



After purchasing my TRS-80 Model 4GA and working to get out up and running, I quickly discovered that several important keyboard keys weren't functioning correctly. The shift keys were displaying the I and H characters (see picture) respectively and the B, H, I, J, K, L, and N keys were all behaving erratically. Since both shift keys were not functioning correctly there weren't many commands I could carry out.



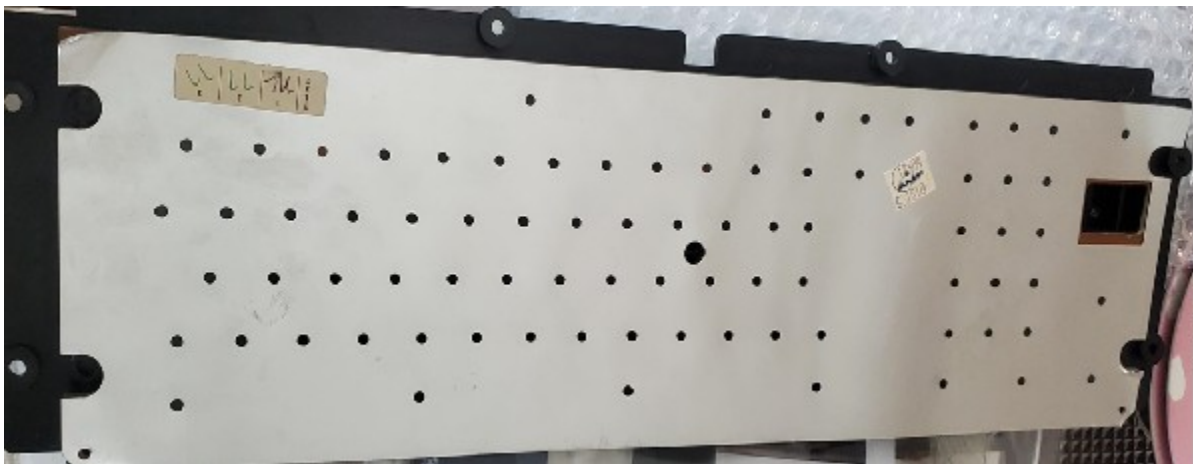
Testing all the major keys produced this set (Note how I, H, K, N, and L were always capitalized, and no B):



I dismantled the entire keyboard, cleaned all the membranes, reassembled it, and now all the keys work correctly. I thought I would share this procedure with the community.

## Process Used To Repair Membrane (alps) Keyboard on TRS-80 Model 4GA

Remove all of the keys & large springs on the top-side of the keyboard. This will enable you to thoroughly wash the entire plastic keyboard structure later in the process.



On the underside of the keyboard, gently pry off the metal foil backing. Do your best not to deform or tear it because you will need to reinstall it later!





Use a box cutter knife to break off only the tips of each plastic peg (melted fasteners), and then slowly work to remove the hard "Formica-like" (e.g., circuit board material) backing plate.

Be very careful not to crack this thick plate because it's essential to supporting the keyboard membrane. Be certain all the tips are removed before attempting to remove the hard backing plate. Also go gently near the Mylar cable areas.



Go slowly when separating the hard backing plate so as to not break any of the plastic pegs. These are essential to hold everything together!



After gently removing the backing plate, remove the first membrane Mylar sheet. It's important to keep track of each Mylar sheet for correct reassembly. This first sheet has large holes around each key location which serve to provide a landing spot for each small "under key" spring (more on these later).



