

Introduction

To make your own WP 34S you need to flash an HP 30B or HP 20B with the WP 34S firmware. In order to do this, you need to connect the calculator to the PC. This can be done using the HP flash cable, connecting into the back of the calculator, and, if you don't have a physical RS232 port on your computer, a USB to RS232 converter. The same connections are required if you want to exchange data between the PC and your WP34S.

Now, wouldn't it be more convenient, if you could just connect your calculator to the PC using an ordinary micro USB cable? At least that is what I thought after using the HP flash cable a few times. So I designed a PCB that would fit inside the calculator and would enable you to do just that.

Versions

There are 3 different version of the PCB available:

1. Basic version

This version provides the USB port and nothing else.

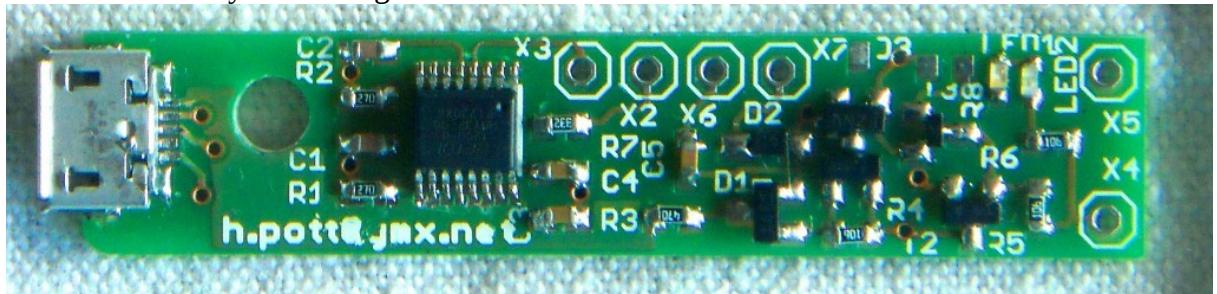
2. USB power and IR printing version

This version provides the USB port, IR printing and USB power when the calculator is connected to the USB port



3. Lithium Ion version

This version provides the USB port and allows you to connect a lithium ion or lithium polymer battery. When the calculator is connected to the USB port, the battery is charged. When it is disconnected it runs off the battery. One of the original CR2032s is kept and acts as a memory backup battery. That way you do not lose data when the lithium ion battery is discharged.



In addition to these 3 versions, there is also a PCB available that replaces the PCB in the original flash cable. The flash cable can then be plugged directly into the PCs USB port.



Installation

Preparation of the calculator

First you need to open the calculator

This has already been described by Alexander Oestert in his guide to installing the crystal and IR diode, so I don't feel the need to explain this here again.

