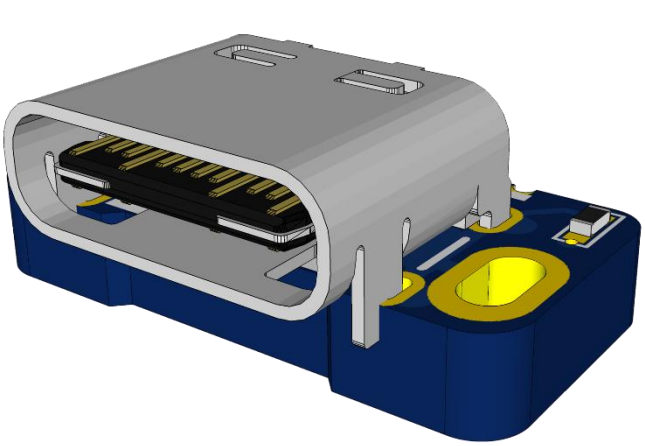
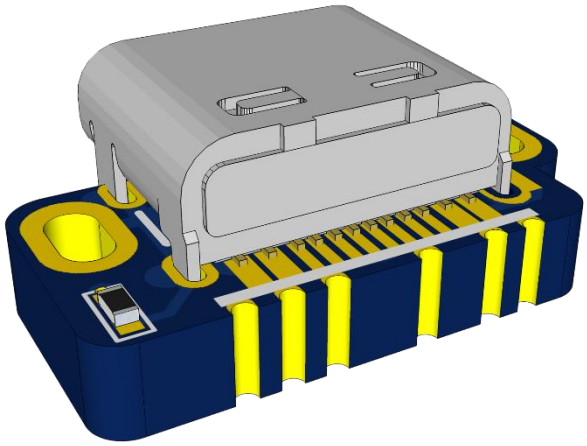
USB-C KIT FOR

GAME BOY ADVANCE SP

NINTENDO DS





PRODUCT V1.6+

HTTPS://SHOP.GILTESA.COM/PRODUCT/GAME-BOY-ADVANCE-SP-USB-C-KIT-CENTERED

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.

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DESCRIPTION

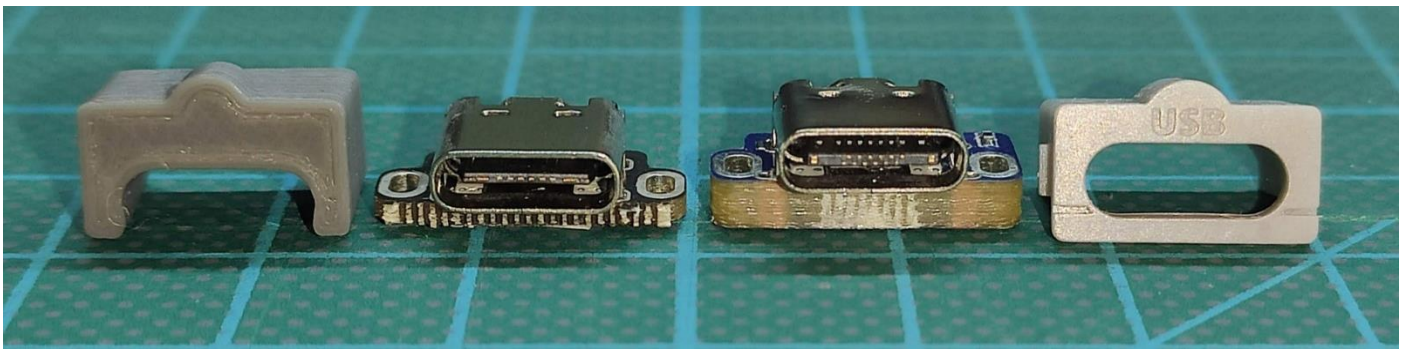
The **Game Boy Advance SP: USB-C Kit** allows to **charge the battery by USB-C** cable or **connect headphones with USB-C** or by jack adapter to USB-C in your **Game Boy Advance SP** *(Also compatible with **Nintendo DS**, you can see some details of the installation at the end of the document.)*

The USB-C specification has two ways of audio connections. Be sure your headphones or jack adapter use the first one because otherwise you will not be able to hear anything.

- COMPATIBLE: The legacy one that use some extra pines of the USB-C to take out the analog audio and where you can connect normal headphones or jack adapter.
- NOT COMPATIBLE: The advanced one where the headphones include a DAC (Digital to Analogue Converter) and needs energy from the USB connector to manage the electronic components inside the headphone's connector.

There are two versions of this board, both with the same features except for the thickness of the board. The first one has 1.2mm thickness, and the USB-C connector is level with the joining of both parts of the GBASP shell. The second version has a 2.4mm thickness the USB-C connector is almost in the centre of the hole.

The plastic cap to cover the hole may change between both versions, check the shop product description for more details.



Comparison between the two versions: Left 1.2mm, right 2.4mm

FEATURES

- New castellated holes (pads): It has never been so easy to solder it. (Link)
- Plastic cap made by 3D printer or resin 3D printer.
- Charging your Game Boy Advance SP by USB-C, compatible with:
    - USB power banks
    - USB-A chargers
    - USB-C chargers *
    - USB-C PD chargers (normal speed, not fast) *
    - USB-A to USB-C cables
    - USB-C to USB-C cables *
- Playing the sound using a USB-C headphones or USB-C adapter to Jack 3.5mm.

* This feature has been recently added but has a limitation. Before USB-C to USB-C cables were not compatible and they didn't charge the GBA SP. They can be used now, but they work only connected in one side. It means when you connect the USB-C cable face up will charge correctly the battery and the orange led will turn on, but when you connect face down will not do anything.

(Supporting double side connecting disable the audio of the speaker. So, this is the best option to keep the audio works and makes the USB-C to USB-C cables/chargers compatible.

INCLUDED

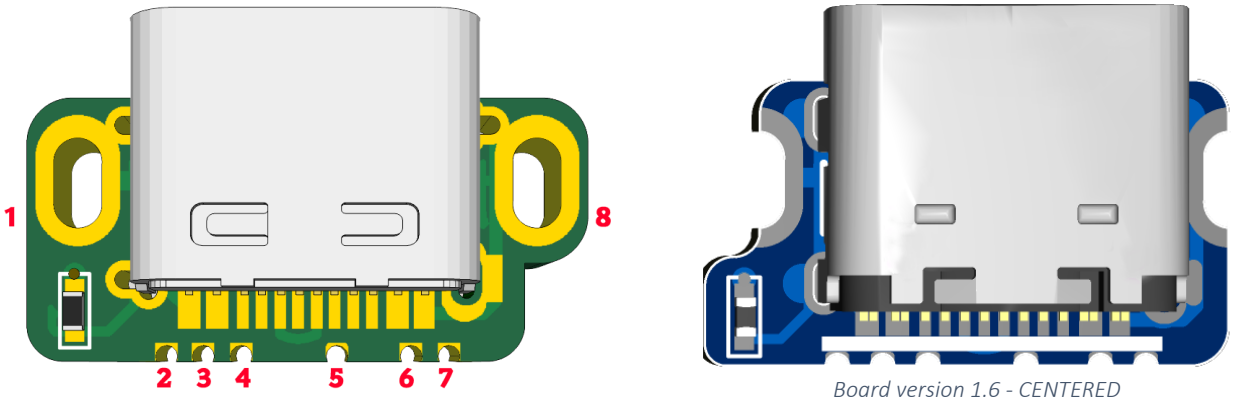
- 1 board (1.2mm or 2.4 mm thickness depending on the choose version)
- 1 plastic cap to cover the hole.

