HP Forum

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HP38C "6" key repair

*Message #1 Posted by **Peabody** on 27 Oct 2009, 11:39 p.m.*

I have a 38C Spice-series calculator, and have begun to have problems with the "6" key. Sometimes when I hit the key I get a 6, and sometimes I get nothing. The harder I hit the key, the more likely it is that I get a 6, but hitting it with the same force I use on all the other keys is kinda iffy. So I always have to be looking to make sure it took.

After much wailing and gnashing of teeth, I managed to get the back cover off in one piece, and took everything out and cleaned it. But I didn't disturb the actual key pad - you know, the back of the circuit board with the round metal domes that go click. It appeared to be sealed with a plastic sheet on top, and I was reluctant to disturb it.

Well, everything is back together, and I still have the 6 key problem. If I open it all up again and peel back the sealed plastic, am I going to find anything underneath that I can clean or fix and solve this problem? Or am I basically SOL? It does appear that the problem is under that metal dome over the 6 key, but I can't tell whether I would even be able to get under it to clean it.

What advice would the experts have on this? I would really rather use this than a 12C if I can get this one working again.

Thanks very much.

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Re: HP38C "6" key repair

*Message #2 Posted by **Vieira, Luiz C. (Brazil)** on 28 Oct 2009, 1:46 a.m.,*
in response to message #1 by Peabody

PLEASE NOTICE THAT THE TECHNIQUES DESCRIBED HERE DEMAND SKILL ON HANDLING THE EQUIPMENT MENTIONED AND ARE NOT GUARANTEED. FOLLOW THEM AT YOUR OWN RISK (looks like copyright warning...)

Hi;

Based on your description, I concluded that the IC´s are soldered in the PCB, right? I'm asking about this because there is a solderless series of spices, and the flex circuit used in these models allow contact cleaning.

If you look carefully at the component side, you´ll see that under each metal key cap there is a small, metalized hole. And we are lucky for the '6' key has an accessible hole, close to the memory IC's.

I succeeded many times (NOT ALL) carefully inserting a small amount of isopropyl alcohol through these holes with the aid of a thin brush in order to clean dirty, bad contacts. Use the

thin brush soaked with a small amount of alcohol only to touch the hole in order to allow the alcohol to slide into the key cap. It should be done carefully not to spread it so it does not reach the sealing plastic you mentioned in the top of the keyboard. If you use an excessive amount, the alcohol may also dissolve the glue in the sealing plastic.

I usually insert some brush bristles (2 or 3 fair ones) through the small holes and gently move, rotate them inside of the key contact. Luckily the bristles will scrap the surface of the contact both in the key cap and the PCB surface. Please, make sure you choose bristles that would not leave small chunks inside the key contact (I prefer using bristles from synthetic brushes). From time to time, with the bristles inside the key caps and steady (do not moving them), press and release the key cap a few times, then move the bristles, hold them steady, press the key cap again and so. This will enhance the efficiency of the cleaning process by forcing the dust to move out.

It is possible that the bad contact persists for a while,. but chances are that after rebuilding the calculator and using it for a while the '6' key becomes more and more reliable.

Please, understand the I added the warning in the beginning of the post for the sake of preserving your HP38C. I've done it many times already, and in some of them I did not get the best results.

Success!

Luiz (Brazil)

Edited: 28 Oct 2009, 1:51 a.m.

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Re: HP38C "6" key repair

*Message #3 Posted by **Peabody** on 28 Oct 2009, 8:37 a.m.,*
in response to message #2 by Vieira, Luiz C. (Brazil)

Thanks very much for the suggestions.

Yes, I have the soldered version of the 38C. I didn't really study it carefully when it was opened up, but I would like to know more about how the metal domes work and are attached.

Does the dome just connect two contact points on the PC board, or is the dome itself one of the contacts? If the latter, then the dome must be soldered to the board in some way. Is it possible to remove (desolder?) the dome and replace it afer cleaning?

Of course removing the dome would require peeling back the plastic sealer. I assume that could be reattached in some way.

