

Little Things are Important SMD Hold Down Fixture Adventures

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SMD Beginnings

I have been dabbling in surface mount technology off and on for a couple of years. The trip has been both fun and a bit frustrating. Most of the frustration comes from the fact that; I have poor eyesight, I am not coordinated enough to walk and chew gum at the same time, my hands are very arthritic, and like most older geezers...I complain too much about what I cannot do. The fun comes from the learning a new skill and building stuff that works. My first SMD project was an ambitious one. It was a N2PK Vector Network Analyzer (VNA). I hand soldered the thing and by golly it worked! It works so well that is one of the single most used piece of test gear on the WA!FXT bench. However, one of the many things I learned was that I was going to need to some new tools. And, I learned not to drink too much coffee or beer when trying to solder this stuff.

Why Do SMD?

Let's face it, leaded parts are disappearing. We will either have to keep up to date and learn newer skills, or, our home brew activities will cease when the junk box runs outta leaded parts and the suppliers no longer sell them at reasonable costs. Can you do SMD stuff? My answer has to be my standard answer. If you want to do it, you will. It is just a matter of patience and making sure you find/build the right tools. Your patience and perserverance will pay off.... And...you can brag about how smaller is better!

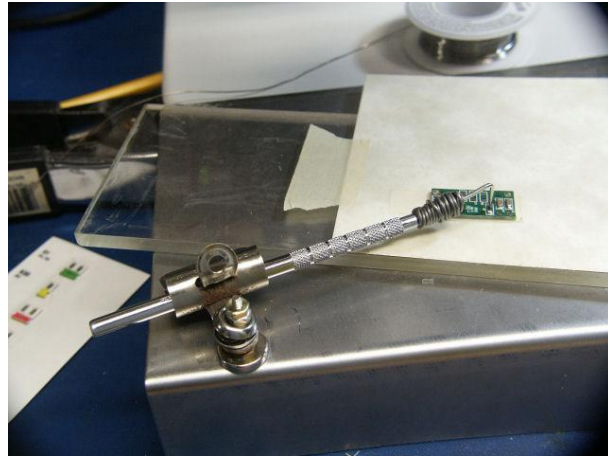
Tools and Stuff

There are a number of ways to solder surface mount stuff. You can bake boards in ovens with the cakes, blow dry them with hot air machines (then do your new hairdo), fry them in electric frying pans without the pork chops, or just hand solder them. Each method has it merits and negative aspects. There has much written on the Internet about all these methods. After trying all of the above methods, I returned to hand soldering. My hands hated me and swelled up a lot. But, I find the hand method cheap and least frustrating for me. After I bought an inexpensive boom stereo microscope the task become much easier. Your hand to eye coordination is very important and just does not exist if you cannot see what you want to touch.

After buying the new eyes, the next task was keeping the PCB board an SMD parts from running around the bench. The board was easy to tame. Double sided tape and clamps were invented for this kind of improvisation. But, keeping the SMD parts in place while they are being soldered is another matter. So, I needed a fixture to hold the SMD parts down to the PCB while I fixed their arms and legs to the traces.

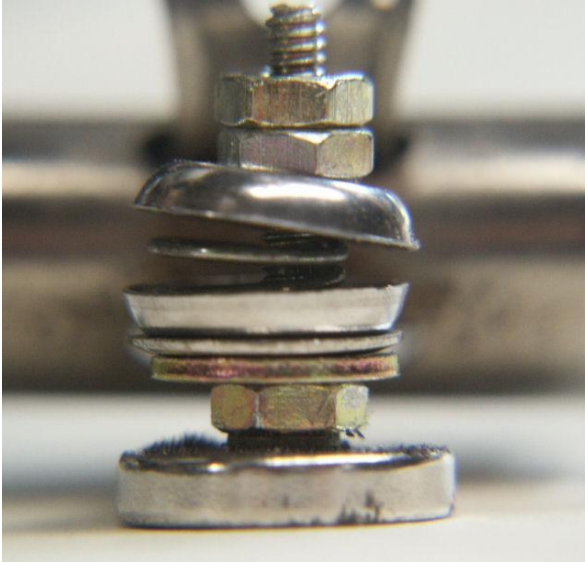
The Hold Down Fixture

Looking around the lab and junk box here is what I came up with.



I think the total cost would be about \$5 if I bought the parts. I managed to find all the parts in the junk box on the hardware bench. A large paper clip holds the dental pick in place. The dental pick was from a set of five I bought at Dayton for \$3.00. The point must be filed to a flat shape. The sharp point and SMD parts do not like each other. The SMD part will jump off the workbench if it stabbed with the needle sharp point. Wouldn't you jump too if you were stabbed with a sharp pick?!!

The most important part of the fixture is the support post. Here is how it is made up:



Starting at the bottom, here is the parts buildup:

Rare Earth Magnet with a center hole
4-40 Screw up through the center hole
#4 Lock Washer
4-40 Nut
#4 Flat Washer
#6 Finishing Washer
 $\frac{3}{4}$ inch spring from a ball point pen or hardware store
#6 Finishing Washer
#4 Flat Washer
Double 4-40 nuts

I had all this stuff in the lab. None of these parts are rare as hen's teeth. They all can be bought at the home center. Needless to say, the hold down fixture will not work unless your table is steel materials. I use an old steel chassis to support the project for soldering. The table, or chassis, is clamped to the microscope support table.

Adjustments

You need to adjust the tension on the spring to make this thing work. Tighten or loosen the double nuts at the top of the support post. The tension needs to be "just enough" to hold the SMD part down on the board firmly. The tension will also depend what type of spring you use. After some futzing, I got mine to work just right. Placing a small dab of paste flux on the PCB pads will help keep the SMD part from sliding when soldering the first joint.

I hope this little suggestion is usefull for youse. Let me know if you have any improvenments or questions about what I did.

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