RECOMMENDED / REQUIRED [NOT INCLUDED]

- Tri-wing and phillips screwdriver
- Tweezers
- Cutting plier
- Kapton tape
- Soldering iron
- Tin
- Flux
- Desoldering pump
- Desoldering mesh
- Isopropyl alcohol

BOARD DETAILS

This tiny board has eight pads in about 1cm^2 surface, which means it requires high soldering skills. The following explains what each pad is for.



Board version 1.6 - CENTERED

Starting from the left to the right:

1. SHIELD *: The shield pad, also as ground pad.
2. GND: The ground pad.
3. SDN: Shutdown pad to disable the speaker when the headphones are connected.
4. AUDIO GND: The ground audio line.
5. AUDIO R: The right audio line.
6. VCC: The 5V line from the USB-C.
7. AUDIO L: The left audio line.
8. SHIELD *: The shield pad, also as ground pad.

* These two pads hold the board to the GBA SP motherboard, make sure to solder them well to hold the board properly.

2023-01: v1.6: The pads 1 and 8, called SHIELD, have been modified to facilitate installation. Now it is much easier to install, and since soldering can be done more easily, it is more robust, as previously, when these pads were closed, the soldering could be incorrectly applied.

INSTALLATION STEPS

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

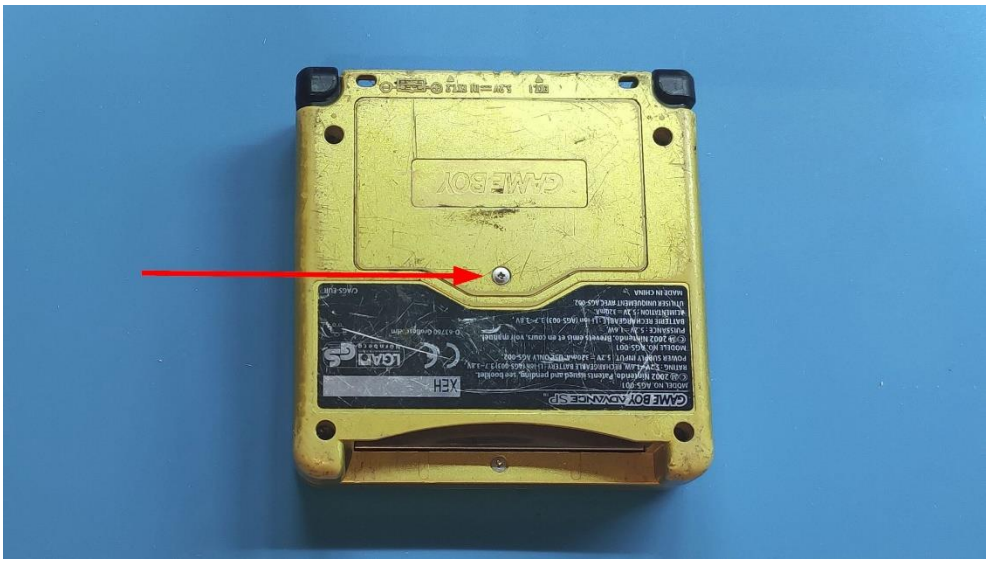
PRE INSTALLATION STEPS

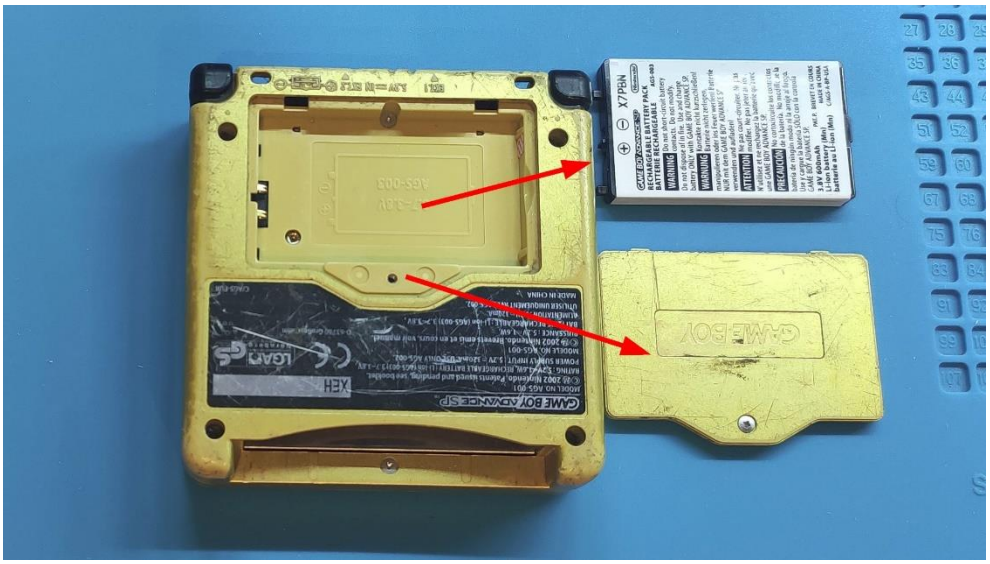
Before the installation, your GBA SP may need some extra steps to have it ready for the kit.

1. DISASSEMBLY THE GAME BOY ADVANCE SP

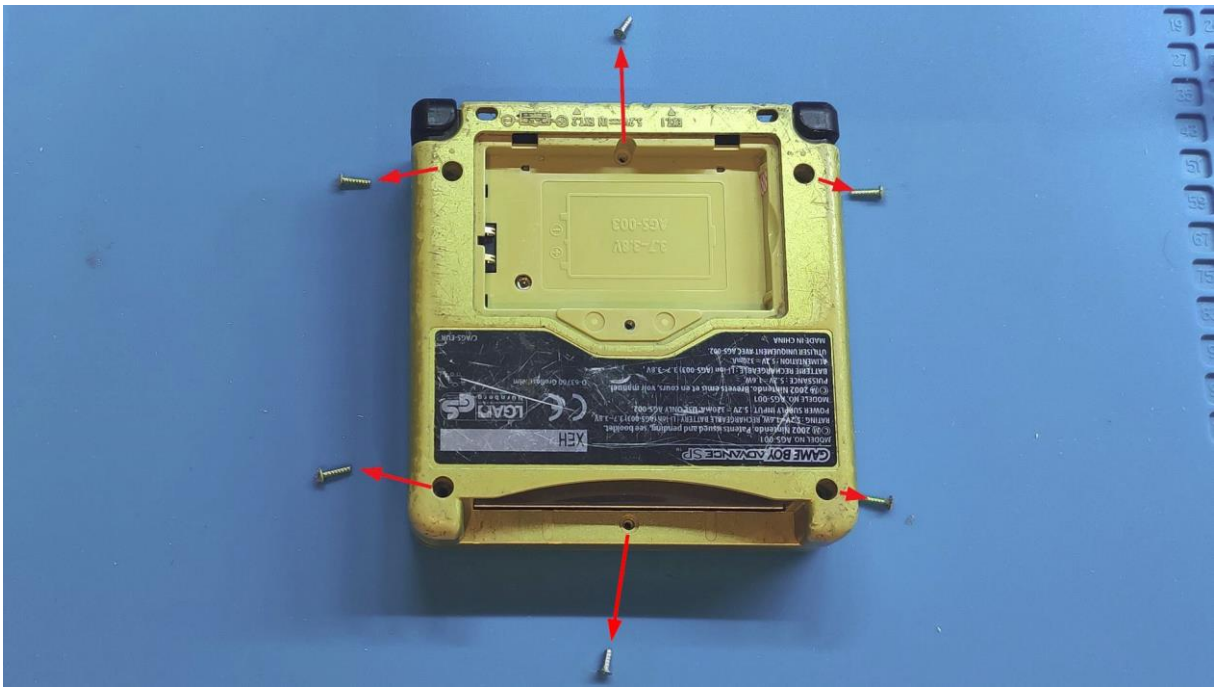
Nintendo products in widespread use two kind of screws. The first one called **tri-wing** to close the shell, and the second one called **phillips** to hold the main board to the shell.

