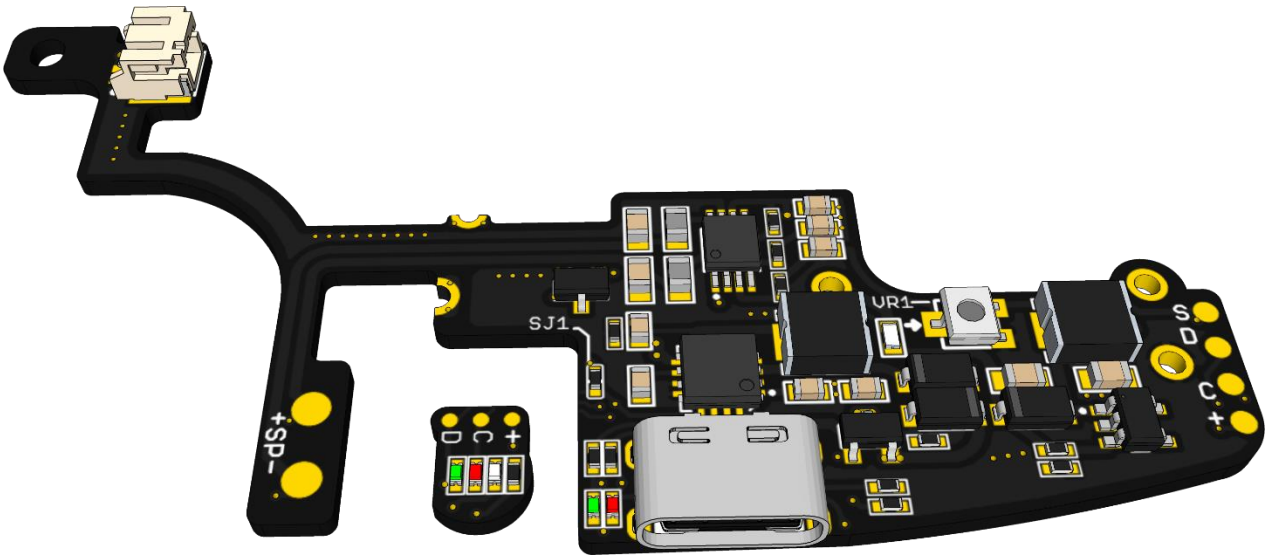
USB-C CHARGING KIT PRO FOR GAME BOY COLOR



PRODUCT

HTTPS://SHOP.GILTESA.COM/PRODUCT/GAME-BOY-COLOR-USB-C-CHARGING-KIT-PRO

PLEASE READ THROUGH THESE INSTRUCTIONS ENTIRELY BEFORE ATTEMPTING TO INSTALL.

WARNING: IF YOU ARE NOT COMFORTABLE WITH SOLDERING, OR PERFORMING ANY STEP IN THIS GUIDE, DO NOT PERFORM THE INSTALL YOURSELF. FIND SOMEONE WHO IS COMFORTABLE TO DO IT FOR YOU.

DESCRIPTION

The **Game Boy Color USB-C Charging Kit PRO** is the new circuit for **Nintendo Game Boy Color**. This time is all in one circuit and includes not only the **charging controller** but also a **boost converter** and **audio amplifier**.

The modern **IPS displays** with background light require more energy than the stock display. Also, **the flash cards** to load tons of games consume the battery very fast. If you really want to enjoy the games, the best way to do it is using a rechargeable battery instead of AA batteries.

However, that is not enough because a higher consume is forcing the original electronic to strive more than it can. That may cause noise in the speaker or headphones.

Typical solution has been adding a charging circuit for the battery and a power converter to replace the old and not efficiently one which is included in the GBC. Some people also add an audio amplifier to hear better the speaker sound. All these things make the GBC perfect, however the installation require a lot of cables and cannot be easy for some people without enough knowledge.

FEATURES

- Exact **shape for Game Boy Color**.
- **Li-Ion battery charger** by USB-C with protection for charging level and over-discharge.
- **DC to DC converter** of 5V output.(The board doesn't support original screen, only IPS screens supported)
- ~~Safe charge and play.~~ (since v2.3)
- **Audio amplifier** for the speaker with a potentiometer called VR1 to setup the maximum volume.
- **Integrated LED indicators** on the main board, next to the USB for charging battery (red) and full battery (green). It can be disabled by the jumper SJ1.
- **External LED indicators** board for playing (white), charging battery (red) and full battery (green). Optional installation.

The feature "**Safe charge and play**" is not supported properly. Please, **DO NOT charge and play at the same time** to avoid any problems.

INCLUDED

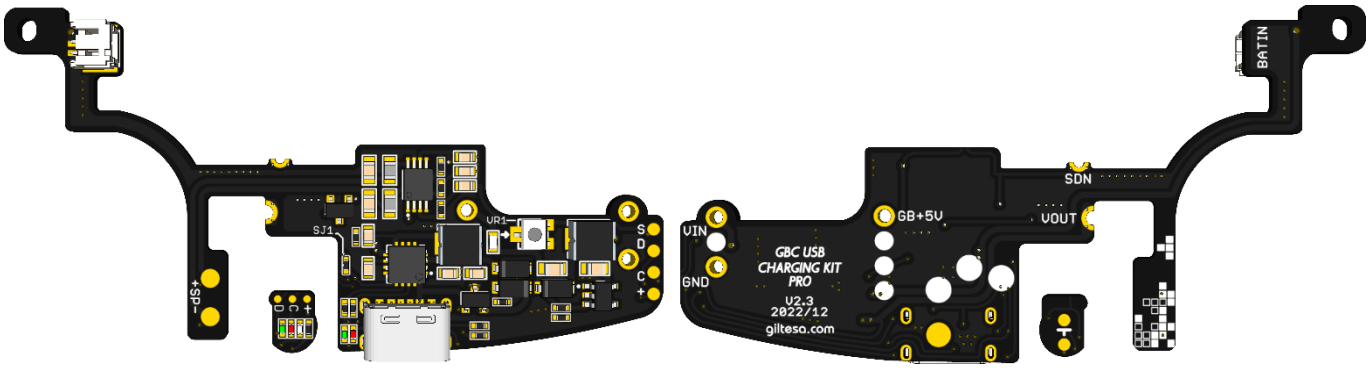
- 1 frame panel which includes the two boards:
  - Main board.
  - Light board.
- 1 Battery cable.
- 1 Cable of 3 wires for connecting the light board.
- 1 Cable of 1 wire for connecting the board to the sound pad.
- 1 Light diffuser pipe.

RECOMMENDED / REQUIRED [NOT INCLUDED]

- Li-ion battery (for example 123048, perfect for an IPS V3 laminated screen shell)
- New speaker 8Ω 1W (optional but recommended to avoid noise, for example this one)
- New capacitors (optional but recommended to avoid noise)
- Cutting tool (optional but recommended)
- Tri-wing sand phillips screwdriver
- Cutting plier
- Cutter
- Tweezers
- Tin soldering iron
- Tin
- Flux
- Isopropyl alcohol

BOARD DETAILS

There are many pads on the charging board that need to be soldered to join it to the GBC mainboard. The following explains what each pad is for.

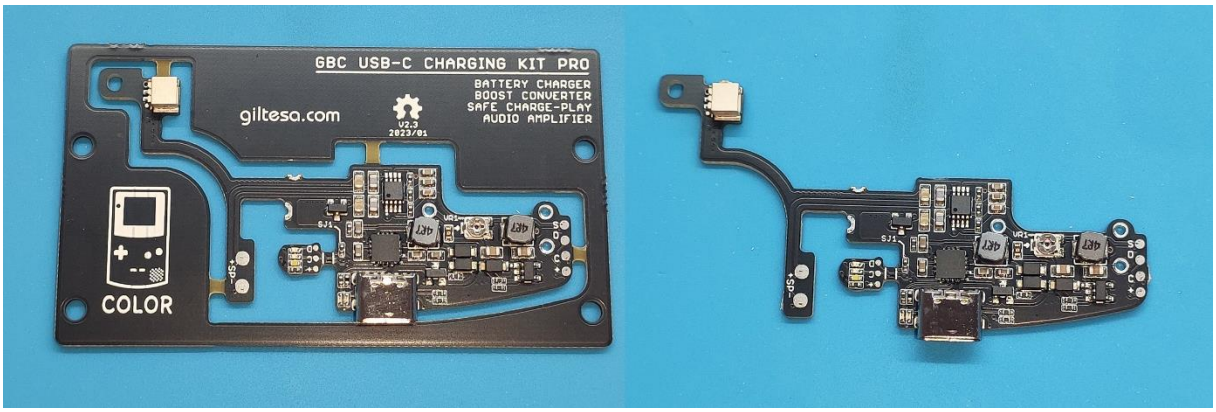


- BATIN: Input connector of the li-ion battery.
- VOUT: The energy output (from battery or USB-C) to the GBC power switch.
- VIN: The energy input after the GBC power switch.
- GB+5V: The +5V line output to power the GBC board (CPU, IPS screen, etc.)
- GND: The ground pad
- SDN: Shutdown pad to disable the audio amplifier when the headphones are connected.
- +SP-: The positive and negative pads for the speaker.
- S: Audio input from the GBP audio wheel
- +: Positive pads for joining the light and main boards.
- C: Charging pads for joining the light and main boards.
- D: Done pads for joining the light and main boards.
- SJ1: Solder jumper. If you wish, it can be removed to disable the integrated LED indicators.

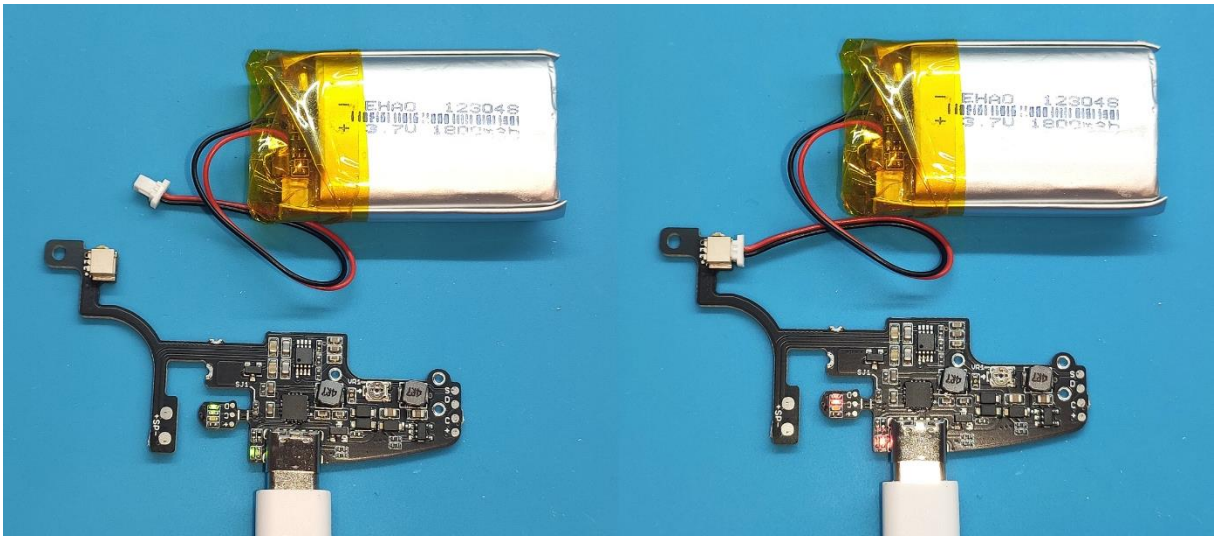
TEST THE BOARD!

Before starting the installation, you should test the board. If it doesn't work contact me for a replacement *(all boards are fully tested, but they may damage during the shipping, we try to package them as better as possible),* **if it works, go ahead with the installation**.

