

Repairing a Nintendo Gameboy Advance SP

Chip surgery to play classic Zelda

Willem L. Middelkoop

Mar. 26, 2017



This month Nintendo released the Switch with Zelda "Breath of the Wild". The new console received positive reviews. The new Zelda game is amazing and can be played on-the-go, thanks to the portability of the Nintendo Switch. But it its hardly the first Nintendo device that features the mythical kingdom of Hyrule with Link and princess Zelda. I found an old Gameboy Advance, perfect for playing classic Zelda games... but it was in need for repair!

The Problem

When this Gameboy is squeezed (what happens during intense gameplay), the system suddenly resets... That is really annoying! (imaging fighting some bad ass boss, nearly winning and then BANG this happens)



This old Gameboy was broken: it stops working if you "squeeze" it... an indication of some electrical failure.

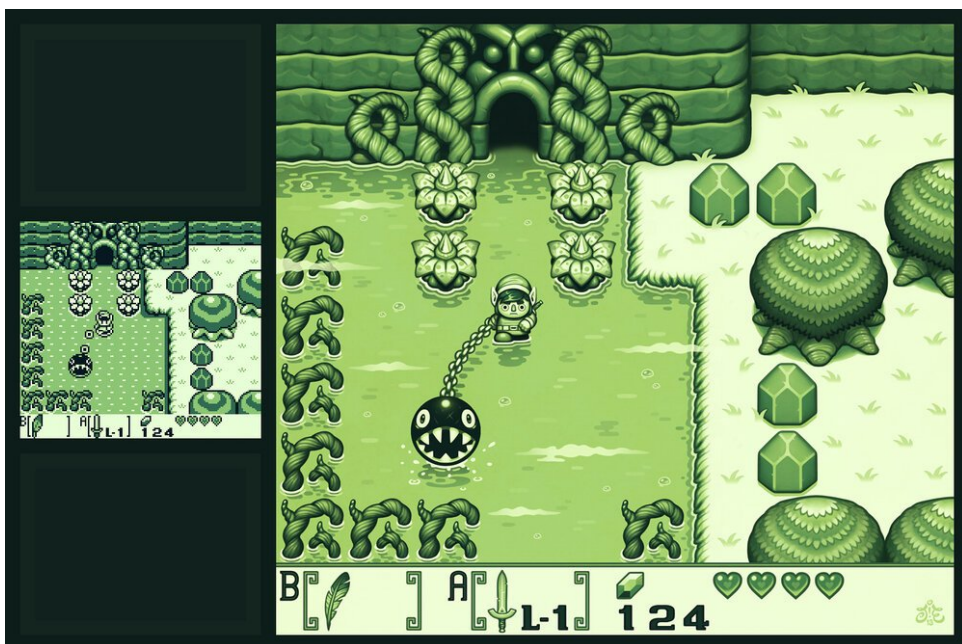
The Gameboy Advance was released in 2002 and was the first Nintendo handheld console that featured a display with light. And yet it is fully compatible with original Gameboy cartridges. It is the perfect machine to play classic Zelda games as many of the original NES titles have been made available as Gameboy Advance title.

Why Zelda: Open world exploring and adventure

Ever since the first Zelda game in 1986 the game allows the player to freely explore an open world full of adventure. You decide where to go next and how to go there: walking (multiple routes), running, horse riding, swimming, sailing, warping and even time traveling. Along the way, the game surprises you with random challenges, interesting characters, secrets and puzzles. This really makes playing Zelda feel like a personalised adventure.



The new Zelda game "Breath of the Wild" sets the new benchmark for open world games according to the popular blog The Verge. It looks amazing!



On the left: an original screenshot from "Link's Awakening" (1993). On to the right: how fans perceive the magic. (Fan art created by "einen" from <http://einen.deviantart.com>)

Repairing the Gameboy: replacing the logic board

Using some simple logic I determined that the Gameboy resets because something electrical fails. At first I suspected a faulty battery (contact), but the problem persisted checking the connection and replacing the battery. If it is not the battery, then it must be something else, but what?

