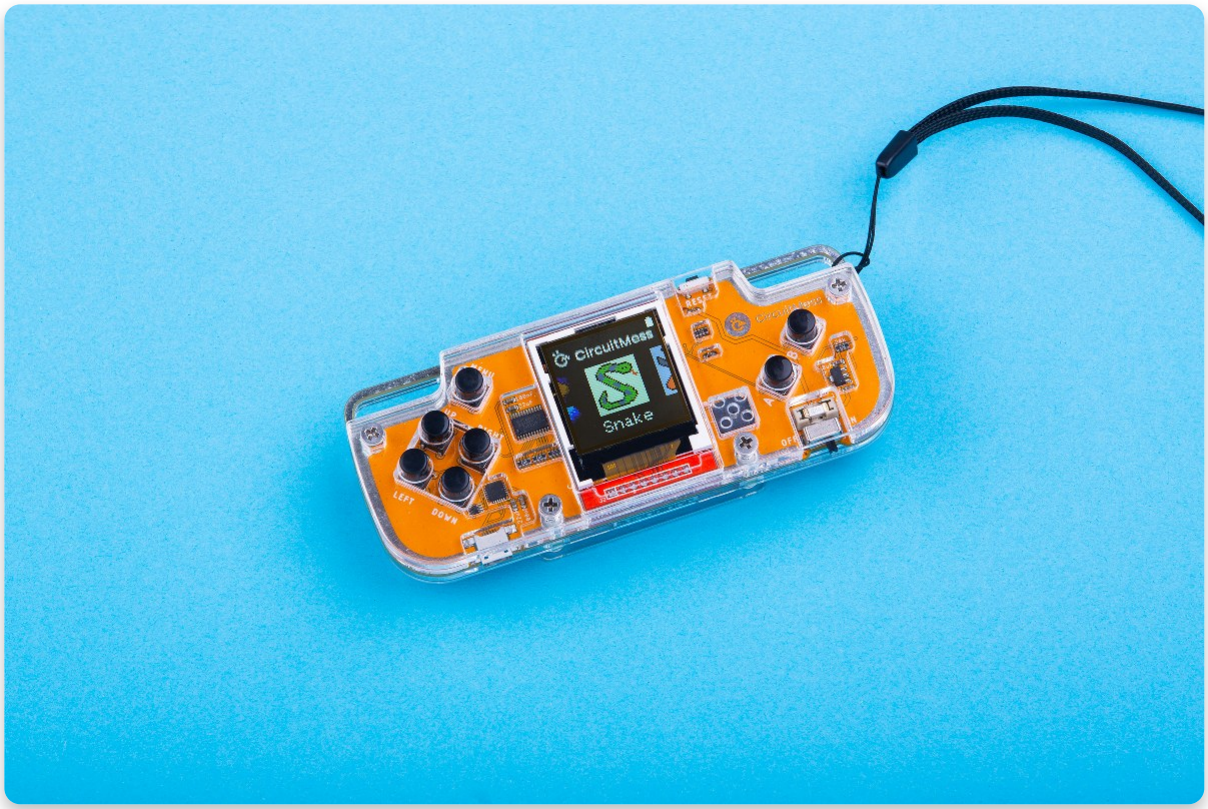
Nibble Build Guide

Introduction

The beginning

Prefer video instructions? We got you covered! You can follow along with our **Nibble video build guide** at this **link**.

Introduction



CircuitMess Nibble after the assembly

Welcome to the CircuitMess Nibble build guide!

In this build guide, you'll discover how to assemble a game console all by yourself, using only a couple of tools in the process.

Whether this is your first time meeting a do-it-yourself device or you're a DIY veteran, there is no question that you will learn a lot and enjoy the experience of

assembling and programming!

Age Group

As it says on the box, you should be at least **9 years** old to assemble this console. With that in mind, parts of the assembly like soldering and tightening bolts should be approached carefully - ask an adult to help out if you've never soldered before.

Time of assembly

The time of the assembly depends on your previous knowledge and experience with electronics. If you've never soldered and handled a DIY project like this before, there is a small learning curve that you're going to have to overcome before really getting in the groove.

You will need an estimate of **2 hours** in total to assemble your console.

Regardless of the assembly time, one thing is for sure - you will have fun!

Fun fact: our engineer Erik holds the record in assembling Nibble in just 14 minutes and 22 seconds!

Skills

There is no required previous knowledge for assembling your Nibble.

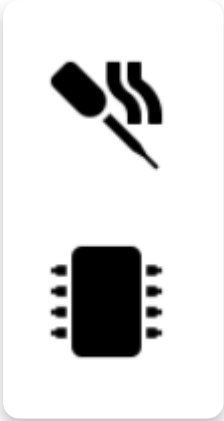
If you follow the build guide carefully, you shouldn't have any trouble along the way. We made sure to show each step as detailed as possible, so no worries!

What you'll learn with nibble

Nibble's main goal is to educate and motivate you to learn something new or brush up on the skills you already have. It also serves as an entry point into electronics, making it the perfect project for starting your big engineering career.

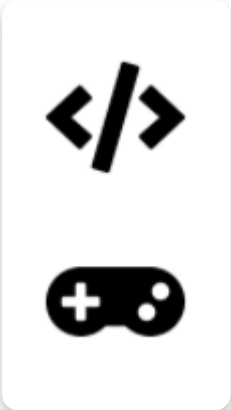
In the process of assembly, you'll learn:

- **How to solder**
- **What are the basic electronic components and their function**
- **How can electronic components be connected and why**
- **What are microcontrollers and some basics of digital electronics**



If you go further and follow our coding and hacking guides, you'll learn:

- **How to program a microcontroller in C/C++ and in CircuitBlocks**
- **How to program a simple video game**



*In addition to following the build guide, you can check out this cool **video** provided by one of our community members **popespacious**!*

What's in the box?

What's in the box?

You've got your Circuitmess Nibble in front of you? Cool!

First of all, go over the list of components below and make sure you have all of them on your table and ready for assembly.

Your Nibble kit was hand packed with love in Croatia by us, the CircuitMess team, and we always double-check the parts, but mistakes can happen!

In case something is missing, please contact us at contact@circuitmess.com and we'll get back to you as soon as possible.

Here is a list of components you should've received in your box:

1. **Acrylic casings (6 clear protective casings)**
2. **Nibble main board (PCB)**
3. **Soldering iron stand**
4. **Soldering iron**
5. **Solder**
6. **Battery holder**
7. **Micro USB cable**

8. **Phillips screwdriver**
9. **Display breakout board (LCD)**
10. **Cleaning sponge**
11. **Component bag (buttons, bolts, spacers, …)**
12. **3x AAA batteries**

In the following section, we'll break down each component so that you know what it's used for and why it's important. We'll also go a bit in-depth with some of the components so that you can get a better grasp of how they work.

Please note that you have got one of the two different models of soldering iron. Their instructions differ a bit, but both of them will perfectly do the job - soldering the components, and there is no big difference in functionality.

In case you got the blue soldering iron with a small metal button, you'll have two more components in your Nibble box:

- Soldering iron cable
- USB power brick for the soldering iron

Meet the components

Meet the components

Display breakout board (LCD)