First use the **phillips** screwdriver to remove the battery cover:

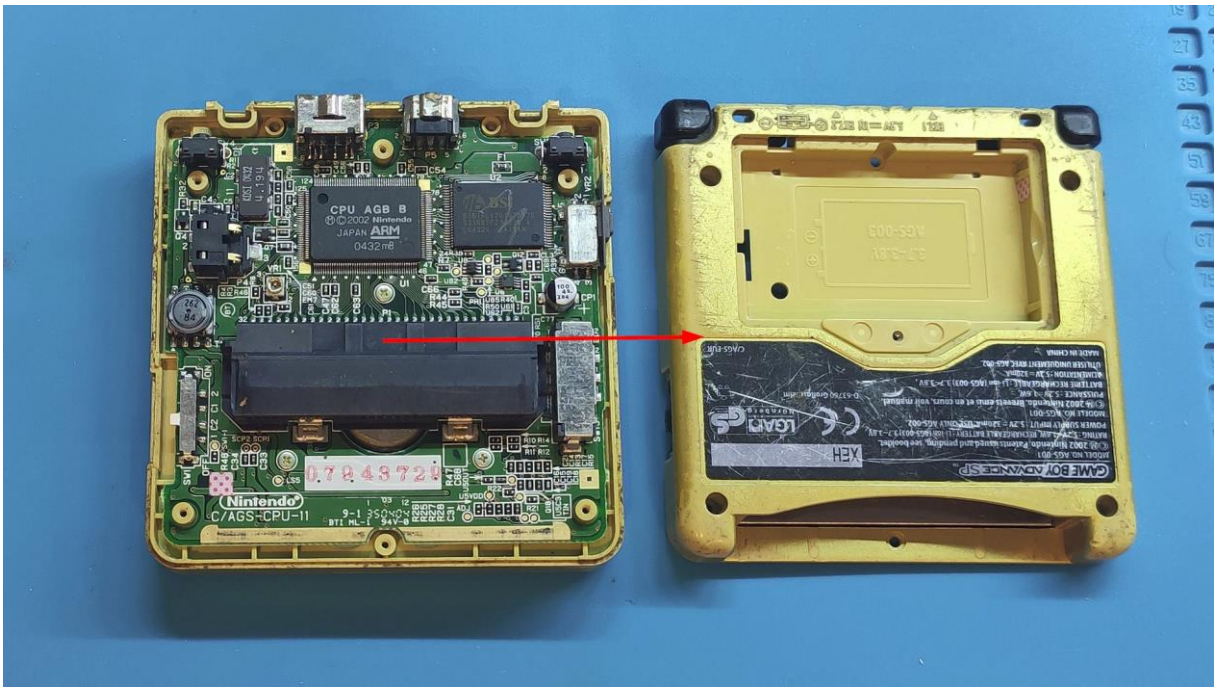




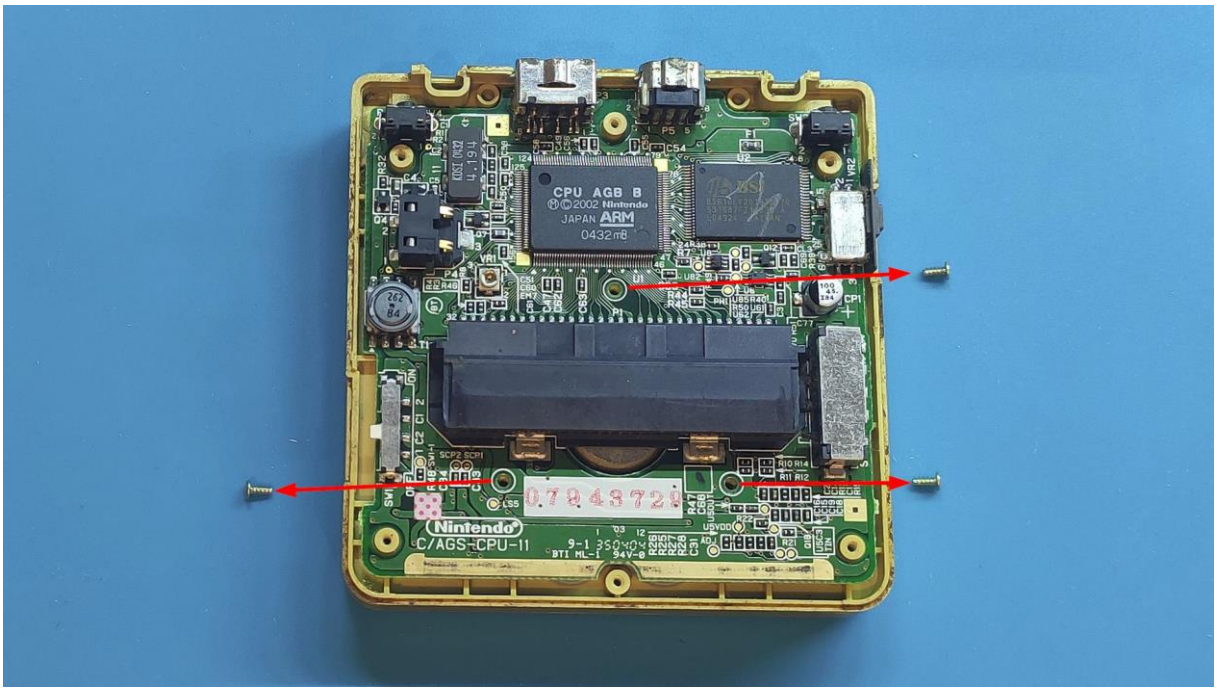
Then, unscrew the six **tri-wing** screws:



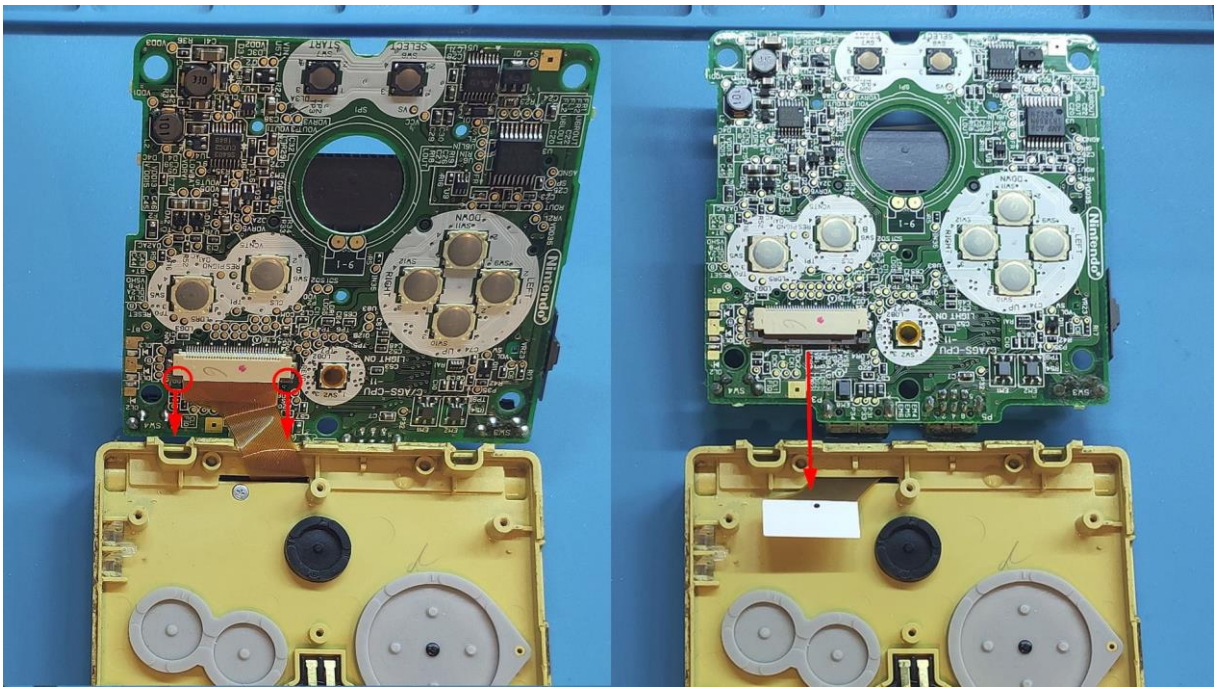
And put aside the bottom plastic shell:



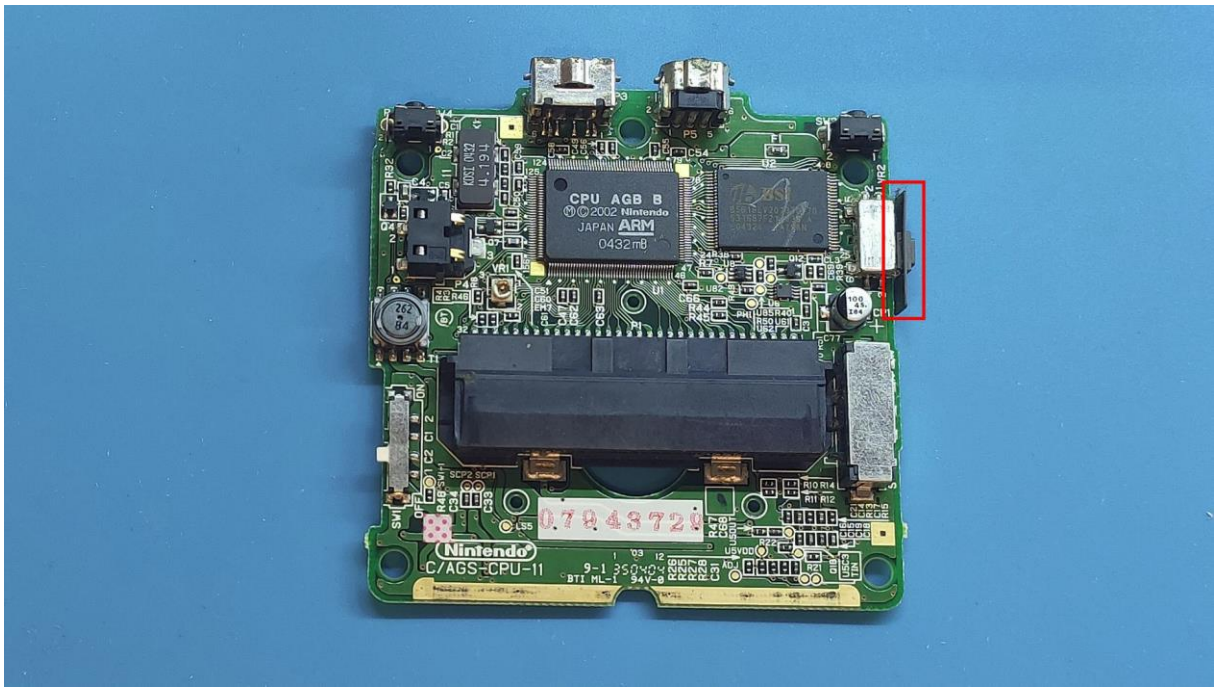
Then, remove the three **phillips** screws with a **phillips** screwdriver.



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



As last step, the volume switch cover can be removed, **but do not force it as it may be held tightly.**



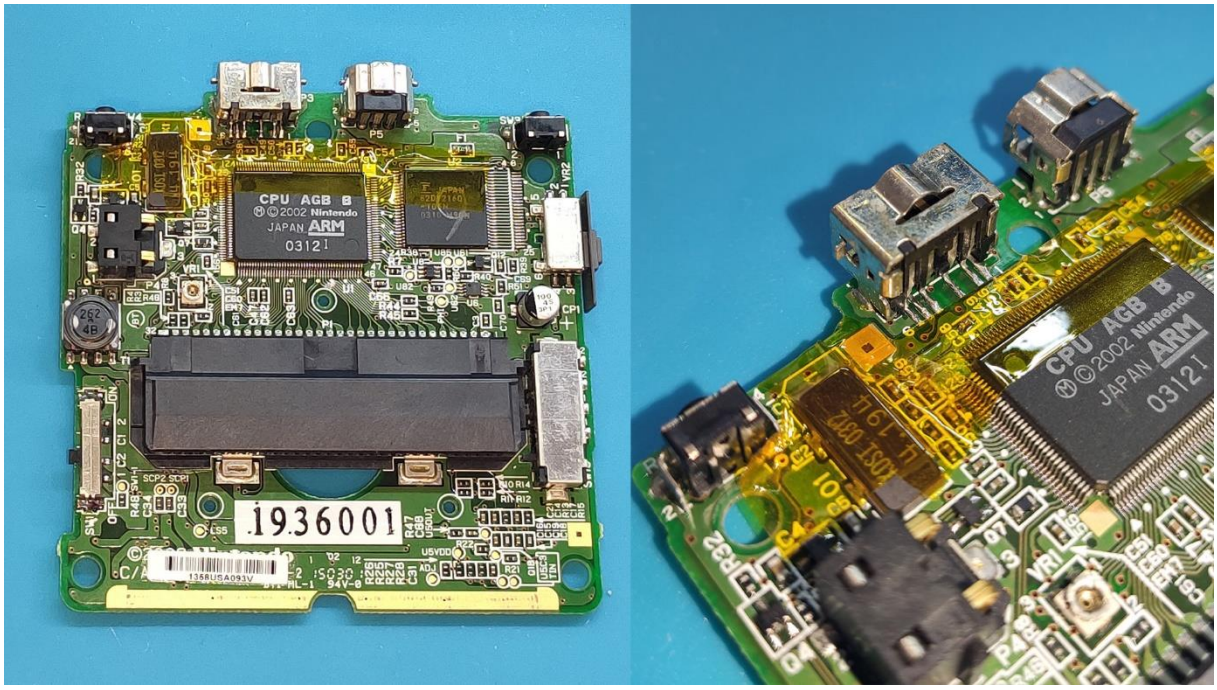
2. *CLEANING THE MAINBOARD*

Use isopropyl alcohol to clean the board. Since the board was made in 2002, the board may be full of dust. All this dirt can be cleaned with alcohol.