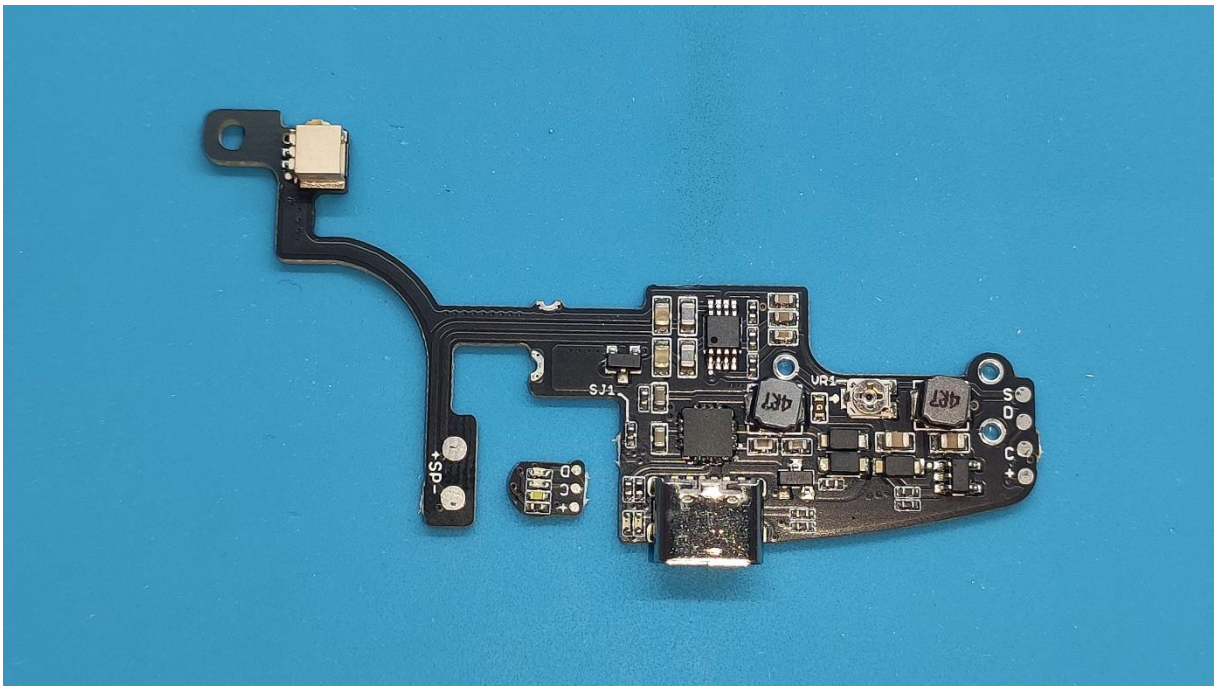
First cut the bridges **(1)** and separate the board from the frame.



Then test the board with USB-C and battery. If the battery is not connected, the green light will turn on and the red may blink. When the battery is connected the red light will turn on (or maybe the green light if your battery is already full)



Second, If the board works as expected you can cut (2) and continue with the guide.



INSTALLATION STEPS

Please, carefully read the following steps for a successful installation.

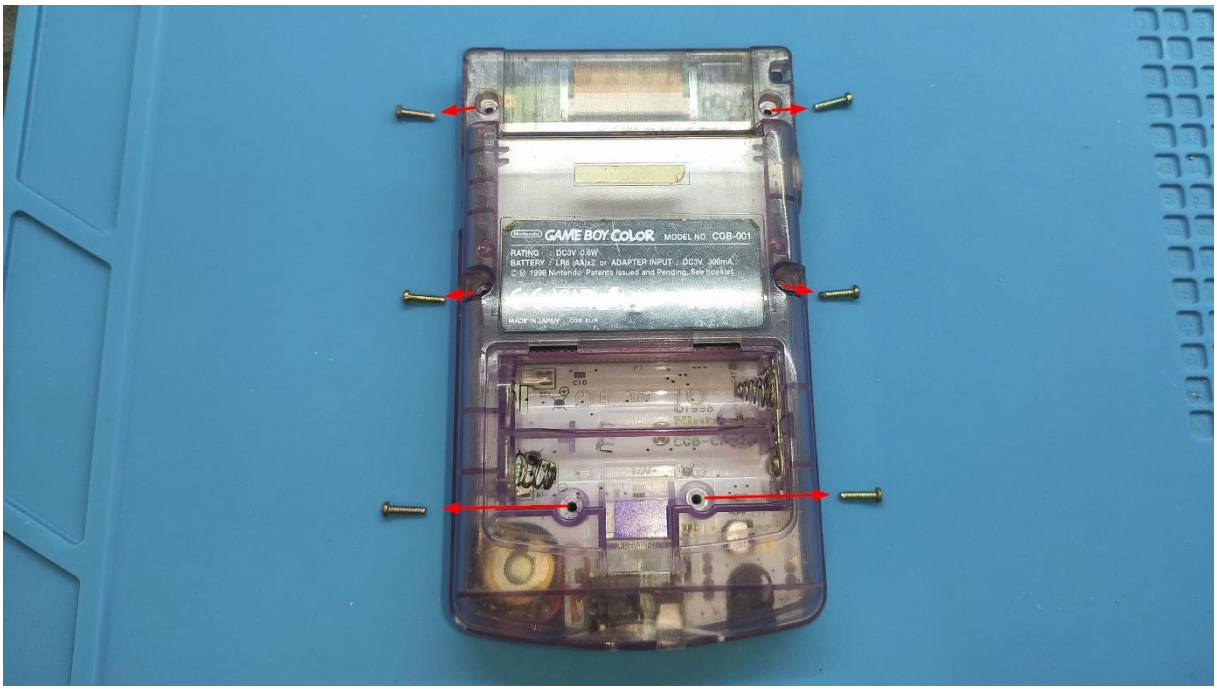
PRE INSTALLATION STEPS

Before the installation, your GBC may need some extra steps to have it ready for the kit.

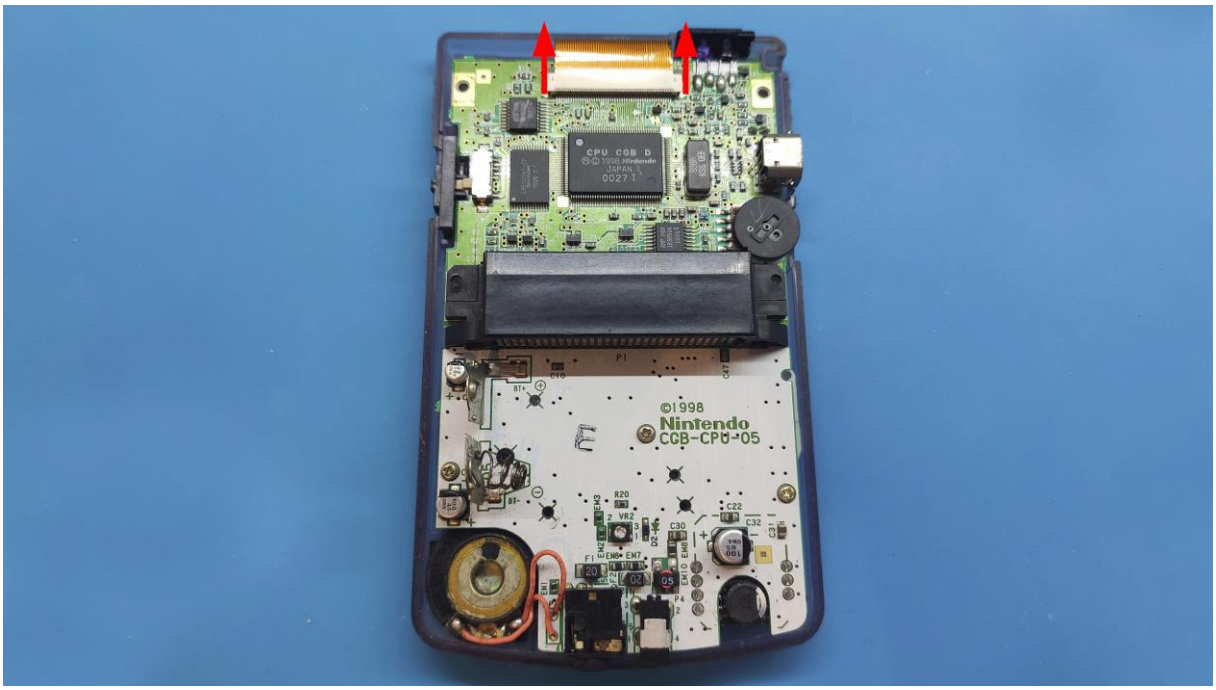
1. DISASSEMBLY THE GAME BOY COLOR

Nintendo products in general use two kind of screws. The first one called **tri-wing** to close the shell, and the second one called **phillips** to hold the main board to the shell.

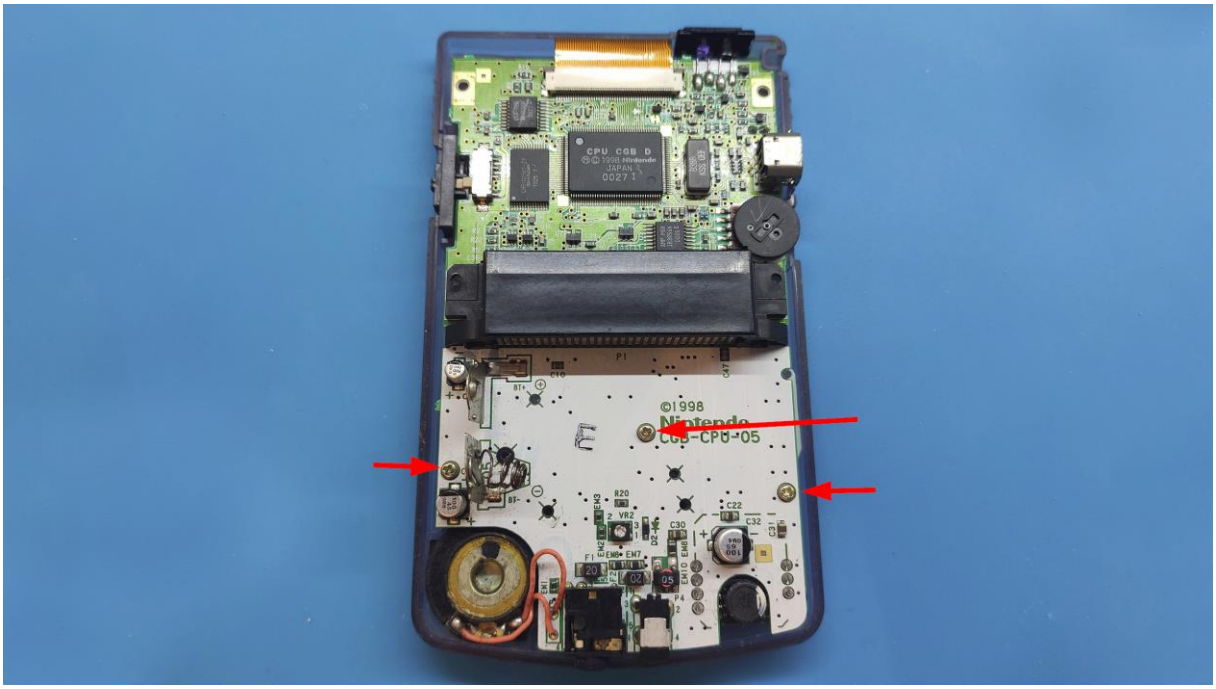
Use the **tri-wing** screwdriver to open the shell and remove the 6 **tri-wing** screws.



Carefully **disconnect the display cable** from the mainboard.



Then, remove the 3 **phillips** screws with a **phillips** screwdriver.



2. CLEANING THE MAINBOARD

Use isopropyl alcohol to clean the board. Since the board was made in 1998, the board may be full of dust or with the flux from the factory (yellow spots). All this dirt can be cleaned with alcohol.

3. CLEANING THE POWER SWITCH

Depending on how the GBC has been stored, the switch can be also full of dust inside and prevent a good electrical connection. **If you see when your turn on the GBC, sometimes it doesn't turn on well at the first time, this may be the cause.**

However, cleaning the power switch is a bit difficult to do. You must be extremely careful about cleaning it or you may damage it.