Thanks again, Luiz. Also, if I remember correctly I have you to thank for the dental floss. :-)

Peabody

[Respond | Quote] [Edit | Delete]

Re: HP38C "6" key repair

*Message #4 Posted by **Vieira, Luiz C. (Brazil)** on 28 Oct 2009, 9:16 a.m.,*
in response to message #3 by Peabody

HI;

thank you but credit for the dental floss is not mine, and I'm ashamed not remembering the name of the very well known contributor who posted about it some years ago... Shame on me!

I hope my explanations make sense for you.

I would not solder the domes (I called them 'caps'...) because when they are pressed down, they change shape and their edges move out a little bit. Soldering them would cause metal stress and future cracks in both metal and solder. And their edges touch the PCB in one of the contacts while their center, when pressed, touches the other part of it.

Earlier models had key contacts being soldered in the PCB or used some injected polymer (plastic) domes with conductive dots inside of them and copper tracks printed on it, and they tend to break after some time. After the Spices we find the metal domes in the HP41 and Voyager series. The clamshells, Pioneers and the hP48 series brought back the injected polymer domes with a single conductive spot in the inner middle of them, so they actually close contacts in the keyboard flex circuit.

Cheers.

Luiz (Brazil)

Edited: 28 Oct 2009, 11:14 a.m.

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Re: HP38C "6" key repair

*Message #5 Posted by **Peabody** on 28 Oct 2009, 11:22 a.m.,*
in response to message #4 by Vieira, Luiz C. (Brazil)

Yes, the dental floss idea was offered by Karl Schneider. Thanks Karl.

Well, Luiz, then what holds the metal caps in place? Are they just stuck to plastic sheet, and just resting against the circuit board contacts without being physically attached in some way?

If that's the case, it should be possible to lift up the plastic, with the cap attached to it, and clean underneath, then lay it back down again. Have you ever tried that?

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Re: HP38C "6" key repair

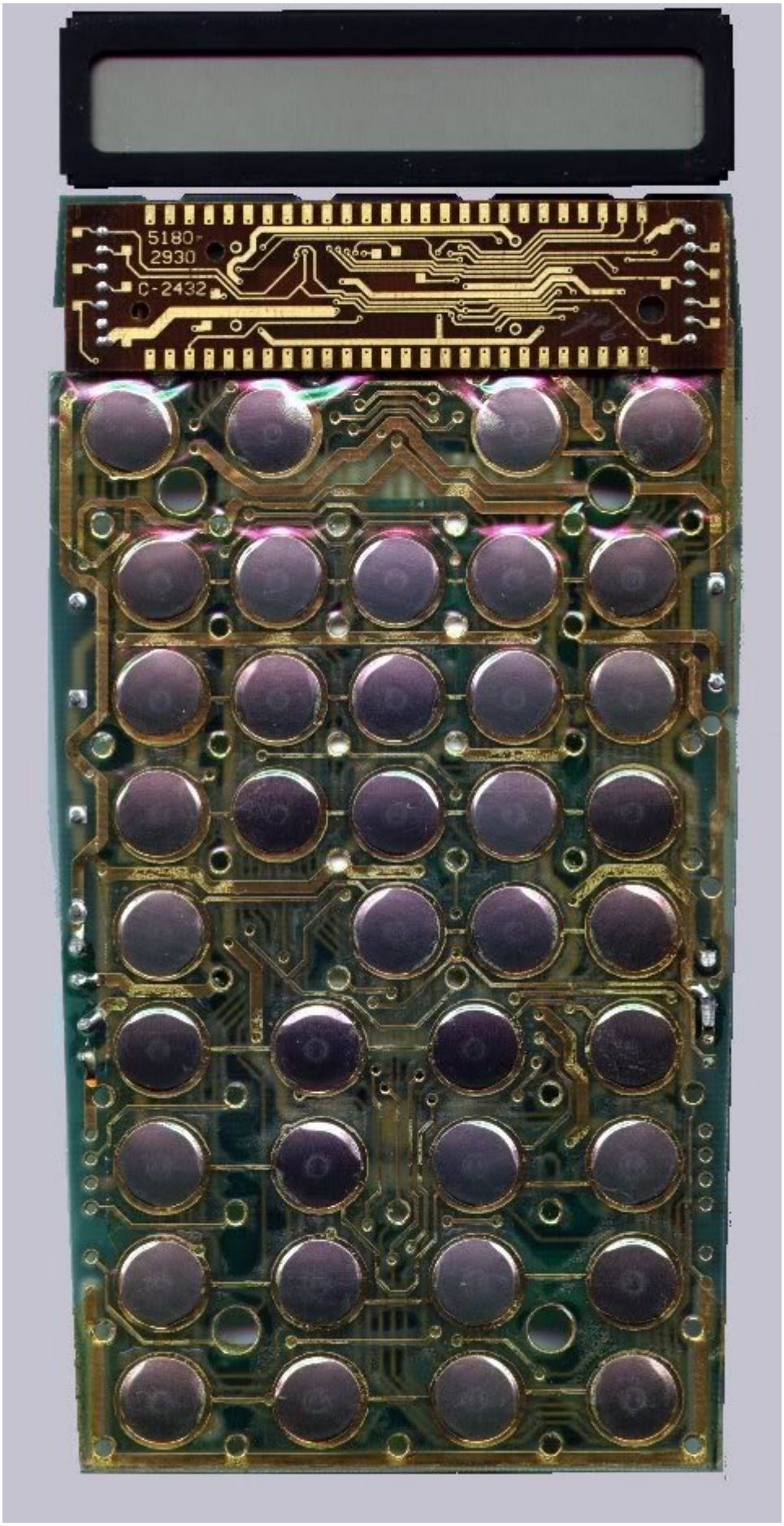
*Message #6 Posted by **Vieira, Luiz C. (Brazil)** on 28 Oct 2009, 12:54 p.m.,*
in response to message #5 by Peabody

