

# Build This Simple SMT Station

*Dinner and a movie? How about pizza and a project?*

*SMT parts are rapidly becoming the "norm" in consumer electronics manufacturing. This "home-brew" device can make the learning and building process with SMT devices a more pleasurable event.*

**M**y initial entry into the hobby was during the generation of tube-type gear (and yes, I'm older than many and younger than a few). I then went to solid state and now have progressed to SMT (surface mount technology) devices. Not wanting to be "left behind," I've been thinking of trying a project using SMT.

SMT, as it's called, is becoming more and more the standard of the industry. That's not to say that all parts are being replaced by these miniature devices, but it sure seems to me that there are many more projects designed around them now than in the past. The manufacturers of consumer electronics can produce these parts more economically than "through-hole" items. Then there's the placement of parts on an assembly line, where robotics can handle the task effectively using the newer devices. Lately, most of the consumer products I've obtained were constructed using this technology. The "writing is on the wall," or should I say, the "chips are on the board."

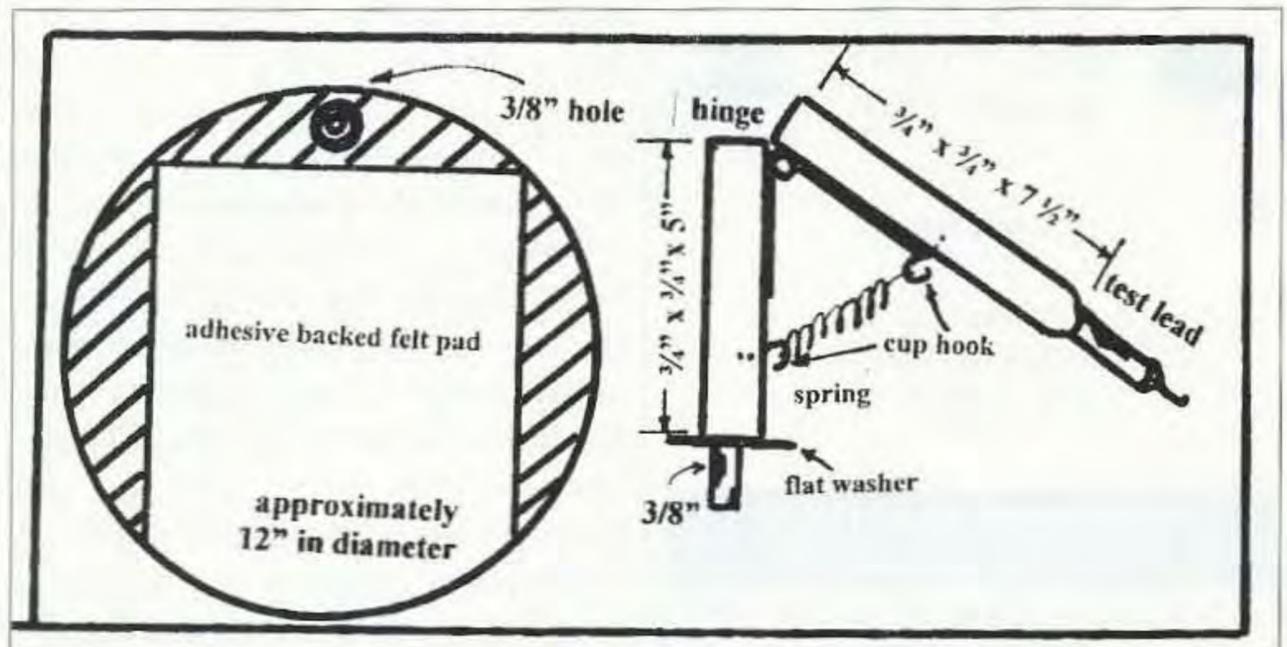
That's what progress is, I suppose: adjusting your skills to coincide with technology. In April, at *Atlanticon 2002*, W2GUM sported an impressive SMT work station as an entry in the

home-brew event. His design is a square, padded work surface, with a machined-brass weighted and adjustable arm, and a padded "turntable" at the business end where construction could take place. Very neatly done and a testament to his skill as a machinist.

I was very impressed by the design and construction of his work station, but keenly aware that not all of us are machinists, capable of duplicating that device — least of all, me! I am fairly

comfortable working with common hand tools and a few "home owner" power tools, and I suspect that many of you are also. So why not make your own station, using easier to obtain materials, while using the tools that most of us either have or can borrow?!

The initial thoughts for design were centered on using a "pizza pan" as the base for the project. This proved to be a poor choice, because the structure of the pan was of such thin sheet metal



**Fig. 1.** Dimensions of the base and hold-down device are approximate. They were selected to use the wood "stock" I had on hand to match the "hobby hinge," and the base size is the remaining "stiffener" for the pizza pan. The primary requirement is, however, to have the test lead point become usable in the lower half of the working surface.



**Photo A.** The completed SMT work station, ready for operation. Not high-tech or difficult to build, it does make assembling a surface mount project much easier to do.

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that flexing of the pan caused by the tension-producing arm would pose a problem.

Using the pan as a template, I cut the same-size disc from a composite wood material, expecting to use it as a "stiffener" under the pan. I then realized that the surface treatment on the pan was a "no-stick" material, and had the work station been completed, the circuit board would likely be sliding around uncontrollably! I wish I had realized that *before* I bought the pan! So the pan joins the pile of "good thought, bad idea" stuff.

The wooden stiffener, as a base, has proven to be the best answer. The attached drawing, (Fig. 1), gives measurements I used to create my work station. The measurements aren't critical; they "fit" my device. Your overall dimensions can be modified to fit your parts. Keep in mind, though, that the pressure point (i.e., the part that holds the SMT to the board) should fall approximately in the lower third of the work surface. I had a test lead probe in my junk box just longing to become part of a project. A "push point" ballpoint pen housing, I suppose, would have worked equally well, provided of course that the pen part was eliminated and a finishing nail of suitable size was epoxied into the housing in its place.

I filed the end of the nail to rest flat on the part being placed, having found that the point originally there marred the surface of the part. Spring tension is a matter of "guess and stretch." Don't make it so tight that the part either breaks or can't be moved. Just enough tension to hold it down firmly but allow it to still be movable. The arm assembly sizes were chosen to fit the hobby hinge (3/4" wide) and the 3/8" test point I had. You might have to adjust dimensions to fit your materials. The flat washer epoxied to the base of the shortest "arm" aids in stability by providing a larger flat surface for the arm to move on.

The felt surface applied to the wooden base serves two functions. First, it holds the project circuit board to protect it and stops it from sliding, and secondly it provides a convenient contrasting color apart from the parts being installed. Black or white parts are more visible on the green surface and therefore easier to keep track of. (See **Photo A.**)

And there you have it! An SMT work station that cost almost nothing to assemble. Construction time varies with the user's abilities and can be modified to fit your needs or available parts. It's small enough to be stored in a desk drawer when not being used, but somehow I suspect that it won't see the insides of the drawer for some time to come.

Now, when the gang shows up, I can offer them pizza. After all, I do have one very new, very unused pizza pan from the beginning of this project. **73**

12-inch diam. wooden base
8-1/2-in. by 11-in. self-adhesive felt pad
Feet, 4 each
Cup hooks
Hobby hinge (hasp and staple assembly available at Home Depot)
Test point or ballpoint pen casing
Finishing nail
Epoxy or glue
Spring
Flat washer

**Table 1.** Parts list.