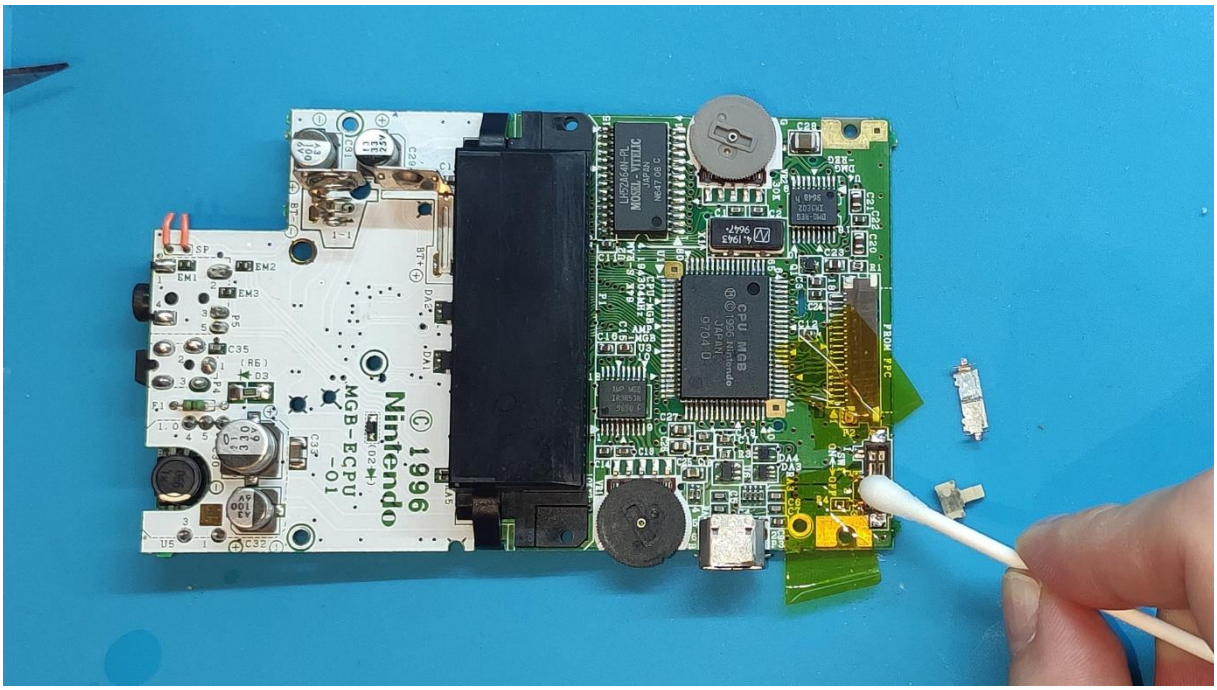
First, protect the nearby parts with kapton tape to avoid burning them with the soldering iron.

Then, heat the pads, first one and with a tweezer or flat screwdriver pry the veneer apart first on one side, then repeat this on the other side.

You can see it in the following video:

https://youtu.be/P-4KlOvaQ2M

Once the metallic veneer is removed. The switch can be cleaned with alcohol and close and solder it as before.



This is a GB Pocket, but it's the same for GB Color

INSTALLATION STEPS

1. PROTECT THE BUTTON PADS

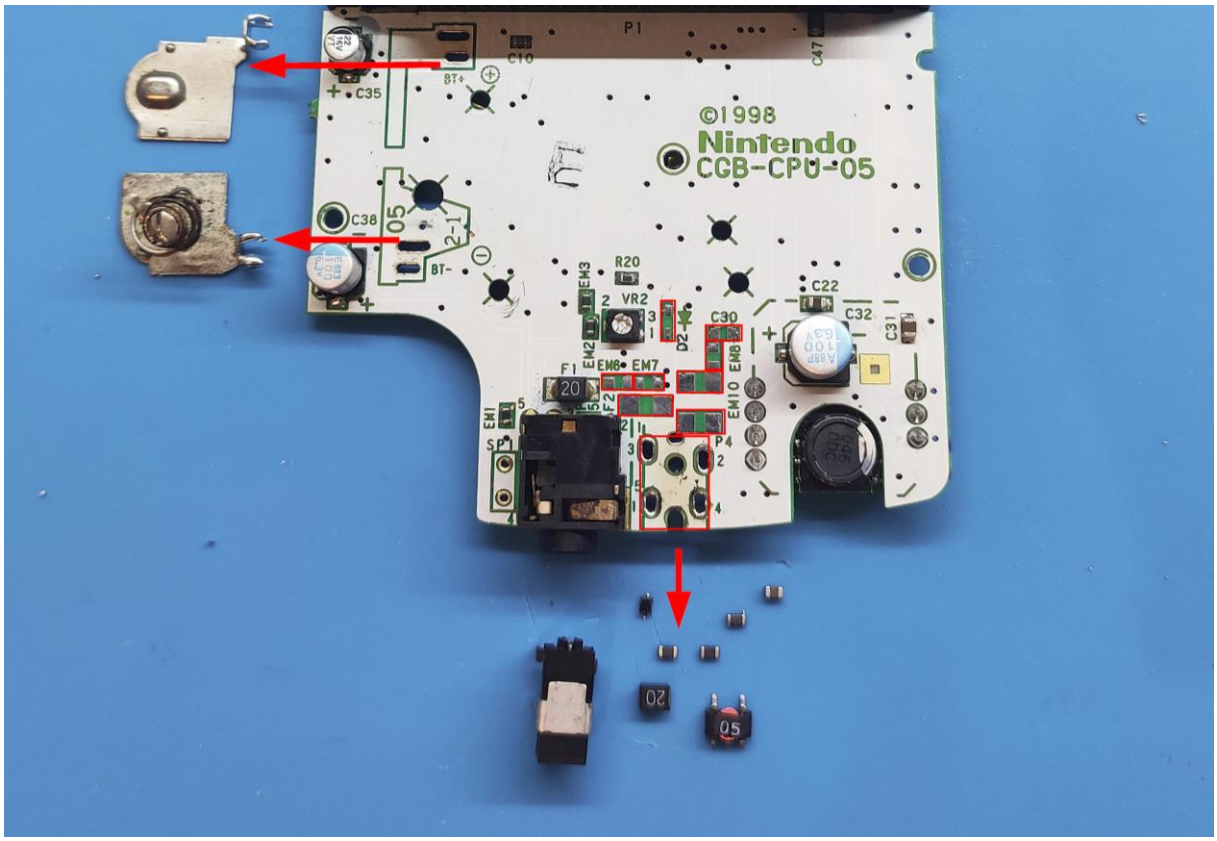
Because many pads need to be soldered and they are next to the button pads. This can cause the buttons pads get dirty with tin and interfere with proper operation. To avoid that, **protect them with kapton tape <u>until the installation is completed</u>**.

2. *REMOVE UNNECESSARY COMPONENTS*

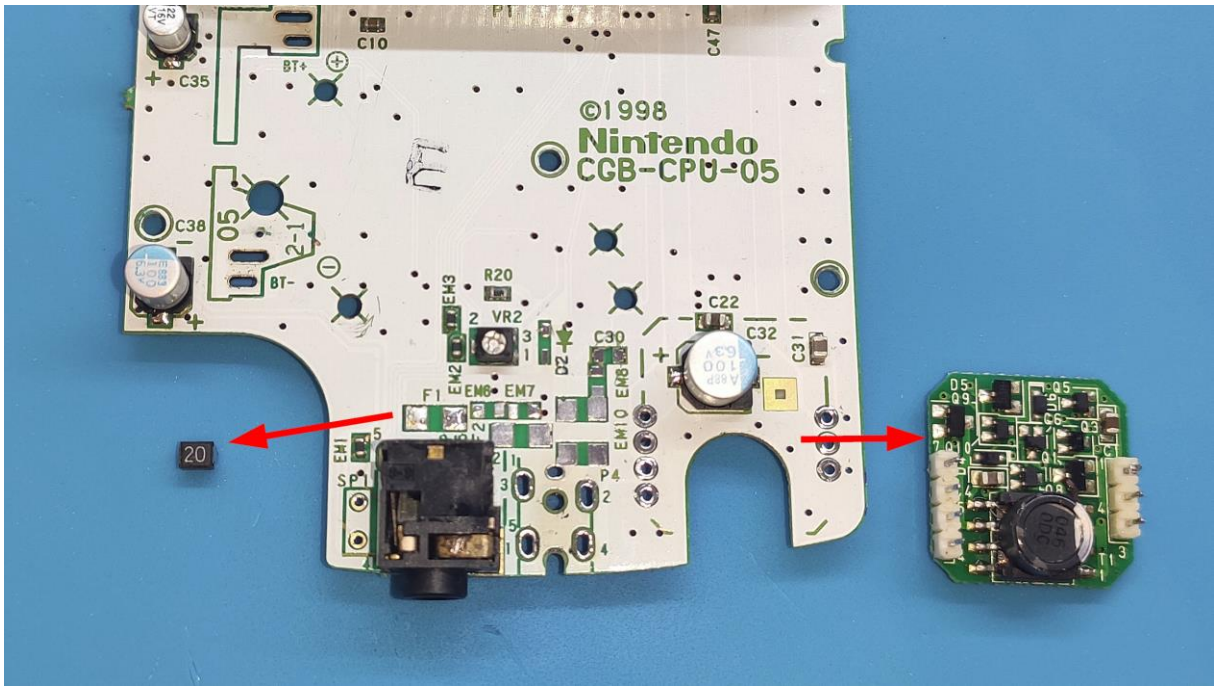
There are some components that the kit doesn't need, and they are in the middle where the kit needs to be installed.

Remove the components one by one. You can follow **this list from the easier one to the harder one to remove:**

- Diodes: **D2**
- Capacitors: **C30**
- Coil filter: **EM8**, **EM7**, **EM6**
- Fuses: **F1***, **F2**
- Coil filter: **EM10**
- **Speaker** (keep it for later if you don't have a new one)
- **Red light** (optional, only if you want to install the light board of the kit)
- Power **plates BT+ and BT-** for the AA batteries.
- **DC Jack**
- **DC-DC converter***



* These two components are specific for the GBC PRO board, remove them too:



3. CLEAN THE EXCESS OF TIN

All the pads where the components were before need to be clean and free of tin. Otherwise, the kit will not be flat over the GBC mainboard.

Use a desoldering pump or/and flux and desoldering mesh for removing the tin.

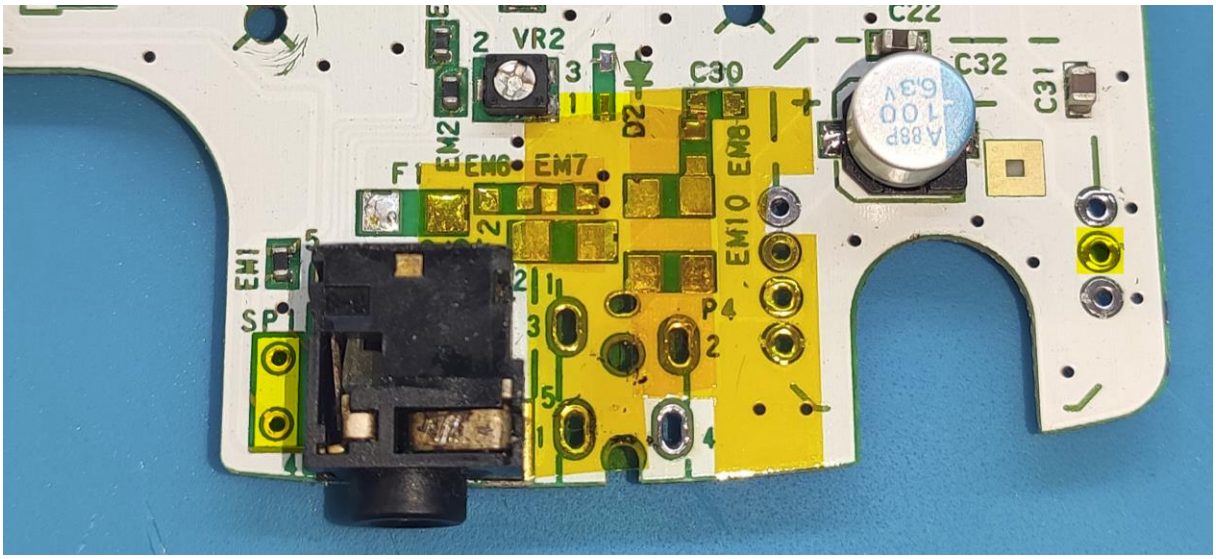
4. CLEAN THE BOARD

After the components are removed, it may be dirty, clean it again with isopropyl alcohol.