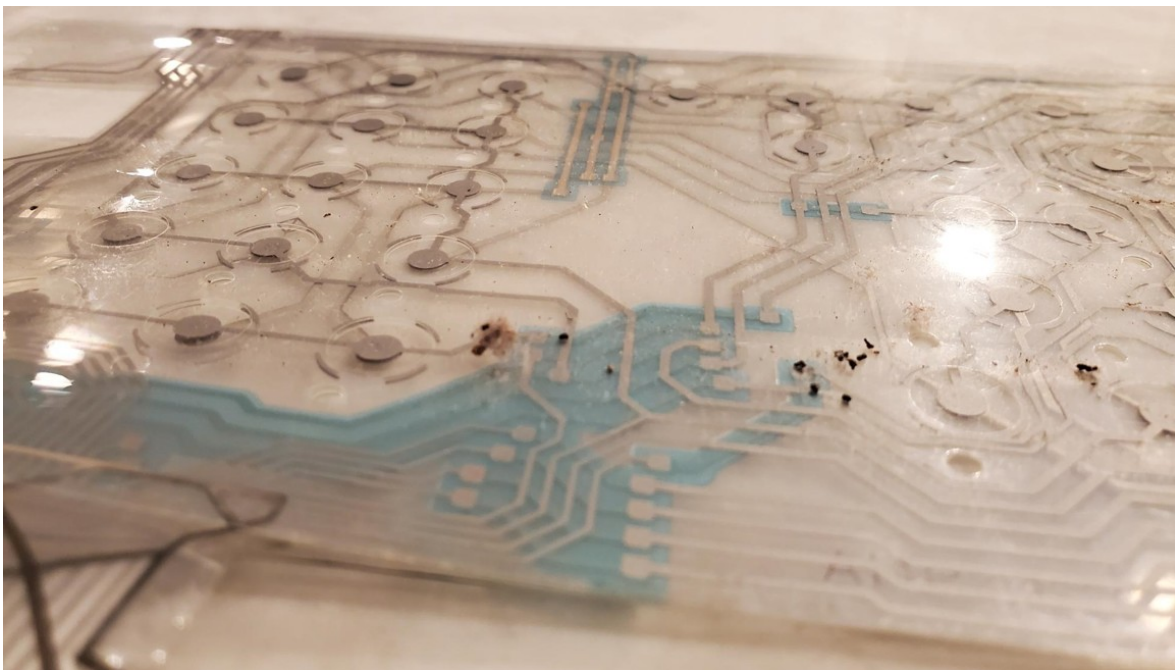
Next, remove the remainder of the membrane assembly, which consists of two layers of Mylar with circuit traces running all over, and a clear blank Mylar sheet that is exactly like the first sheet you removed. The difference is that this sheet lies between the latter two circuit sheets.

Note: The purpose of the "spacer" membrane sheet is to provide a slight separation of the switch pads that are painted onto the circuit sheets. This sheet prevents random keystrokes from occurring from vibration when other keystrokes occur.

Carefully unfold the two circuit membranes. Look for contaminants (bugs, spider parts, etc.) within these membranes). Note the contaminants found in the pictured examples. Be prepared to find this in your keyboard! Gently clean the surfaces of both membranes - a product I recommend is product called Novus #2 which is a combination of a very mild abrasive and mild wax.



Membranes pulled back, revealing contaminants. Be certain not to lose any of the tiny springs inside!





After the Mylar cleaning is done, and you've done a full inspection of all the circuit traces to ensure none were broken, close the membranes back together ensuring the spacer sheet goes back in between as it should be.

At this point, you may want to take the membrane assembly and plug the cable into your TRS-80 and test all or at least some of the primary problem keys. Do this by touching the spots on the Mylar where the key-spots make contact. Hopefully they are working now!