Hi;

Quote:

> Are they just stuck to plastic sheet, and just resting against the circuit board contacts without being physically attached in some way?

AFAIK, it seems to be like this. I forgot to mention that Voyagers have the domes grouped in five units, forming half a row of contacts in the keyboard. This makes a more stable arrangement. In the HP41 (earlier than the Voyagers design) the domes are arranged in single units. Check the picture bellow (HP41 halfnut).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I have never tried to remove the protective plastic because of two reasons:

1 - centering the domes back in place - after 'pealing' the keyboard contact, chances are that the plastic never returns back to its original shape and position, and the key´s domes may slip away after some time

2- neutral atmosphere - surely the final assembly of the keyboard´s PCB, when the protective plastic is fixed in place, is performed in a neutral, dust-free environment. I am not quite sure about that, but by simply opening the plastic we will also allow more dust to get in and later we may face other keys with contact issues.

Please, understand that these are my own concerns. I do not like to think I'd find a solution for an emerged problem when I'm performing a technical task, I prefer to predict all possible scenarios (not possible, I know, I just go as far as I can). If you have a place where you could try opening the keyboard and removing the plastic with a confidence degree, I see no problem. You do not need sterilized environment, only dust free. And also you should find a way to make sure the dome will not slip out of the original place after settling it back.

Success!

Luiz (Brazil)

Edited: 28 Oct 2009, 12:55 p.m.

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(new) Re: HP38C "6" key repair

*Message #7 Posted by **Peabody** on 28 Oct 2009, 6:01 p.m.,*
in response to message #1 by Peabody

I wanted to report the results of my key repair. I ended up just cutting and removing a rectangle of the plastic which covered just the bad key, cleaned the contacts, and replaced the cap and plastic. And it appears to work fine. For now. Time will tell. It looks like the plastic is just like the very thin clear shipping tape.

And I took pictures showing the rectangle and cap removed, and more details of the infamous Spice bottom latch. The pictures are posted here:

http://drop.io/HP38C_KeyRepair

On close inspection, it's clear that the "9" key had already been repaired in this way. That must have been done by HP long ago. The original calculator was sent back shortly after purchase because it didn't work right, and I assumed they had sent me a new one in its place. But apparently not.

I also found that three of the six latches that hold the board to the case had been broken,but not by me - the top two on one side, and the top one on the other side. It has been that way for 25 years, and I never noticed anything amiss. So it appears these latches are not critical, at least in the soldered version of this calculator. Of course it does put more pressure on the two screws that hold the case together because the bottom case now also has to keep the

innards in place.

One other thing I did was to put a thin coat of Vaseline on the bottom latch parts in the hope they will come apart more easily next time. Hopefully it will not migrate. I used the dental floss method, but I hope in the future I can just side the bottom cover rearward with respect to the top cover.

Thanks again to Luiz for his help.

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