Solder wicki

M. Simon

I like to do projects. I like to do projects that involve soldering. These days that means surface mount. And therein lies a tale. I design my own boards and get them produced by OSH Park [1] they do great work. I try to make the boards easy to solder. To see the little bits when I do do the soldering I use a pair of Foster Grants with 3.25 magnification that the first mate bought for me at WalMart. Soldering is a lot easier when you can see the small stuff.

I use a 45 watt Weller heater [2] with a pencil point tip. To control the temperature I use a lamp dimmer (My buddy Vic remarked when he heard that, "You are cheap." Yes I am.)

I make sure to use the 3 wire handle for the iron and also make sure that the metal conduit box the lamp dimmer is mounted in is sitting firmly on my grounding mat (black anti-static bags taped together [3] - I told you I was cheap). That minimizes the chance of an event that could upset your day - loose currents or static sting - both are hard on chips. I make sure I can see what I'm doing and to handle the parts with some ease, I use no passive parts smaller than 0603. Humans can handle those with tweezers.

I also keep around a fair amount of solder wick (thus "solder wicki" - heh) for the times when the solder gets smeared around. The way to prevent that (well reduce the incidence actually) is to make the solder lands for surface mount chips as narrow as possible. I generally don't pay too much attention to manufacturers recommendations. Those are for machine assembly and I am not a machine. Philips did suggest something that seems to help. Fatten the corner pads. You can do that aggressively without affecting the spacing between pads. I also like to lengthen the pads compared to suggested pad sizes. If you can keep your iron away from the pins it helps to lower the thermal stresses on the parts.

You can't solder surface mount by hand the way you used to solder DIP ICs. Remember the old admonition "apply the solder to the pins not the iron"? Well forget that. The idea was to get the rosin flux in the solder core to the pins and not boil it off with the iron. It makes a cleaner joint that adheres well to the board and

to the pin. What you do with surface mount is use a rosin pen to coat (liberally) the area you are soldering and apply the solder directly to the iron - there goes the rosin in the core - it does keep the solder on the iron clean - for a while. Then you touch the iron to the pad (avoid heating the part directly - chip IC or passive) and let the solder wick up to the component (more wicki - heh). This minimizes the amount of heat the component has to deal with. And as soon as the solder has wicked up to your component remove the iron and let things cool down a little. Then do the next pad the same way. Or the next corner pad in the case of an IC - making sure everything still lines up. If not get out the wick and try again. Don't be in a rush - cooling time is good. You want things to get warm but not hot.

I have made a number of boards this way with pretty fine pitch ICs, down to .65mm pin spacing. I had excellent results. So I got cocky. I went to .5mm and I met my match. I fought those chips for hours. I finally got them laid down but the board didn't work. Did I get the chips too hot? Did I leave an "invisible" solder bridge? I don't know because I didn't investigate. Fortunately the chips that gave me trouble are available in .65mm lead spacing. So I redesigned the board with the easier (for me) to solder versions of the chips.

Let that be a lesson to you. Don't get cocky kid. Or: the road of excess leads to the palace of wisdom. For It is only when you have had too much that you know how much is enough. That is a William Blake quote - approximately. I never knew he was into soldering.

M. Simon's e-mail can be found on the sidebar at Space-Time Productions [4].

Engineering is the art of making what you want from what you can get at a profit.

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