The main screen of the device

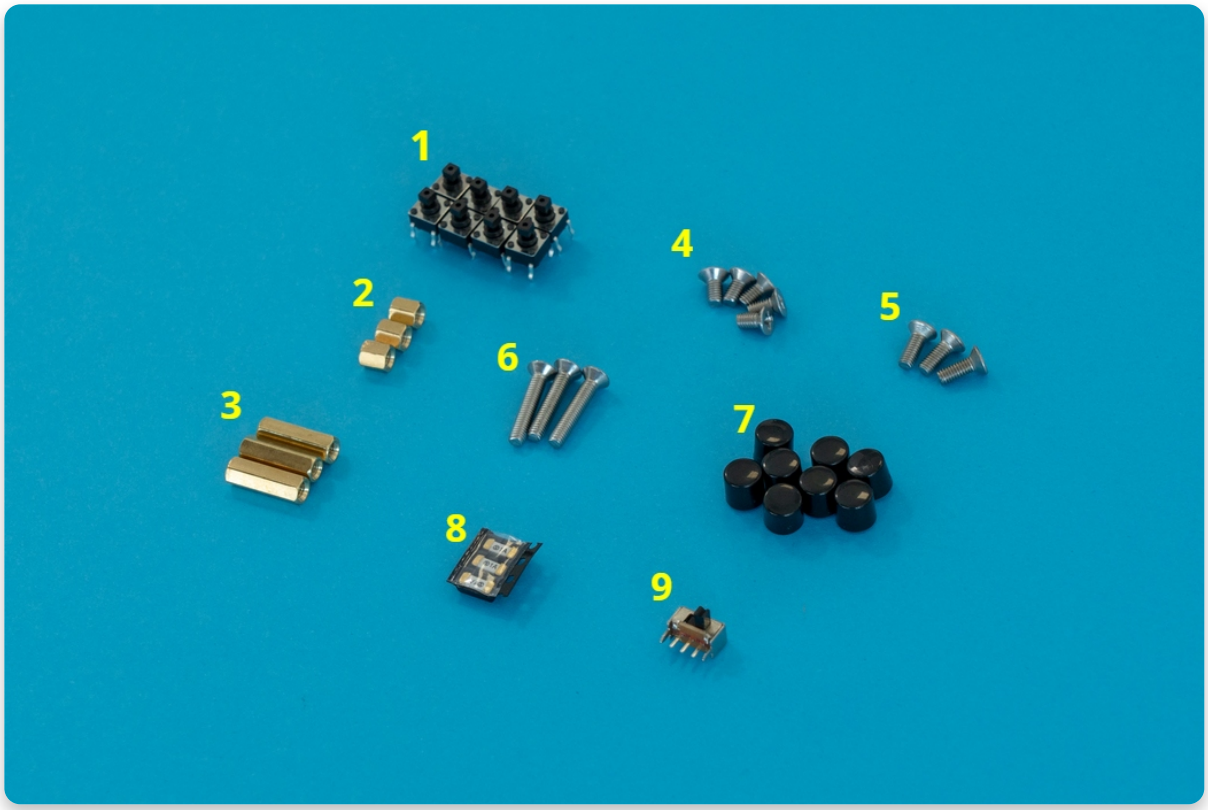
This board's main component is the display.

LCD stands for liquid crystal display. It works on the basis of current which is applied to the crystal layer inside the display and is used to change the color of individual pixels on the screen.

The display itself is 128x128 pixels with 18-bit color depth at a 1.44'' (diagonal) screen size.

The display is more than capable of creating some fine objects with more than 260 thousand colors that can be used to make some really sweet games.

Component bag (buttons, bolts, spacers, ...)



All the components from the bag

The component bag holds all the parts that need to be either soldered or screwed onto the board.

As a matter of precaution, we usually put one piece extra for the smaller mechanical components, such as buttons, bolts, and spacers.

The bag features the following components:

1. 8x small black pushbutton
2. 3x M3x4mm golden spacer
3. 3x M3x14mm golden spacer
4. 5x M3x6mm metal bolt
5. 3x M3x8mm metal bolt
6. 3x M3x16mm metal bolt
7. 8x small black pushbutton cap
8. 3x fuse
9. 1x switch button

Components like pushbuttons and switches are going to be soldered onto the board, while components like bolts and spacers are used for keeping the whole console and its casing in one piece without breaking apart.

Replacement fuses are included as a security measure; if any of the components are not soldered properly, the fuse will burn out instead of something important on the board. This will be explained more in detail later, but let's hope the fuses won't see much use!

Nibble main board (PCB)

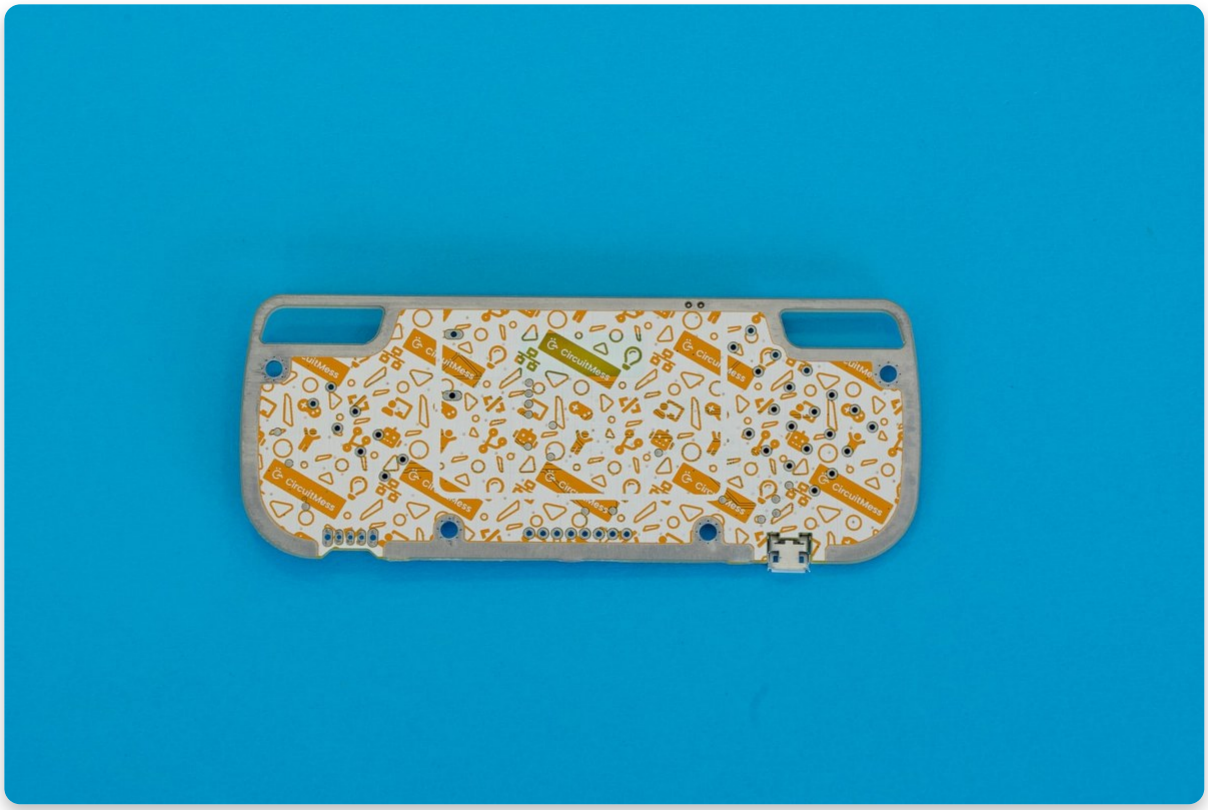
Front side of the main board

PCB stands for printed circuit board. Basically, this is a fiberglass board with copper traces on it, along with some protective paint and insulating material.

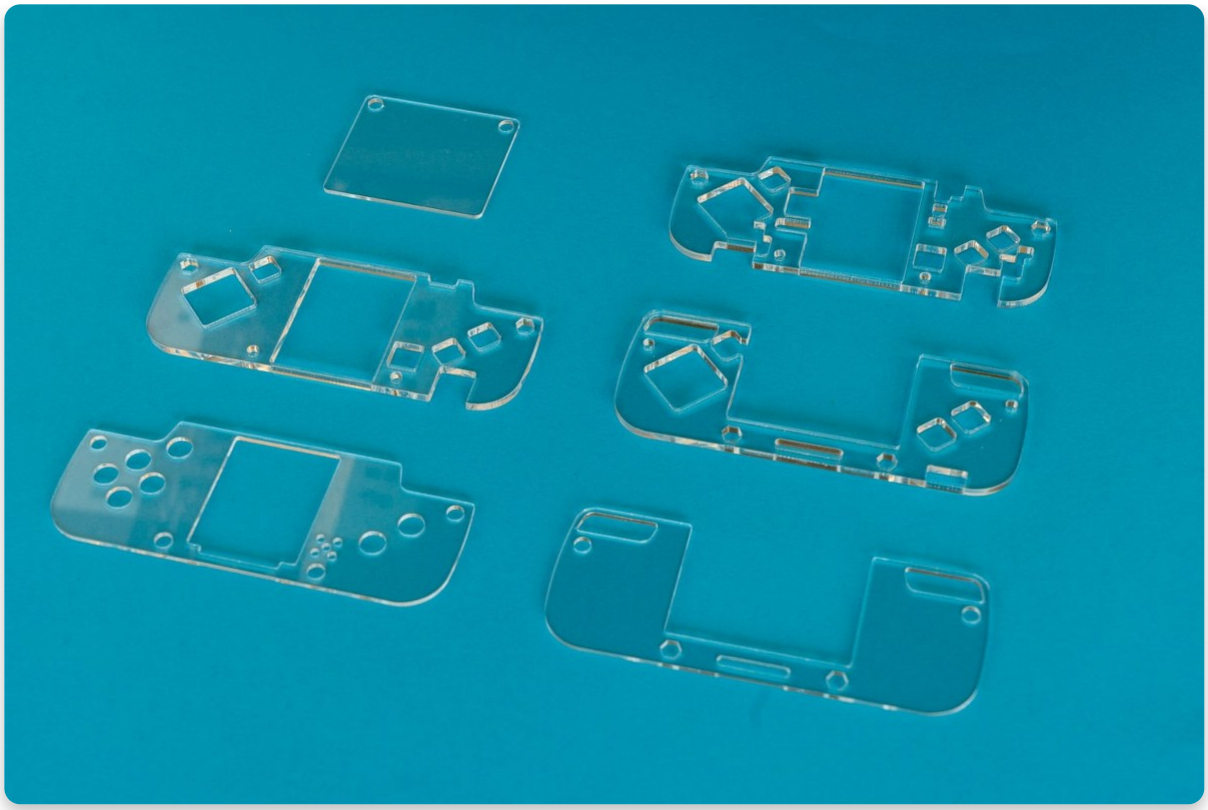
Copper layers on the board form traces that connect various components on your Nibble kit so that they can work together as an electronic device.

