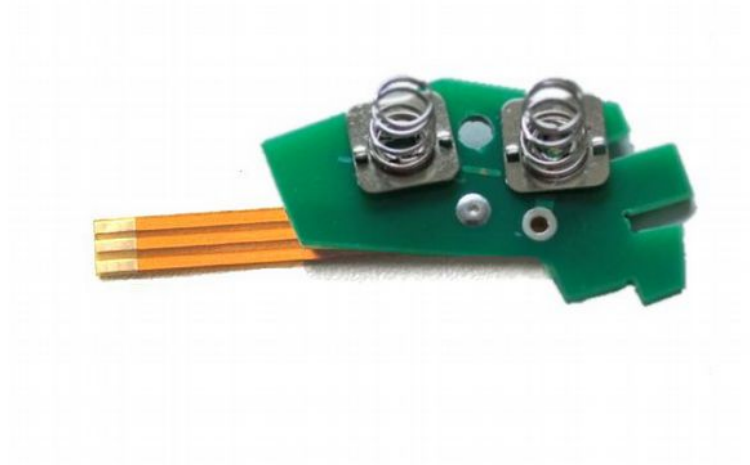
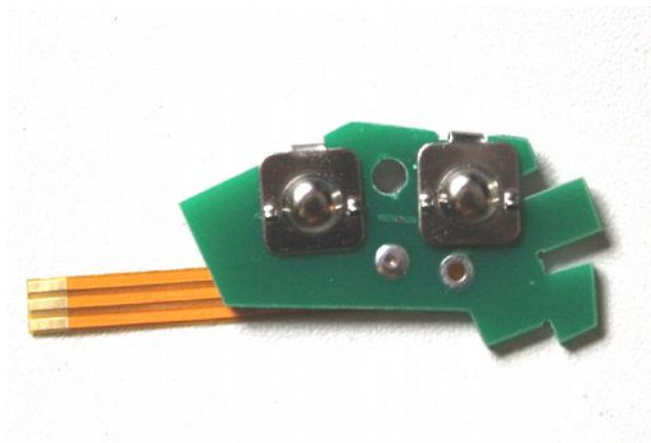


