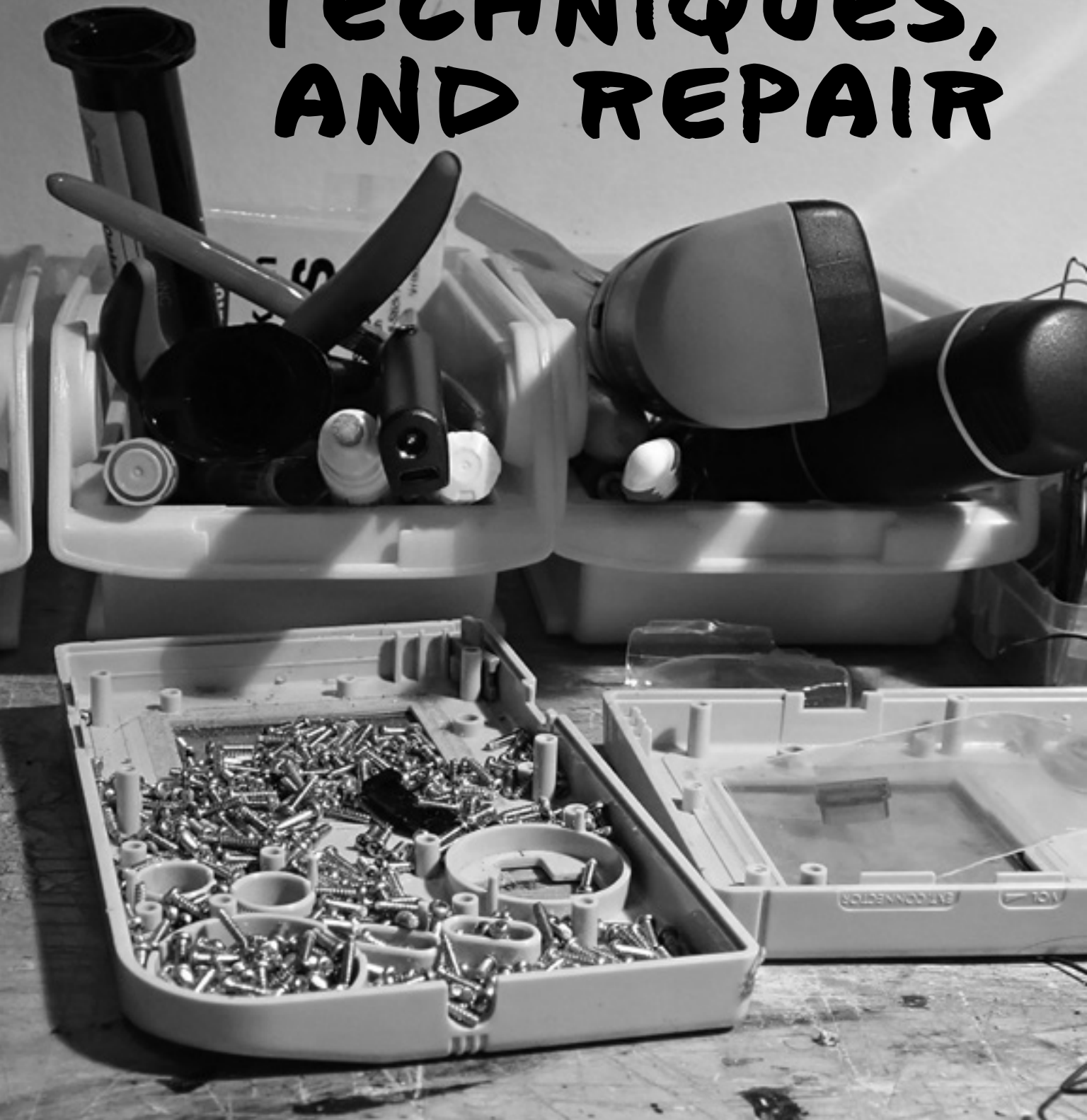


CHAPTER 2

TOOLS, TECHNIQUES, AND REPAIR



MODDING TOOLS

There are a number of common tools you'll need for any modding endeavor. These are generally affordable and can be found at most hardware or general stores.

This section describes a complete base set that'll get you through all the mods in this book. I'll mention other tools throughout the book that we'll only use for special purposes. There are plenty of options, so use whatever works for you.

ELECTRICAL TAPE

Covers up contacts and prevents shorting.



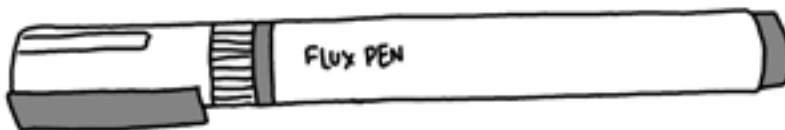
SOLDER Metal wire used to form electrical connections. You melt solder with a soldering iron. Solder comes in different gauges, which is just the diameter of the wire. You can use any gauge you prefer. I use 1.6 mm.



SOLDERING IRON Used to melt solder to form electrical connections. Invest in a \$30 or \$40 name-brand iron for quality and safety. Get a soldering iron with variable temperatures if you want the most control on your mods.



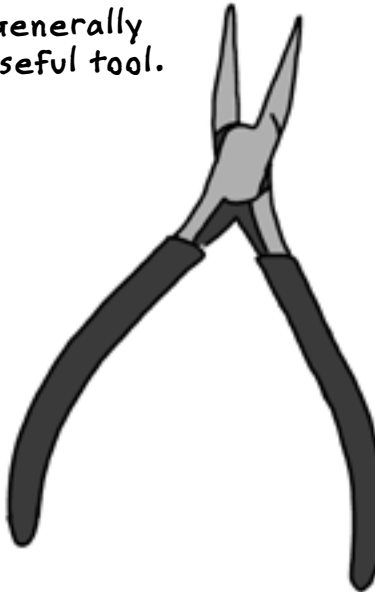
SOLDER SUCKER Really helpful for removing wayward blotches of solder.



FLUX PEN OR FLUX Helps the solder flow more cleanly for better connections, especially on smaller solder points.

**NEEDLE-NOSE
PLIERS**

Generally
useful tool.



**PHILLIPS-HEAD
SCREWDRIVER
(SMALL)**

Removes small
Phillips-head
screws.



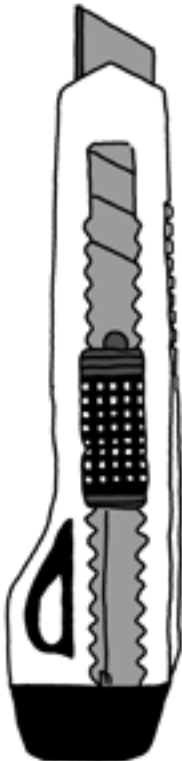
**Y-TIP SECURITY
SCREWDRIVER**

Essential for
opening a
variety of
Nintendo
products.



BLADE/BOXCUTTER

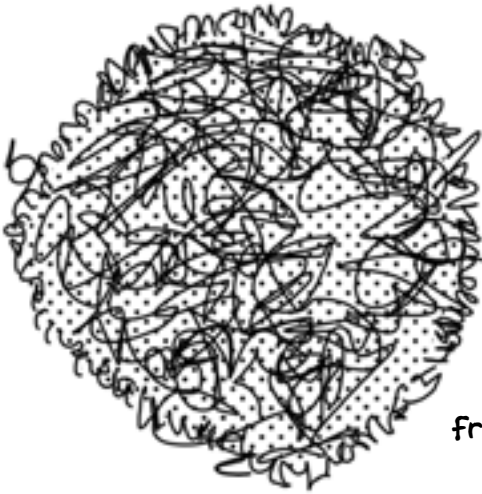
Useful in all sorts
of ways. You'll use
this to prepare
the LCDs for
backlighting.



FLUSH CUTTERS

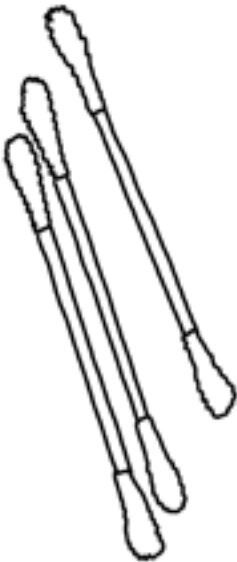
Cuts wires and can
modify some plastic
shell parts.





STEEL WOOL
Cleans solder
off the tip of
your soldering
iron.

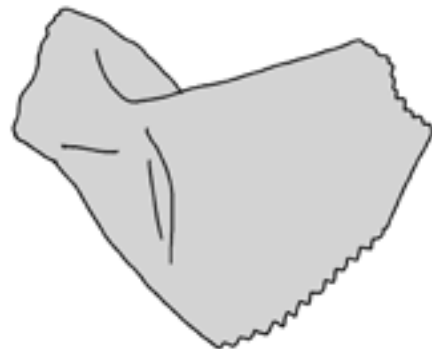
**ISOPROPYL
ALCOHOL**
Removes glue,
wipes away gunk
from button contacts,
rubs down shells,
cleans lenses,
dresses a wound,
dissolves label
residue, and so on.



COTTON SWABS
Used with rubbing
alcohol for cleaning.
Also good for cleaning
contacts on a Game
Pak.



TOOTHBRUSH
Generally
useful tool.



MICROFIBER CLOTH
For cleaning dust and
smudges.



WD-40
Can fix a switch or potentiometer that isn't functioning properly.

VINEGAR
Dissolves corrosion.
Smells bad.



BABY POWDER
Prevents Newton rings on backlight mods.



COMPRESSED AIR Your greatest weapon in the fight against dust and spots on your screen mods. Critical.





UV LAMP Cures LOCA glue to allow it to set properly. You can purchase these online. The sun is a free alternative.



LOCA (LIQUID OPTICALLY CLEAR ADHESIVE)

Used for adhering frontlights to the LCD. Comes in several types and viscosities, which all function a little bit differently and have different results.

