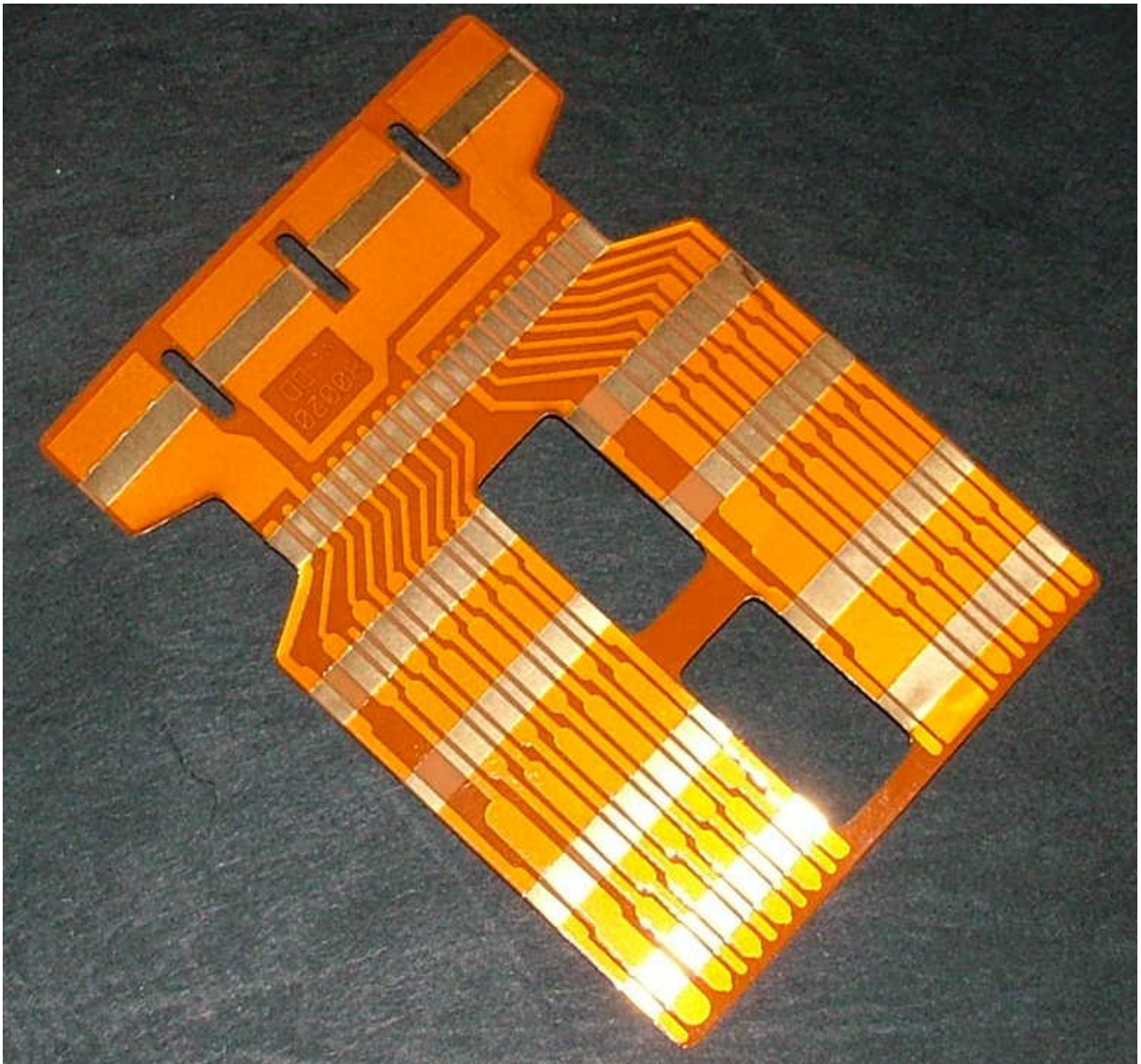


Replacement procedure guide for the HP-41 calculator series I/O Block Flex-PCB



The first steps.