# **SPICE Battery connector**

## **Installation manual**



PANAMATIK June 2020

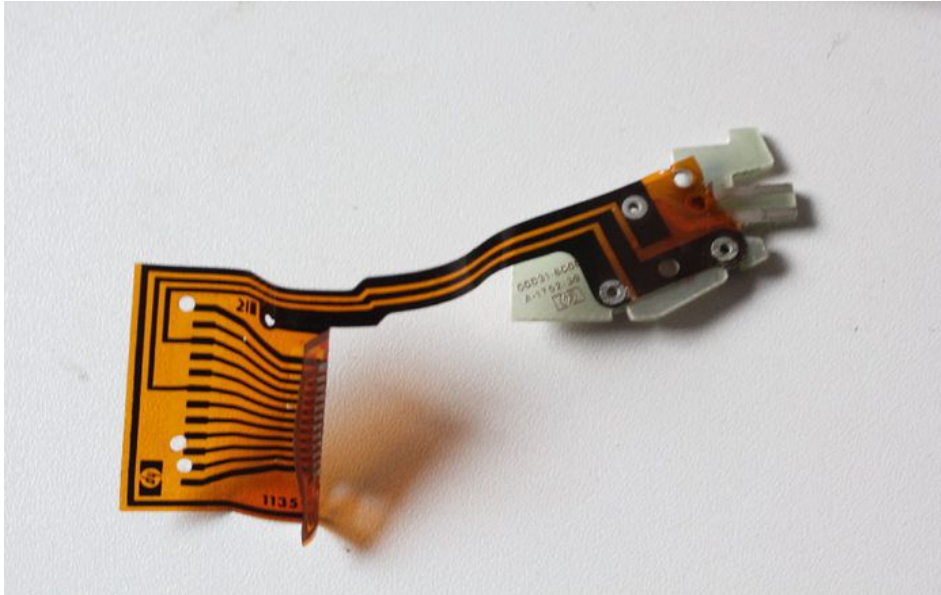


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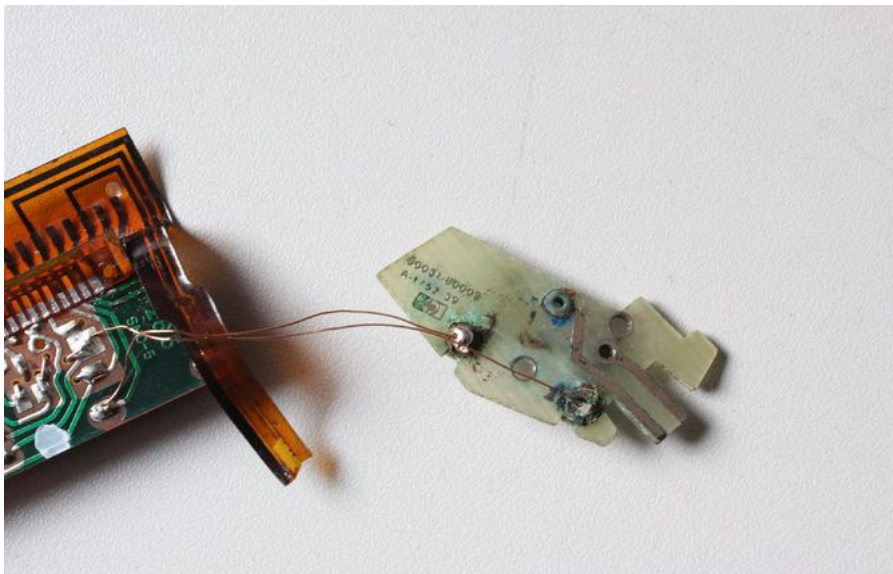
## Original SPICE battery connector

The Hewlett Packard SPICE calculators, like the famous HP-34C, are the most advanced red LED pocket calculators HP ever made. Unfortunately they are also known for a series of design faults, which make the models unreliable and often to fail.



SPICE battery connector

One of the design faults is the battery connector. It connects the batteries to the internal power supply board with a ribbon flex cable. Its contact springs are always broken and the attached flex cable is often corroded.

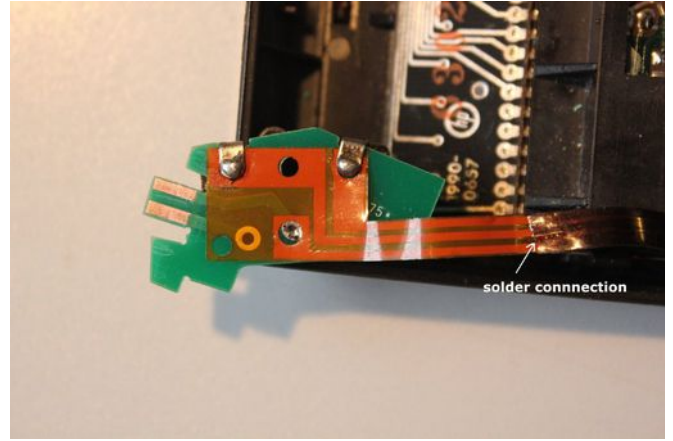
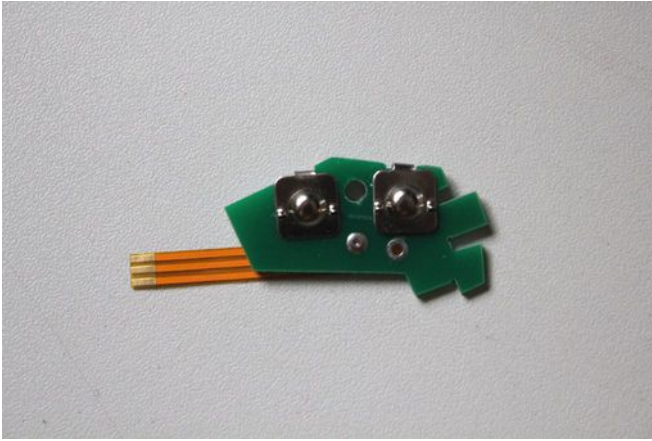