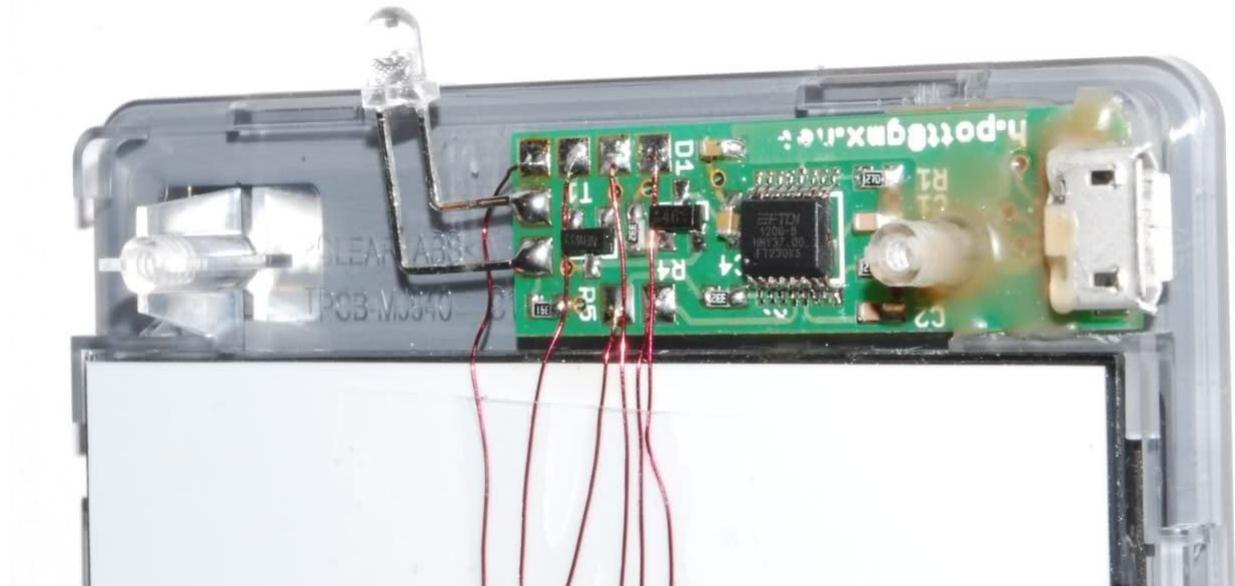
Then you need to prepare the area where the board will be installed. Cut away the plastic supports around the top left screw post with a sharp knife:



This is what it looks like when you are done:



Next you can glue the PCB in place:

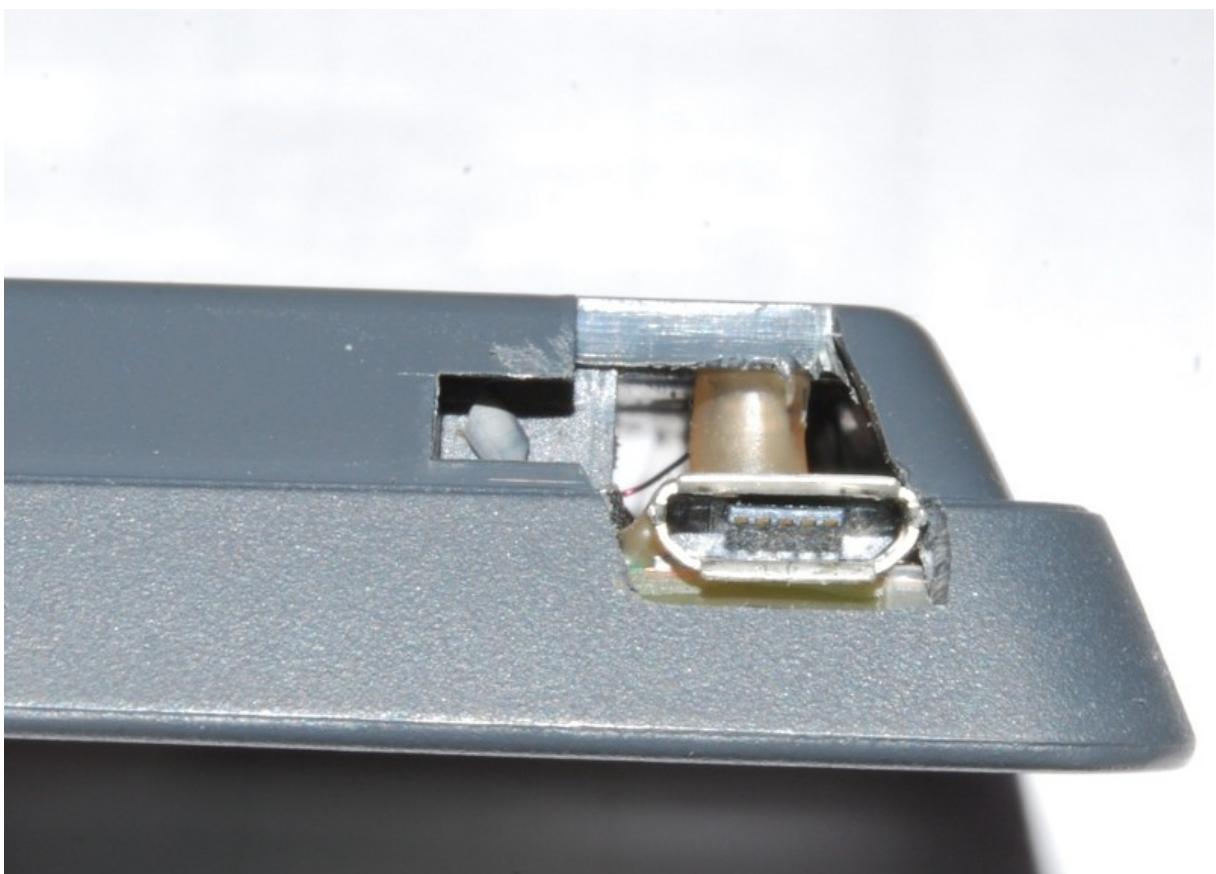


Then you need to solder the LED and the wires to connect to the calculator to the board. See next chapter for instruction on what to connect where.

Finally you will have to drill a 3mm hole for the LED and cut a hole for the micro USB connector. This is a bit tricky if you want to be exact. I got the best results when drilling out the corners of the hole with a small (1.5 to 2mm drill) and then cutting the rest with a sharp knife. When you are done, it should look something like this:



And with the board already installed:



The result looks like this:

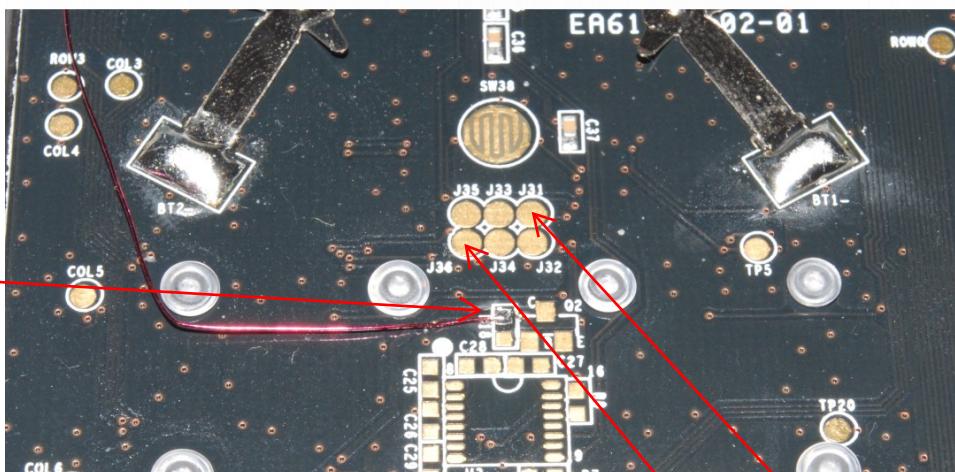
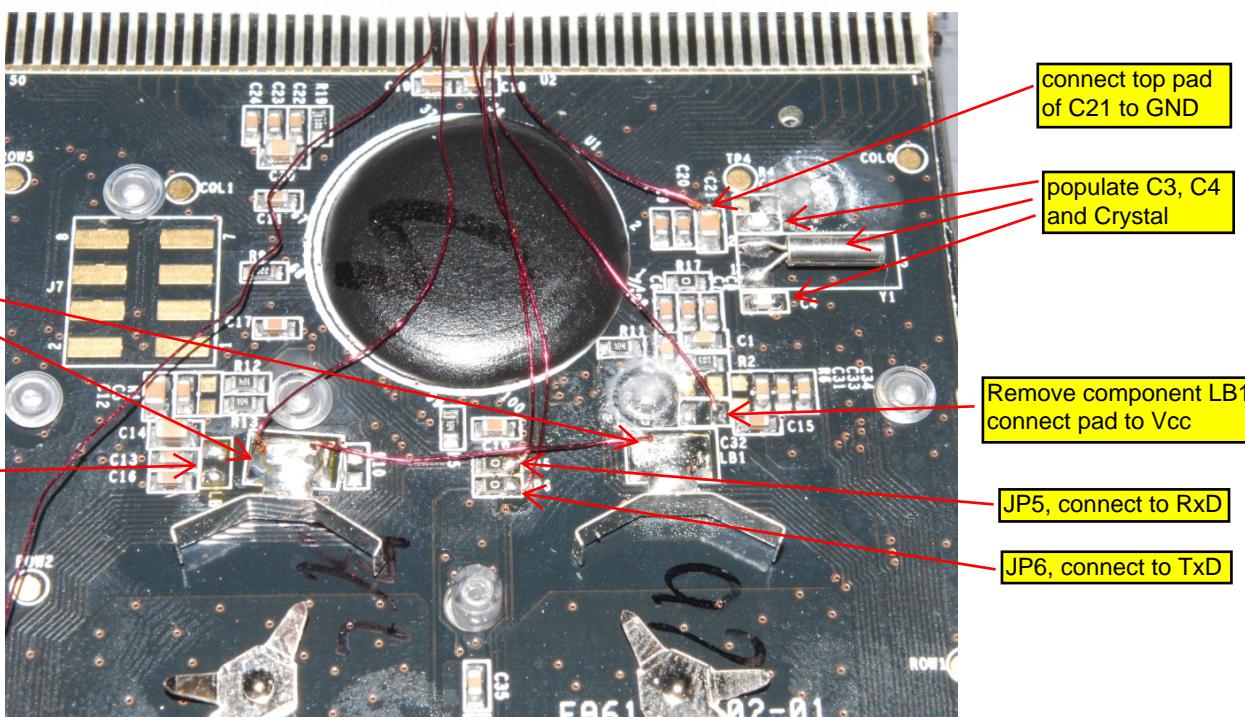
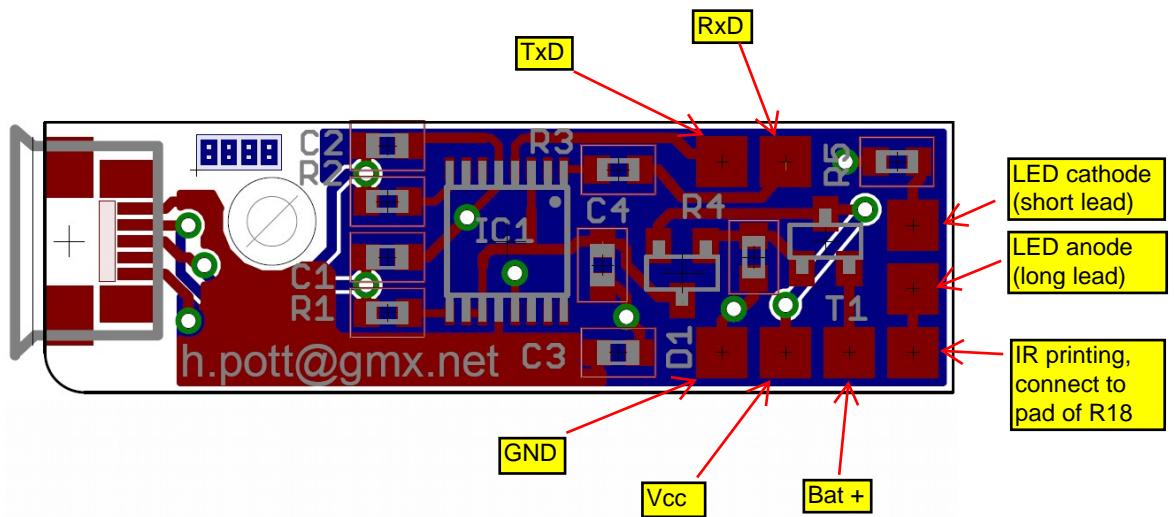