The Gameboy has very few parts, all the action is on one single chip: the logic board. I figured that if I replaced the logic board, the problem would be gone. Luckily original parts can be found easily through Ebay.



Thank you Ebay: an original replacement logic board for about €15



Using the right tools: a Tri-wing triangular screwdriver

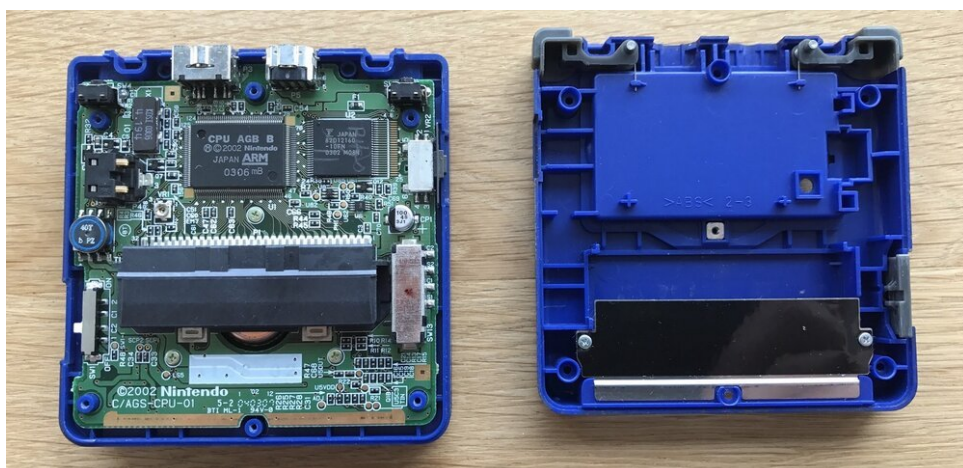
Nintendo prefers no tinkering with it's hardware so it uses special screws to keep

people from opening the consoles. You really should use a tri-wing triangular screwdriver to open your Nintendo, using the wrong screwdriver will much likely damage the screws.



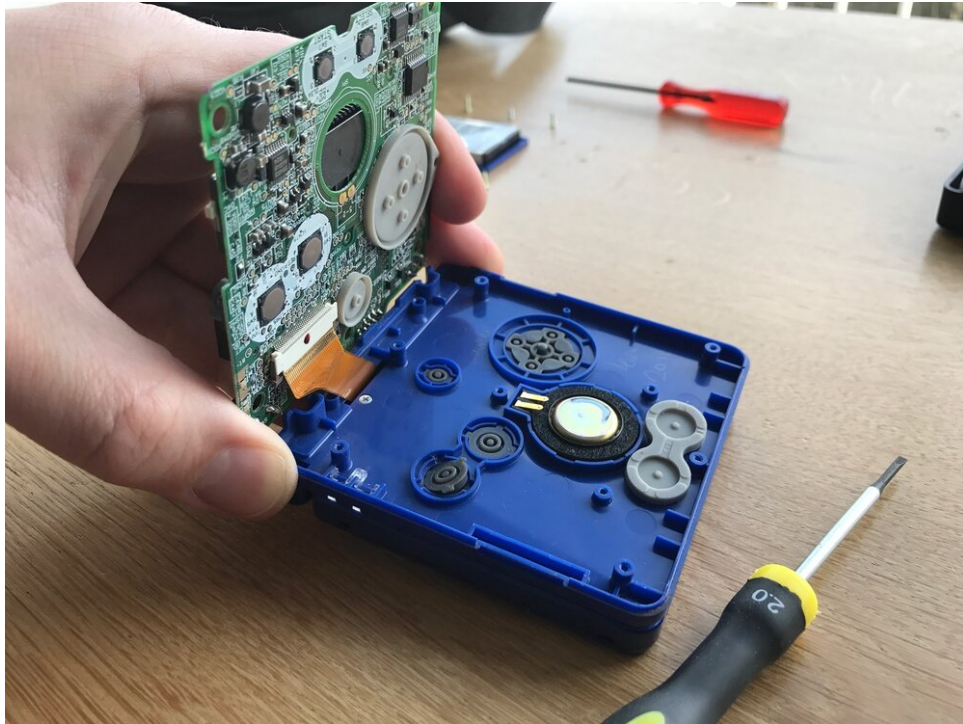
Arrange the screws around something easy to recognise (the battery) to easily keep track of where the (different) screws should

It is always good to keep track of individual screws when opening up electronic devices. Very often different screws (length, width) are used in specific positions. I learned this the hard way when opening up an Apple PowerBook G4 (a laptop that contained more than 50 screws...). I arranged the screws around the battery - something that I can easily recognise.