corroded SPICE battery adapter

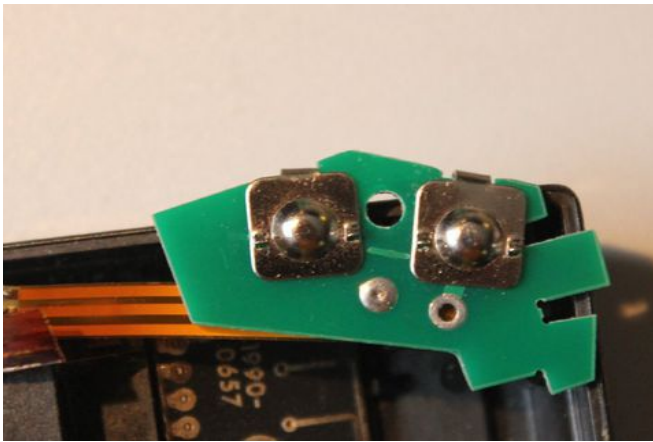
In the above image you can see a corroded adapter, where half of the old flex cable is missing, it was removed because the copper traces were not longer usable, and it was tried to establish contacts with two copper wires. This would be a makeshift solution but it doesn't look nice.

## Replacement SPICE battery connector

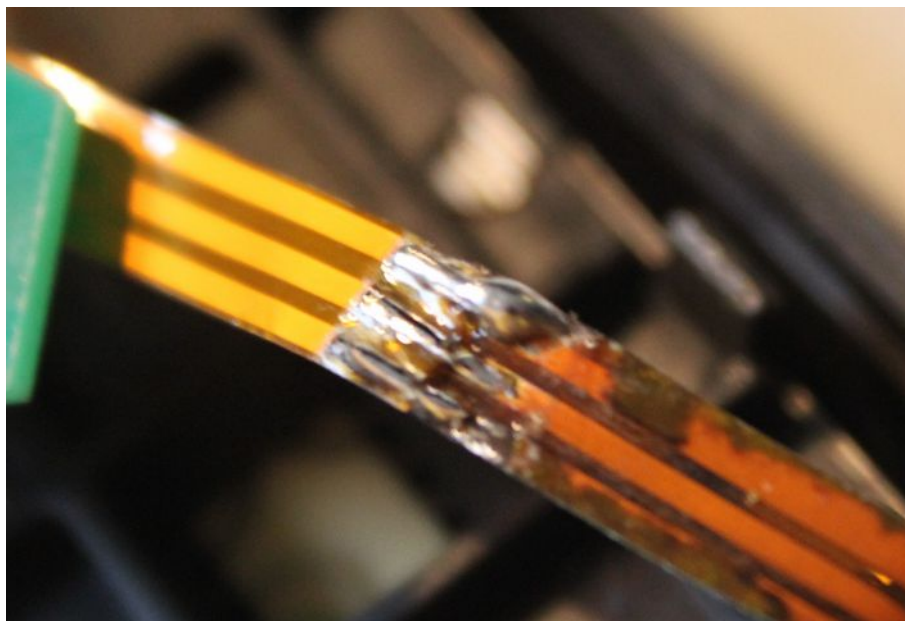
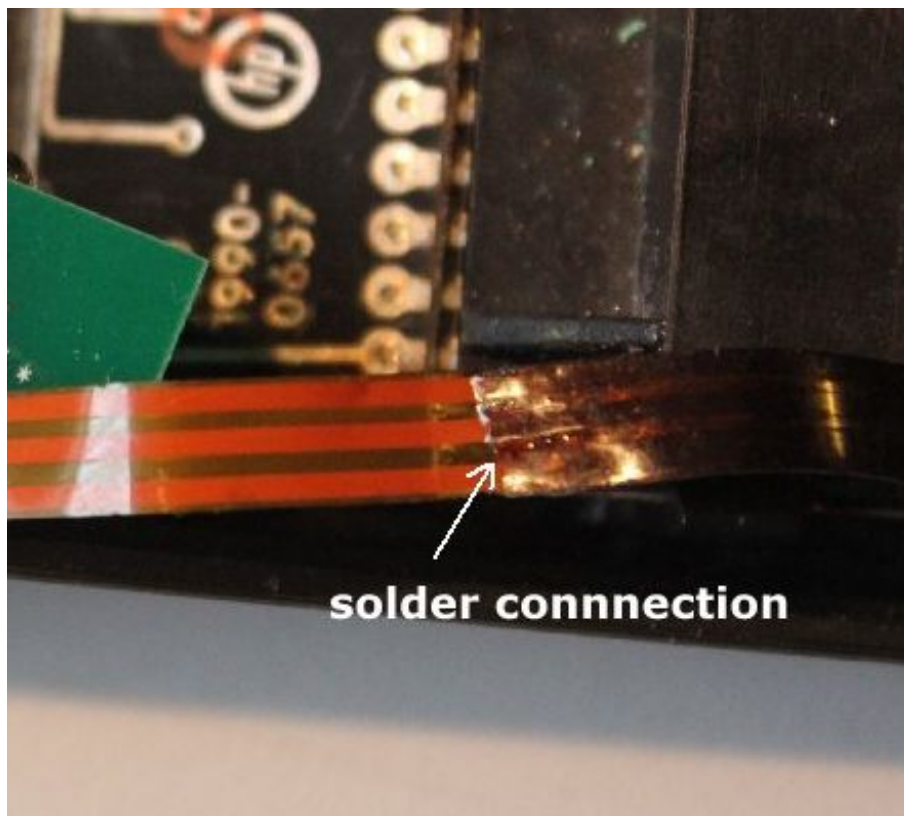
The new „SPICE battery connector“ replaces your original connector and installs new contacts and a new flex cable to your calculator. To install the new SPICE battery connector you'll need only a small Philipps screw driver to open the case and a soldering iron for attaching three wires.