MAGNETIC SCREW DISH

Magnetic dish that will help you keep your screws from getting lost. This is optional but can be very useful!



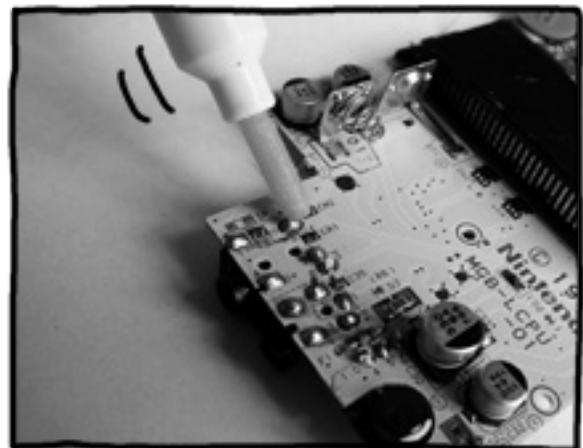
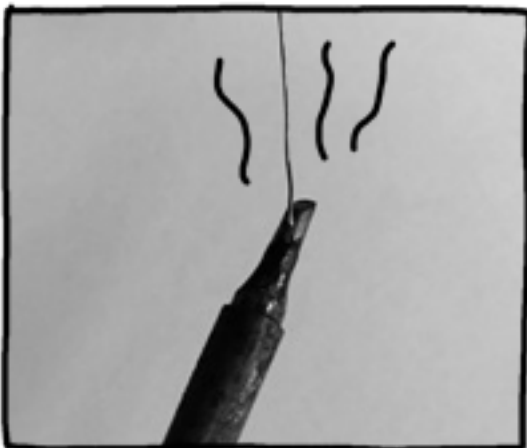
QUICK AND EASY SOLDERING

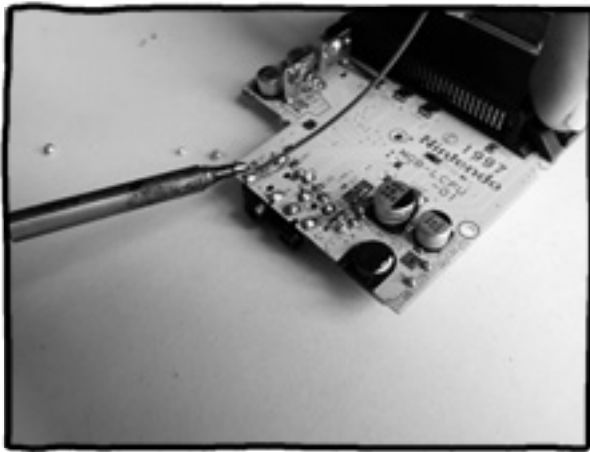
If you've never soldered before, don't worry. Only very limited soldering skills are needed for the mods in this book. We'll start by trying soldering on a dead board or piece of scrap. The aim is to make a solder joint between two components or over one cold solder joint; the key is to make sure your solder joint is secure, so the wires will not come loose later. You also need to keep your solder joint contained and not let the solder touch any other connection.



If your soldering iron is new, before you start you'll need to burn some solder onto the tip, known as tinning the iron. This will help the solder flow and ensure even heat.

1. On your old board, put some flux on the existing solder joint you want to re-solder. The flux helps the solder flow and adhere to your solder joint. This makes it much easier to work with small contacts like those on the GBA.





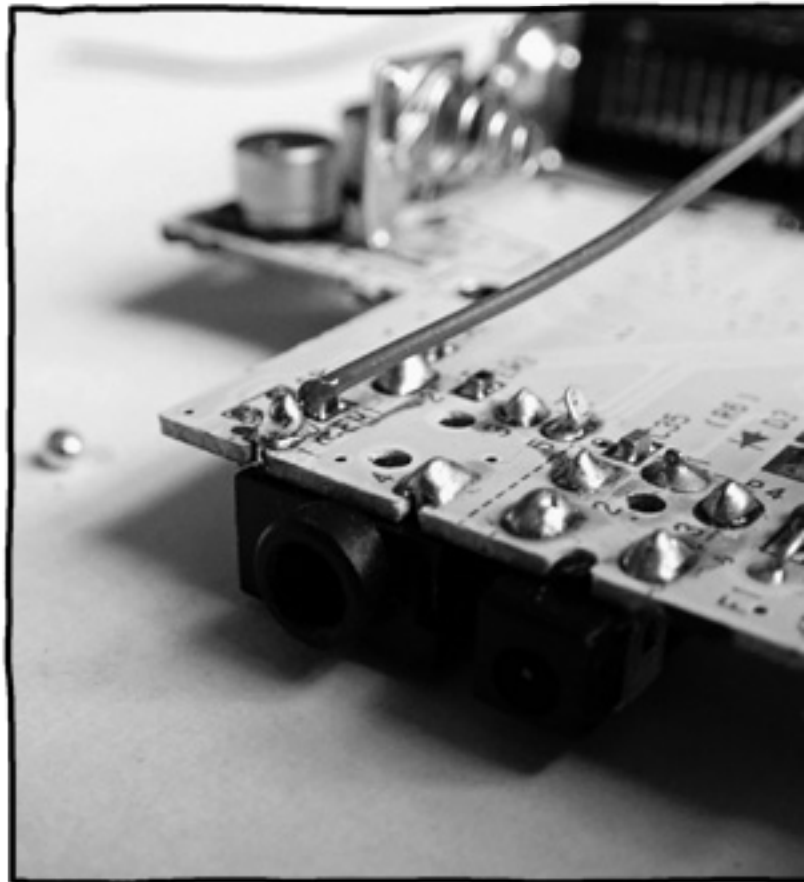
2. Heat the contact with your soldering iron. Soldering irons get VERY hot, so be careful!

3. Heat the joint and touch your solder to the joint. Get the old solder flowing, and then touch the wire to the joint. Let the solder flow around the wire and the joint. Hold it in place for a moment as the solder cools.

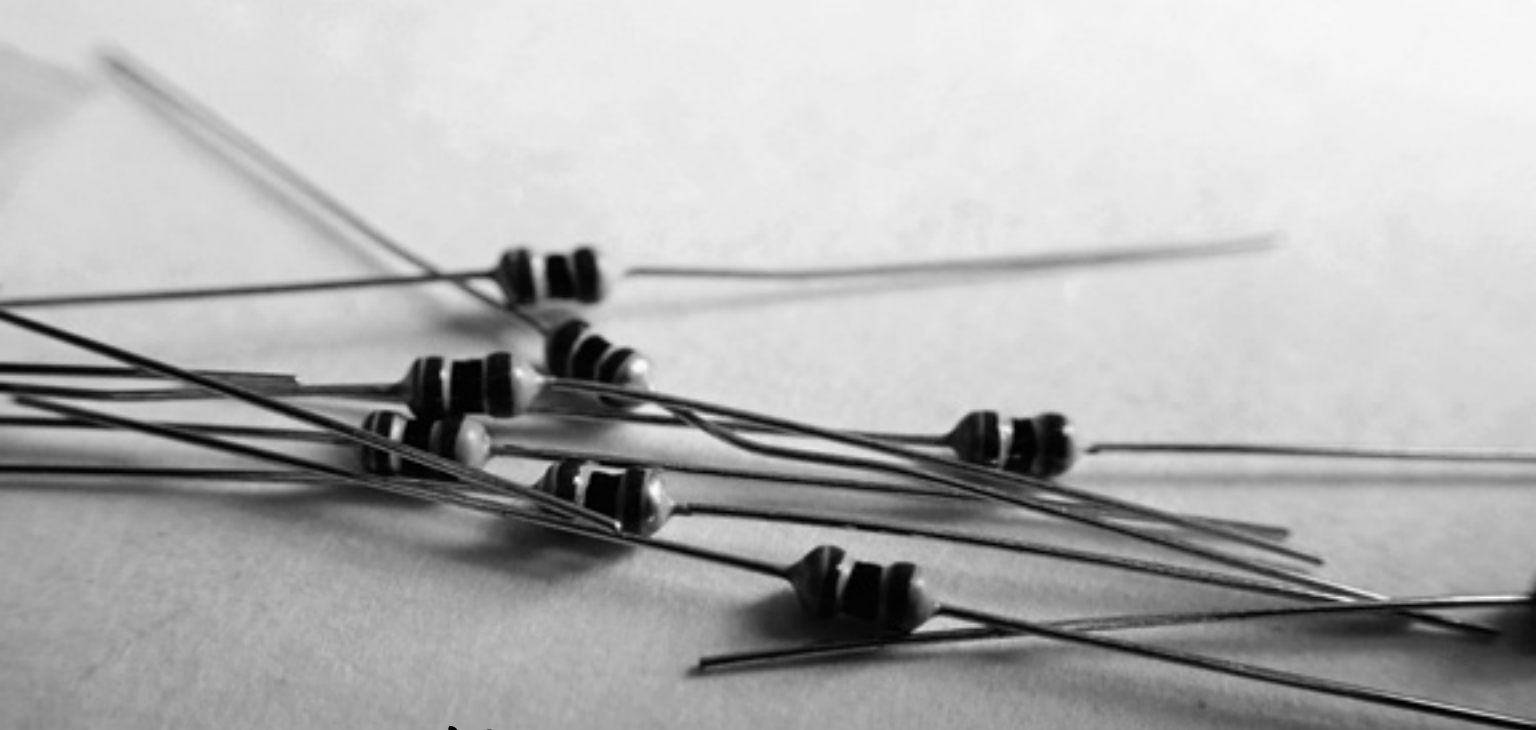
Avoid creating a solder bridge that connects two separate contacts, as this will likely short out your system.

4. Remove the soldering iron and let the joint cool. A clean solder joint will look like a little smooth bubble. A small dollop of solder is enough for most joints; any more risks your joint getting messy. If your tip starts to accumulate solder, dip it into your steel wool and wipe it clean.

If your joints do look messy, you can reset them with your solder sucker. Heat up whatever solder you want to remove with your iron, and use the solder sucker to suck it up while it's still hot.