Just for those not yet aware, I've included a brief description on how to take your HP-41 apart.

- 1- Carefully remove the four rubber feet.
- 2- Remove the four screws, first the lower ones.
- 3- If your calculator is a Halfnut (those with rounded corners display) be careful when lifting the bottom half, as the bender is attached to it and you may break the wires. The I/O block will remain attached to that bottom half.
- 4- Straight pull the I/O block off from its positioners.
- 5- Keep every piece (rubber feet, screws etc.) in a safe place.

Not a big deal so far, is it?

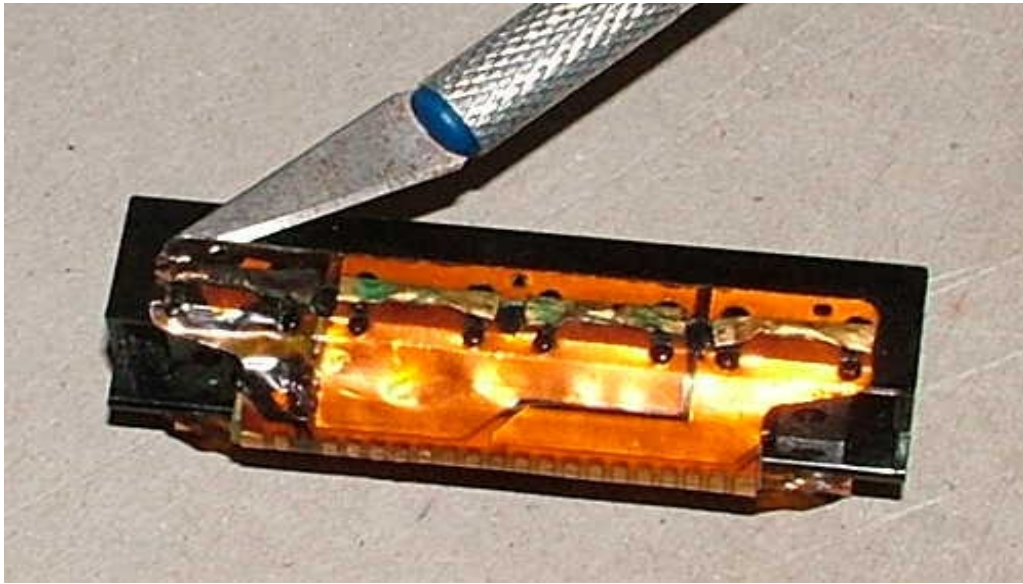
Damaged Flex-PCB removal.

Your I/O Block may look similar to this:



Now remove the plastic rivets that hold the damaged Flex-PCB. A sharp X-acto knife will help a lot here.

Insert it between the plastic base and the Flex-PCB.



You don't need to cut all the rivets for now, just enough to pull the old PCB off the plastic block.

Once you have removed the old PCB, cut the remaining rivets.



These most inner rivets are the more difficult to remove, you'll need a sharp knife achieve a good flat surface.

Please make sure all the rivets have been completely removed and the plastic block surface is a flat and smooth as possible. This is essential to obtain a good bonding.

Also don't forget to remove the pressure sponge pad and clean it thoroughly.