The new flex cable is manufactured intentionally only as part of the complete cable, because normally only the battery side of the cable is corroded and the other end is still in good shape. It would be more difficult to unsolder the old cable from the power supply board than just to cut it halfway and solder it to the new cable.



For installing the new cable you have to cut the old cable, then you remove the yellow brown solder resist from the old cable and solder the two parts together. Removing the solder resist is not easy and you might need a sharp knife or even a Dremel tool to remove it. After this is done you must connect the three traces. Because of the thickness of the flex cables normally it is not possible to solder them together directly. You need three small 1/2 cm copper wires as a solder bridge as shown in the next images.



Now you can insert the new board back into its place and close the calculator case.

Your HP-32E or HP-33C or HP-34C, whatever your model might be, now has new reliable battery contacts again.

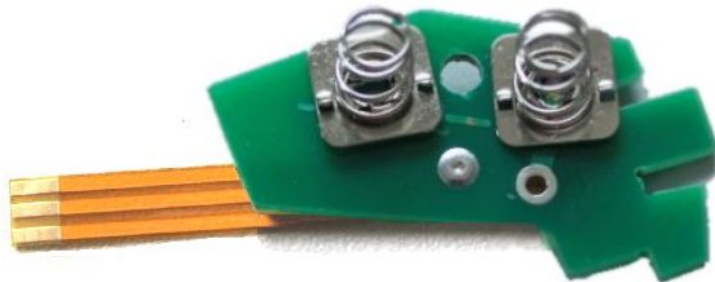
## AA battery size problem

There is still a problem left. The today's AA NiMH accus are 1 mm bigger in size than the old AA NiCd accus 40 years ago. This leaves a severe problem unsolved. When inserting the batteries the pressure to the calculator case can be so high, that it will break at the weakest point, mostly near the left screw, and it is impossible to fix it. The new battery connector with flat contacts does not solve this problem because it doesn't give you more space than the original.

Therefore the new battery connector can also be ordered in the spring version.

## SPICE battery connector spring version

I would highly recommend to use the spring version of the new battery connector. This prevents accidentally breaking the bottom case of your calculator by inserting today's bigger AA batteries.