Electrical Connections

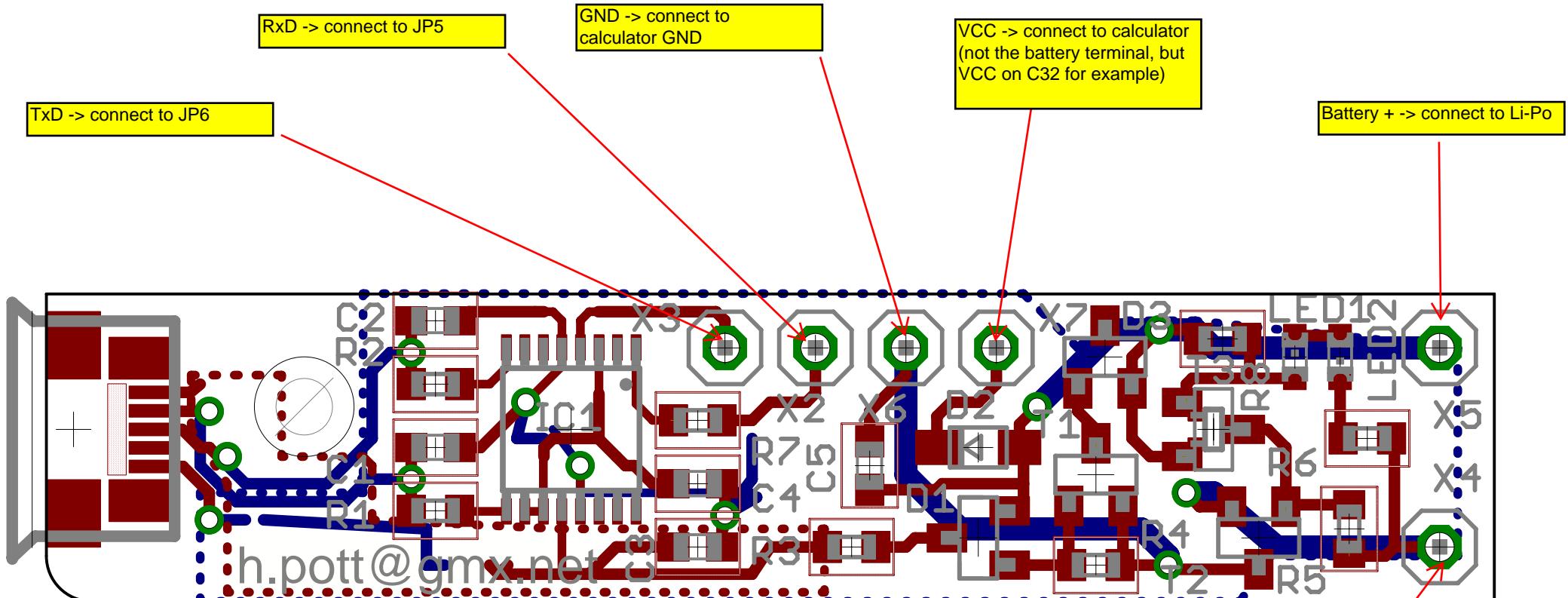
The instructions on the next page are for the installation of the “IR printing and USB power” version of the flash adaptor.

The page after that shows the “Li-Ion board” and how to connect it.

(sorry for not having any proper structure in this document. I have just cobbled this together in a hurry, as I have to much else going on right now. Hopefully I'll find the time to do this right in the future.)



If you are using the flash adaptor for first time programming of a HP30B, you will need to short out these two pads instead of pushing the erase button on the flash cable. It is easiest, if you solder a wire accross the two pads, and remove it when you are done.