INSTALLATION STEPS

1. PROTECT THE NEAREST COMPONENTS

Use Kapton tape to protect and avoid any damage to the electronic components that are next to the connector.



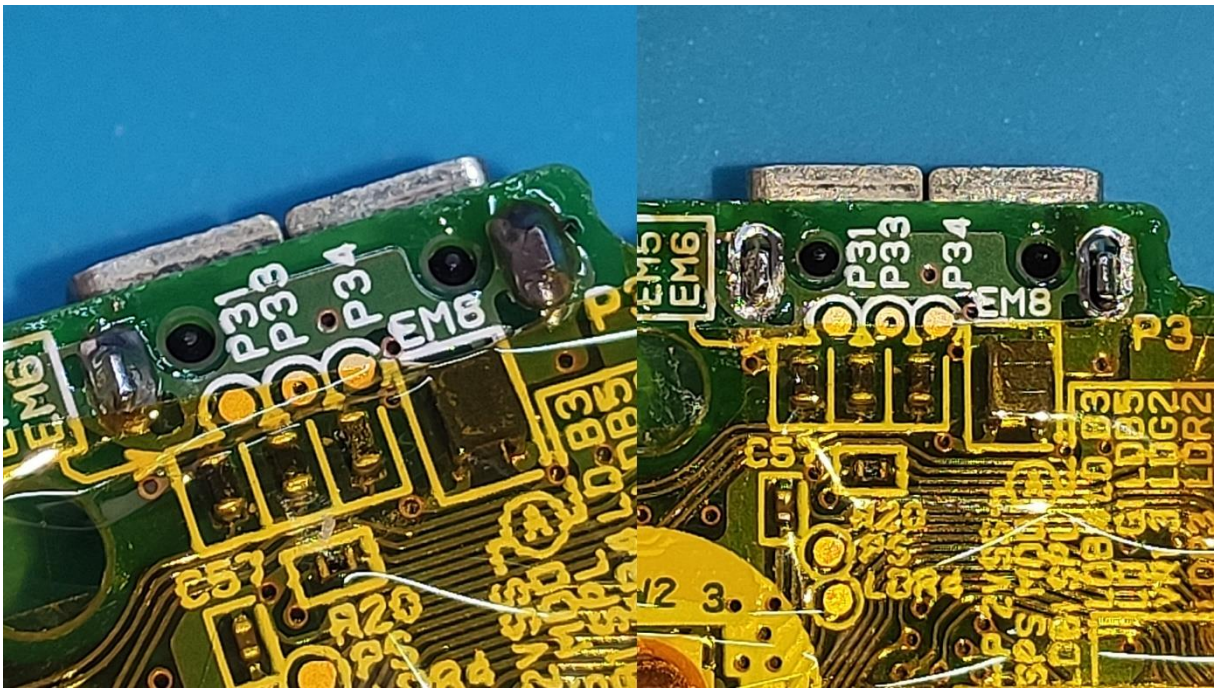
2. REMOVE UNNECESSARY COMPONENTS

This kit only requires removing the EXT.2 connector. However, it has many legs, and it may be hard to remove. Following the next steps should help to do it.

BE INCREDIBLY CAREFUL WHEN REMOVING THE CONNECTOR. THE COPPER PADS, WHERE THE CONNECTOR IS SOLDERED, ARE EXTREMELY FRAGILE AND CAN PEEL OFF.

If you have an air solder station, you can remove it easily, but protect perfect the nearest places with Kapton tape or something may be burn.

Otherwise, the recommendation is using a desoldering pump which will help to remove the tin from the shield pads.