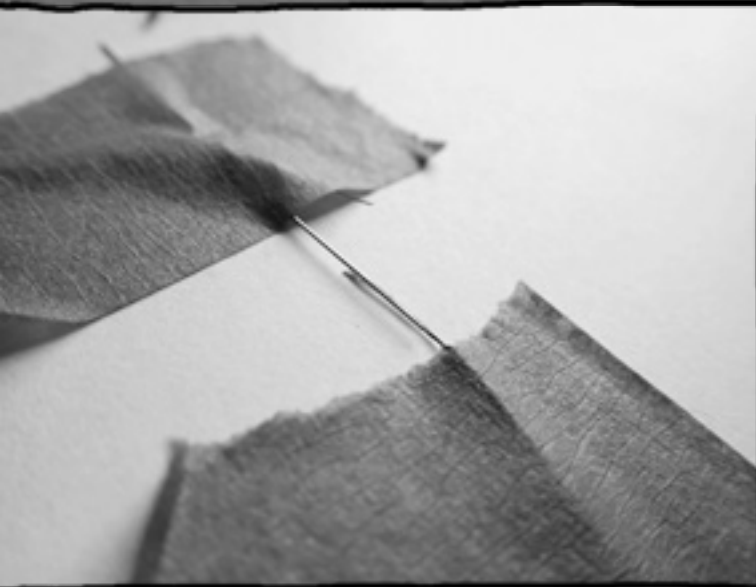


Often when a certain Game Boy component isn't working properly, it's the result of a solder joint that has dried out with age and now fails to conduct; this is known as a cold solder. If this is the case, you'll need to apply your solder tip to the old joint and flush it with some new solder.



SOLDERING RESISTORS

Most backlights and frontlights come with resistors. You can solder resistors to the + wire of your light to help limit the flow of power to the LEDs and prevent shortages. Some people like to use them to dim the GBC frontlight, making it less harsh.



If you want to use resistors, it's easier to solder them to the end of the wire by taping them down in place and soldering them together. Wrap some electrical tape around the connection for safety.

CLEANING AND FIXING COMMON ISSUES

BONDS TO PLASTIC
DRIES IN 15 MINUTES
KRYLON
FUSION
The no-prep, superbond paint
FOR PLASTIC,
METAL • WOOD • WIRE • MORE
GLOSS
NO SANDING OR PRYING
For the inside and outside on most plastics
NET WT. 12 OZ (340 g)

KILL & FLU
Red & White
DISTILLED VINEGAR
VINEGAR DESIGNS
5% ACETIC
16 FL OZ
SRA

25% EXTRA FRESH
WD-40
MULTI-USE PROTECTANT
• Stops Squeaks
• Drives Out Moisture
• Cleans
• Lubricates

Nintendo products were made to endure years of use and abuse at the hands of five-year-old kids and careless college freshmen.

Thirty years later, this means two things for us:

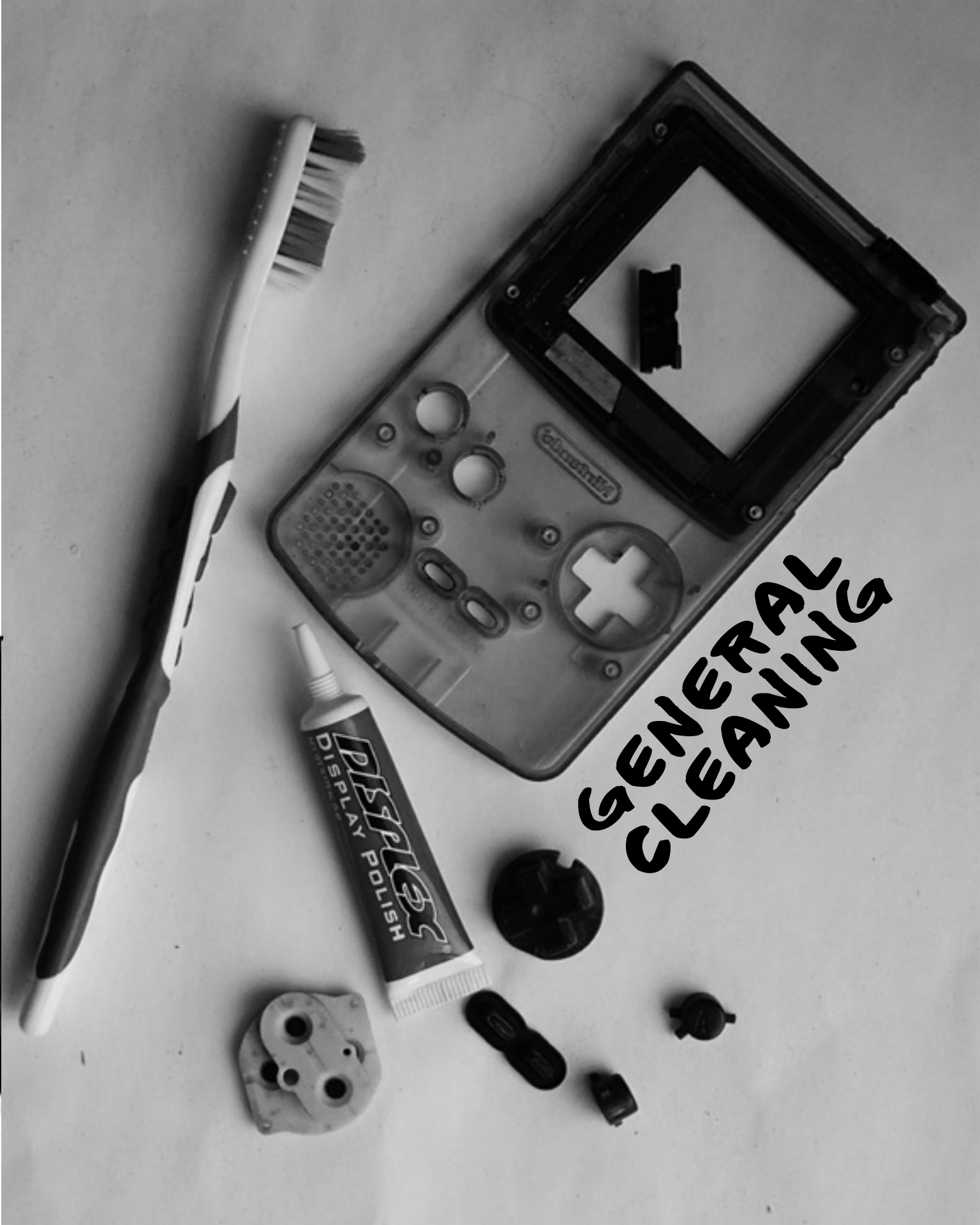
1. Nintendo consoles are durable. They were stress tested to survive hundreds of drops, spills, and exposures. That's why even 30 years later, we commonly find perfectly functional Game Boys in desk drawers around the world.

2. Game Boys were very regularly subjected to these stresses. As a result, many old handhelds suffer from common functional or cosmetic issues.

Luckily, since we'll go deep inside the Game Boys for our mods, you'll be able to fix most of these problems, and since you know how to fix them, you can acquire damaged or "for parts" Game Boys for cheap or even for free and fix them up to be as good as new. Obviously, all the various issues we will encounter in the following pages are red flags, and there's no guarantee that we can resolve all of them, but the odds are in our favor.

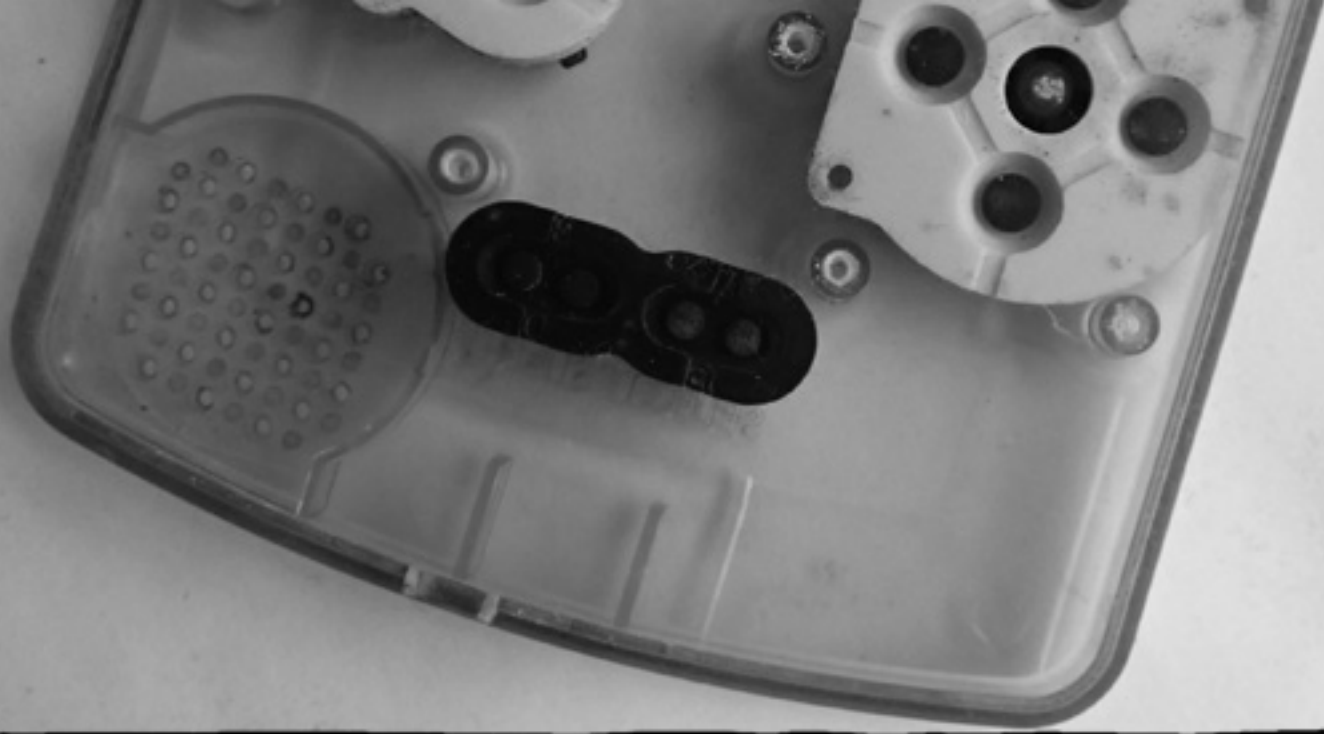
See later chapters for instructions on how to disassemble each Game Boy.





