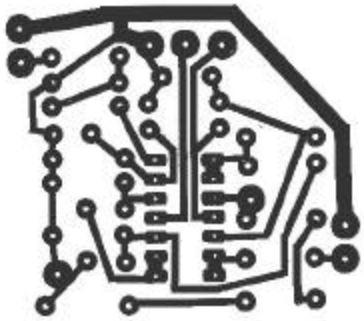
Drum Trigger Project

Based on Ray Wilson's Drum Trigger Circuit for the Sound Lab

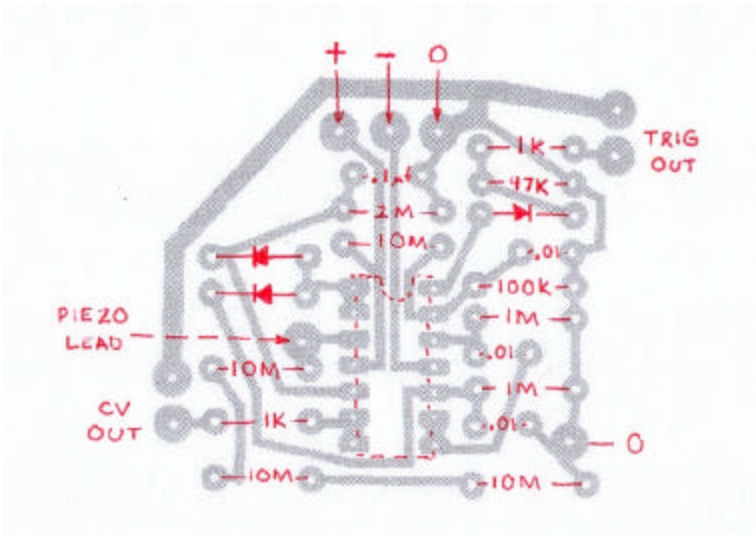
Modular analog synthesizers allow so many options for control that one could spend all of one's time experimenting with different controllers. I certainly spend an awful lot of time involved with such projects. Fortunately, there are individuals who provide the synth DIY crowd with circuit designs that facilitate these obsessions. After working on numerous sequencer circuits, for example, I found that a certain Ray Wilson had designed exactly what I'd been searching for. Better still, he offered a PCB kit for a very reasonable price. I hit the Paypal button without hesitation and built myself a very nice sequencer without having to mess with designing, prototyping, modding and troubleshooting. As I said, however, controllers are a bit of an obsession.

Not being a keyboard player, I want my synth to either play itself or be controlled by any number of physical adaptations. I had already designed and built a working ribbon controller from readily available materials. Ray Wilson's Drum Trigger project got me thinking about a bongo-like control device. Since the circuit details were already worked out, how hard could it be? Please note that none of the dimensions or materials are terribly important. This is simply what I did with stuff found in the trash. Test the materials and parts you intend to use before building the finished product.

Ray's circuit was put together on a solderless breadboard and tested with 1" piezo elements purchased from a surplus shop (http://www.sciplus.com/) for 40 cents each. It worked as expected, so I made 2 PCBs for the project. Instead of the LF444, I used some TL084s from the parts stash. Also, the 2M resistors were replaced with common 2M2 values. Here is a scan of the foil side of my hand-layout PCB:

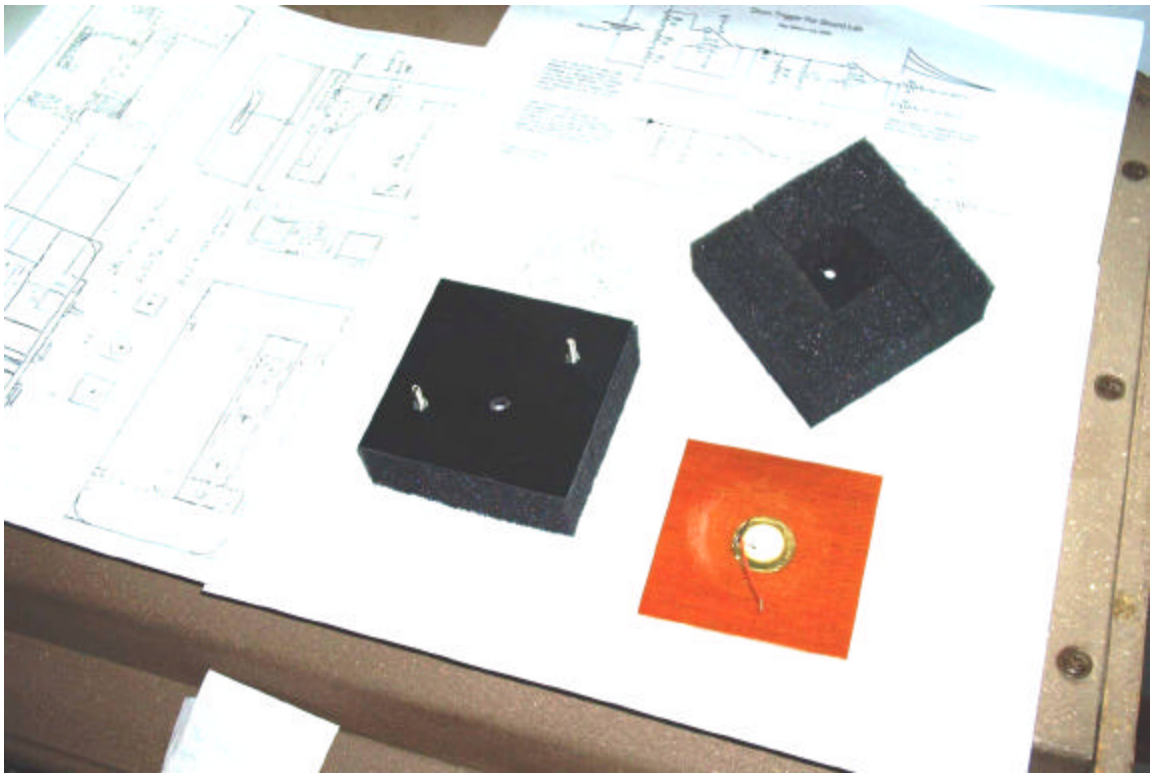


This is the parts placement guide for the PCB:



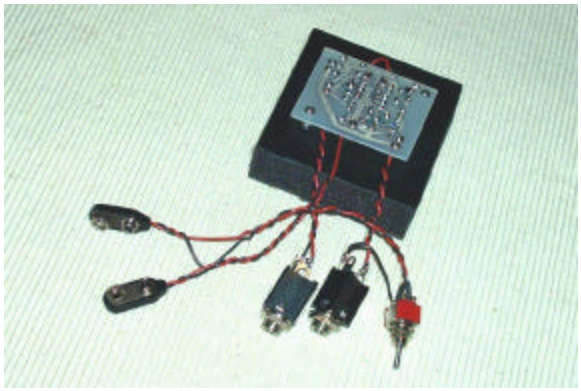
The bongos will be powered with two 9-volt batteries providing positive and negative voltage. Honestly, there is no advantage to battery power as the device is already going to be tethered to the synth with up to four cables. I just didn't feel like cluttering things up more than they are. To switch the battery power on and off, you will need a DPDT switch. Wire the red wire of one battery snap and the black wire of the second to the center terminals of the switch. Jumper one set of poles together and connect to any 0-volt (ground) point. The remaining wires of the battery snaps are soldered to the PCB at the respective positive (red) and negative (black) pads.

I wanted my drum trigger project to play like a set of bongos. For greater sensitivity, the piezo elements were epoxied to a 2.75" square piece of 1/16" thick phenolic board. Each drum trigger would be a separate module. This was made by gluing rectangular foam pieces onto a 3" square piece of scrap plastic. The plastic was drilled for the element wires and two #4 x ¾" screws which would serve as mounting studs for the PBC. The phenolic piece was then glued to the foam, centered, with the element inside the structure and the wires protruding from the hole in the plastic bottom. The adhesive used for gluing to the foam was RTV silicone. When placed in the as-yet unfinished case, the phenolic "drum head" will be completely isolated from the rest of the unit. This was done to prevent triggering due to vibration between the elements. The photos should make the construction clear:



The populated PCB gets mounted to the module on the studs after all the external wiring is in place. Note that the thin element wires got a drop of silicone adhesive to keep them from being yanked out of the piezo element:

Here's the completed module:



Next, I'll be making the wood case for my bongo modules. The second module will be connected to the battery power wiring, but will otherwise operate independently. Each "drum" of the bongo set will have one trigger and one CV output. The bongo case will be constructed to resemble regular bongos, though square, and will fit on a normal bongo stand if needed.