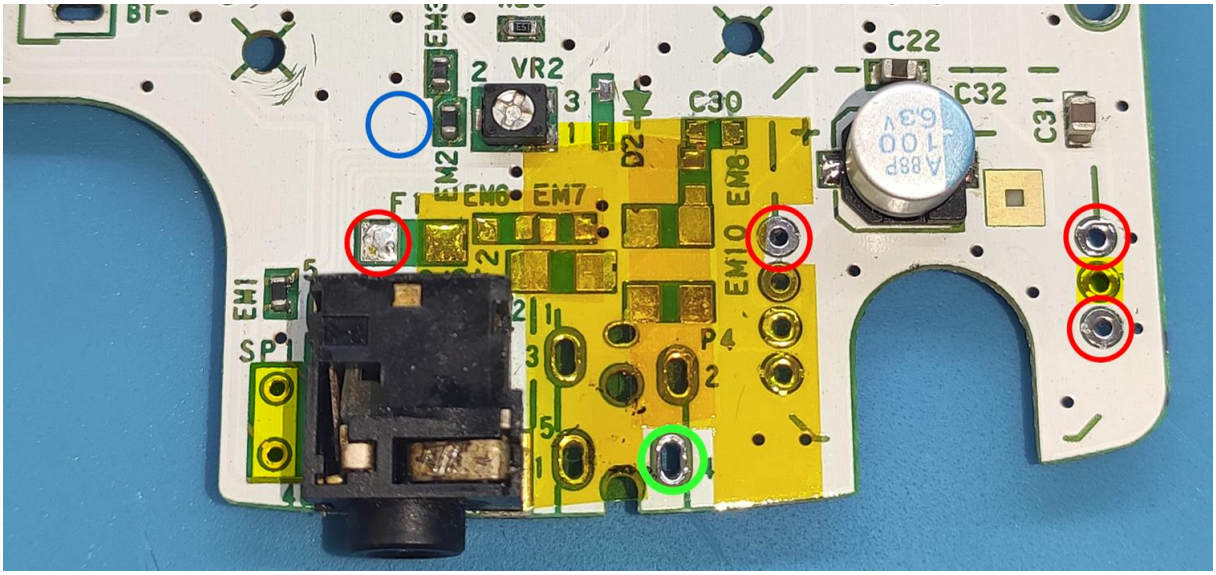
5. *INSTALLATION OF THE MAIN BOARD*

There are some pads on the board that the kit doesn't need, and they may interfere with the correct operation of it. **In the worst case, they can cause short circuit and burn the kit or the GBC.**

Please, protect these pads with kapton tape following the next picture:



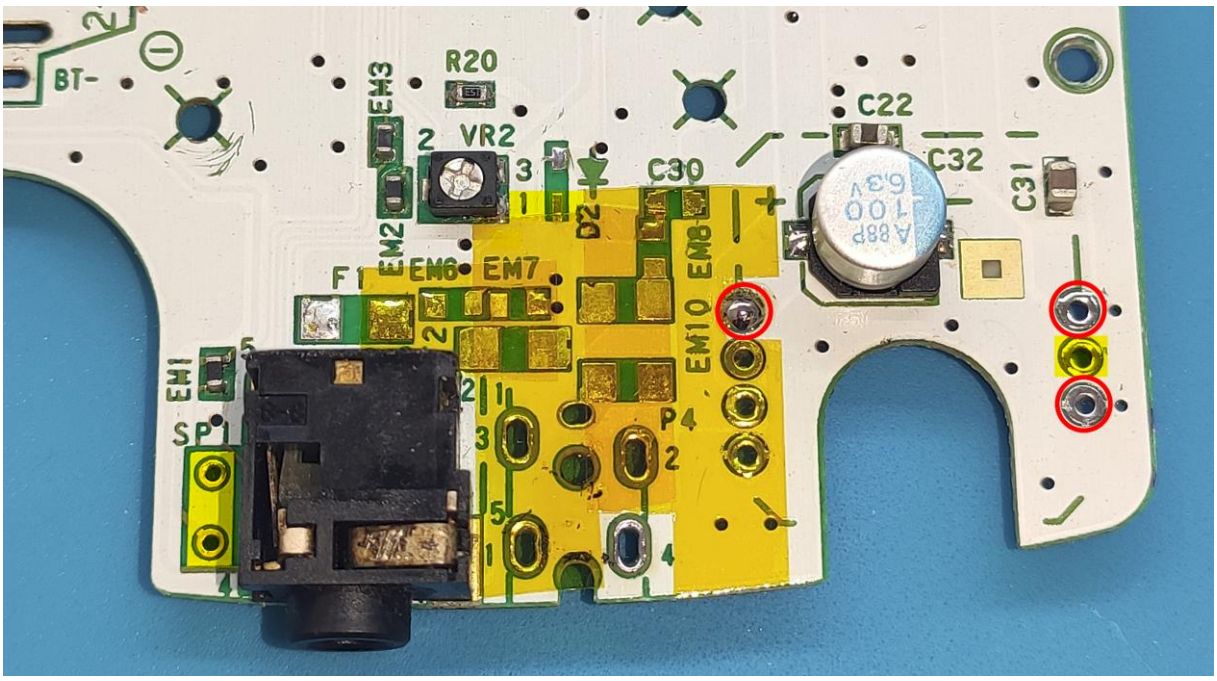
The board is going to be soldered in these pads:



(Blue circle) Some versions of GBC board, like mine in the previous picture, don't have the electronic component **EM4** where the GBC PRO board need to be soldered. This can be easily fixed using a cable. You will see in later in this guide.

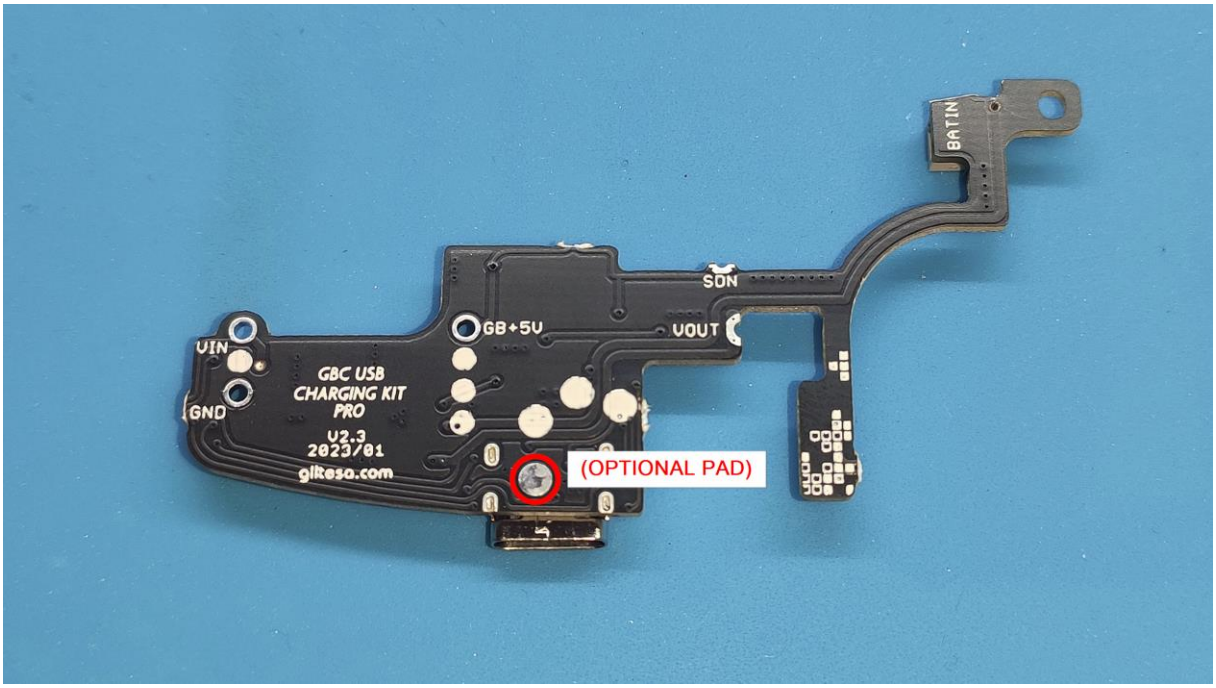
(Green circle) This pad is optional, it doesn't have any connection to the circuit, it is just for holder stronger the board to the GBC mainboard.

First, **presolder these three pads** with **a bit of tin** (not too much):

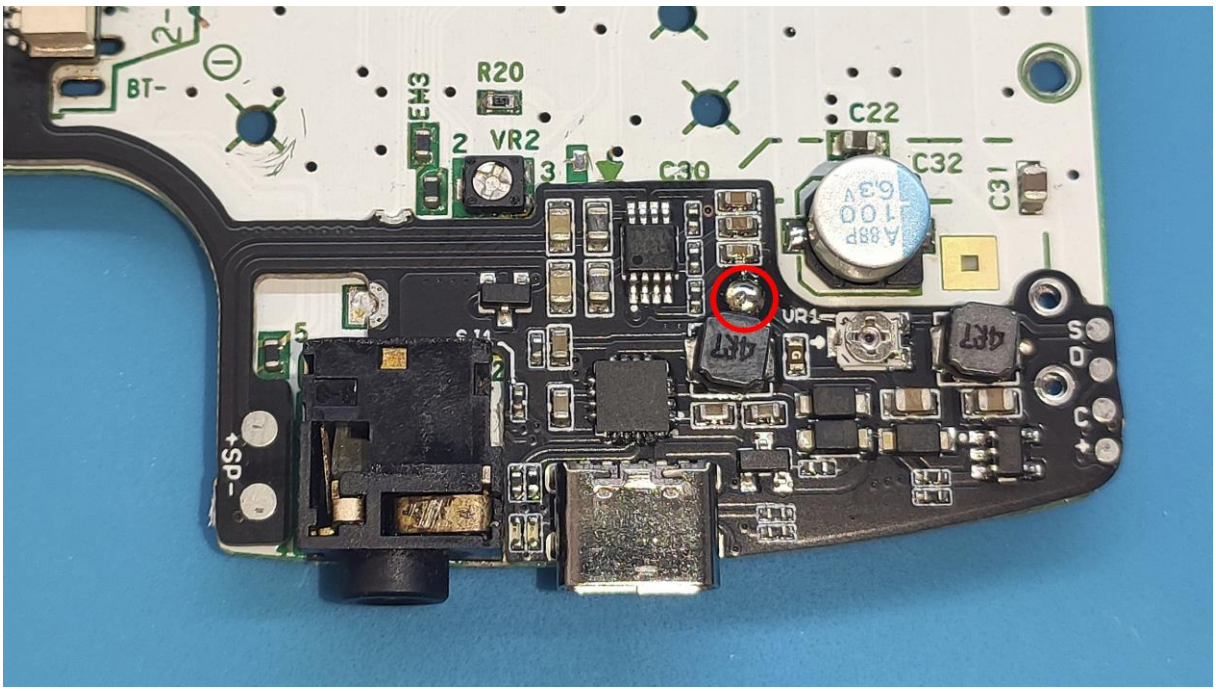


Note: In the picture it's presolder only the pad on the left, but I think it's going to make easier to have these three pads soldered since this step.

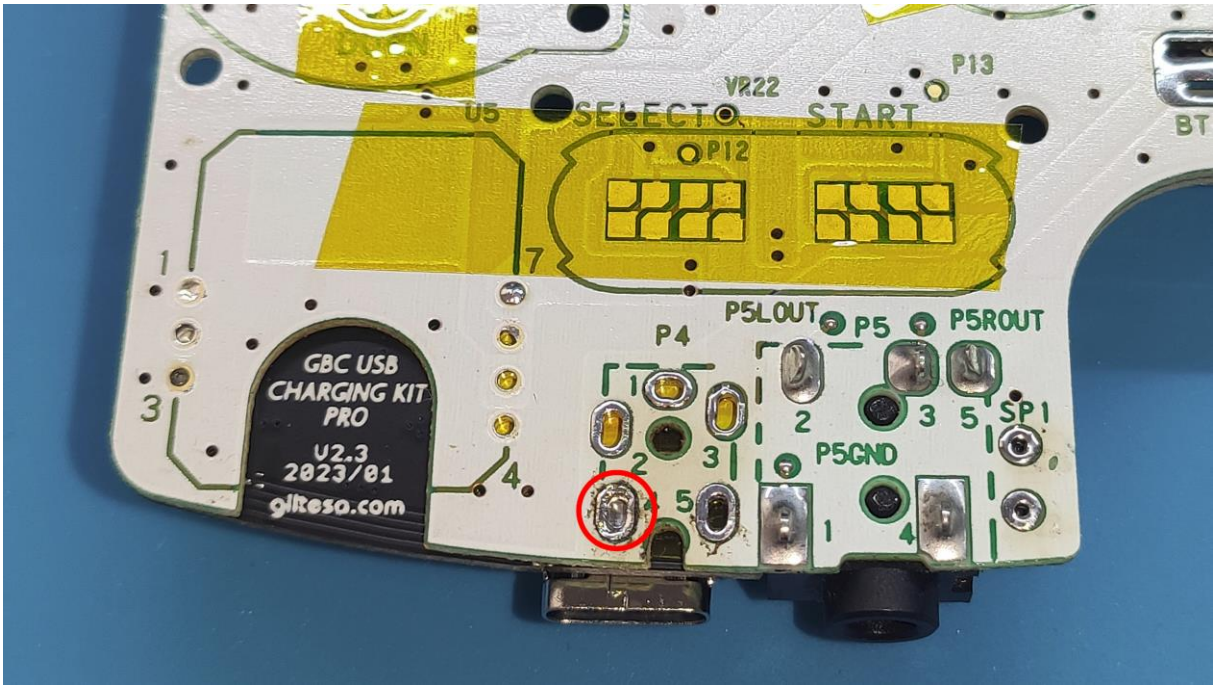
OPTIONAL: This another pad can be also presolder, but with few tin, otherwise it will make harder to join both boards as flat as possible.