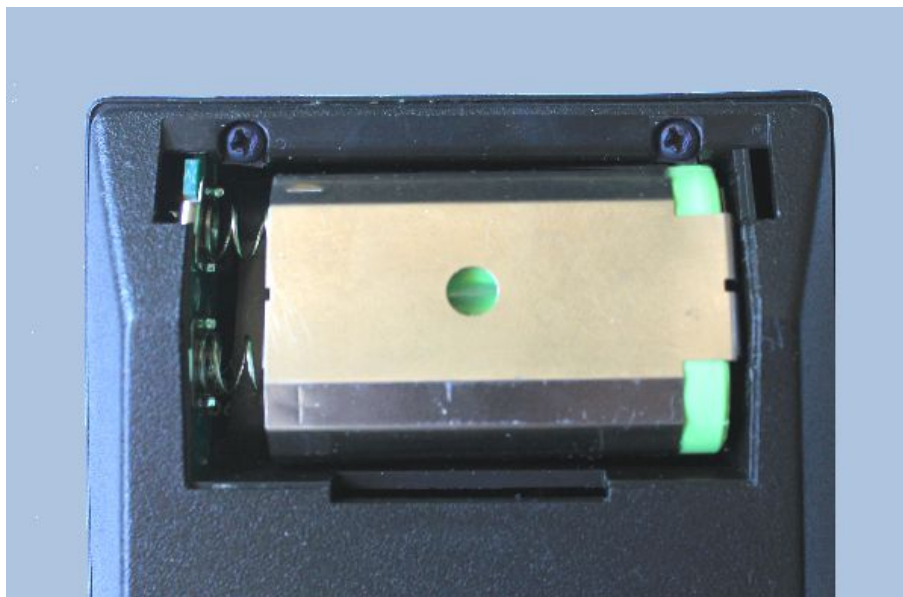


This version uses springs instead of flat contacts. It allows you to insert 4/5 size (42mm) AA batteries. These are smaller than the full size (50 mm) AA batteries. This is an optimal size for releasing the pressure from the case and still having good contact with the battery connector.





Try to find double 2,4V 4/5 AA accus, which are already point welded together at the bottom side as shown in the image above. This is useful if you miss the original metal cover, which connects the two batteries. But you can also buy two single 4/5 1,2V batteries and use the special battery metal cover of the SPICE models, which connects the two batteries.



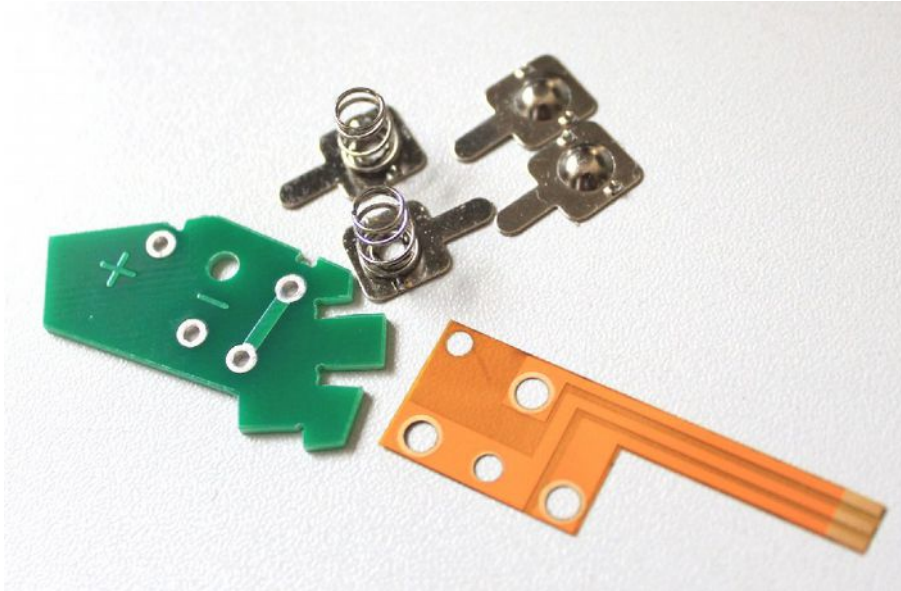
If you choose this solution then it is very easy to insert and remove your batteries.