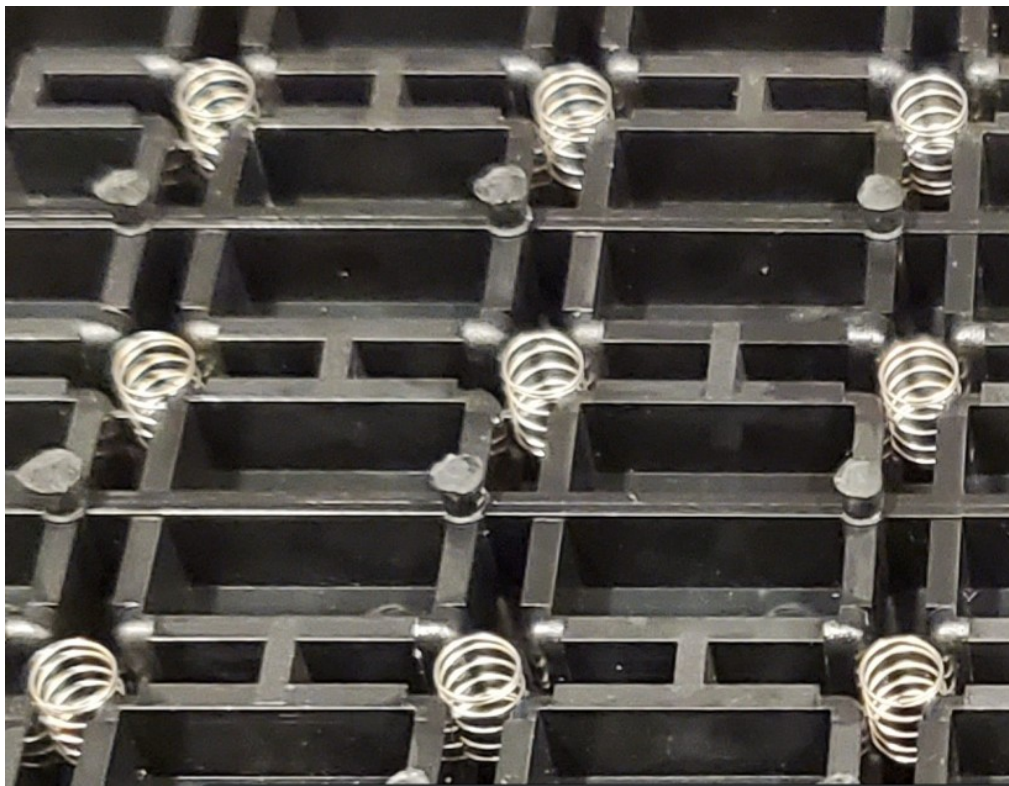
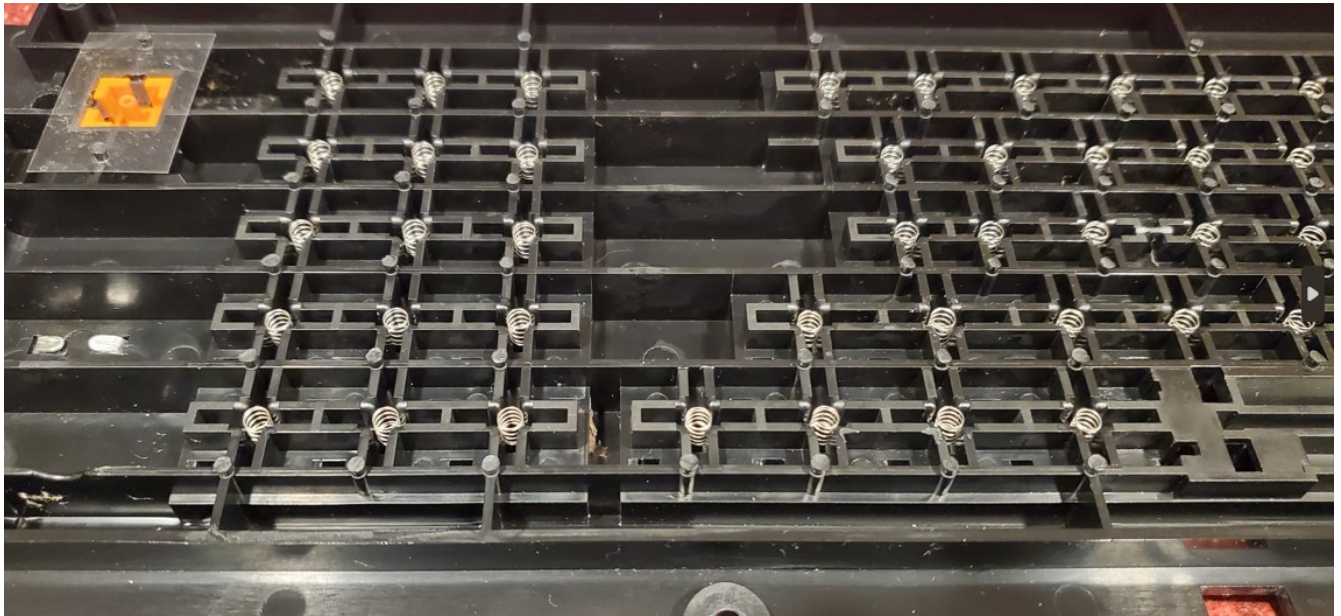
The next task is to clean the large plastic keyboard structure. Gently remove each tiny "under key" spring, making certain not to lose any of them! Consider placing them into a small bowl for safe keeping.