Put the GBC PRO board over the GBC mainboard and solder this pad which is going to be joined with the previous soldered pad. When you are heating the pads press with your fingers to be sure both boards are flat and there isn't any gap between the boards.

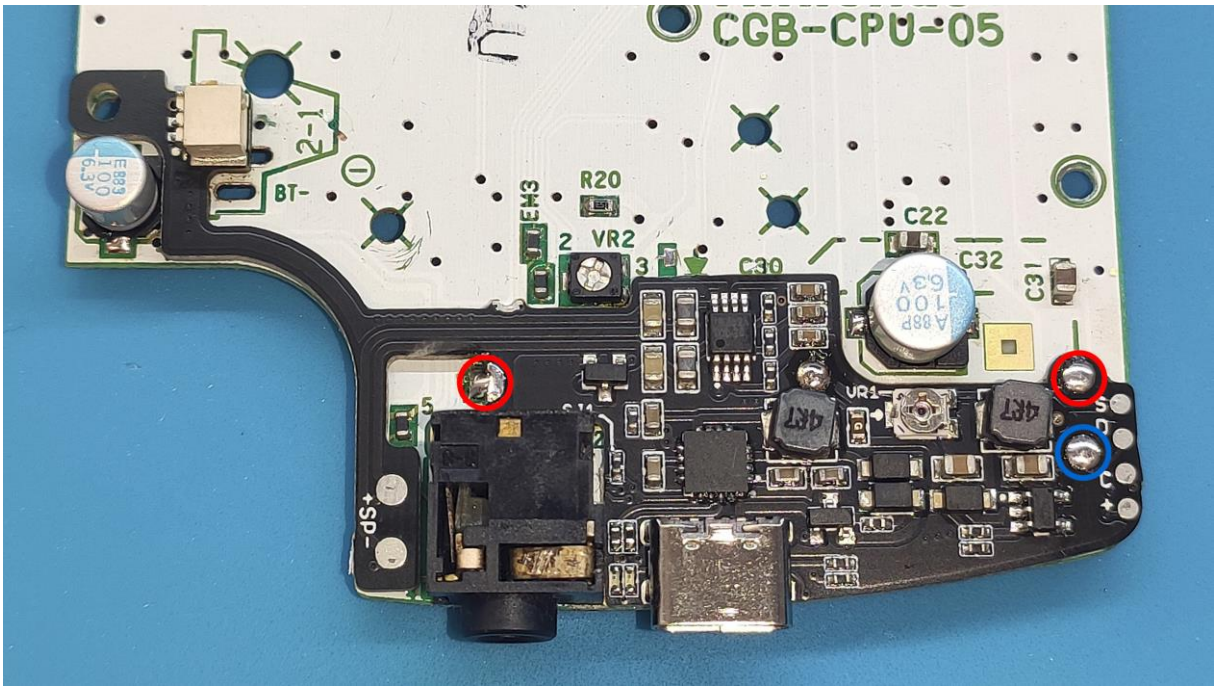


OPTIONAL: repeat the same operation but from the other side:



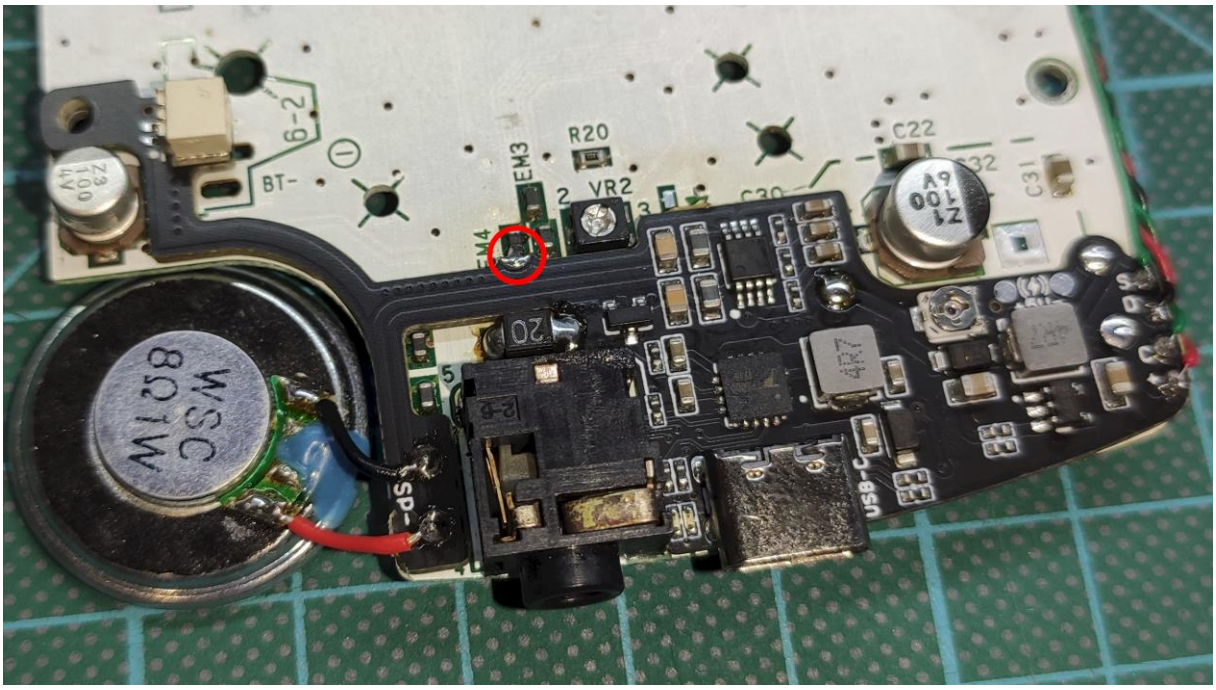
Then continue with these three pads. But **start with the blue one with is far away the harder of the installation**. This pad is the ground / GND pad, and it loses the heat of the solder iron very fast.

If you presoldered before these pads, shouldn't be too difficult. Add tin on the GBC PRO pad and the one down the board should melt and joint. Press the board with the fingers to keep both boards as together as possible and not gaps in the middle.

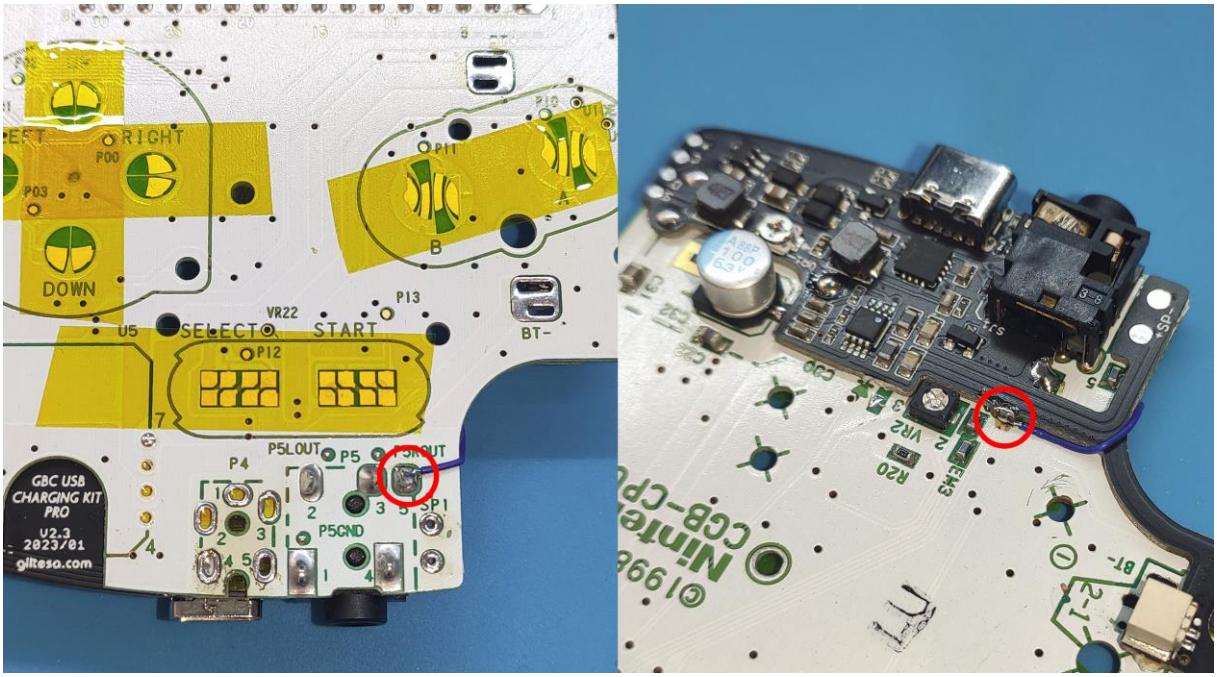


The last but not least, it’s this pad which control when the speaker or headphones needs to work depending on if the headset are connected or not.

If you have the component **EM4** on your GBC mainboard, you can solder it easy:

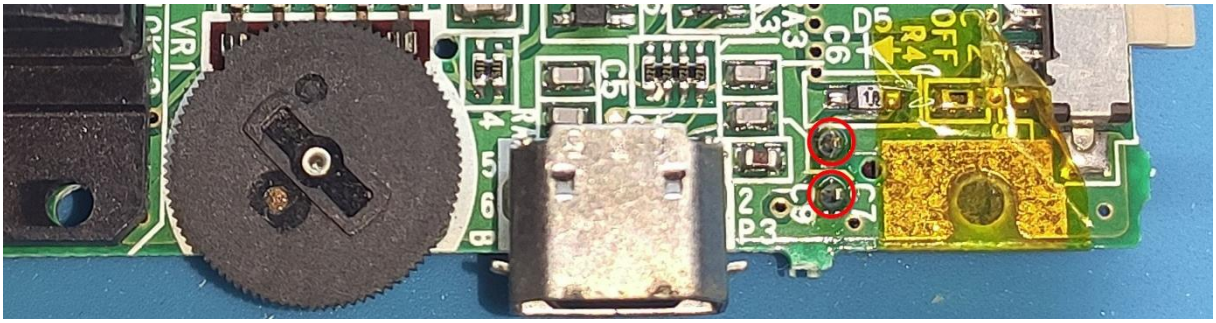


Otherwise, you will need to solder a cable like these two photos:



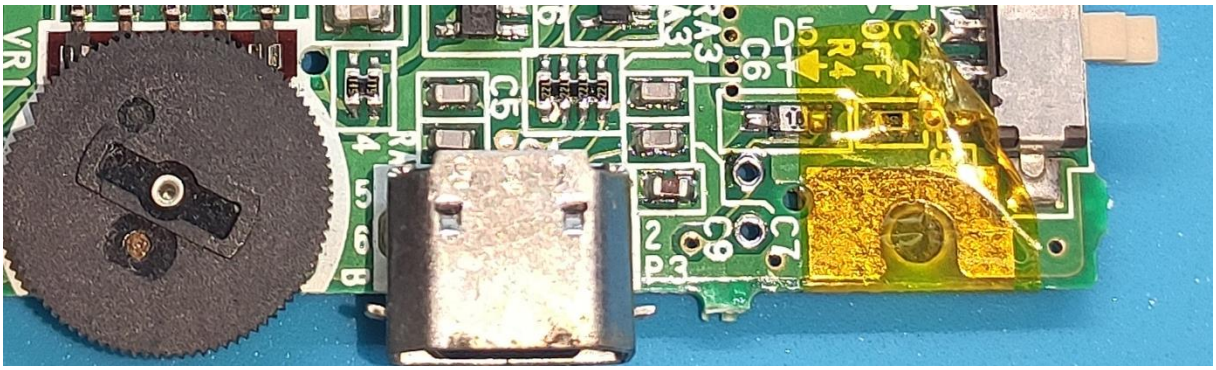
6. INSTALLATION OF THE LIGHT BOARD [OPTIONAL]

First you need to remove it. Heat both legs at the same time and then remove it from the mainboard.