search for:

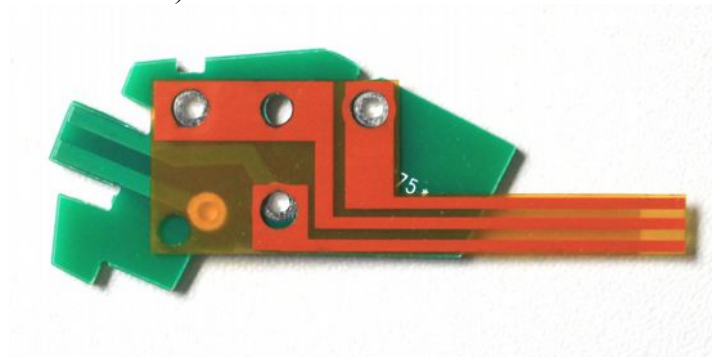
AccuCell 2HHR140 Akku passend für Rasierer 2,4 Volt, 1400mAh mit Lötflähen or  
Panasonic 2HHR120 Akku passend für Rasierer 2,4 Volt, 1200mAh mit Lötflähen

## Do It Yourself

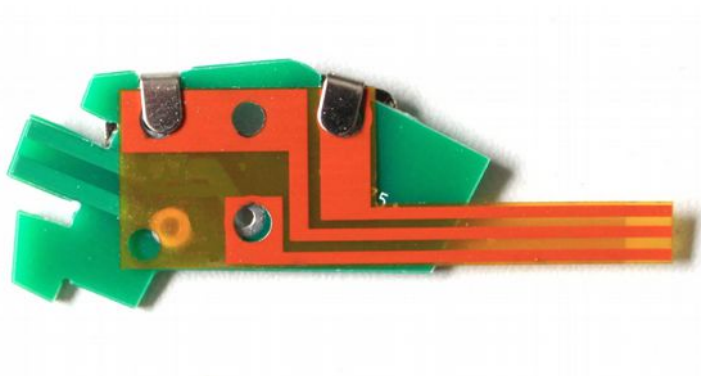
If you want to save tons of money or you are happy to do things yourself you can buy the „SPICE battery connector“ unassembled. Also you might decide not to use the flex cable and just connect the board with wires. Here are some hints how to assemble the parts.



First solder the flex cable to the back side of the board at the three soldering pads (this is optional if you don't want to use the flex cable).



Next add a thin layer of solder to the contacts, then bend them around the board and fix them one by one with tongs or use some glue and solder them to the two upper pads. Use as much solder as needed. It is a little difficult to keep the contacts aligned while soldering, but you will manage it.





# Appendix A

## ***How to open the calculator***

Believe it or not, the most difficult part of the repair is to open the calculator. There are some different methods described here.

<https://www.hpmuseum.org/cgi-sys/cgiwrap/hpmuseum/archv019.cgi?read=151125>

<http://voidware.com/calcs/spicerepair.htm>

[https://www.keesvandersanden.nl/calculators/hp32e\\_repair\\_1.php#links](https://www.keesvandersanden.nl/calculators/hp32e_repair_1.php#links)

The approach as described by voidware.com

Take off the battery cover and remove the battery pack. Undo the two small screws at the top. The unit wont open because there is a catch inside the case at the base. Adopt the special grip shown here and push up with the thumbs and pull back with the hands so as to pull the case twowards you.

Another method described by Karl Schneider:

Tie a loop of waxed dental floss. After removing the two screws in the battery compartment, place the calc face down and spread the halves apart at the top no more than an inch (watch the battery terminals). Insert the floss between the halves and slide it past all six tabs (three each side) and around the corners at the bottom so that the floss exits through the case seam at two places on the bottom edge. Internally, the floss should wrap around the long hooked bridge attached to the bottom case half. Hold the main (top) case half in place on the table face down (use a rubber glove if you like) and gently pull the loop of floss away from the calc in order to detach the smaller back case half