At this point, with all the tiny springs removed and safely stored, the large plastic keyboard structure is now ready for a good soap scrubbing. Used a light brush (old toothbrush) with dish washing liquid to clean all of the aforementioned junk out, and then give it a good rinse and set it out to dry.

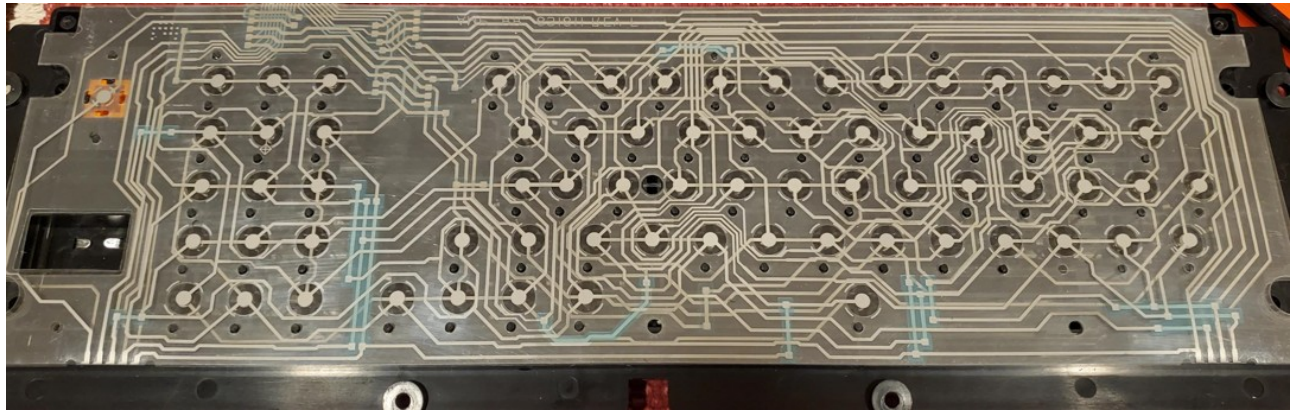


Once the keyboard structure is dry, it is time to put everything back together. Carefully replace each and every "under key" tiny spring.