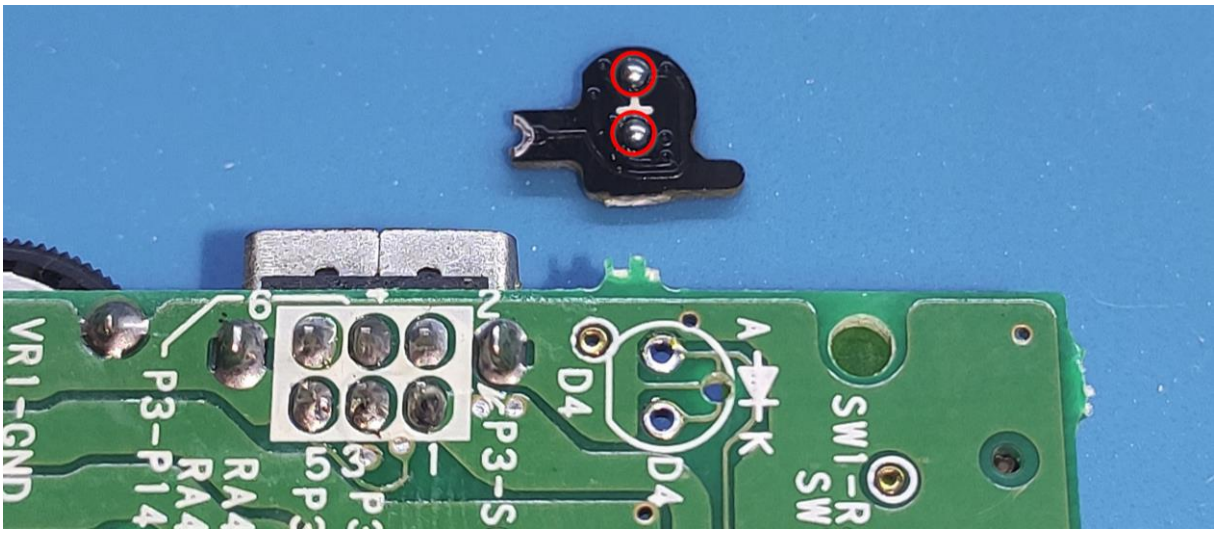
This is a GB Pocket, but it's the same for GB Color

Now, remove the excess of tin and clean it:



This is a GB Pocket, but it's the same for GB Color

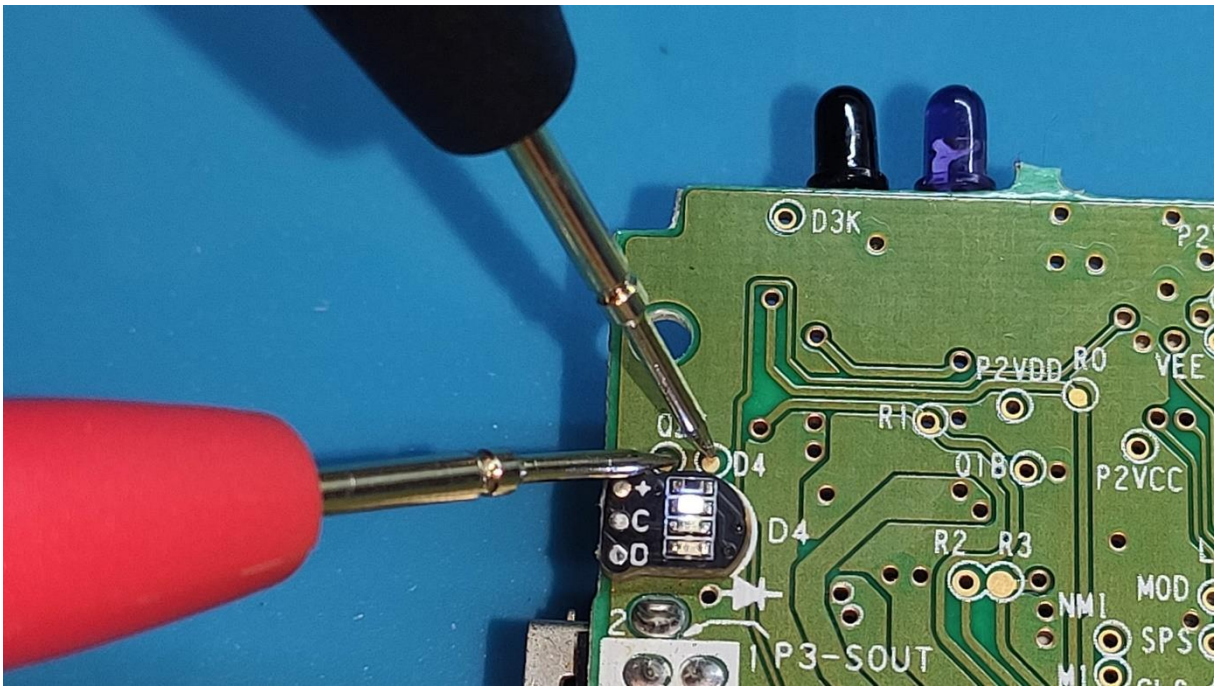
The best way to solder the light board is presolder the two pads that the board has:



This is a GB Pocket, but it's the same for GB Color

Then, put it on the mainboard and heat the holes from the opposite side, the light board will be soldered.

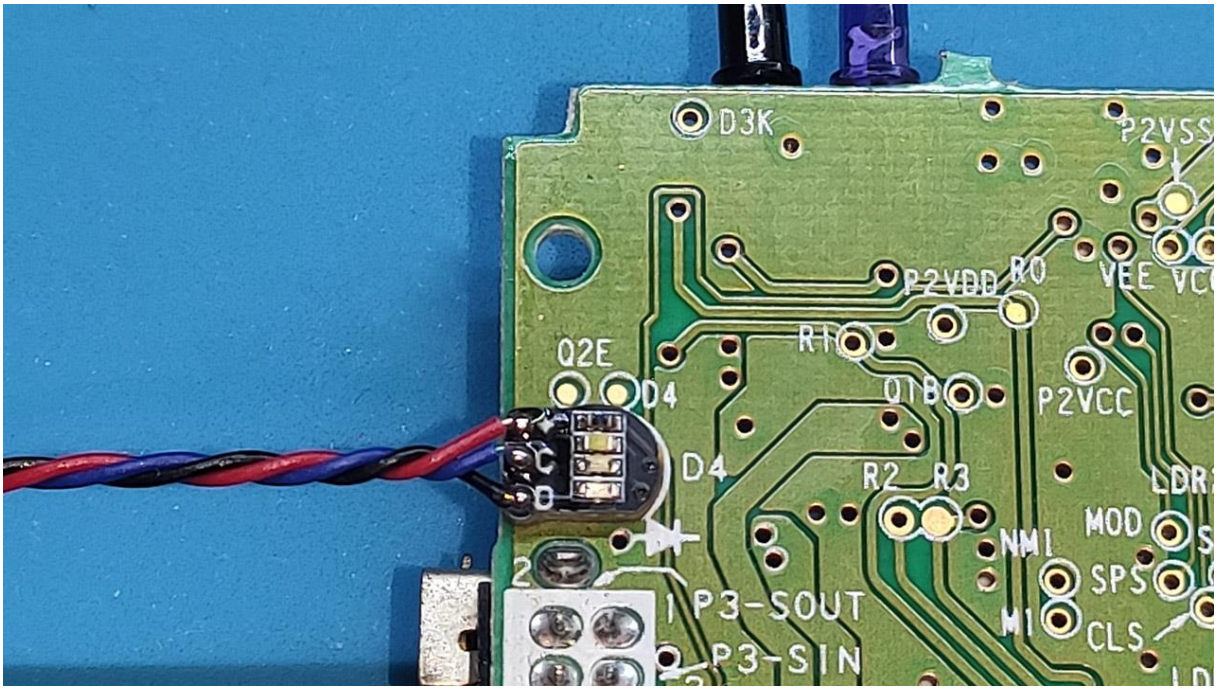
If you wish, you can test the white light with a multimeter in diode mode here:



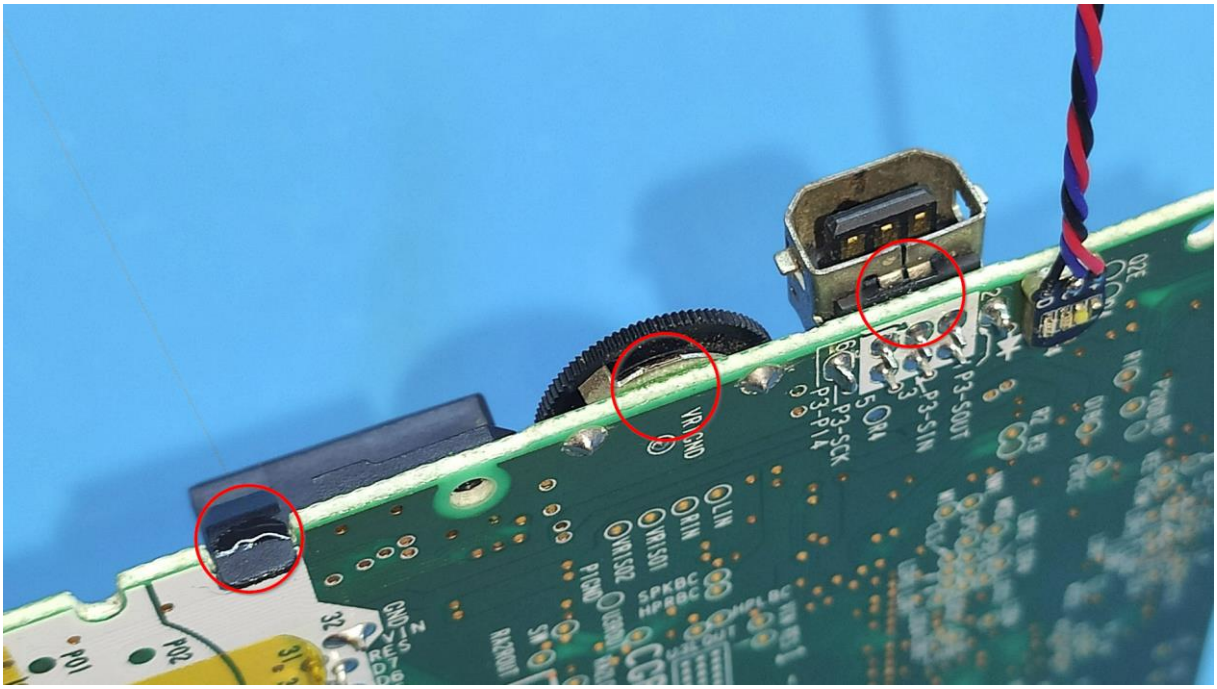
Once the light board is installed on the GBC mainboard is time to solder the cable for the battery charging status light.

This cable has 3 wires, which color may change but it is not a big deal. The point is joining both boards correctly. Both boards have 3 pads called: **+**, **C** and **D**.