GENERAL CLEANING

PLEDGE
DISPLAY POLISH



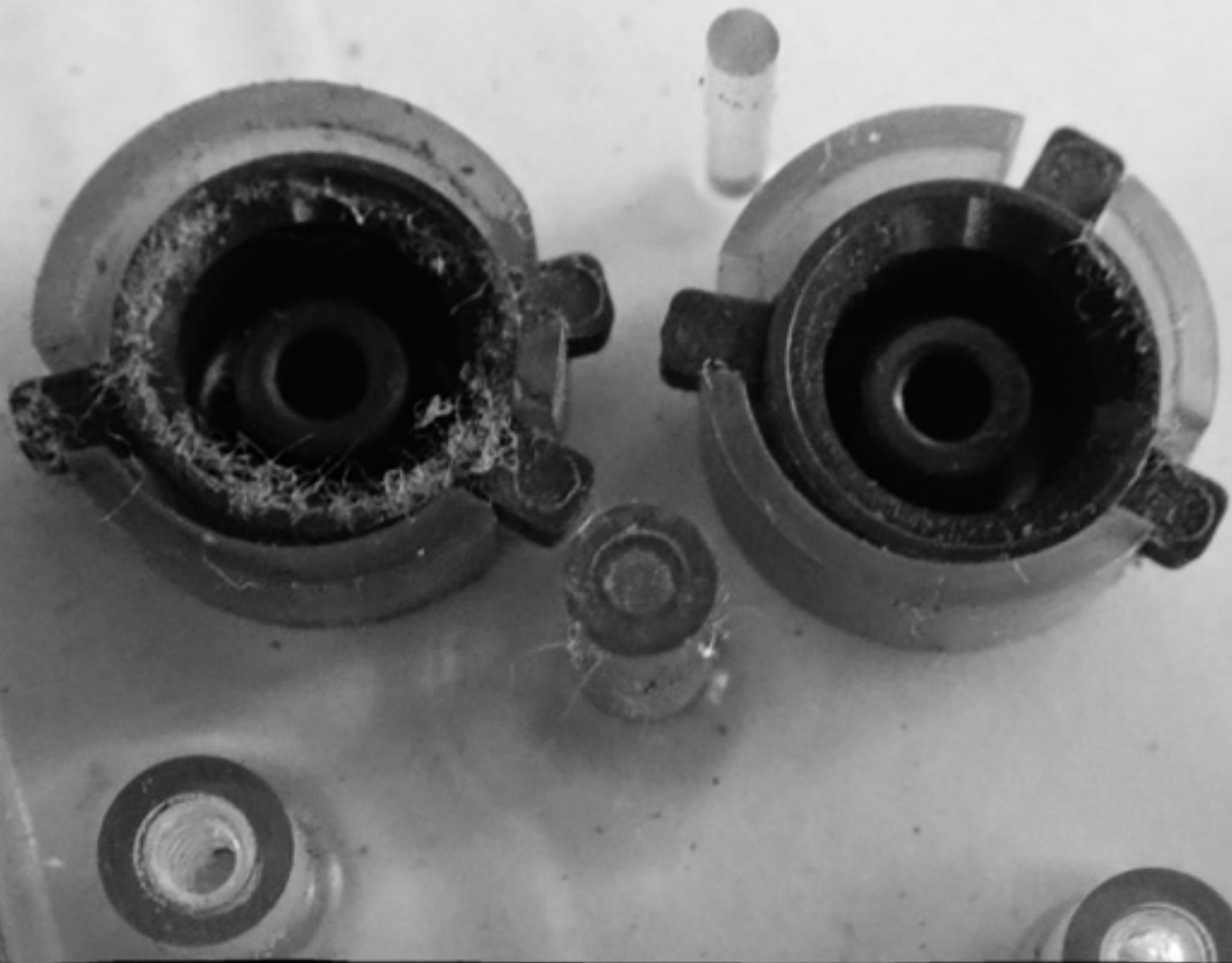
SHELLS

The shell of the Game Boy protects everything inside. OEM (Original Equipment Manufacturer) shells are high-grade plastic that can really take a beating and are difficult to crack or break. The LCD is protected by a high-impact plastic lens. The Game Boy is fully encased within this sturdy shell, and it's generally impervious. However, there are points of weakness around the buttons, speaker, and battery compartment, where dust and grime can become trapped and accumulate.

Sometimes, this doesn't affect the functionality of the Game Boy whatsoever, but it may still be worthwhile to give your Game Boy a thorough cleaning inside and out, even if you don't feel like modding it.

To clean the shell, take the shell apart by unscrewing the case screws. Use a toothbrush, cotton swabs, and rubbing alcohol to clean inside the button wells and around the speaker cover. Run a tweezer or blade along the seams to dig out any hardened filth. Once you've separated everything, put the plastic parts in the sink and soak them with warm soapy water.

If your Game Boy is too far gone, you can also cheaply acquire brand-new replacement shells and lenses in a variety of colors. If you have a collectible Game Boy and want to preserve the OEM screen lens, you can use a product called Displex to polish out relatively deep scratches with a little time and effort.



STICKY BUTTONS

So much gunk and grime can collect beneath the buttons of a Game Boy. Usually it's just general filth that inhibits proper button and speaker function, but sometimes you may even find desiccated insect remains! If your buttons stick, you can likely just open up the shell and wipe off the PCB and move on. While you're in there, you may as well change the silicon pads and even the buttons themselves if they're particularly worn.





SILICON PADS

Buttons on all retro handhelds work the same way. A silicon pad with a springy contact resides under the buttons. Press the button, and the pad makes contact with the PCB and sends the button press signal to your game. Gunk can collect in the ridges of the pads, and sometimes the pads can be affected by battery corrosion. In this case, simply remove the pads and wipe them down or replace them entirely. Seat the pads over your buttons inside the front shell and make sure the corresponding PCB contact is clean before replacing the pads.

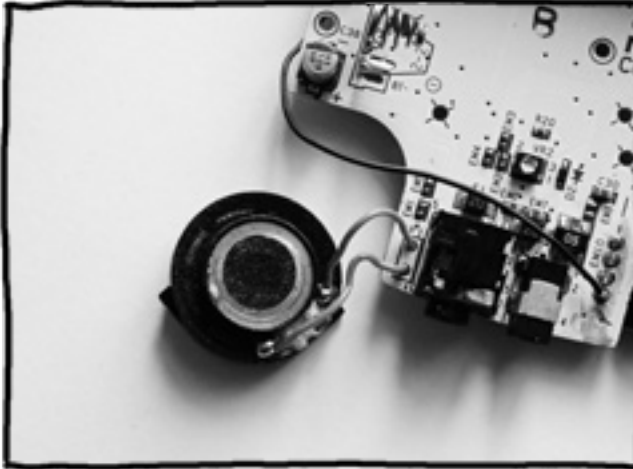


SPEAKERS

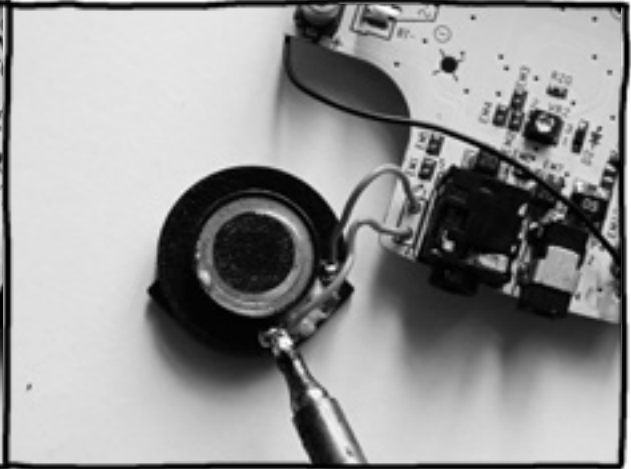
Speakers are another commonly faulty and easily replaced feature of any used Game Boy, especially on Game Boy Color models. Later Game Boys like the Game Boy Advance are a little more gunk-proof, with more refined shell design to more effectively keep dirt particles out, so the speakers are less likely to need cleaning or replacing.

CHANGING THE SPEAKER

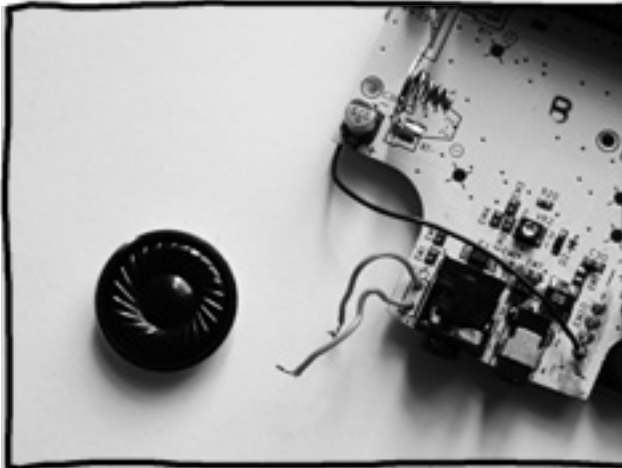
The steps will vary slightly depending on the specific Game Boy model, but the speakers are all generally replaced the same way.



