global sales at Weller Tools, a leading soldering technology company, agrees with this tip. “To be successful, you must keep pace with the industry. Be ready to constantly move forward with new ideas and technologies because what works today may not work next week.” She added, “However, while staying updated with current technologies is important, it is just as important to keep your quality level high. If quality slips, not only is the operator at greater risk of being hurt but also your product may have more defects, which could have detrimental results.”

3. Use the correct tip. Too often I see people using the tip that is in an iron or desolder tool just because the tip was already in there. Is it really that hard to change a tip? The single simplest way to increase quality, increase throughput and decrease defects is to take the time to put the correct tip in the iron. And

with today's quick change cartridge tips, it usually can be replaced and up to solder process temperature in about 10 seconds. Seems like a good time investment for the return of increased quality and throughput.

4. "Mellow Yellow." Take it slow and easy when soldering. Don't try to solder too quickly. There is a definite optimal time to dwell on the solder joint to create the optimal intermetallic bond. Soldering too quickly might just mean you're putting out more defects. Also, related to that, be sure to use the right temperature and pressure (or lack thereof). Turning up the heat doesn't make you more efficient, it just makes you a faster defect generator. There is an optimum temperature for your applications. Do the engineering process work to figure it out and stick to it. Just as more heat doesn't result in more efficiency, the same is true with more pressure. Do you think you can push more heat into that tough multilayer PCB with heavy copper ground planes? That's like saying if I push the plug in the wall outlet harder, my belt sander will turn faster. Maybe you need preheat/auxiliary heat to accomplish the task correctly? If you don't have the expertise to do the process development work needed, look to a good vendor who can help or take a training class to learn.



Take the time to use the best tip for the job – it doesn't take long but results in increased quality and throughput.

5. Throw away the old sponge and replace it with a "brass wool" type tip cleaner. The wet sponge thermally shocks solder tips and creates micro cracks in the tip plating. These cracks allow oxidation/corrosion into the tip core and lead to premature tip failure. This is especially true with elevated tip temperatures for lead-free soldering. So, unless you like supporting your favorite tip supplier with extra purchases, lose the sponge.

6. Remove the old solder when doing rework. Don't reuse that solder. You're not saving any money and only a few seconds to remove it with a good desolder tool. When solder has been reflowed too many times, it forms a crystalline structure and sometimes loses its strength. Start fresh with new solder for long-term reliability.

7. Inspect your masterpiece. Don't just finish the job and send the board on to the next step in the process. Most of us can't see today's SMT packages with the naked eye so use a suitable inspection tool and take a minute to inspect your work, ensuring that it's as good as you think. It's amazing how much more you can see at 3, 4 or maybe even up to 10X magnification. Know the IPC-610 specification and what the accept, reject and target criterion are for your components/assemblies.

Here's a tip for the bonus round: always strive for IPC Class 3. If you must meet IPC Class 2, don't just settle for Class 2 because it is good enough. Strive for Class 3. It's not that difficult if you know how to get that level of quality. A little knowledge and process work can do wonders for your masterpiece (and your company's reputation).

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