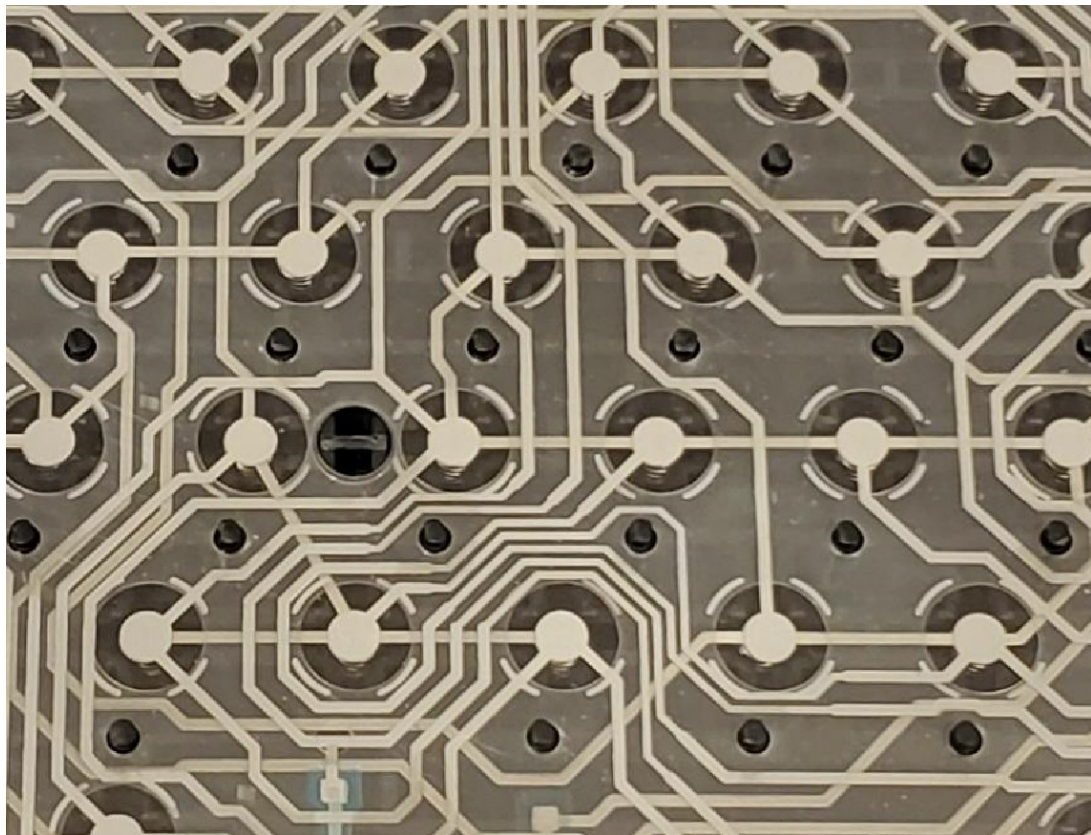




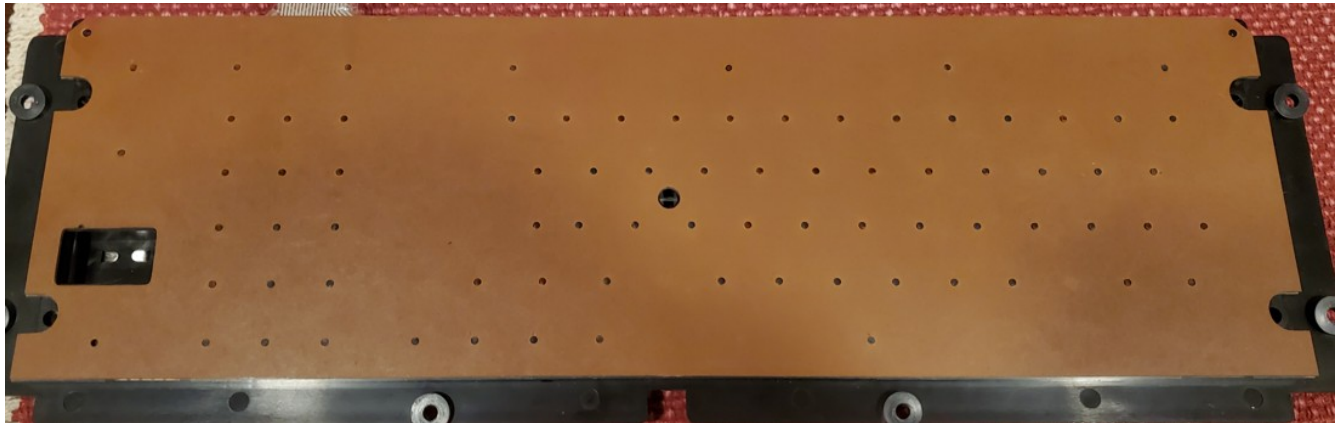
Next, align and place the membrane assembly back into the plastic keyboard structure, making certain each and every hole meets up with its corresponding plastic peg.



Next replace the bottom Mylar spacer sheet, ensuring to also matches up perfectly with each plastic peg.



Finally, place the hard backing plate back on, aligning it to every plastic peg just like you did with the Mylar sheets.



If you were careful to cut only the tips of the plastic off, the backing plate should go back on quite snugly, looking a lot like this picture.



Add the foil backing plate in the same manner, and use a glue stick as a replacement way to add back the plastic tips.





Make certain you to replace the metal foil under the keyboard because it's used as a ground strap across the computer. Don't worry about how it looks, just make sure it functions electrically as it was designed to do.

Install the and plug in the keyboard into your Model PC. Hopefully it works!