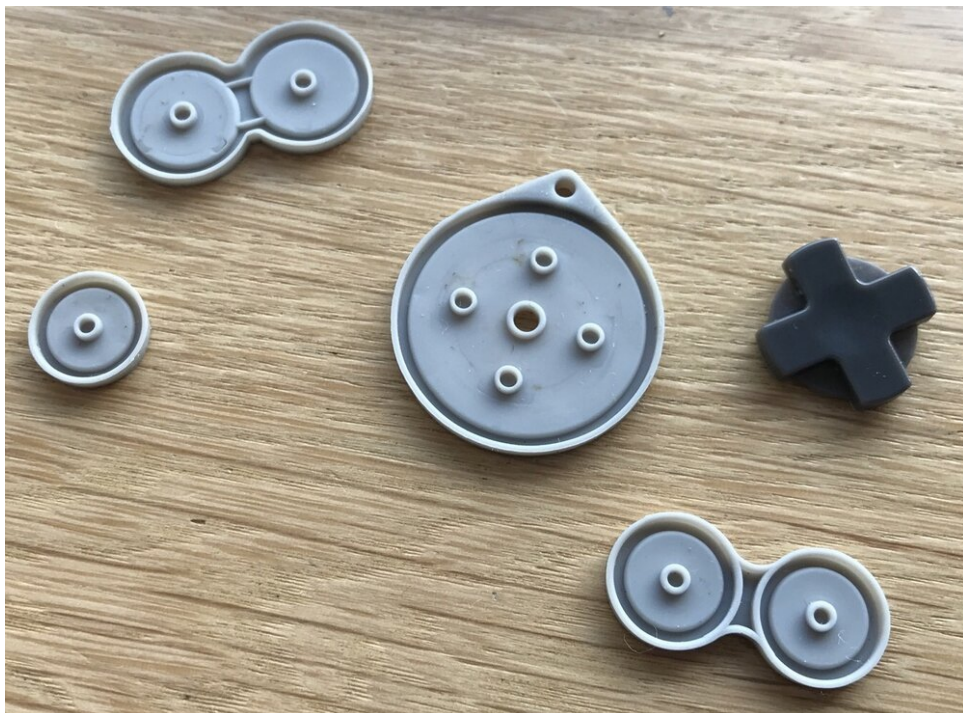
The Gameboy Advance SP from the inside

After removing the screws, carefully remove the rear cover. Pay special attention to the shoulder (L/R) and power buttons.



The buttons can be removed easily to be cleaned

Lifting the logic board from the Gameboy, be very careful with the flat cable connecting the logic board to the display. It is secured using two tiny plastic 'flips'. Make sure to remember what logic board is the faulty one... and what is the new one. :-)



Clever hardware design: each button fits exactly on one position and orientation only!

This is an excellent time to remove the buttons from the Gameboy and have them cleaned. Over time they collect dirt and cleaning them is an extra bonus.

I cleaned mine using some water with dish washing soap. Make sure to dry them thoroughly before placing them back!



Spot the differences: the original faulty logic board above and the replacement on the bottom

My replacement logic board appears to have a slightly different CPU. You can see this by the differences in reference numbers on the logic board. My replacement seems to have a higher CPU revision number, indicating a newer board. It is not uncommon that game hardware evolves during the lifecycle of a game console, but fortunately it doesn't affect gameplay whether or not you have newer logic board.

After reinstalling the logic board, make sure to secure the flat cable, buttons and screws back again.



Zelda "Link's awakening" from 1993 on the repaired Gameboy Advance SP

After putting the Gameboy back together it was time to see if it worked... it did! The repair was successful and the Gameboy is back into service!