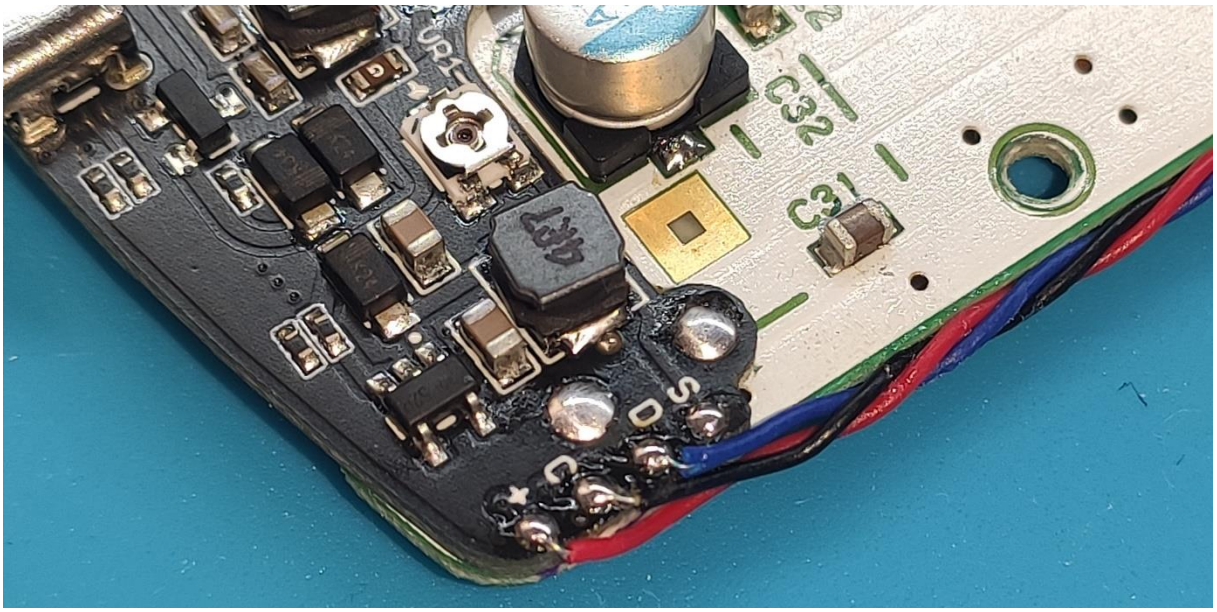
Fist start soldering the light board:



When you have it, my recommendation is you **glue** the cable to the side of the main board, it will hold the cable and be almost “invisible” in transparent shells.



When the cable is near to the mainboard, cut the excess of cable (the cable is always longer than you need to), and solder it:



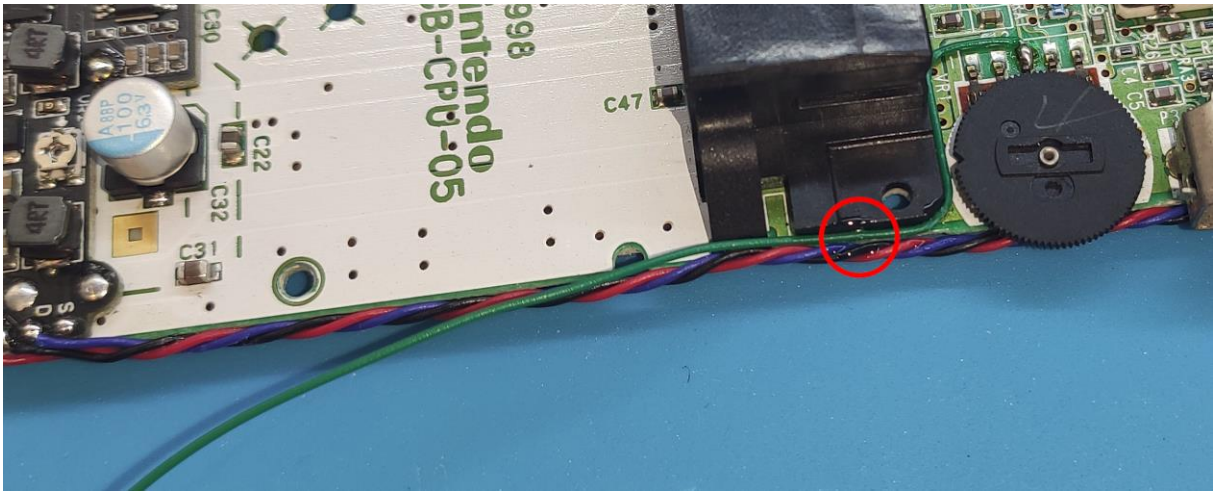
NOTE: The colors of the cables of the kit may change, but it doesn't matter. The important is to join both boards properly.

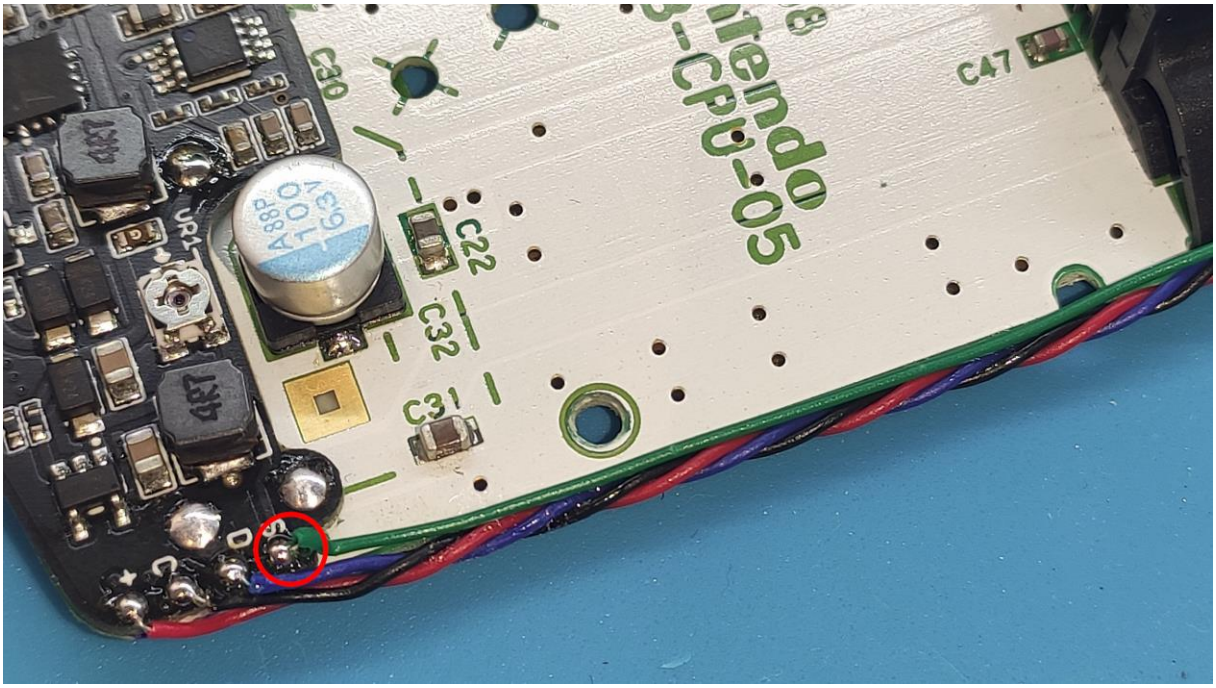
+	→	+
C	→	C
D	→	D

7. INSTALLATION OF THE AUDIO CABLE

This point is very important, otherwise your GBC won't make any sound. The provided cable need to be soldered between these two points:

As the previous cable for the light board, you can glue this one too:





Once at this point, you can assembly everything except the bottom shell than need to be trimmed in the next step.

So, install the screen, light diffuser included with the kit, bottoms, and mainboard. You can also test the board with USB-C cable and the battery, check the lights works well.

*This photo is with a GBC board, but with the **GBC PRO board** is the same.*

IMPORTANT NOTE:

If your IPS screens requires a power cable, which is usually soldered between the flex cable to the switch. **Solder it now**, and if the screen doesn't turn on or blink, you may need to solder the cable instead the switch (or any place the manufacturer says) to the **GB+5V** pad.

This has happened with these screens (not sure which version of each one):

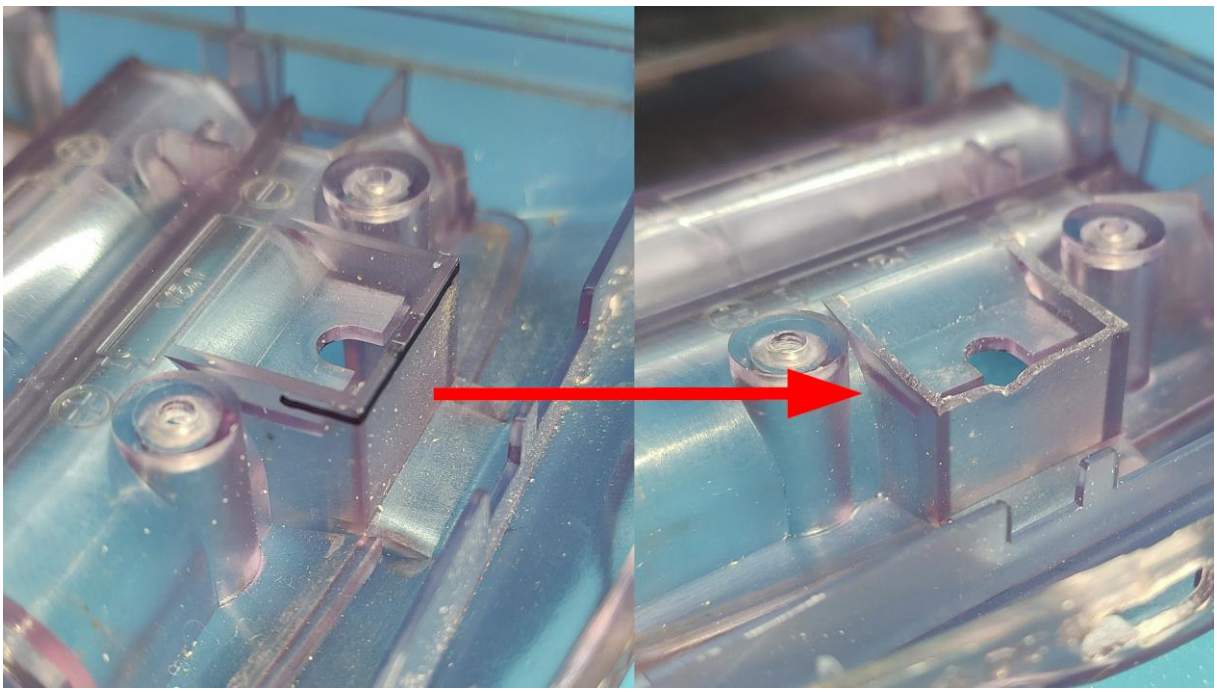
- FunnyPlaying Game Boy Color 2.0 Q5 IPS Laminated Backlight Kit (photo)
- IPS Display Q5 TV Out HDMI (photo)
- IPS LCD GBC (photo)

8. CUTTING THE PLASTIC SHELL

The GBC board has been designed to try to cut into the shell as less as possible. However, there are some parts that need to be cut/trim.