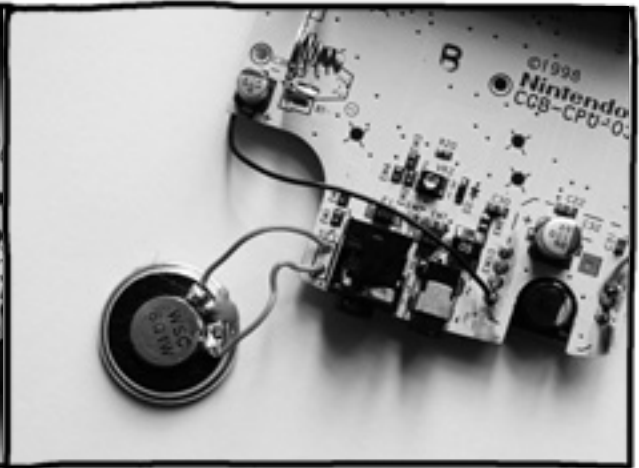
1. With your shell opened up, pull the speaker away from the board.



2. Desolder the two wires from the back of the speaker and remove the old speaker.



3. Get your new speaker. Make sure you're using a speaker that corresponds to the Game Boy you're fixing so there are no issues fitting it into the front shell.



4. Solder the two wires to the pads on the new speaker. Occasionally you'll need to reconnect the speaker wires to the board to ensure proper function.



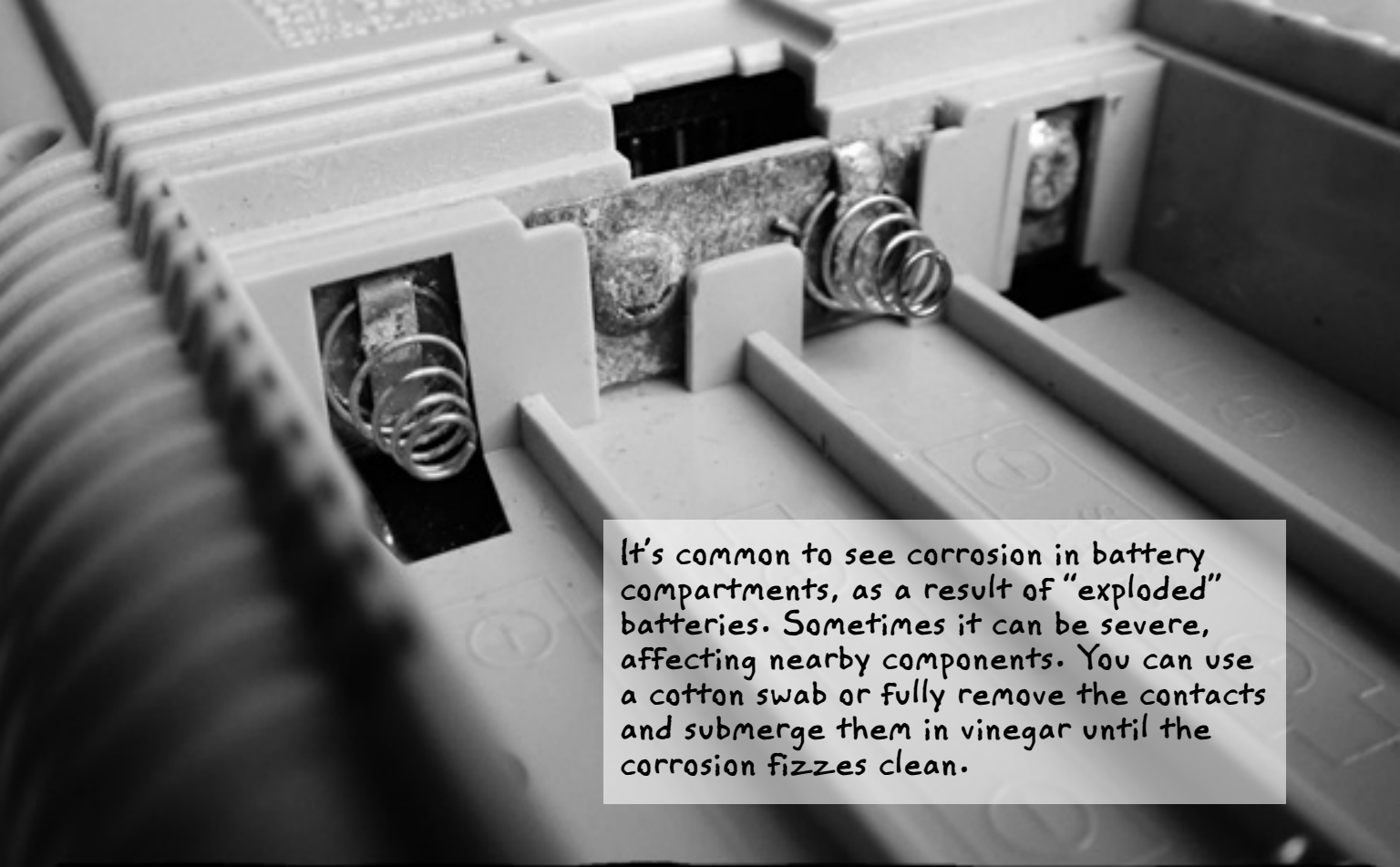
CORROSION



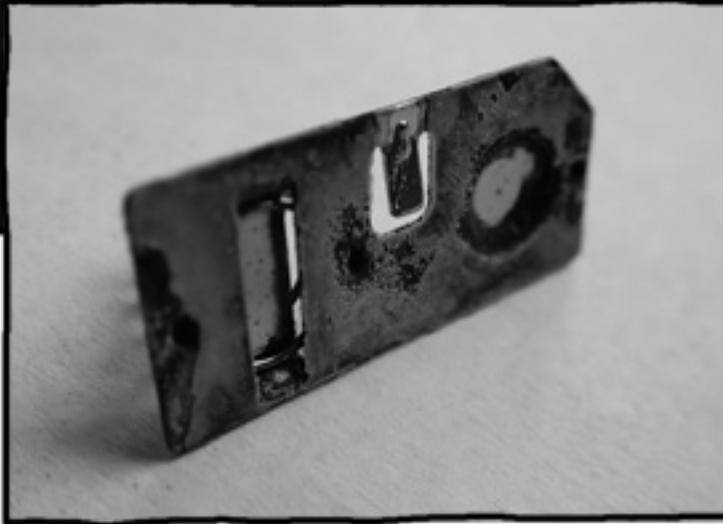
If you're having sound problems and changing the speaker doesn't solve them, it's worth checking the headphone jack for corrosion—particularly on a Game Boy Color. Make sure to completely clean the headphone jack of any corrosion, as well as any other area with corrosion. Minor corrosion is relatively common, and you can dissolve it with ordinary household white vinegar. Use a cotton swab.

If the volume sounds uneven, or if the knob doesn't work, spray the area around the volume potentiometer with WD-40 and work the wheel. Reset any cold solder joints around the component by holding your soldering iron over the joint and melting the solder, then letting it reset.





It's common to see corrosion in battery compartments, as a result of "exploded" batteries. Sometimes it can be severe, affecting nearby components. You can use a cotton swab or fully remove the contacts and submerge them in vinegar until the corrosion fizzes clean.

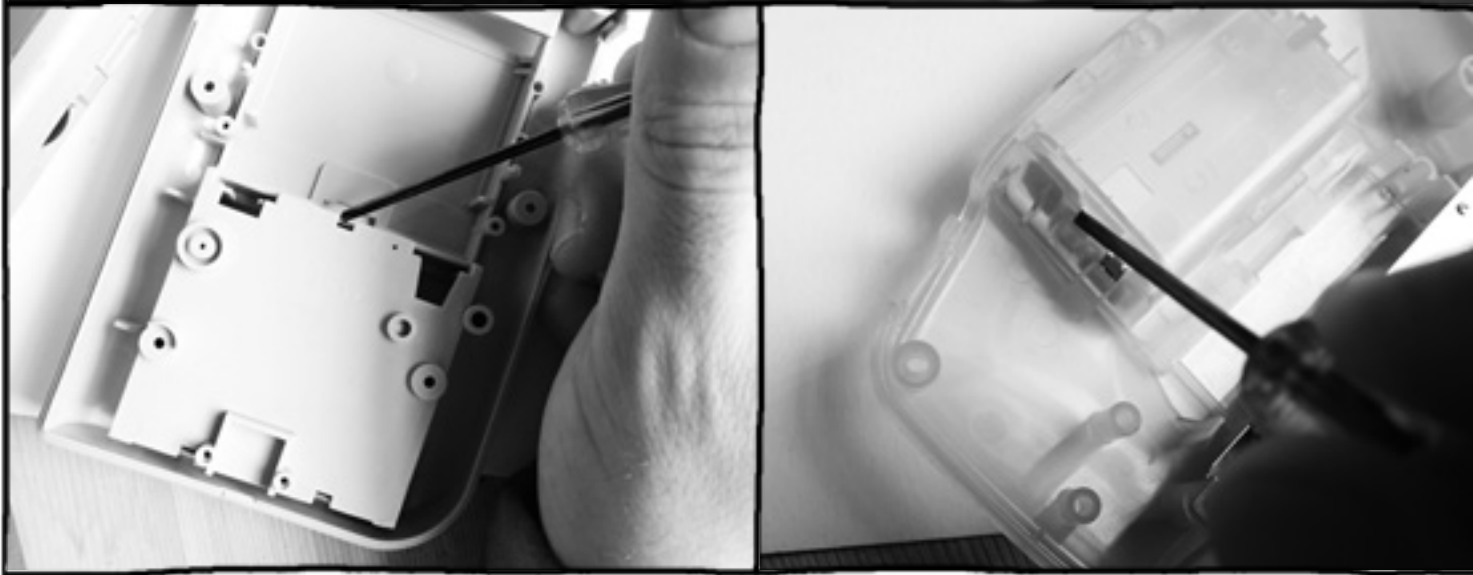


If you plan to store your handheld for a long time or ship your device, make sure to remove the batteries to prevent corrosion, and don't subject them to extreme temperatures.