On the back of the board, you can see a snazzy pattern - we want our components not only to work but to look super cool as well.

That's why we've really tried to make it the coolest PCB there is. A real piece of PCB art!



Acrylic casings (6 clear protective casings)



Clear protective casings

These protective casings are made out of CNC laser-cut acrylic plastic.

They are used to not only keep everything in place but to also protect other components from breaking.

There are a total of six protective casing parts - three front casings, two back casings, and a battery casing.

Casings are stacked together using metal bolts and spacers. This style of casings assembly is called **“the sandwich design”**.

Protective casings come with a blue or white protective layer that needs to be peeled off

! All of the casings come with a protective layer that should be peeled off. You can do this right now or later on before putting the casing on the device. We will also cover this in later chapters anyway!

Soldering accessories

Solder, soldering stand and sponge

Soldering sponge

This piece of sponge doesn't seem like much, but put it under some water and see how it turns into a solder-cleaning super-sponge.

Use it after soldering a couple of joints to remove excess solder from the tip of your soldering iron.

Make sure it's not dripping wet, but also not completely dry - it should be damp!

Soldering iron stand

This stand is used for keeping the soldering iron in a safe place while it's still hot.

Place it close to your working area (but not too close) when your not using the soldering iron. Be careful when you are picking up/placing the soldering iron on the stand!

Also, use it to cool off the soldering iron after all the soldering work is done.

Solder

This is the metal material you will be melting with your soldering iron in order to connect two components together.

This type of solder is commonly used in the DIY electronics community for similar soldering projects.

Be careful about getting new solder for your other DIY projects. Bad solder can lead to a lot of complications like poor solder joints and unwanted bridging.

Micro USB cable

Micro USB cable

This cable is used to connect your Nibble to a computer.

That way you can download the newest firmware and upload new games to your console.

Soldering equipment

Soldering iron

This is the most important tool in a maker's arsenal, but for the Nibble's assembly, any entry-level soldering iron will suffice.

If you plan to dive into the world of DIY, you should consider getting a more expensive one with more features. There are also many soldering irons with interchangeable tips that can be particularly useful when working with much smaller components.

There are two types of soldering irons you could have gotten in your kit. The first one is white with a temperature regulator, and the second one is blue with a small metal button. Both of them will perfectly do the job - soldering the components, and there is no big difference between them.

You will find the instructions on how to properly solder and take care of both soldering irons in the next chapter.

White soldering iron with temperature regulator

Soldering iron with a small metal button

Soldering iron cable

This cable is used to connect your soldering iron to the USB power brick.

When you connect your cable be prepared that your soldering iron will heat up if you hold it in your hand.

For safety reasons, make sure to plug out the cable whenever you're not using the soldering iron.

USB power brick for the soldering iron

Use this power brick to connect the soldering iron via the USB cable to the power.

Be sure to only use this power brick because using some other power bricks can damage the device or cause it to not function properly.

Phillips screwdriver

Standard Phillips screwdriver

You'll need this cross screwdriver to screw down all the modules to the main board and to assemble the entire casing together.

A standard 2.0mm cross screwdriver is one of the most used tools in the world of DIY, and this project is no exception.

Head of the Phillips screwdriver is shaped just like a cross

Head of the Phillips screwdriver is shaped just like a cross

Batteries

Batteries and a battery holder

3x AAA batteries

These are some of the most common batteries on the market. They are usually called AAA or triple-A batteries.

Sizewise they are smaller than D, C, and AA batteries, but also bigger than AAAA batteries.

These batteries are commonly used in many devices so you'll have no problem getting new ones when these run out, although they should last for a long time.

Also, note that connecting the device to the computer via a micro USB cable will not charge the batteries.

These batteries can't be recharged!

Battery holder

One of the bigger parts that you have to solder onto the main board.

The battery holder will contain your AAA batteries which will make this little console come to life!

Additional useful tools

Additional tools that follow are not mandatory but can help you with assembling Nibble

Desoldering vacuum tool (aka. solder sucker)

This tool is useful for cleaning up soldering mistakes but is not 100% necessary for assembling your Nibble.

It should help you with the removal of solder if you make a mistake here or in any other case of soldering later.

Simple solder sucker used for removing excessive solder

Helping third hand with magnification

This one is also not necessary but will make your life (...and soldering) much easier when it comes to assembling and/or repairing devices more complicated than Nibble.

Helping hands can sometimes have multiple accessories on them

Multimeter

It will prove useful for testing some tricky connections and measuring supply voltage.

Besides that, a good multimeter can help you test resistors, transistors, diodes, capacitors, measure the current and do all sorts of other useful things.

When checking if something is working or not, it's best to use one of these

Solder wick

You can use it along with the desoldering vacuum tool to clean up soldering mistakes.

It will clean the excess solder from the places unreachable with a regular desoldering vacuum tool.

Solder wick makes your life much easier when removing solder

What's on the board?

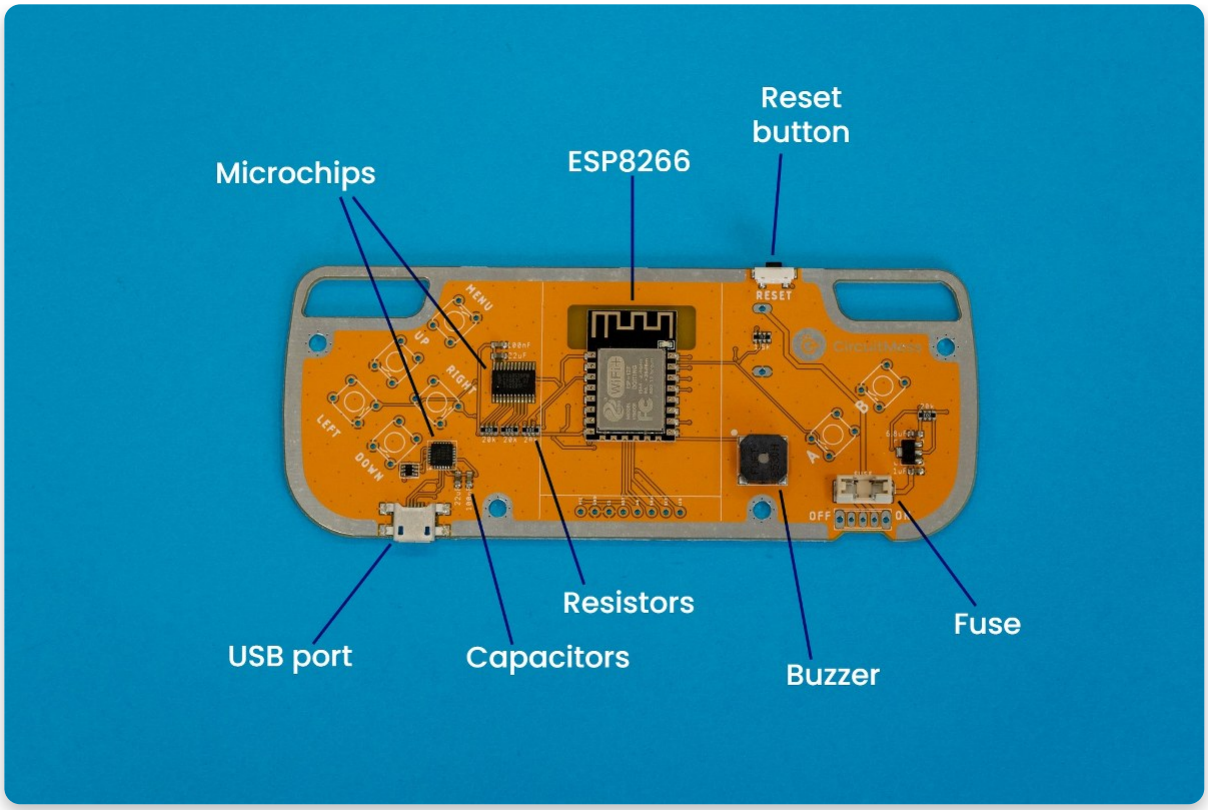
What's on the board?