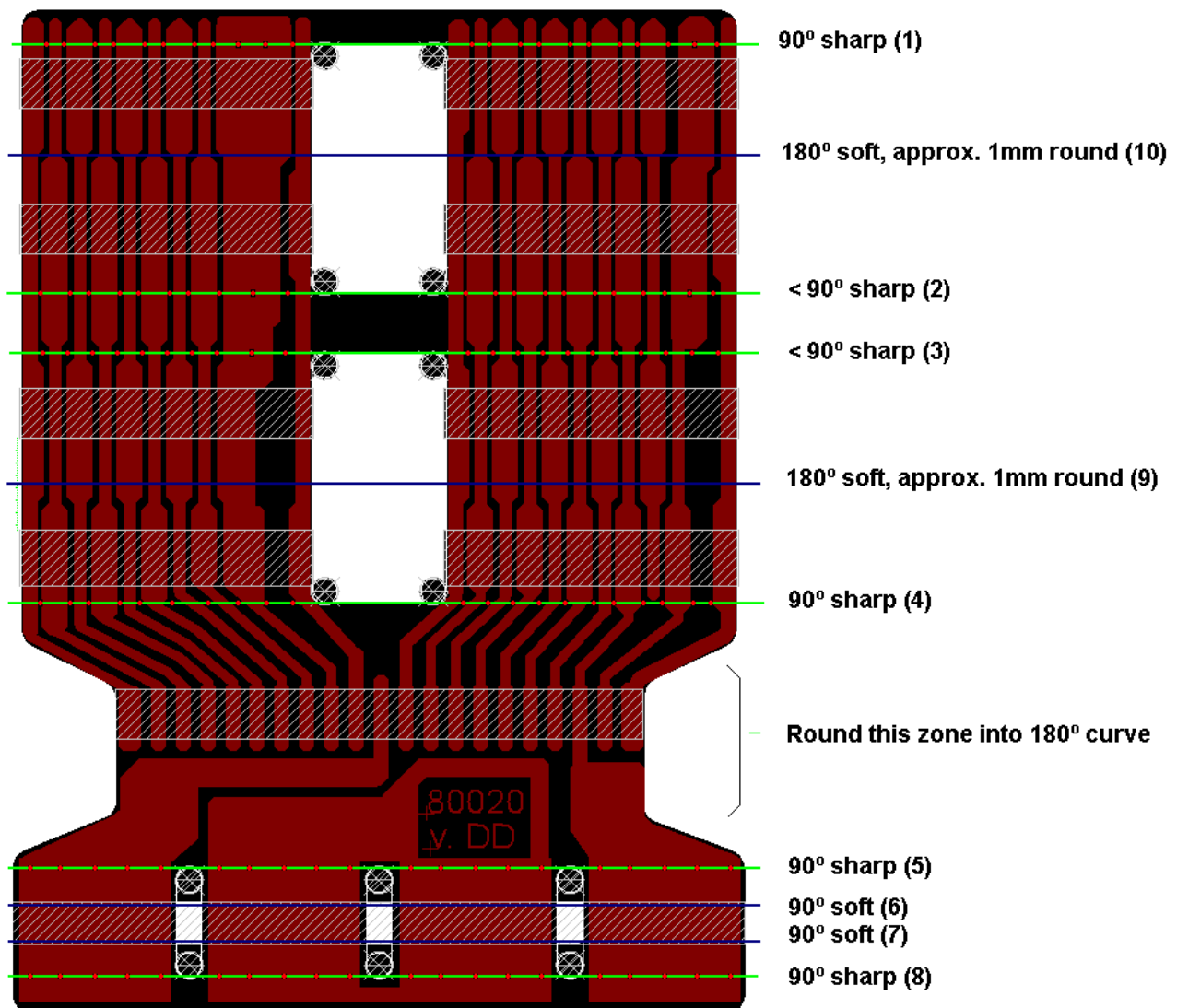
NOTE: I've found some cases in which the sponge has also been damaged to the point to be useless and no longer provides the required pressure to the contacts underneath.

In such circumstances a suitable replacement can be made by trimming some dense sponge pad to the appropriate dimensions. The backing of some old mouse pads have revealed as a valuable supply for such material.

Clean the I/O Block plastic base with isopropyl alcohol, make sure (again) that no rivets remains protude and you have an evenly flat surface.

The Flex-PCB replacement is suitable to fit any HP-41: C, CV, CX, CY, CL; regardless if it is a Coconut (usually referred to as "Fullnut") Halfnut or Blanknut. All of them use the same type of I/O Block.

Now it's time to shape-fold the board.



Please pay attention as the accuracy of the refurbishment process relies on the precision of the Flex-PCB folding. It must reproduce the original circuit folding as exactly as you can.

In order to help this bending process with the most sharp angles (those of 90°), it is **highly** advisable to pierce the Flex-PCB according to the suggested pattern in the picture above. Piercing points have been highlighted as red dots along the green lines.