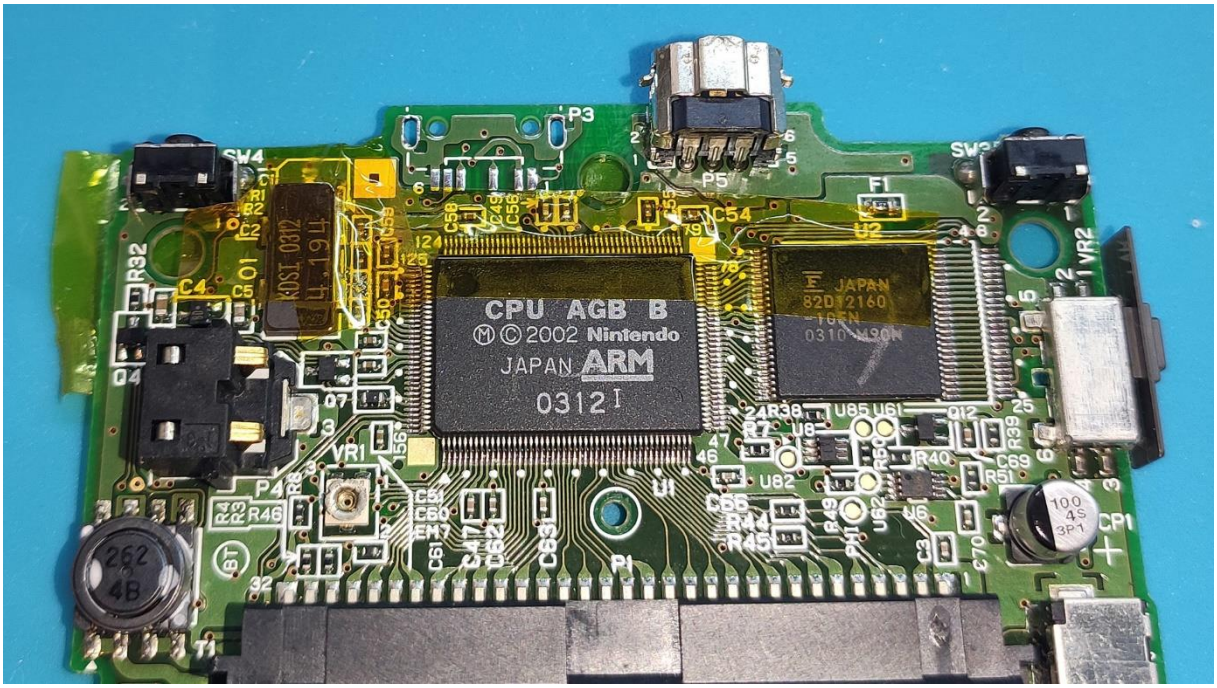


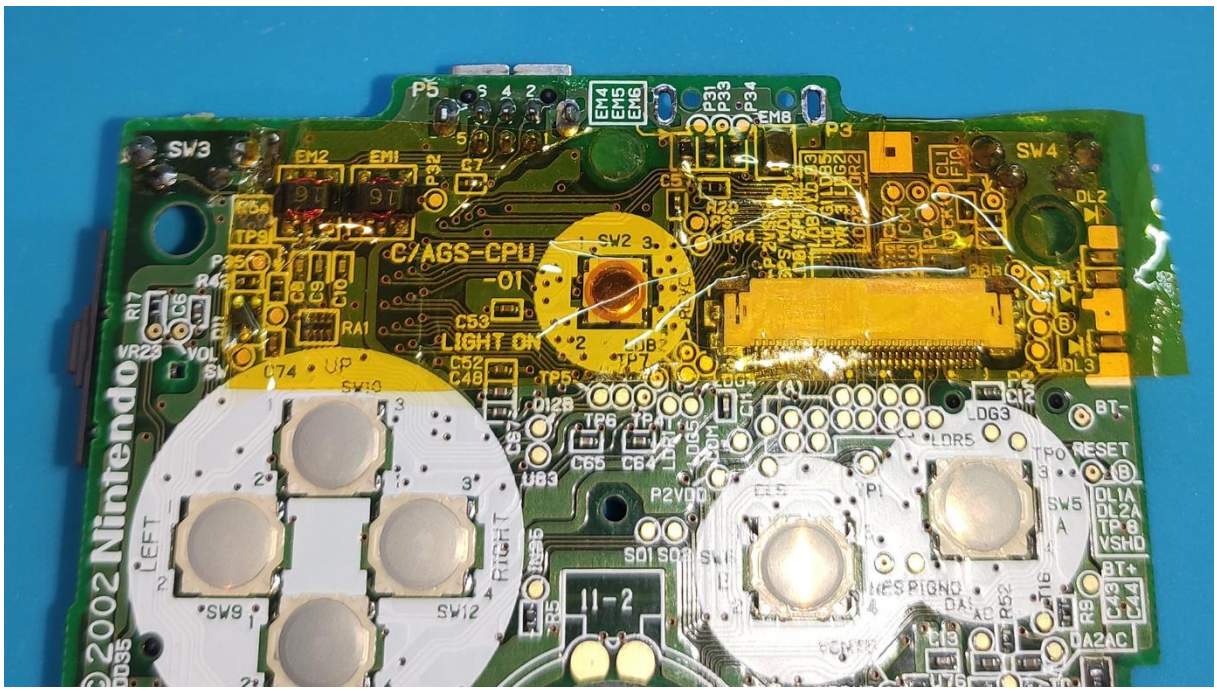
Left before, right after

After that, with the solder iron is possible to heat the remaining six legs at the same time and remove the connector. Some flux will help to desolder it.

3. CLEAN THE BOARD

After the component is removed, it may be dirty, clean the board again.





4. INSTALLATION OF THE USB-C BOARD

The easier way to centre the board on the mainboard is when the mainboard is screw on the GBA SP shell, so, you can put it back (the video cable doesn't need to be connected)

Once the mainboard is in the shell, you can place the board on the place where the original connector was. The board also must be touching the back of the plastic shell.

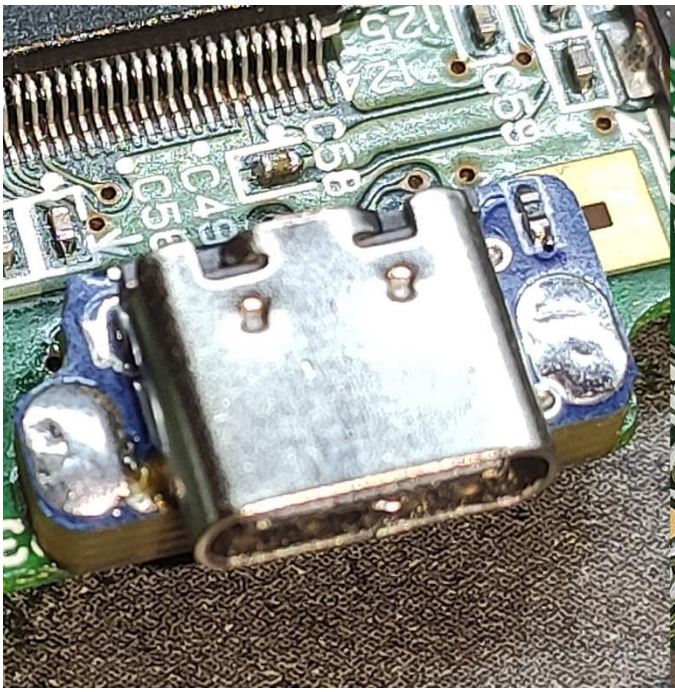
Please, see below video to understand how to do it:

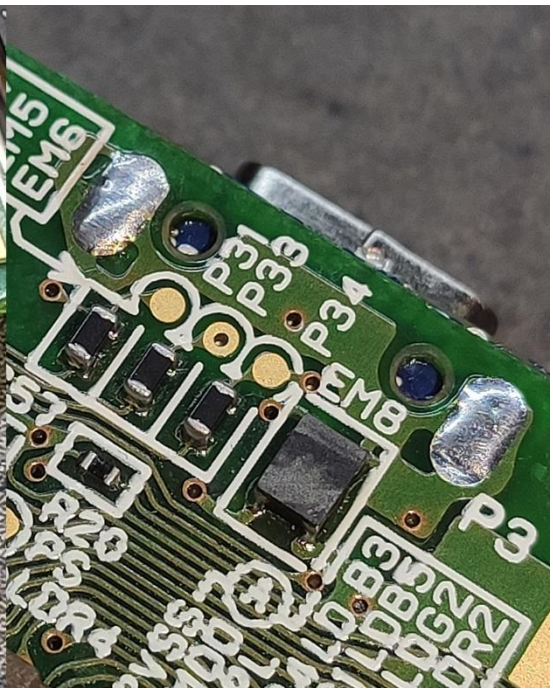
https://www.youtube.com/watch?v=PKm9SWTC8MQ

At this point, you can put the plastic lid and check everything matches correctly.

After the 6 pads are correctly soldered, remove the mainboard from the plastic shell and finish the installation soldering the 2 big pads that will hold strong the board to the mainboard.

Be sure you solder it well and both pads are joined with the tin, otherwise the connector may move and damage the 6 weak pads.





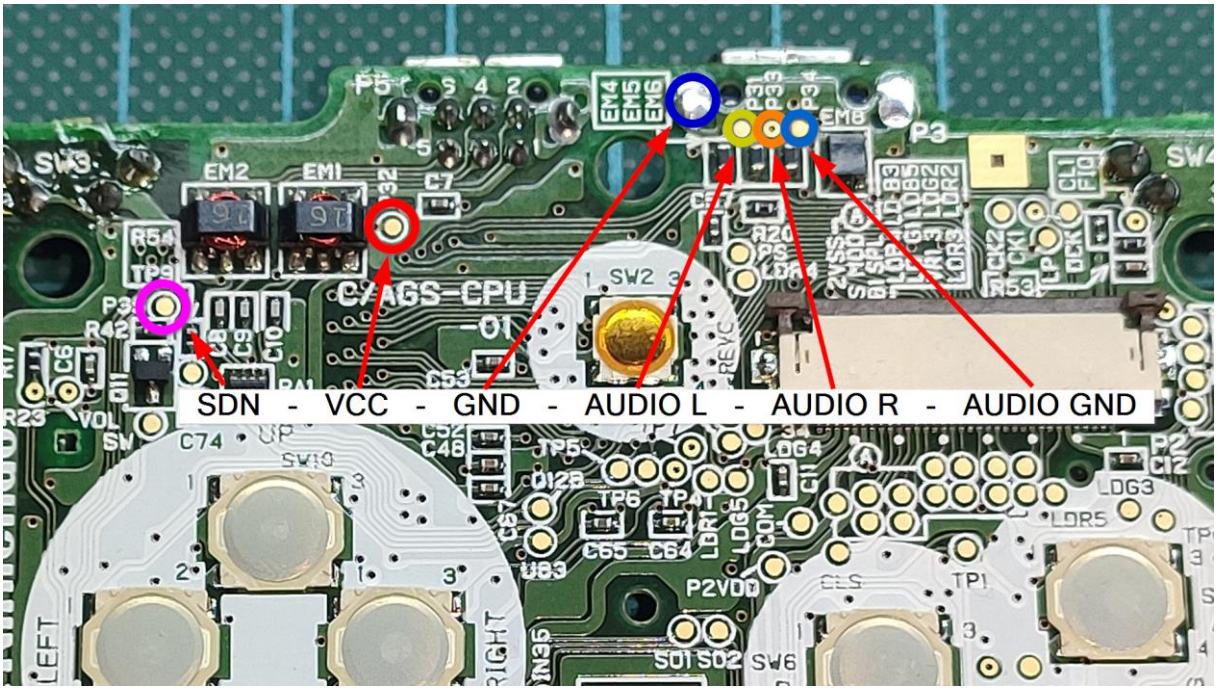
5. FINISHING THE INSTALLATION

Now, you can put the mainboard back to the shell, connect the video cable, put the screws and everything as before. Enjoy it!