Sometimes, like in the pictures above, the contacts are just too far gone to be worth cleaning. You can find cheap, brand-new clean replacements anywhere that sells modding supplies. I'll talk you through replacing the contacts next.



REPLACING BATTERY CONTACTS



To replace contacts, open the Game Boy and remove the back shell. Flip it over and find the metal tabs on the inside of the shell where the battery contact is. Press in and down to remove the contact. Pop in the new contact from the outside until you hear the tab click.

You may have noticed that some old game consoles have turned yellow or brown over time. This is a result of the chemical makeup of the specific ABS plastic, the bromine in which changes color when exposed to UV light rays. If your old Nintendo was in your living room by the window for 10 years, this is likely why it's yellow now. The best remedy is to simply replace the shell, but if you're determined to rescue your console from this yellow menace, RetrObright will do the trick. RetrObright is a hydrogen peroxide mix that reverses yellowing when applied to the shell. Results are mixed, with some saying the yellowing returns over time. If you want to try this method, you can find RetrObright recipes and instructions online.

YELLOWING



SCRATCHED SCREEN


Screen scratches are the most scrutinized aspect of a Game Boy's condition but are easy to fix! Thankfully you can buy any size or color replacement screen lens and merely stick it onto your shell for a brand-new view. Open the Game Boy and push out the screen lens from the inside. Clean the area around the screen, and apply the new screen lens like a sticker.





POWER SUPPLY

Throughout this book, you may notice thick wires sticking out of the Game Boys in the pictures. These are AC adapters. You can plug these into the wall, and they will power your Game Boy without batteries. You may want to invest in one for the best results with your mod, especially a frontlight mod. If you plan to do a lot of modding, having an AC cable around is ideal for testing. This way you won't have to juggle batteries too much.



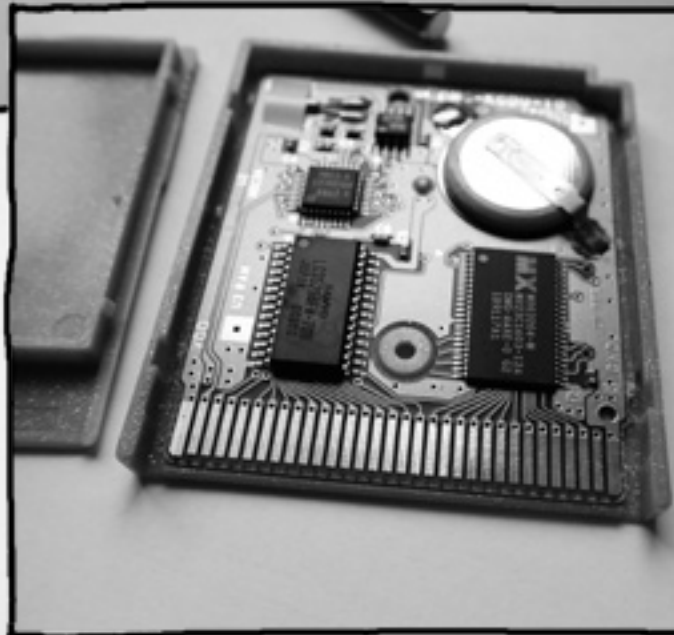
GAME PAK BATTERIES

Even some Game Paks will need repair. Some games utilize batteries to save or perform clock functions in a game. Without the battery, these functions are no longer available and may hinder playability.



To fix Game Pak battery issues, you'll need a new battery and another special security screwdriver to open a Game Boy cartridge. It's a 3.8 mm bit, and it looks like a little starfish. You can acquire both online from parts suppliers.

1. Screw open the cart and slide off the back shell.



2. Remove the game board from the casing.



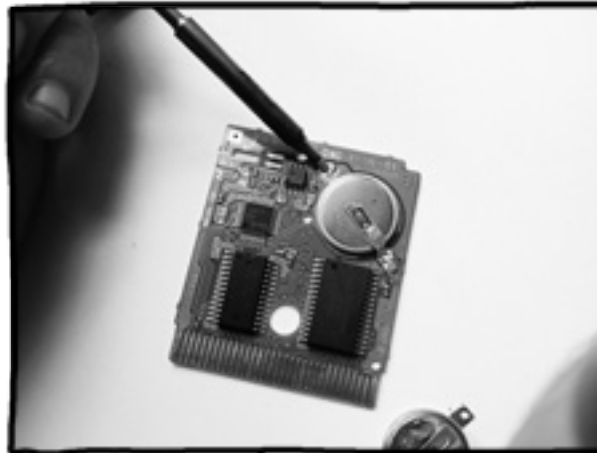
3. Desolder the battery using a wick or solder sucker.



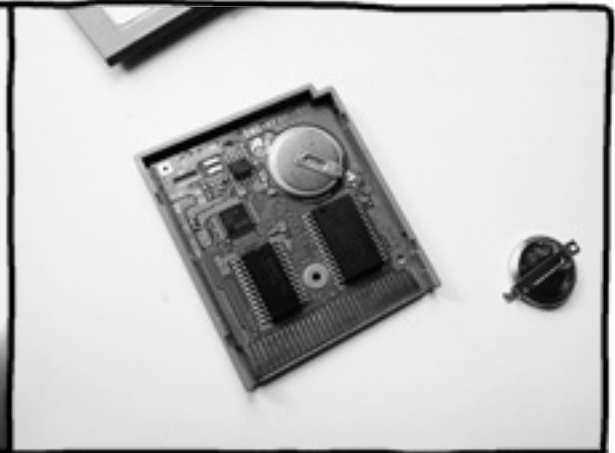
4. Ready your new 3 V battery.



5. Solder the new battery with the positive side down.



6. Replace the board in the casing.



7. Screw the Game Pak back together.



FIXING VERTICAL SCREEN LINES

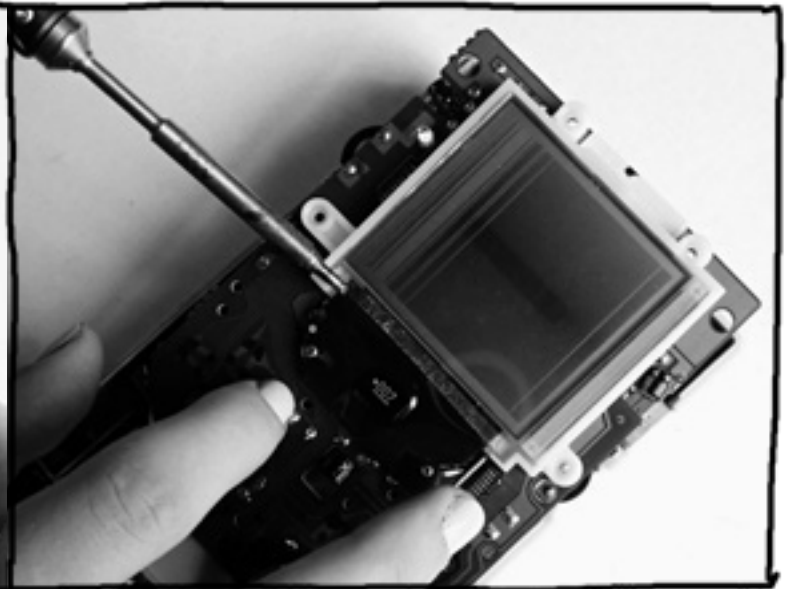
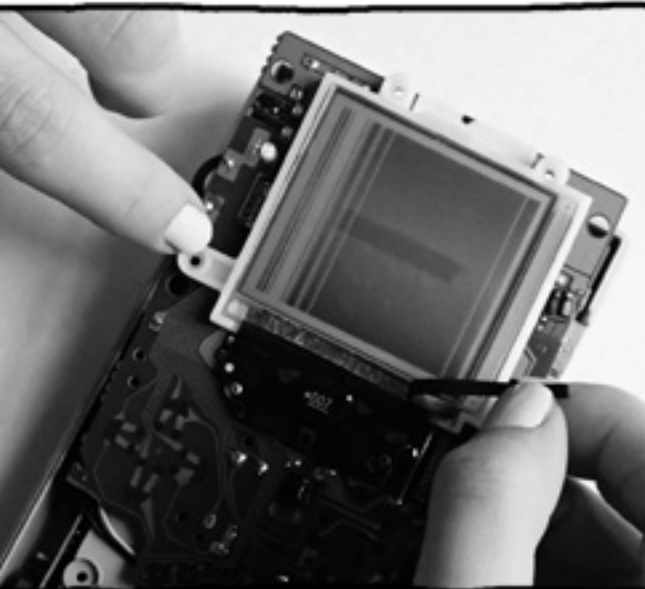


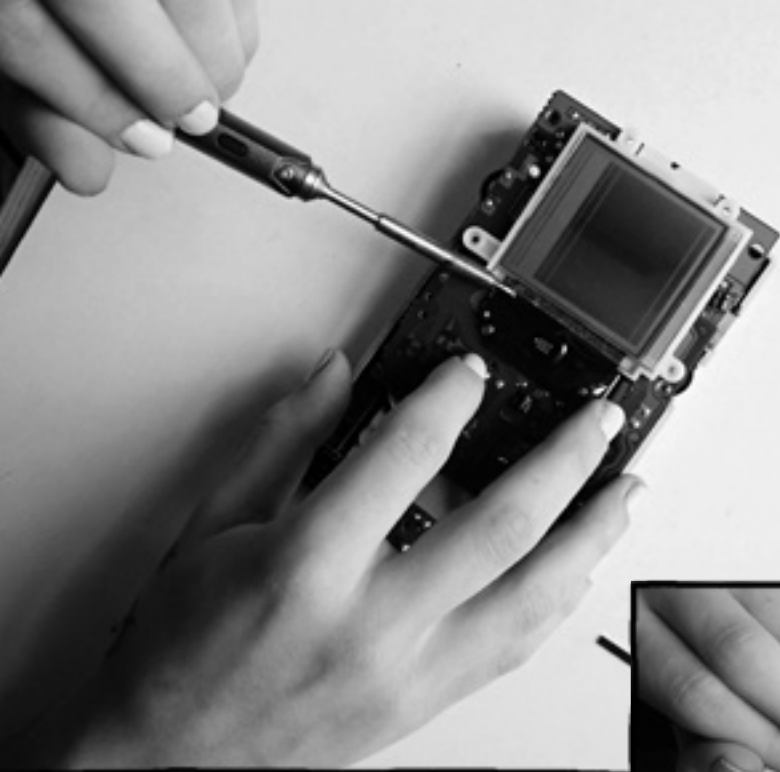
Vertical screen lines are another common problem that occur on an original Game Boy when the glue strip at the base of the LCD dries out. We can reset the connection with a little heat and patience and save a Game Boy that would otherwise be useless.