Numbers in parenthesis indicate the order to follow when folding the PCB.

Note that numbers 2 and 3 in the figure are marked to be smaller than 90°, this is to help while setting the board on its place. Also numbers 9 and 10 are not sharp foldings, but just rounded to about 1.5mm diameter instead; these will conform the module connectors edge.

DO NOT REMOVE THE ADHESIVE PROTECTION LINER YET!

After the bending process is completed you should end up with something similar to the circuit on the left. Always use the old circuit for comparison measurements.



Bonding the Flex PCB.

I've found advisable not to wear gloves but your bare fingers to handle the Flex-PCB during the bonding process. Clean your fingers with isopropyl alcohol to remove grease before touching the adhesive.

A friend user: Dan Grelinger, mailed me with some comments regarding the initial (and most important) part of this process. I've included his advice so it can be helpful to others as well.

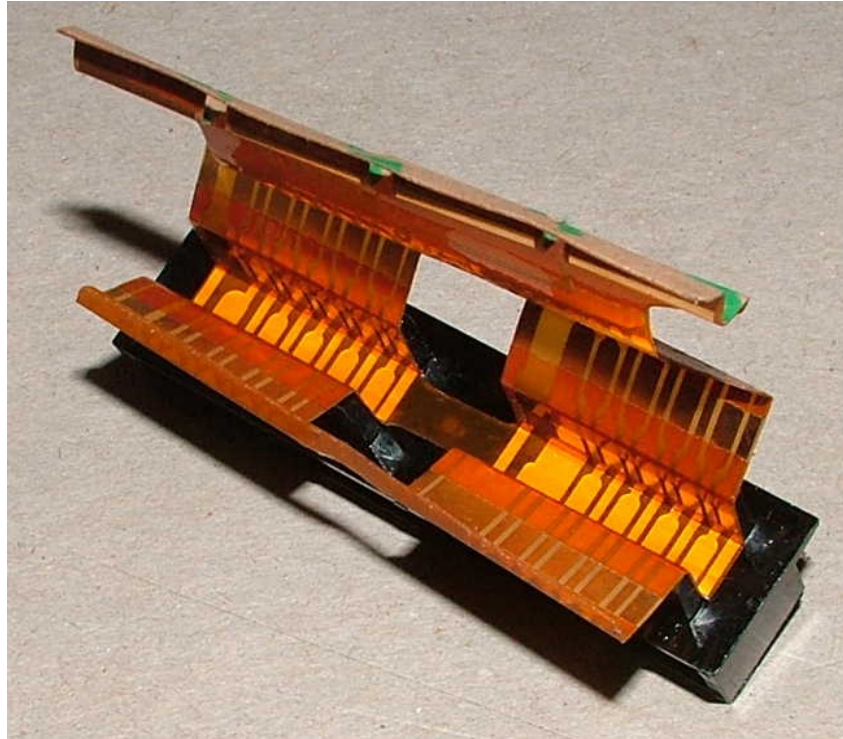
“ To get the Flex PCB initially stuck correctly to the block connector, I ended up cutting the protective sticker backing such that only the area that sticks to the block in the valley between the port tabs was exposed. The problem I had was with the connector sticking to the port tabs as I tried to insert it into the space between them. Once I covered up the sticky parts other than what stuck to the block at the base of the 'valley', I was able to insert the connector in between the port tabs and get it aligned and fully stuck from corner to corner, before removing the other parts of the protective backing. Once I got the connector stuck down fully in between the port tabs, it went pretty easily.”

“The only part of the backing that I left removed for the initial placement was between the 90 degree sharp folds you have labelled (2) and (3) in your installation diagram. This technique may help other users.”

Use some hard and sharp plastic piece to press the Flex-PCB in order to ensure a good surface contact. I use a piece of cardboard PCB base to apply pressure. Do not use fiberglass or metallic pieces as these may damage the gold deposit on the new Flex-PCB tracks.