https://www.youtube.com/watch?v=ZznNsDhFl9U

6. ALTERNATIVE PADS FOR SOLDERING

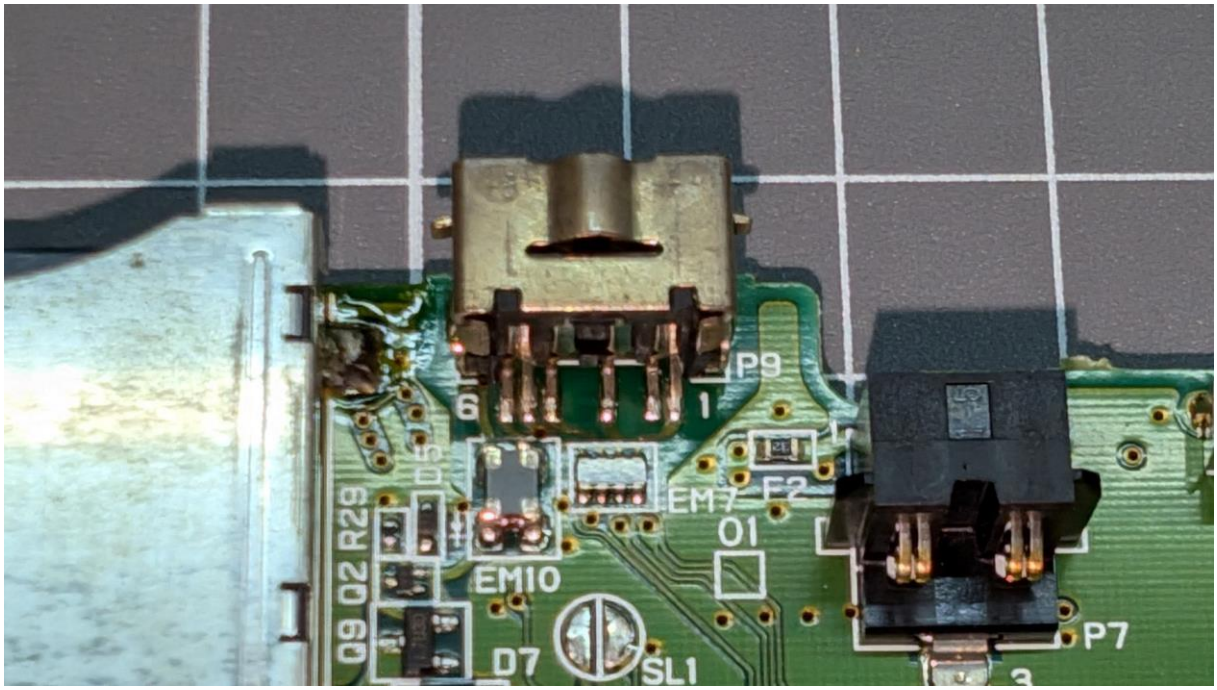
If during the removal of the original connector any pads were broken, you can solder the board to the following alternative pins:



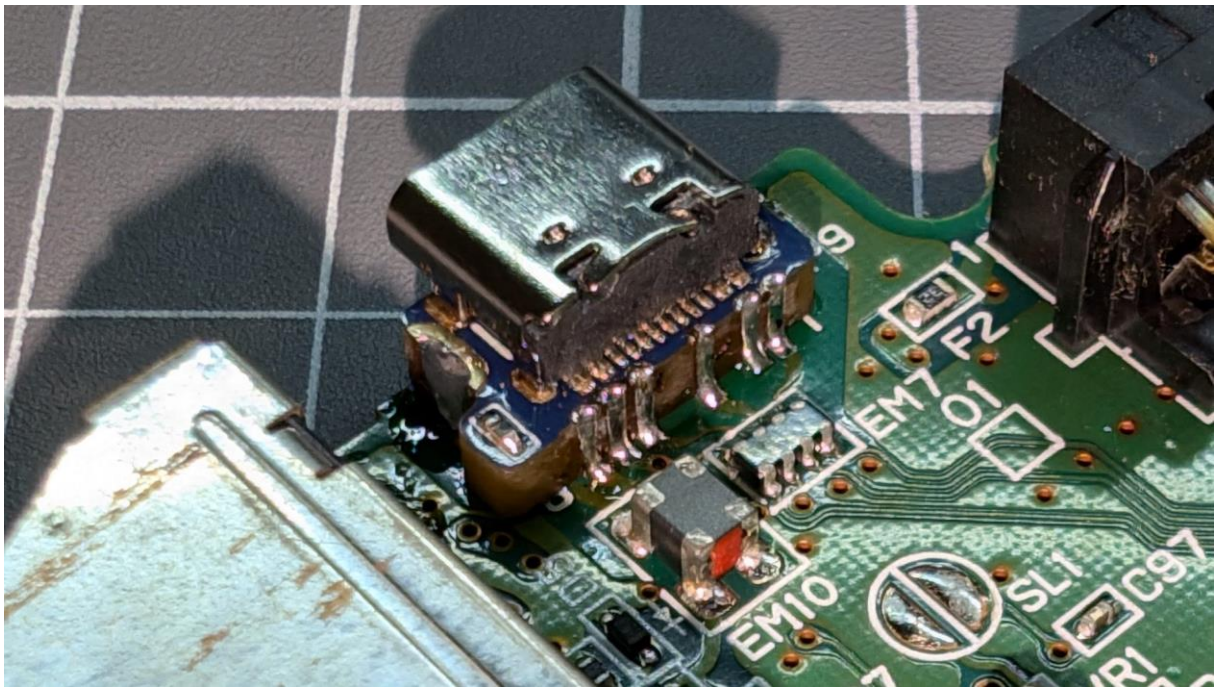
INSTALLATION ON NINTENDO DS.

The installation on this console is very similar to the GBA SP, although it requires a couple of modifications to the plastic cap and the rear casing of the console.

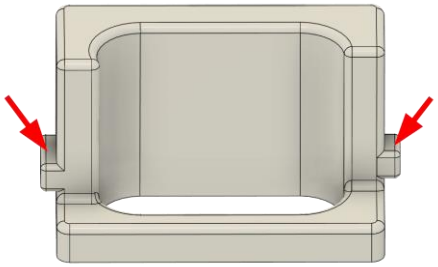
Once again: open the console, disconnect the 4 flat cables and the antenna cable, remove the motherboard from the casing, and desolder the original charging and audio connector *(in case you didn't know, in addition to the audio jack, this connector can also be used as an audio output, but without a microphone input)*.