There are some things that are already soldered on the main board.

These parts are either really sensitive or just too small, so we've decided to take care of that for you in order to save you both time and effort.

Either way, you must know all of the components on the board in order to be a real maker!

Take a look at this picture so you can see where each part is located:



ESP8266

The most important part of the device is the microcontroller that runs everything. It's the brain of the console. ESP8266 is one of the most popular chips in the world since it's really powerful and reasonably priced. It features many cool things like Wi-Fi support and it's really fast when receiving and sending data.

Its older brother ESP32 is also one of the most used chips and even more powerful!

Older brother ESP32 runs on our mobile phone Ringo.

Microchips

These two additional small chips that are on the board have their own specific mission and are not as powerful as the ESP8266 one. Whenever you see really small chips on devices like these, that means they probably only have one specific function, like controlling power consumption or expanding GPIO slots.

Reset button

This button is pretty self-explanatory - it allows you to reset the console anytime you want, making it easier to refresh it once it gets frozen (which is hopefully

never).

USB port

The USB port is the main communication channel when talking to a computer. It is used to connect the micro USB cable to the computer and transfer new files and games to the console.

This port is, however, not used for charging the console.

Capacitors and resistors

These small components are the main parts of pretty much every electronic device in the world. They are used to control the flow of the current in a circle.

Wherever you see a number followed by "**k**", it is a resistor, and it's measured in **Ohms (or kiloohms)**. If the number is followed by "**F**", it is a capacitor measured in **Farads (or nanofarads).**

There are a few locations on the board where these components are located.

Buzzer

Whenever there is a sound in a game, it is coming from this little thing. The buzzer is capable of only producing quiet and short noises and is not as capable as a real speaker, but it's still a useful tool when you need just that tiny audio output.

Fuse

Fuses are usually used as a security system in circuits and they keep other components from getting damaged if something goes wrong.

Their use and the process of replacement will be explained later in the build guide.

Assembly

Soldering

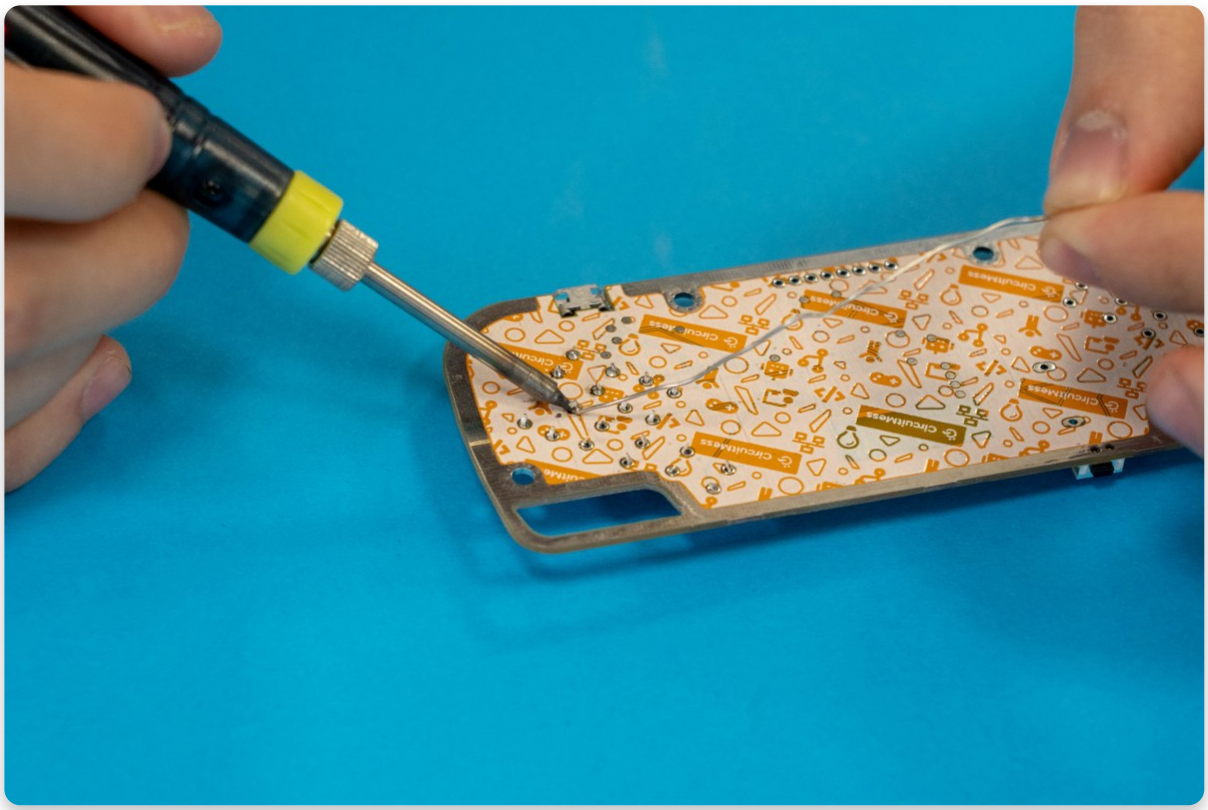
Soldering

Have you ever soldered before? If your answer is "yes", you'll probably know what you're doing and you can just skim through this intro paragraph. **In case you've**

never soldered before, please take 10 minutes of your time and look at one of the following how-to-solder guides:

1. Adafruit's video tutorial featuring Collin Cunningham – a tutorial featuring Collin Cunningham, a super charismatic electronics guru.
2. Adafruit's standard soldering tutorial – A great and thorough video tutorial. An absolute must-read, even if you know how to solder. Make sure to check the "common soldering mistakes" section at the end.
3. Sparkfun's video soldering tutorial – Another well made a how-to-solder video tutorial.
4. Sparkfun's standard soldering tutorial – Well written tutorial made by Sparkfun

There are several rules of soldering that everybody, regardless of their skill level, should follow at all times.



Soldering iron + a little bit of solder = connection!

These rules are the following:

- **Never inhale the dust and the fumes that can be produced by the soldering iron!** These can be hazardous so please don't inhale them.

- **Never touch the tip of the soldering iron!** Even if the soldering iron is turned off or completely disconnected from the power source, there is still a possibility that it's very hot and therefore can cause very uncomfortable pain if touched.
- **Clean the soldering iron!** The sponge is your best friend while soldering. Make sure to use it often to clean your soldering iron if you wish to have an easy and simple soldering experience!
- **Check your solder joints twice (at least)!** Most of the malfunctions in the world of electronics are due to bad solder joints, so regardless if this is your first or 100th soldering project, always make sure to inspect your joints multiple times before proceeding to the next step.
- **Know how much solder is needed!** Make sure to put just enough solder, not too much, and not too little, since both can cause the device to malfunction.
- **Don't leave any residual solder on the board!** The solder should only be on the parts of the console where the pins connect to the board and everything else should be clean. Little pieces of solder all over the board are a big no-no.

Now read through these rules a couple of more times to make sure you don't forget them.

Once they are engraved in your memory, your soldering experience will be like a stroll in the park - nice and easy!