Please double check that the Flex-PCB is perfectly centered and the connector tabs are aligned with the corresponding contact tracks area of the Flex-PCB.

After this first part of the bonding process you should have something like the image below.



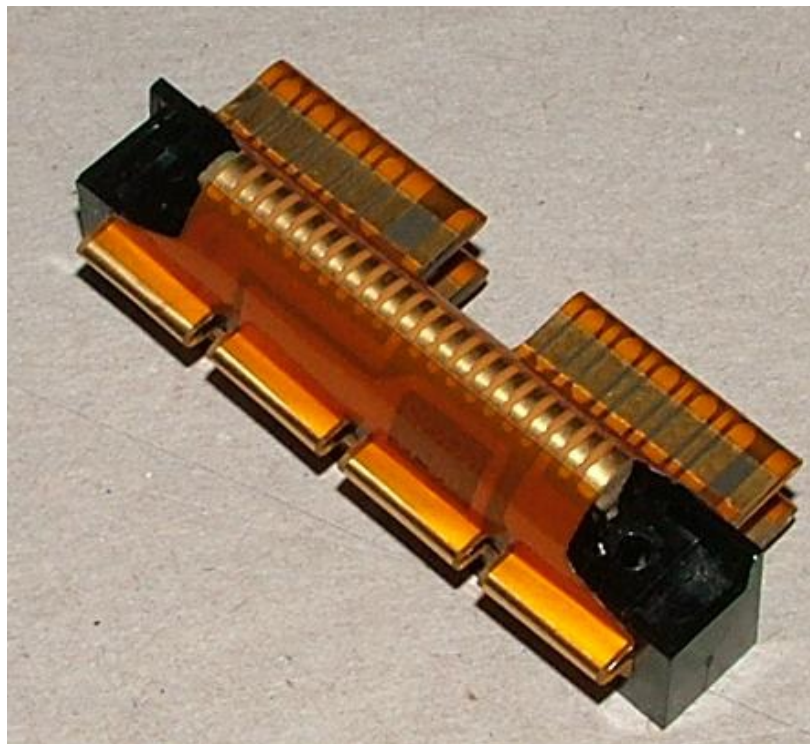
Now tight bend the connectors area of the Flex-PCB around their plastic flanges and apply good pressure again to ensure proper adherence. First the outer ones.



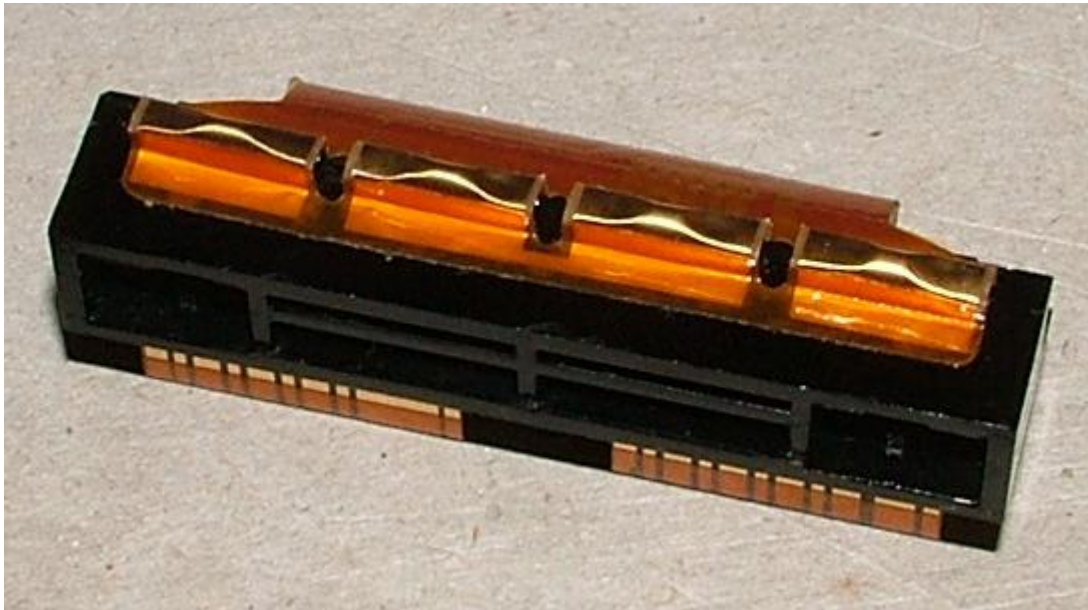
Then the inner ones.