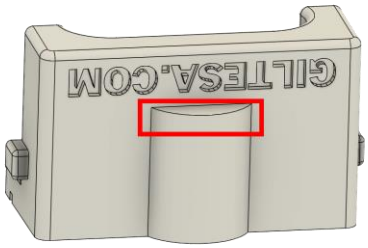
After removing the connector, you can install the new one. Be careful not to let it protrude too much so that it doesn't interfere with the lower casing. *To do it correctly, it will help to place the motherboard back into the casing, and with the USB-C connector in its position, solder the first pin. Then, remove the motherboard again and solder all the remaining pins.*



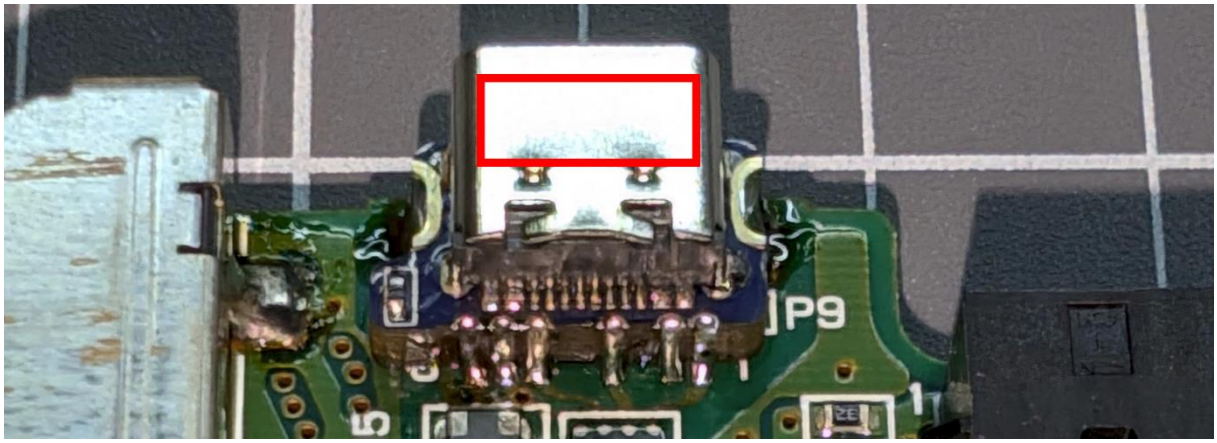
As for the modifications mentioned earlier, it's necessary to trim the side fins of the plastic cap because they are too wide and won't fit properly. Ideally, the width should be reduced, but the plastic is very brittle under pressure, so it's better to remove them completely.



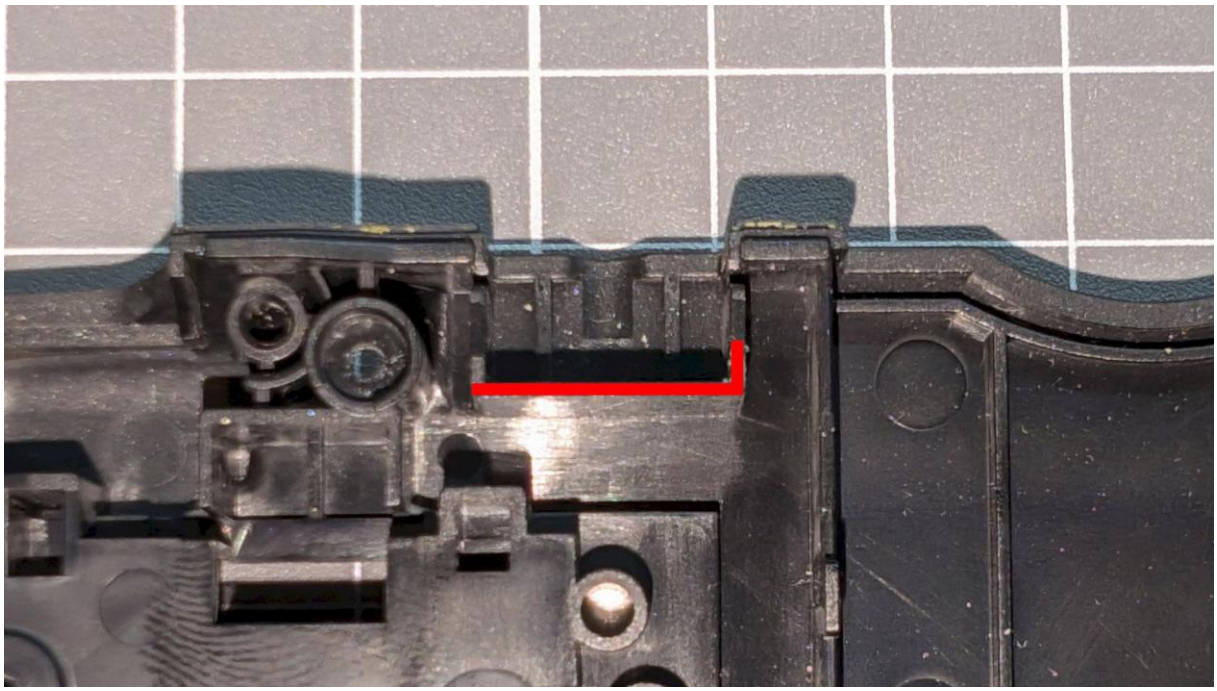
You will also need to remove some plastic from this area.



To prevent the plastic cap from coming out of the hole, it is recommended to place a bit of double-sided tape right above the connector so that the plastic stays in place.



Finally, it's also necessary to trim this area of the console casing, as it will interfere with the USB-C circuit when closing the console. A depth of 1-2mm is more than enough to prevent any further contact.



Now you can close the console; the installation is complete.

FREQUENTLY ASKED QUESTIONS - FAQ

WHAT CHARGER CAN BE USED?

You can use any standard charger for mobile phones, computers, etc., with 5V 1A. It doesn't need to be a Power Delivery charger since this feature is not used. Of course, if you want to use a Power Delivery charger, there's no problem or risk.

Technical data for curious minds:

Power Delivery chargers can supply a wide range of voltages: 5V, 9V, 12V, 15V, and 20V. However, for this to happen, the device must communicate with the charger to explicitly request the desired voltage. Without this communication, the charger will never supply more than 5V. That's one of the advantages of USB-C, as it can be used with both old and modern devices.

THE SPEAKER IS NOT WORKING.

Make sure you haven’t created a short circuit between pins 2 and 3 (GND and SDN, respectively). If you can’t see it visually, use a multimeter in continuity mode to check.

THE CONSOLE DOESN'T TURN ON.

Make sure all the cables are properly connected and, most importantly, that the battery is in good condition. I'm not entirely sure about the GBA SP, but on the Nintendo DS, the orange LED that indicates charging blinks if the battery cannot charge due to being in poor condition. The normal behavior is for the LED to stay on continuously until charging is complete, at which point it turns off.

DOES THE AUDIO OUTPUT WORK AT THE SAME TIME WHILE THE CONSOLE IS CHARGING?

Yes, it works. Both the audio output and console charging can function at the same time, as long as you use a USB-C to USB-C+Jack adapter without an internal DAC. https://youtu.be/FPShycH6Fj8

THE CONSOLE DOES NOT CHARGE OR THE AUDIO DOES NOT WORK.

Using a multimeter in continuity mode, you can check on the GBA SP that each soldered pin has continuity from the connector pads to the alternative pads.

At the same time, you can also verify that power reaches both ends. Connect the USB-C charging cable and check that you have 5V on the VCC and GND pads using the multimeter in voltage measurement mode.