Using the soldering iron

The Soldering iron is very easy to use but only when used properly. You will have one of the two soldering iron models in your box:

1. **White soldering iron with a temperature regulator**

1. **Blue soldering iron with a small metal button**

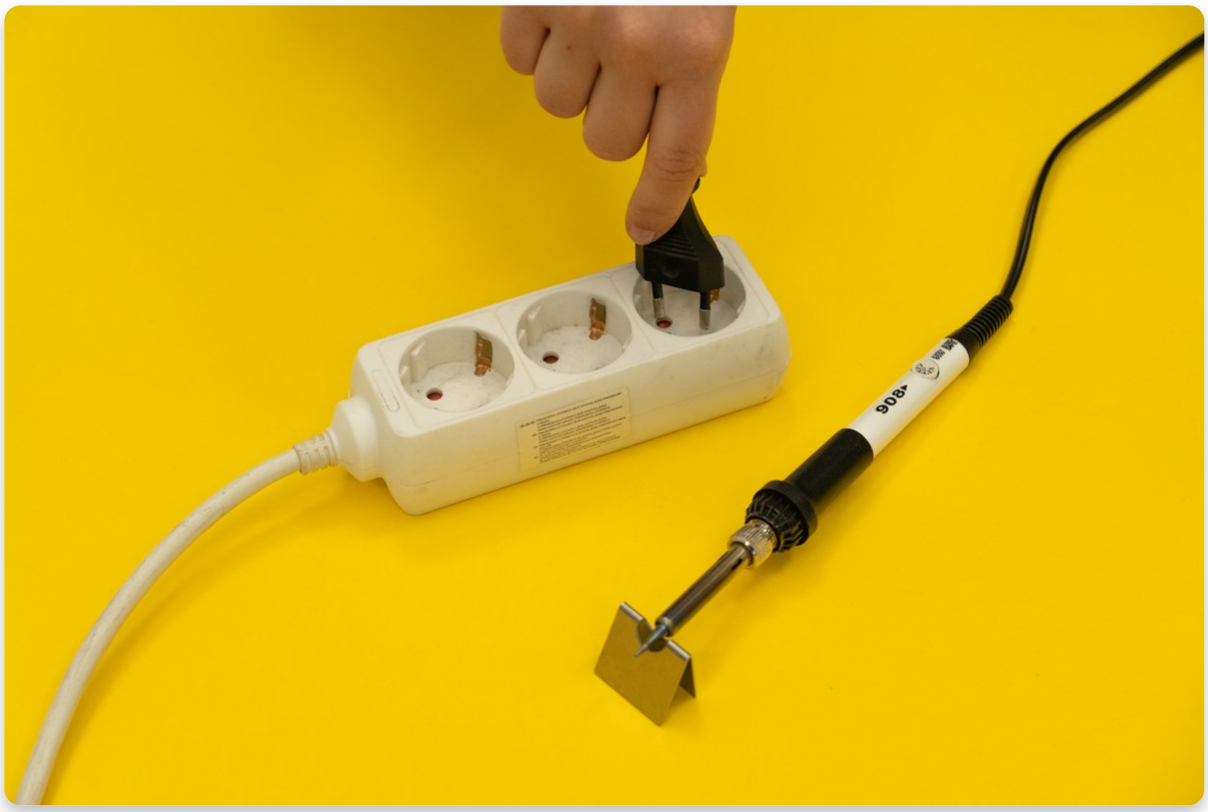
Remember the rules mentioned previously? Good! Let's go over the instructions on how to use the white soldering iron first. In case you have the model with a small metal button, scroll down to see the right instructions.

If you're using your soldering iron for the first time or need help with cleaning its tip, check our **video tutorial.**

White soldering iron with temperature regulator

Step 1

Set up your soldering iron so it stands on the stand, as shown in the below photo. After you do that, plug it into a power outlet to let it heat up!



Step 2

Set the temperature to 350° by turning the regulator. There is a small black arrow next to the regulator wheel, so make sure that it points to the right temperature, like in the photo.

Your soldering iron is now ready to use, but give it a minute or two, so it can heat up. The safest way to do that is to leave it on the stand while you wait for it to be ready for use.

Set the temperature at 350°

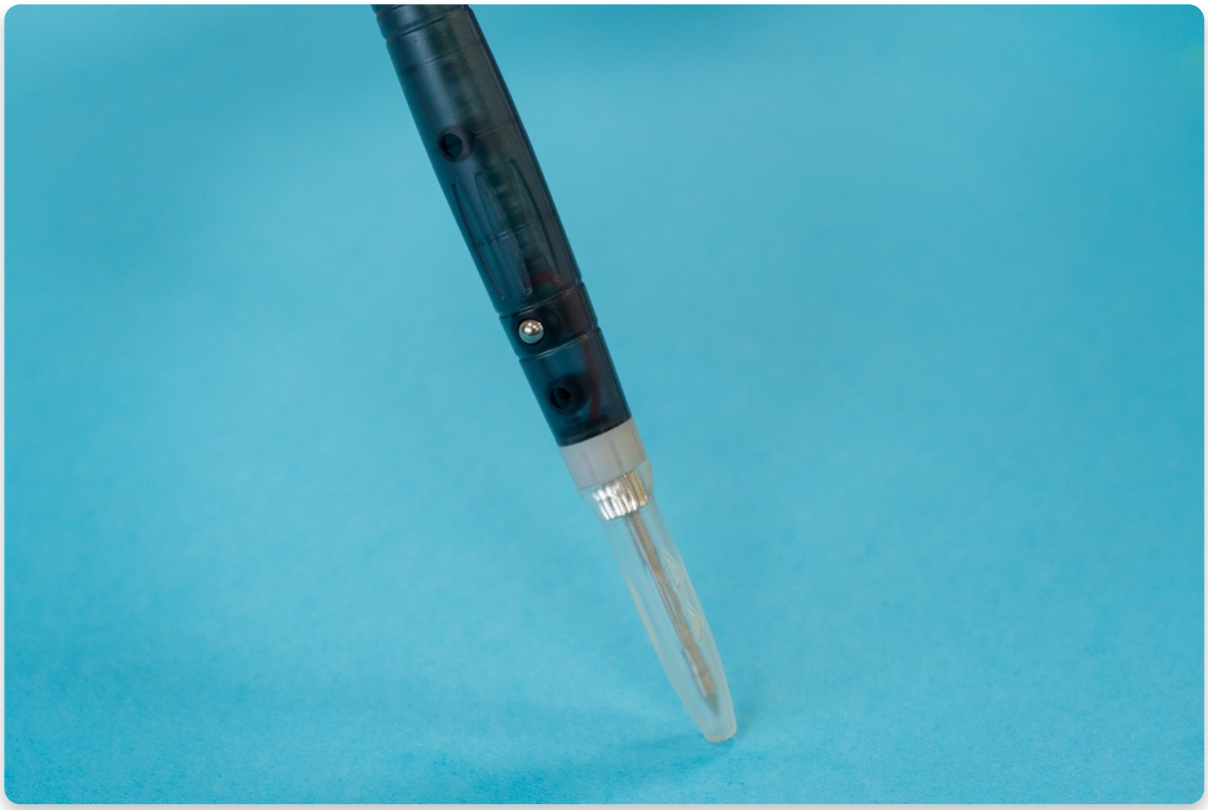
Step 3

Once you're done with soldering (don't worry, we'll let you know when that time comes), you'll unplug the iron from the power outlet to turn it off.

Please use the soldering iron stand each time you are not using it so you don't burn the surface or the circuit board.

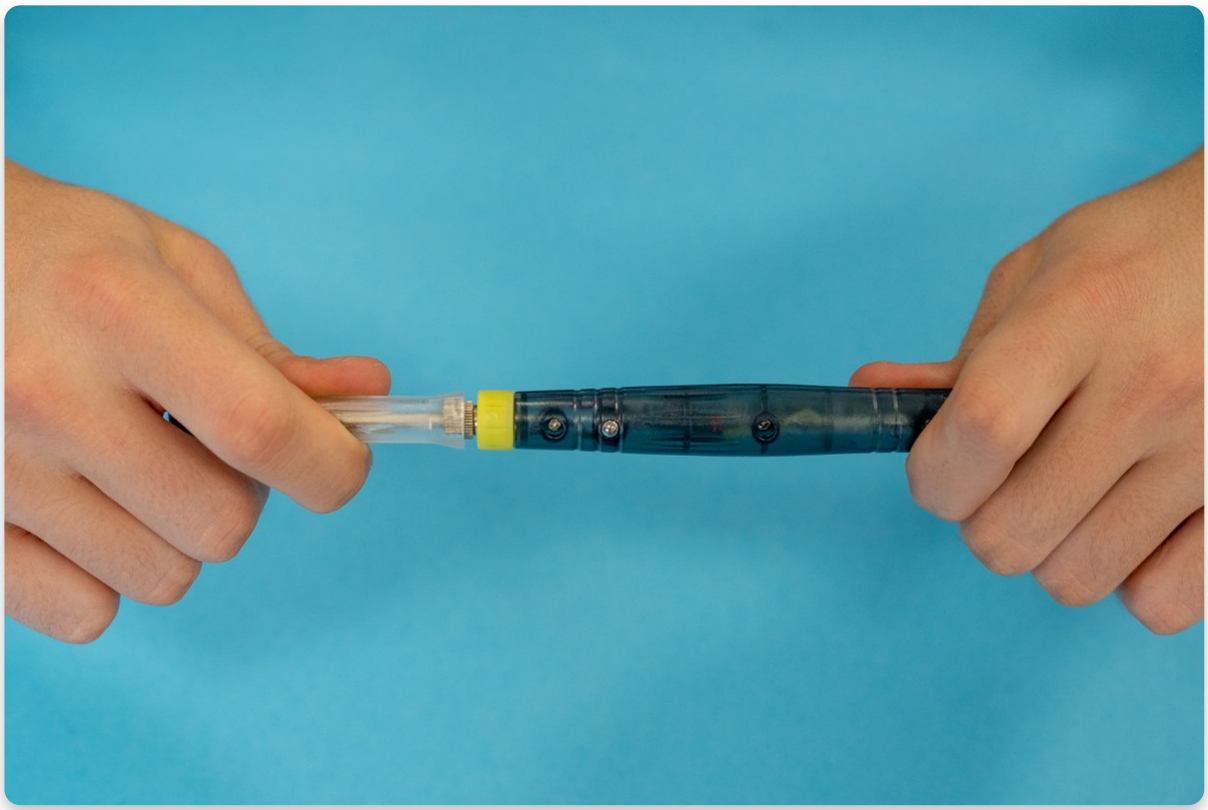
Make sure not to touch the soldering iron tip for at least five minutes after you have turned it off.