Make all the connections shown above, in addition make the following modifications to the calculator:
 Replace one of the inductors LB1 or LB2 on the calculator PC with a diode (BAS16).
 If you replace LB1 with the diode, also install battery 1. The battery will act as memory backup when the Li-Po battery gets low and disconnects itself (in order to avoid deep discharge). This way the calculator will shut down in a controlled manner and no data will be lost.
 Unsolder the other battery holder (in this case no. 2). You will be able to install the Li-Po battery in this space.

Battery - -> connect to Li-Po

And here is where you can hide the battery for the lithium ion version:

At first I placed the battery in the space freed up by removing one of the original CR2032s and its battery holder. And then I found out there is a much nicer place to put it. It fits neatly into the space underneath the display. Have a look at the pictures:

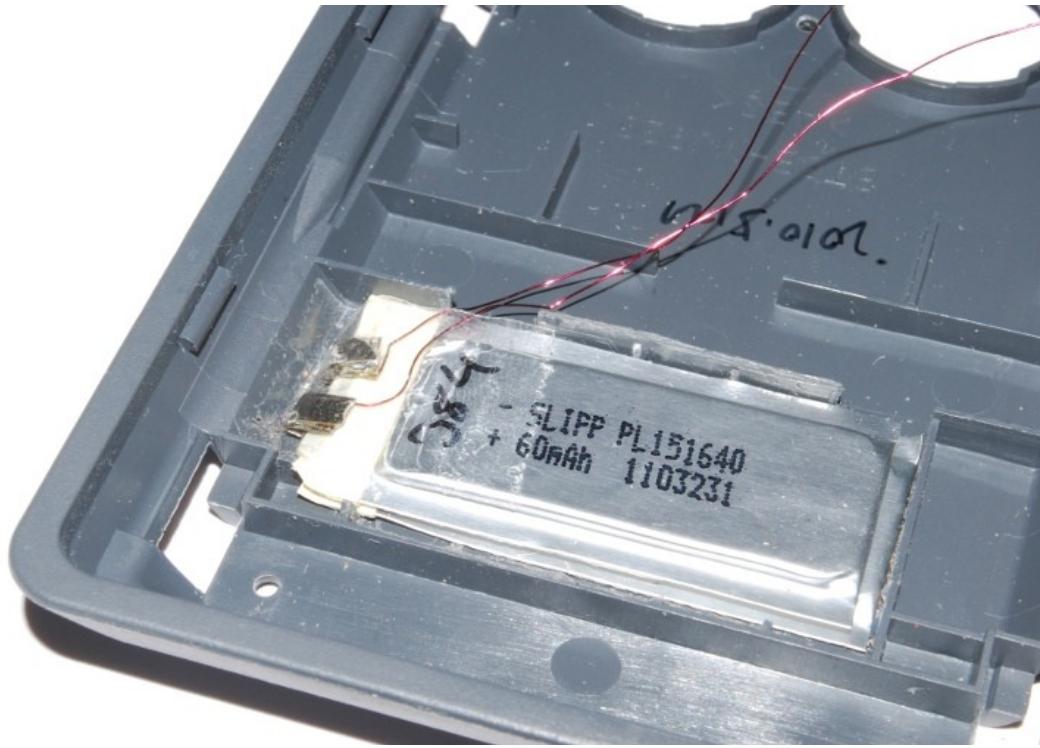
Remove the aluminium (or aluminum if you are in the US ;)) plate and rubber foam:



Then cut away the plastic supports underneath. Try and leave some in place so later on you get the same height for the aluminium plate:



Place battery in the space you made available. Here I used two batteries because this results in exactly the correct height to replace the aluminium plate. If you use just one battery you should fill the left over space with cardboard or some other material of the right thickness. Make sure you insulate the battery terminal so they don't get shorted by the metal plate:



Finally you replace the aluminium plate and the rubber foam:



I will update and extend this document in the future.
Feel free to email me with any questions or corrections.
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