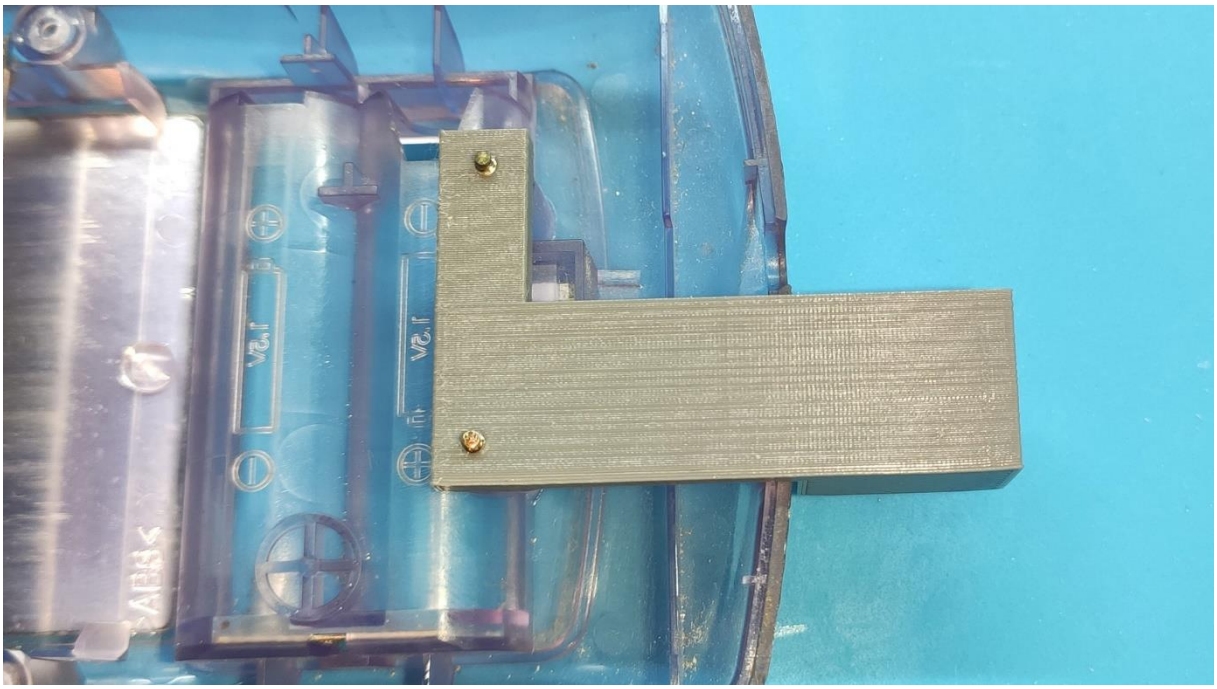
INSIDE THE SHELL

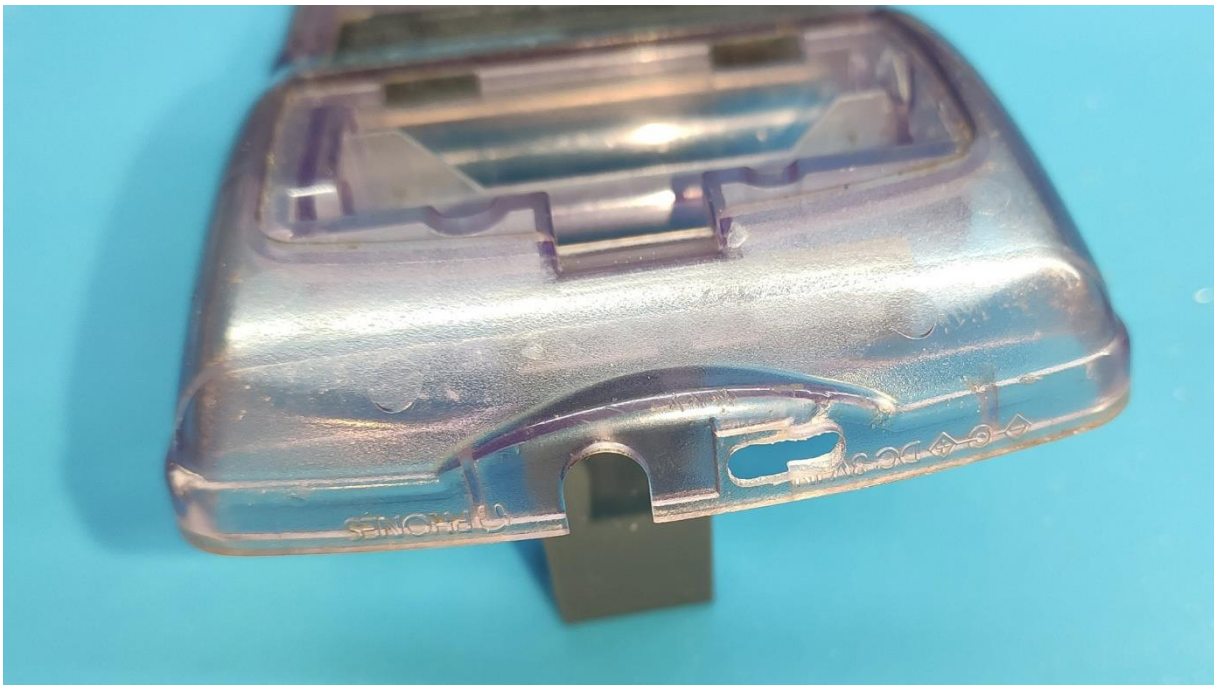
This part touches the main circuit, trim it:



THE USB-C HOLE

This is the part you must do as carefully as possible since this is visible from outside. Use the [GBC cutting tool] if you have it, or you can print it yourself.

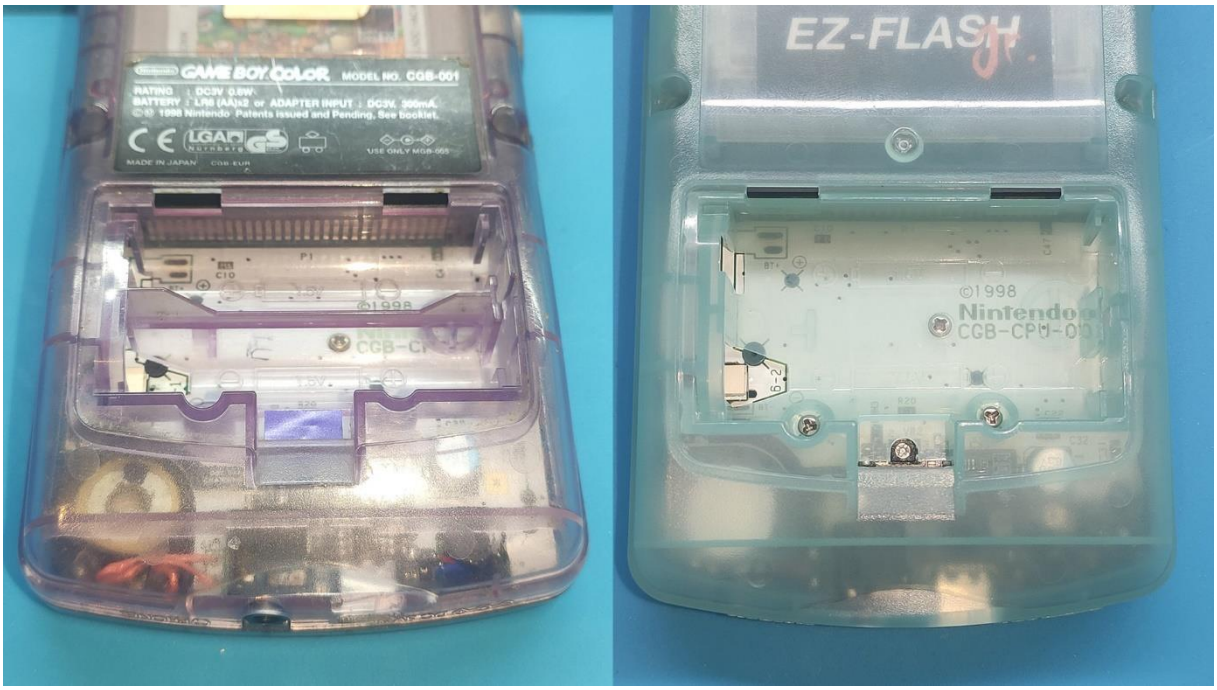




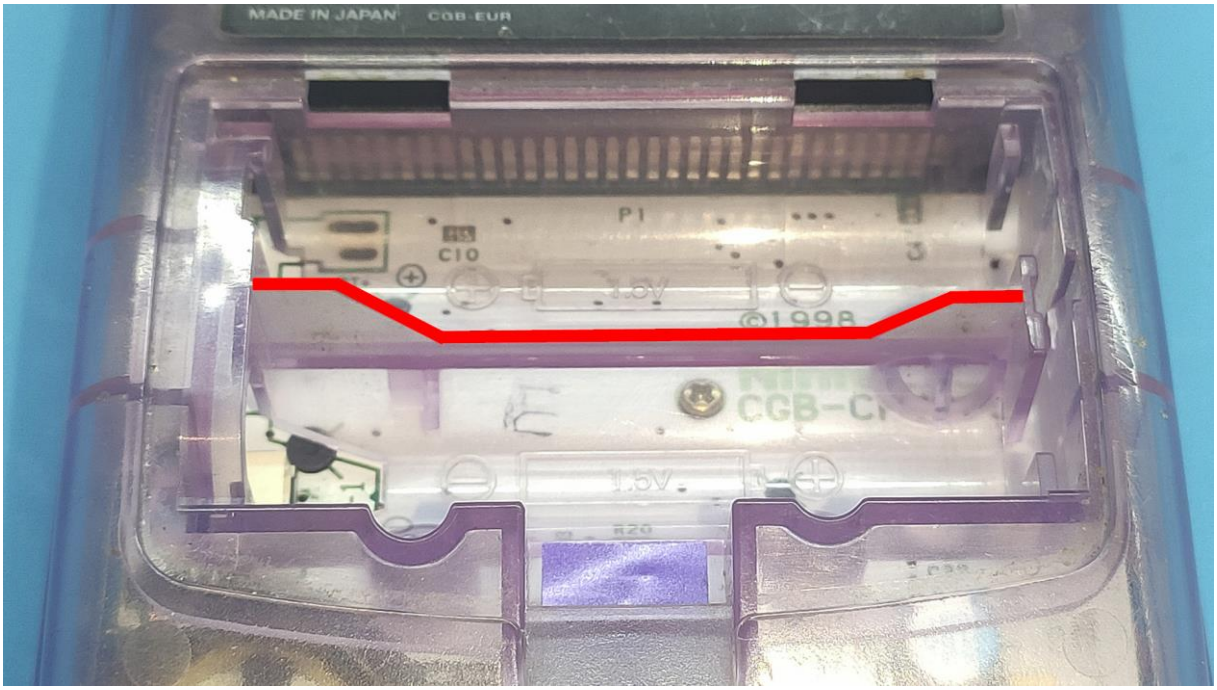
BATTERY COMPARTMENT

Depending on the shell you have, you may need to trim or not the shell.

These two pictures show you the original case and the special case with a special battery compartment from the factory.



The original requires to remove the plastic in the centre as much as possible:

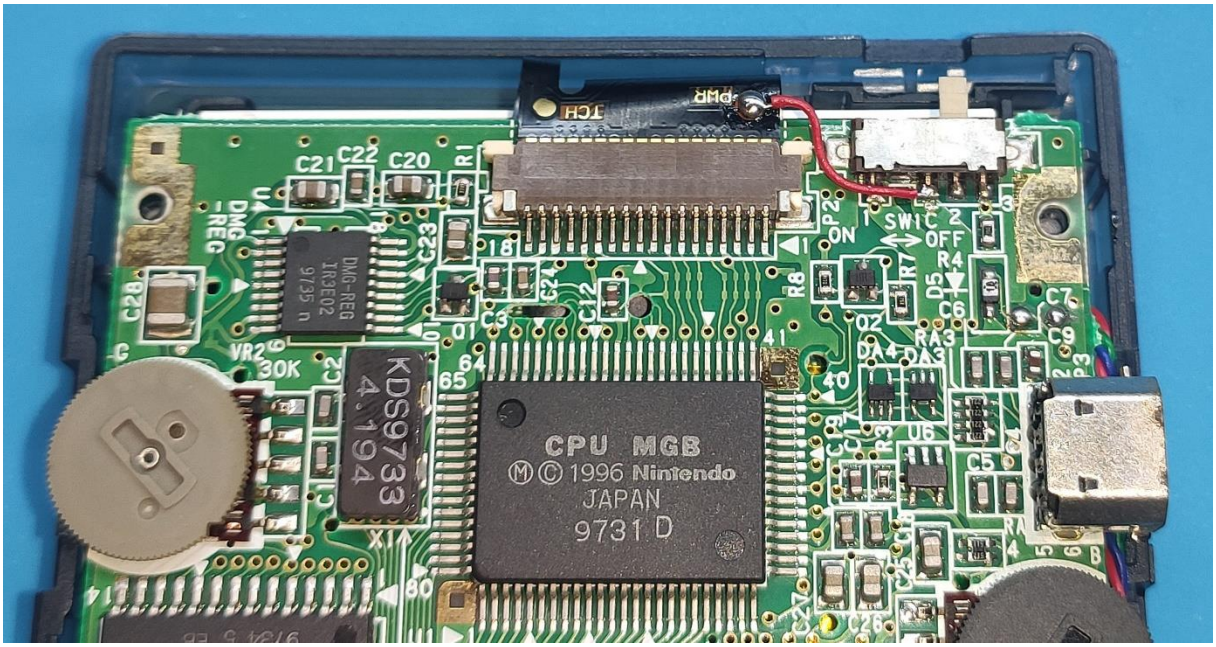


The copy doesn't need any cut because it's already prepared for li-ion batteries :)

9. FINISHING THE INSTALLATION

Once the shell is ready, you can install it back.

But, **if your IPS screen requires to solder a power cable, please don't forget it**!



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10. LIGHT STATUS

The board has 3 lights, **white when the GBC is turn on** (if you have installed the light board), **red when is charging**, and **green when the battery is full**.

This is a GB Pocket, but it's the same for GB Color

11. BATTERY CABLE

If your battery includes the appropriate battery connector, you just need to connect it to the GBC, otherwise you will need to replace the battery cable for the provided one with the kit.

The easy way is to splice the original wires with the new ones and use kapton tape to protect the joint.

If you are comfortable soldering, you can replace the whole old cable and solder the new one directly to the battery. It will be cleaner:

12. DONE!

Here we are, it’s time to enjoy it!