Let's fix some vertical screen lines together.

1. Remove the rubber strip from below the LCD screen.

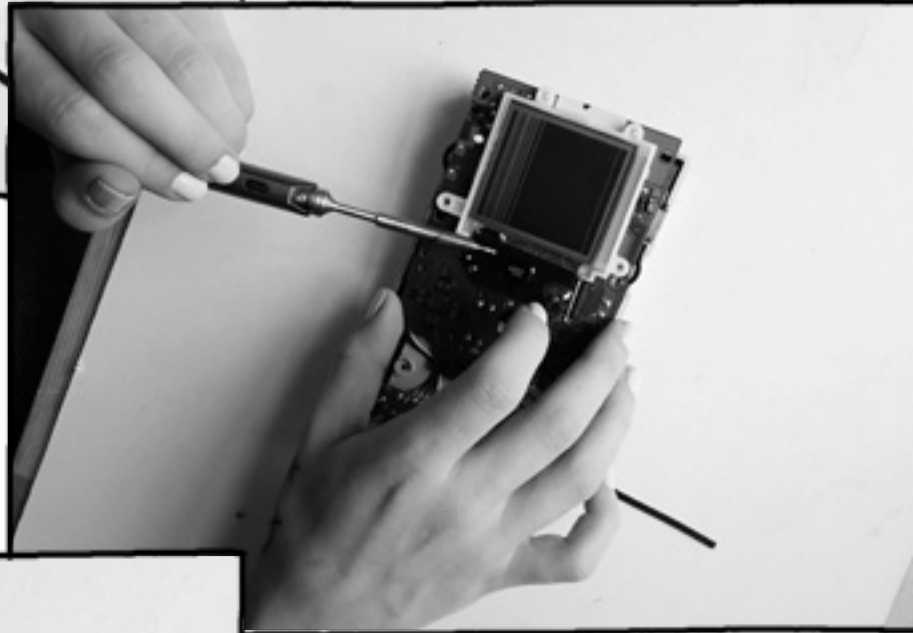
2. Heat up your soldering iron. You won't need any solder for this fix, just heat. Press the iron against the newly exposed strip of ribbon.





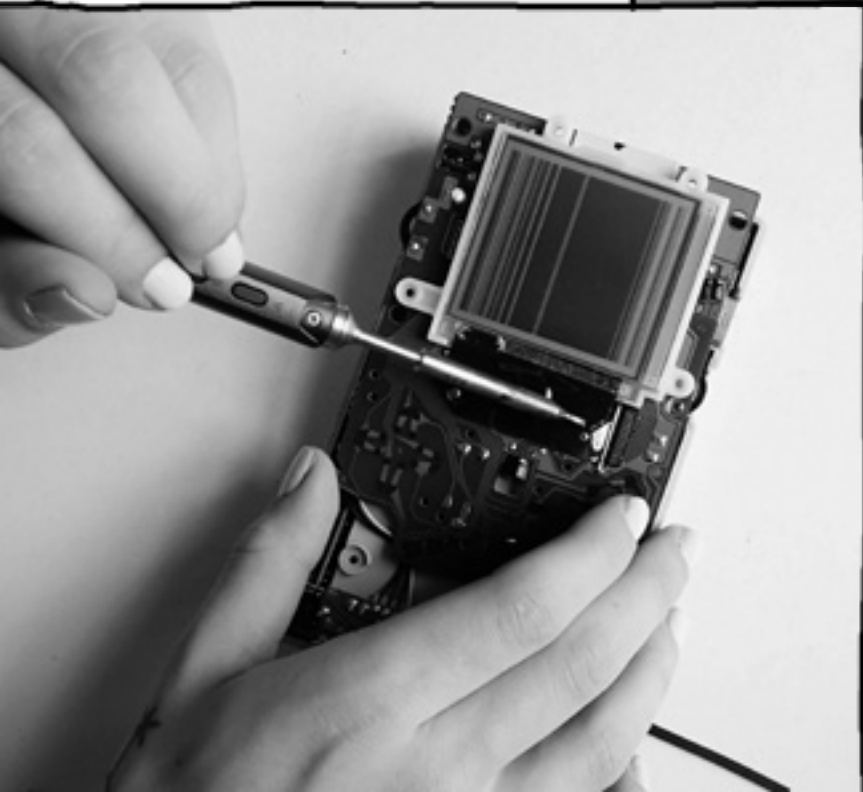
3. Let the heat melt the connection back into place, and move it along the strip. As you re-form the connection, the lines will disappear. Different lines will require heat in different places along the brown cable. Sometimes you'll need to find the right spot to heat for a specific line.

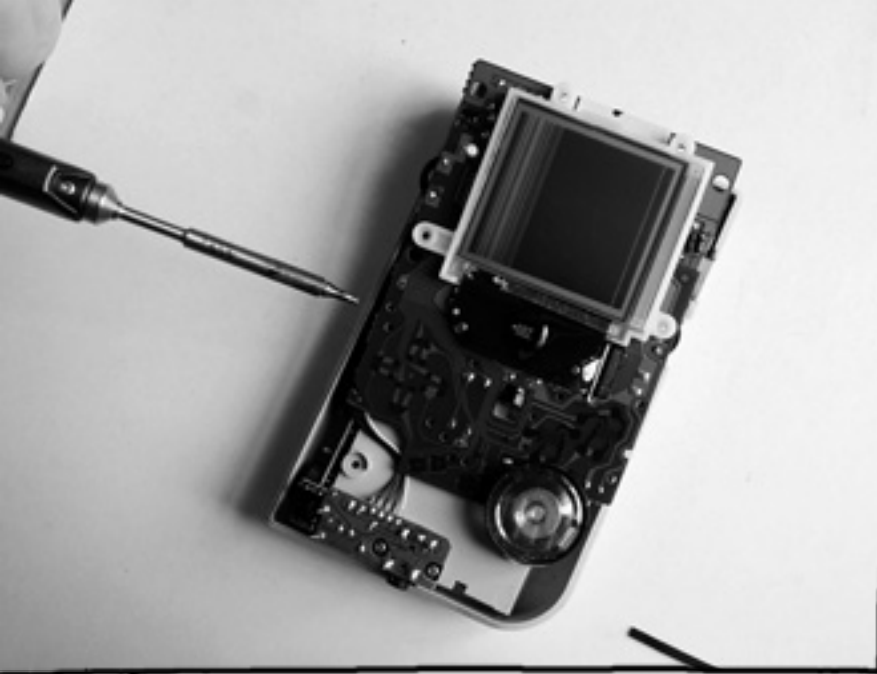
4. Apply some heat to the thick brown ribbon below the rubber strip. Use gentle pressure to slowly work your way around the whole ribbon. Don't worry, you won't melt through it.



5. Continue moving around the ribbon cable and the glue strip. You'll see lines disappear and reappear, and you may even see some new lines pop up that weren't there when you started. This is normal.

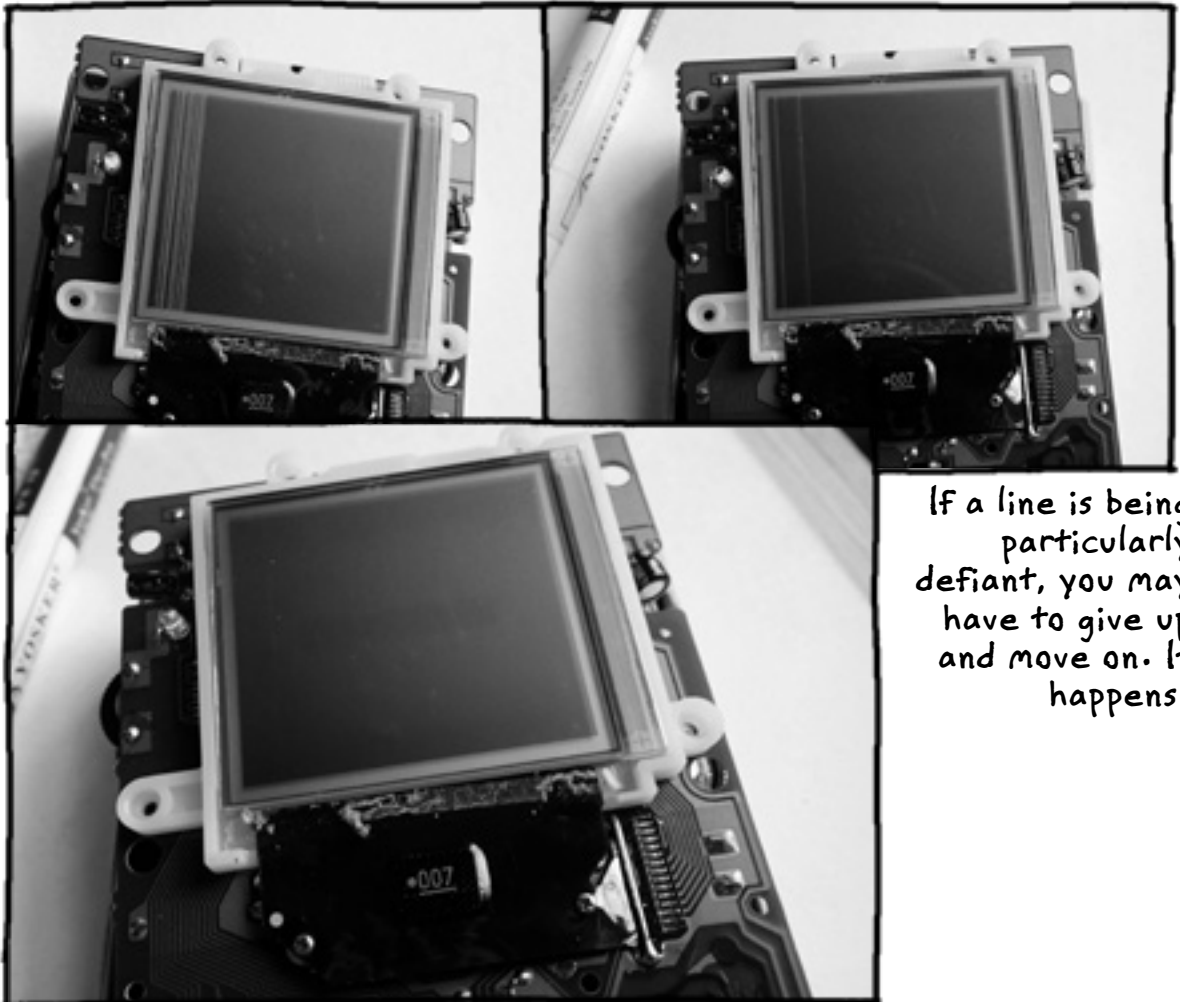
If you're close to the LCD and you see it changing to a dark blue, remove the heat.