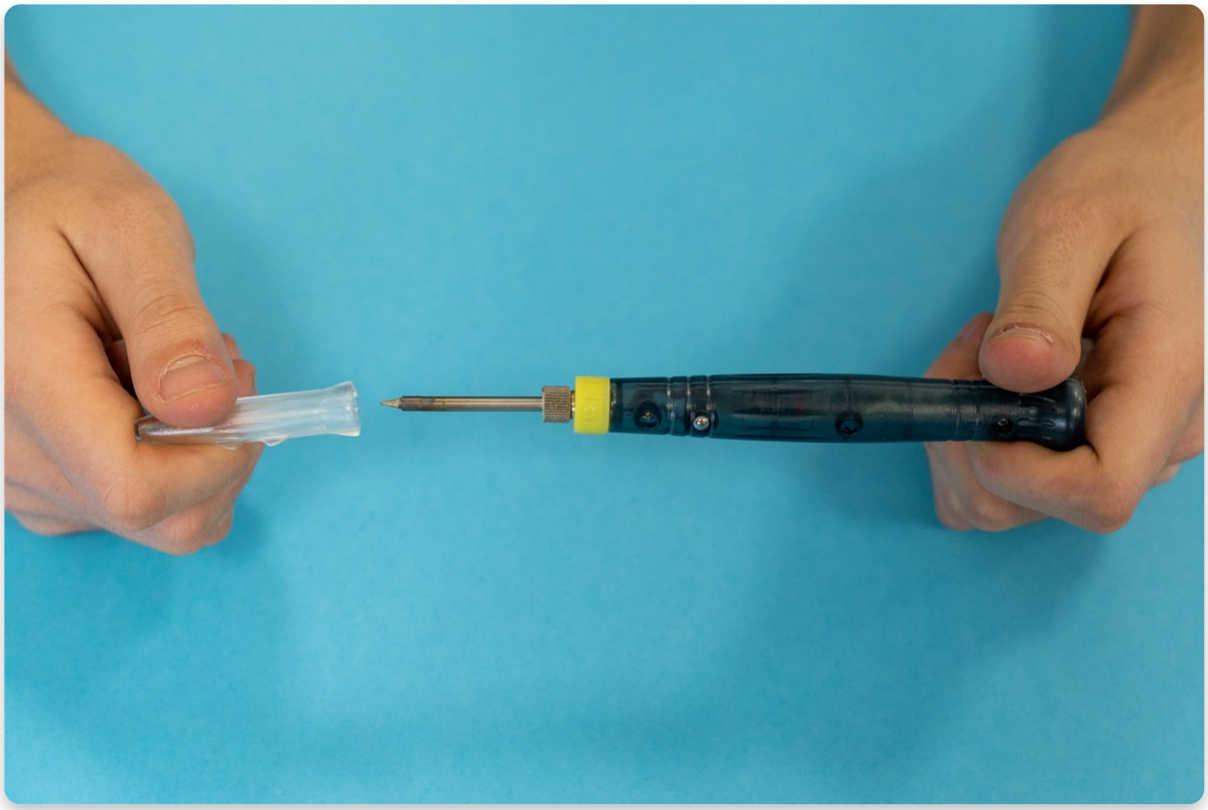
Soldering iron with a small metal button



Step 1

Firmly pull the cap off, do not unscrew it!





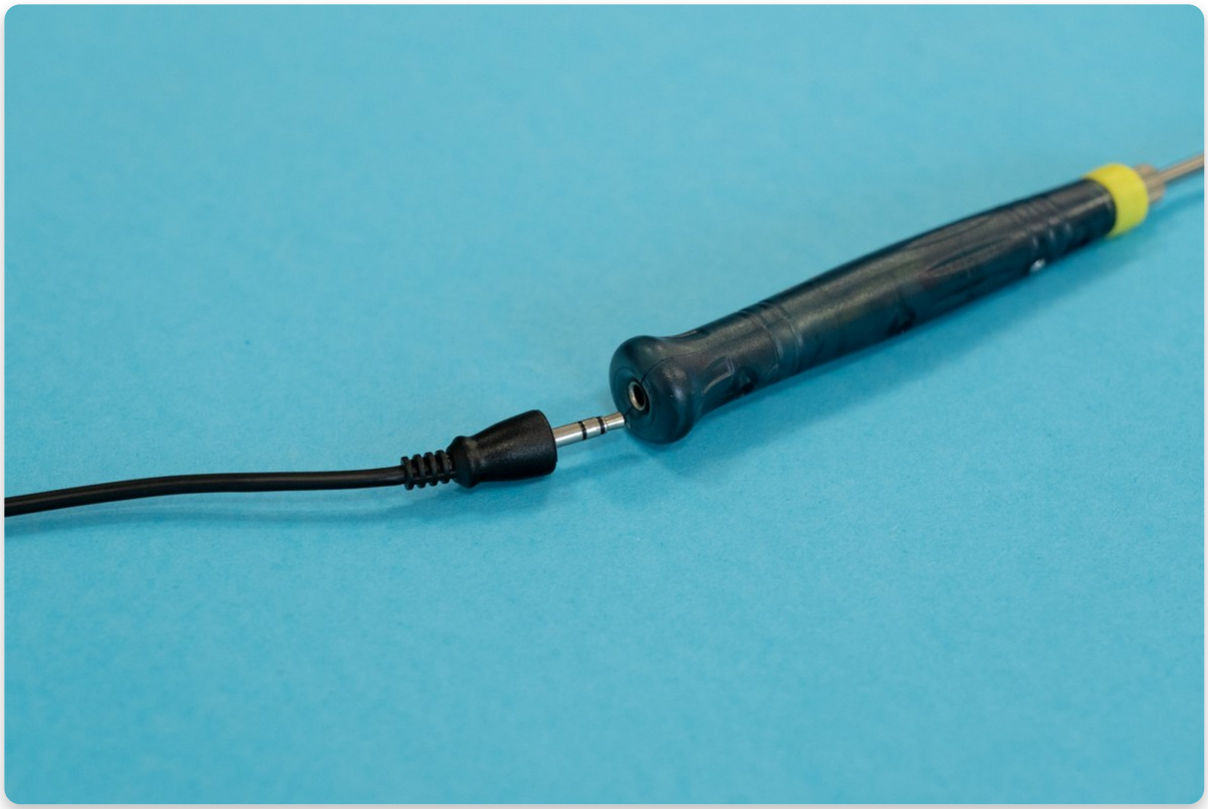
The correct way of taking the plastic cap off