Now it's a good time to put the sponge back into its place, gently bend the battery contacts area to its position and, as usual, apply generous pressure to get a good adherence.



Still one small but meaningful step, use your finger and/or nail to obtain that beautiful “bow-tie” shape on the battery contacts.



Isn't it pretty? ;-)

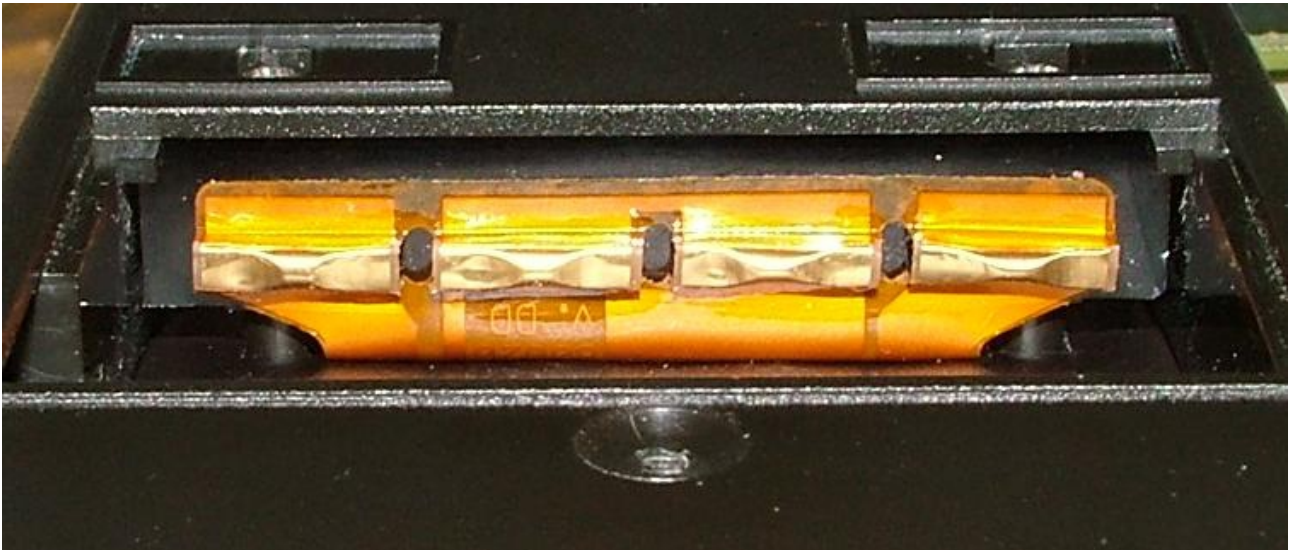
The upper edge of the Flex-PCB battery contact area is the weakest point in terms of adherence. To improve that, it is advisable to place a piece of adhesive tape holding it in its place.

Piercing the Flex-PCB in the three existing holes also helps and if you're obsessive with mechanical strength, you can also use three tiny screws to hold it (not necessary though.)



Now you're done with the hard part of the job, just replace the refurbished I/O block and reassemble your HP-41.

It should look quite better now, clean and shiny...



... anyhow, remember this is not a simple cosmetic task, so you must check functionality.

Place the battery holder, (crossed fingers ;-) press ON and... hopefully, see “X” register contents in the display. Then check proper functionality of the four I/O ports.

If you find any trouble, please let me know: “clonix41@gmail.com”

If you manage to get a “brand new” I/O block, took some pictures and let everybody know! :-)

With my best wishes to the HP-41'ers enthusiasts community from Caribbean.

(c) Diego Díaz, March '13