6. Repeat steps 1 to 5 for a while and then remove the heat from the Game Boy and let it rest for a minute. You should see various lines flicker on and off. If you still have lines once the flickering has settled, let it rest a few minutes and come back to it.

7. Repeat steps 1 to 6. You should slowly see all the lines filling in. With enough patience, the screen should be as good as new!

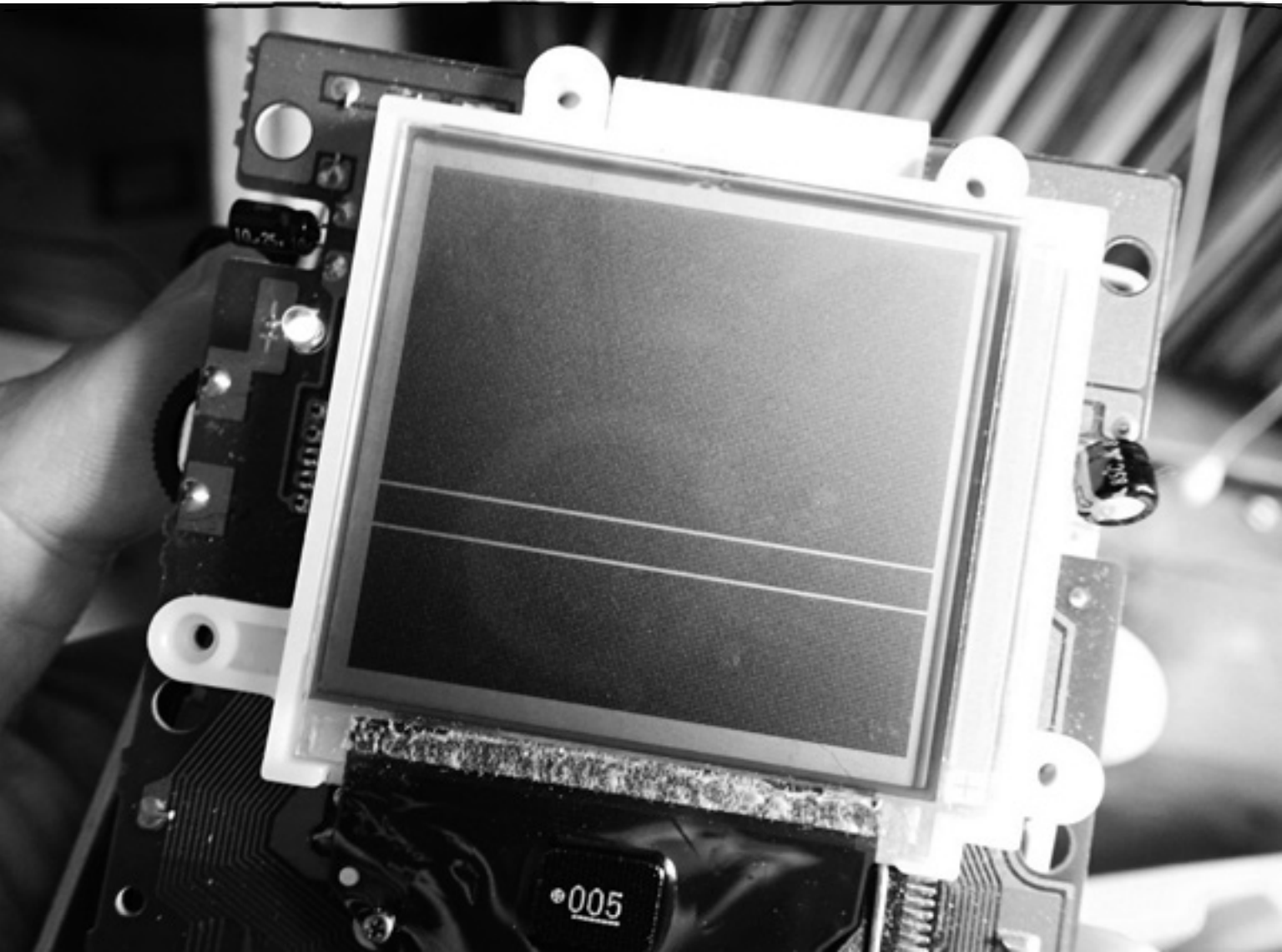


If a line is being particularly defiant, you may have to give up and move on. It happens.

HORIZONTAL SCREEN LINES

Horizontal screen lines are a different matter altogether. You may have noticed that the screen has two ribbon cables: one along the bottom and one along the right side. As we've seen, the bottom cable is thick and can endure high heat applied directly to it. The side cable can't endure the same kind of heat.

If we tried to fix the side cable the same way we fixed the bottom cable, we would melt right through it. While horizontal lines can be fixed, the process is time consuming and difficult with a very low success rate. If you see a Game Boy with horizontal lines, I suggest you move on and find another.



"WON'T TURN ON"

You'll see this a lot on eBay listings. If you really want to get a deal, snatch up one of these and roll up your sleeves! Sometimes, a dead Game Boy is being sold for parts simply because it hasn't been tested.

Several of the issues described thus far in this section could single-handedly be the cause of a "dead" console. Cleaning corrosion, heating cold solder joints, and removing grime may easily revive a dead Game Boy.

But sometimes, it's just not gonna come back to life. Be prepared to use some extra parts and be ready to let it go if you can't find any signs of life. Just consider it a learning experience and move on to another Game Boy.

You can find a perfectly functional Game Boy for \$20 to \$30 online, so if it takes much more than two hours to fix, it's not worth your time.



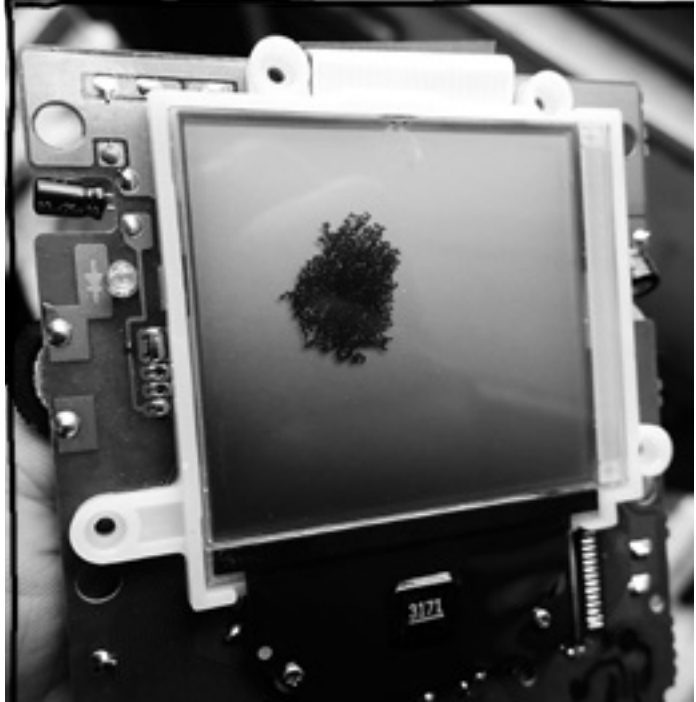


SCREEN BURN

When your polarizer gets fried, you end up with screen burn. This can occur on all LCDs. If you see it in a Game Boy Pocket, removing and replacing the polarizer can remedy screen burn issues.

"SCREEN CANCER"

Screen cancer occurs when LCD pixels deteriorate and burst. You will usually see it creeping along the edge of the original Game Boy and Game Boy Pocket screens, though it can occur anywhere on the screen. There's no cure for this, so if you see a Game Boy for sale for cheap that shows signs of screen cancer, it's best to avoid it unless it's confined to the very edge of the LCD and doesn't interfere with the play area. You can use black electrical tape to obscure minimal screen cancer around the edge of the console.



)))
POWER



CRACKED LCD

The only way to fix a Game Boy with a cracked LCD is to replace the LCD. That means finding and disassembling a working Game Boy to salvage the screen of a broken Game Boy. There are no replacement screens available on the market.

Don't bother. A cracked LCD is game over. You might be able to salvage the board or shell, but otherwise just move on from these, unless they're free or you plan to mod in an aftermarket screen anyway.

GAME BOY GRAVEYARD

It's best not to spend too much money or time on a broken Game Boy unless you're sure you can fix it. Even the most seasoned modders lose them on the table. Luckily, there are lots of salvageable parts. Keep these salvaged parts in your own personal Game Boy graveyard. You never know when you'll need them to revive a broken Game Boy in the future.