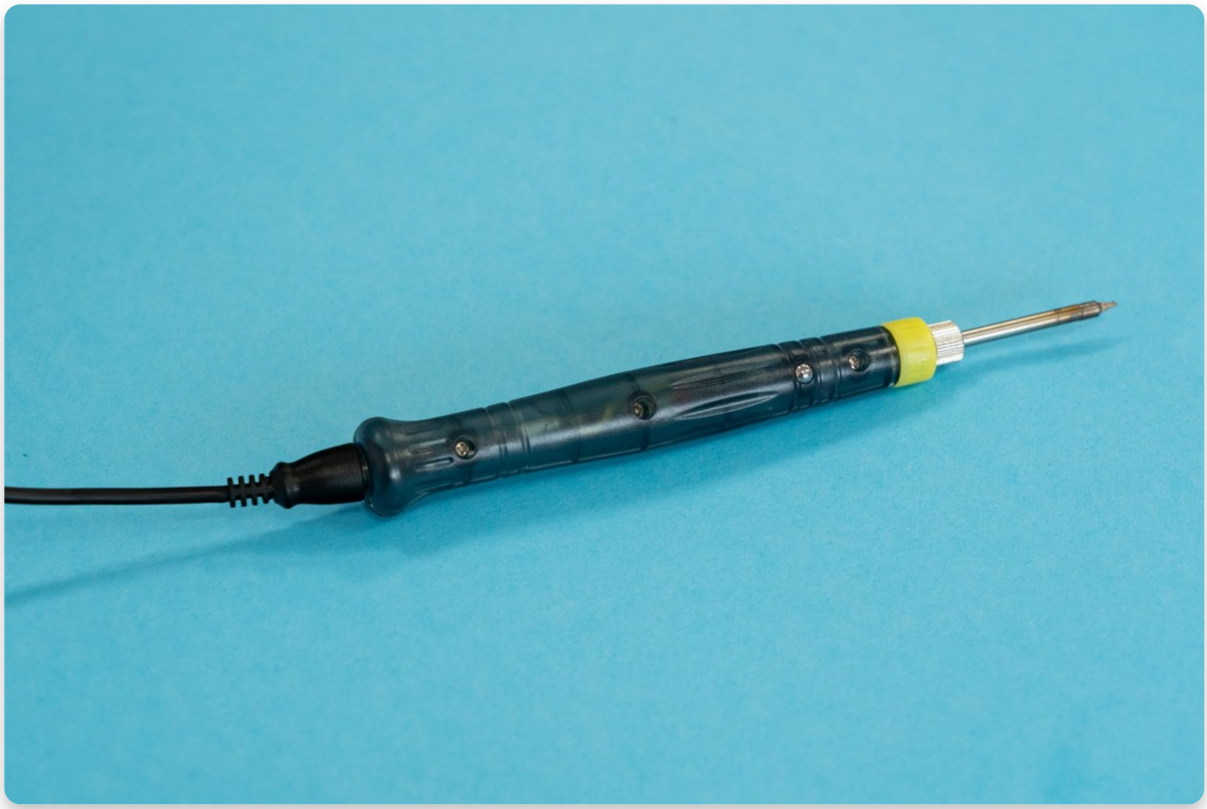
The metal ring is necessary for the soldering iron to function.

If you accidentally remove the metal ring along with the cap, screw it all back on and remove the cap so the ring stays in its place.

Step 2

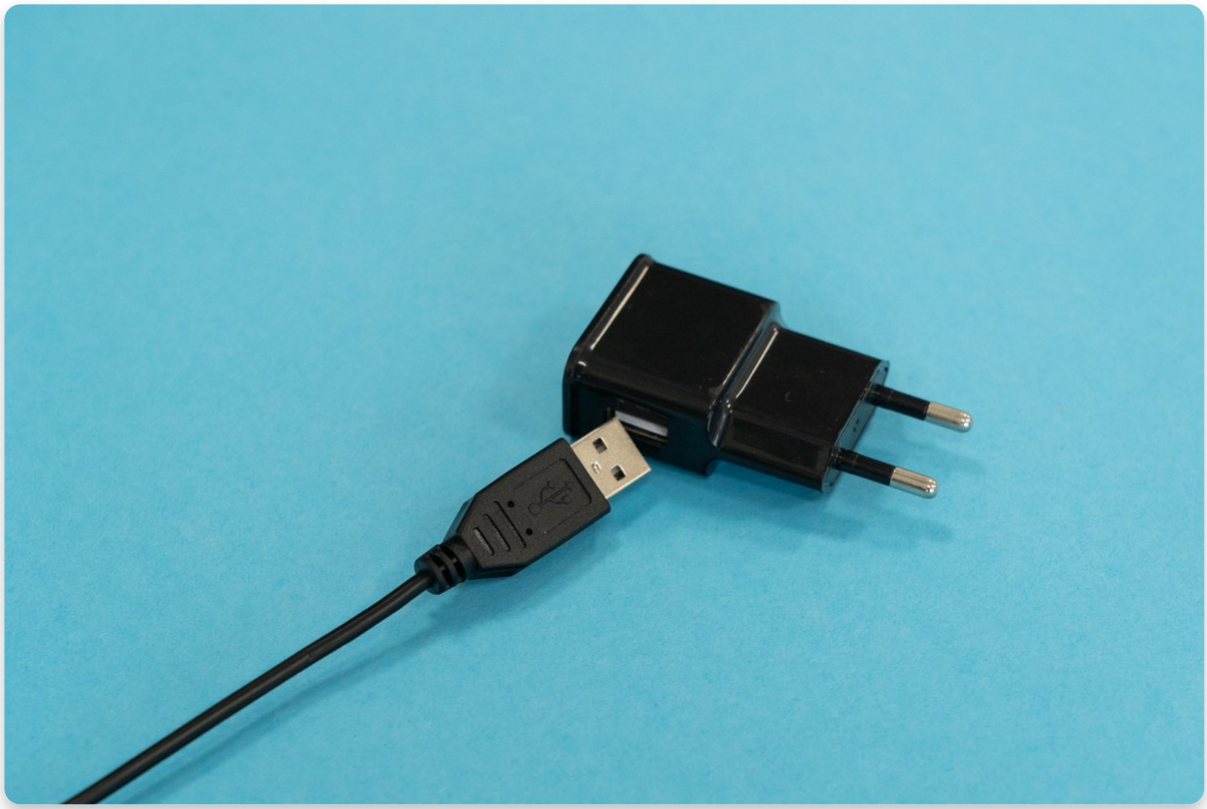
Plug the soldering iron's power cable.

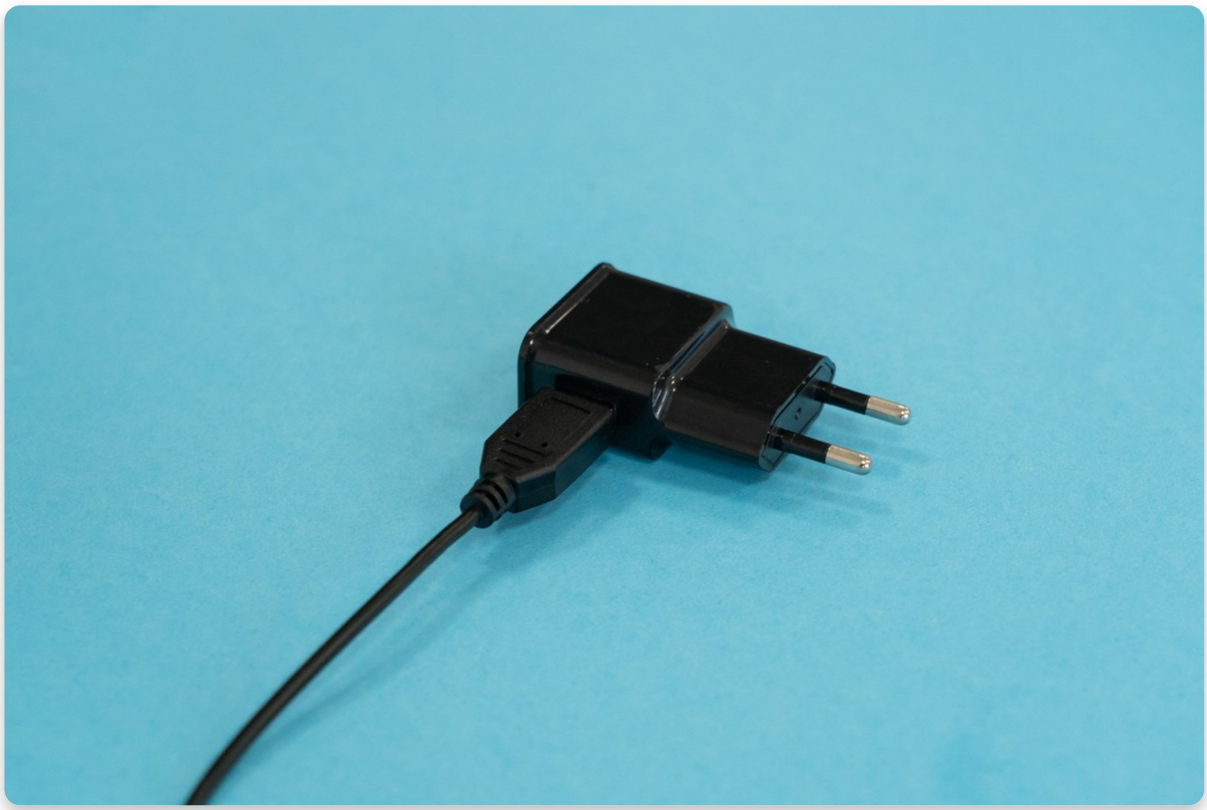




Step 3

Plug the power cable into the provided power adapter and then into a power outlet.





Plug the power brick into a power outlet

Step 4

In case you have this type of soldering iron, all you need to do is turn it on by pressing the small metal button at the top of the iron.

Once you press the button, you should see a blue light signaling that it's turned on.

As long as the blue light is on, your soldering iron is turned on as well.

The blue light means that the soldering iron is turned on

Once you're done with soldering, turn off the iron by pressing the same metal button.

The light will be switched off immediately. However, this does not mean that the iron is cold. **Make sure not to touch the soldering iron tip for at least five minutes after you have turned it off.**

FIRST USE!

If the blue light is off, this means that the soldering iron is turned off as well

In case you have a soldering iron with a small metal button and a grey ring, make sure to do this before the first use:

- **Tighten the metal ring with needle-nose pliers from your Tools pack.**
- **Secondly, melt some solder so that the tip of the iron gets covered with the solder. You should then see a shiny metal layer on the tip that will prevent overheating and burning.**

Click on this link **to see the video that shows two necessary steps!**

Keep the soldering iron on the stand when you're not using it!

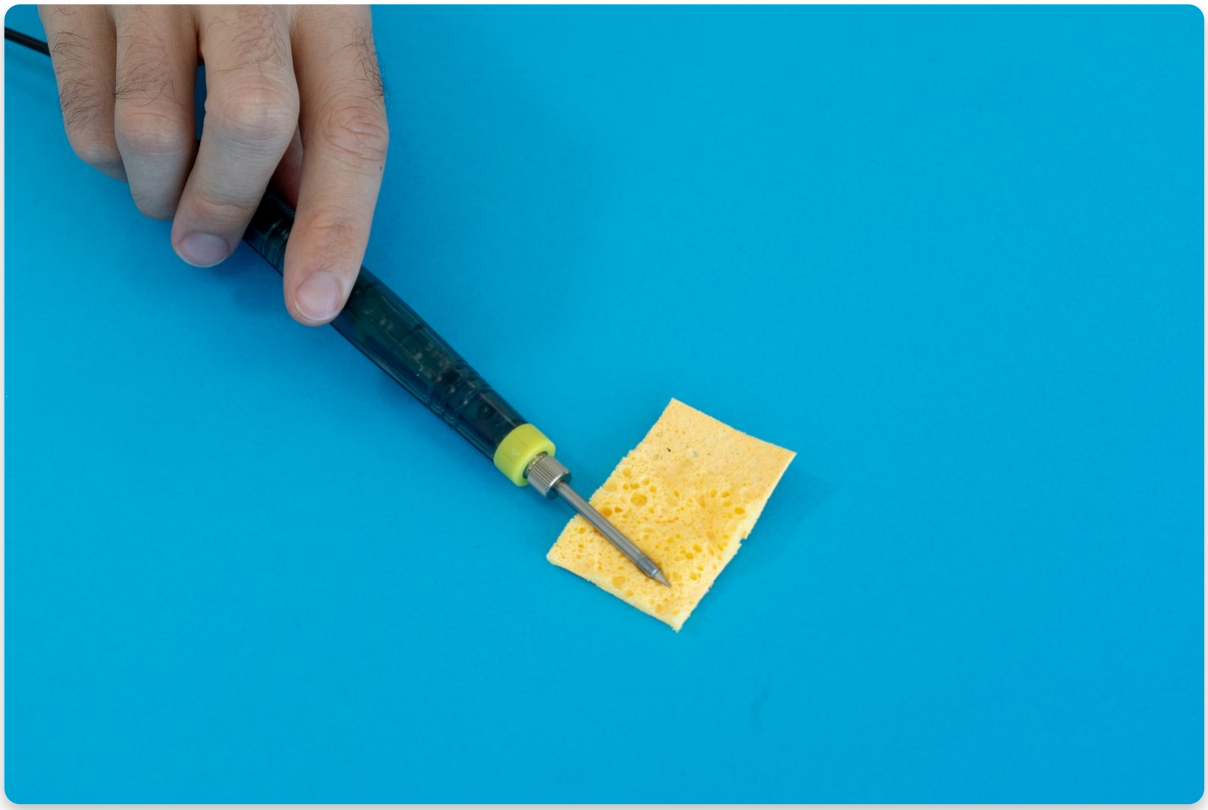
Always keep it facing away from your hands.

If you’re finished with soldering, unplug it from the power source and leave it to cool off for at least five minutes before putting it back in the box.

The safest place to put the soldering iron is the stand, facing away from your hands

Use the sponge for cleaning the soldering iron after a few solder joints!

Carefully hold one part of the sponge with one hand and wipe off the soldering iron on the other part of the sponge, so that the extra solder gets removed. Repeat the process until the tip of the iron is nice and clean from the old solder.

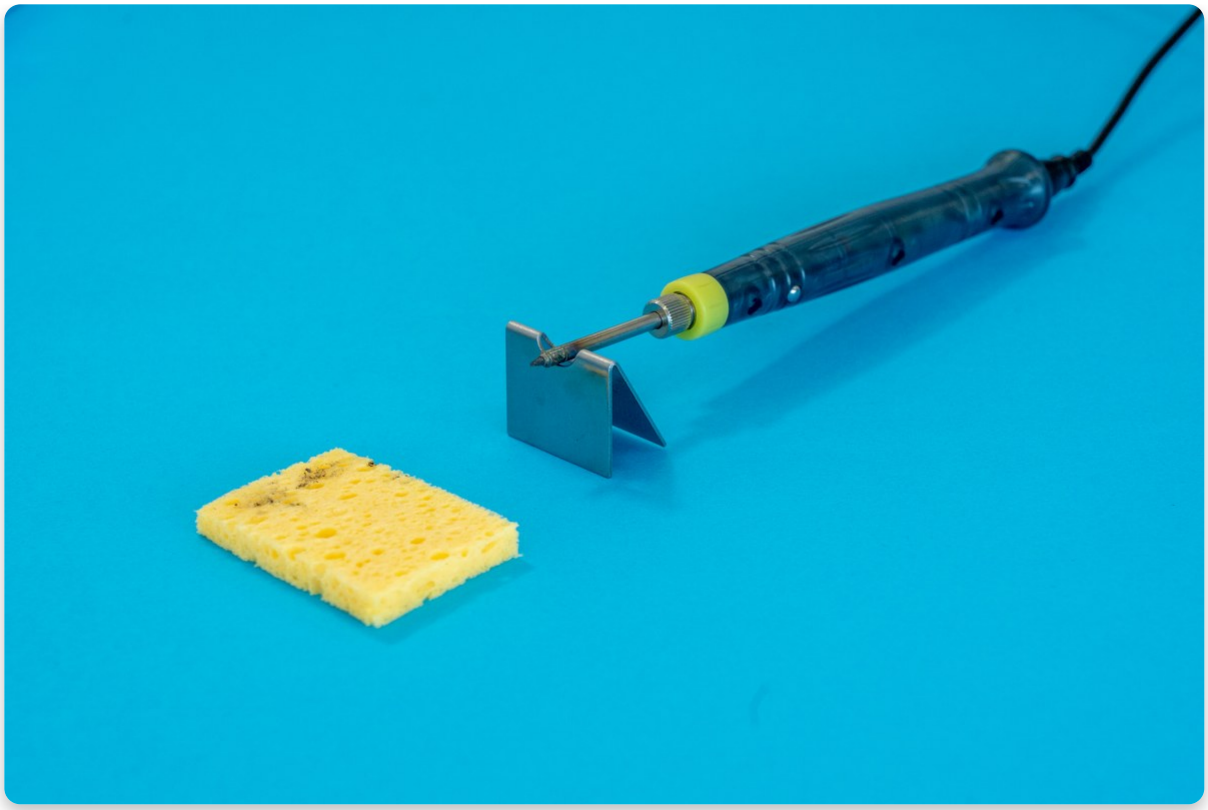


Cleaning the soldering iron

Now that you know how to use the soldering iron, it’s time to learn how to solder.

The first important step is to make your little soldering space.

Remove everything from the table beside the soldering iron, sponge, stand, solder, and the components that you will use for soldering. Have at least 1 meter (3 feet) of space in all directions cleared.



The most important three things when soldering all in one place

Also, it wouldn't be a bad idea to protect the table with some heat resistant material (wooden sheet, aluminum, or soldering pad).

Do not use any type of fabric since it can easily catch fire! You can also use an old desk that you don't care about damaging or a nice clean piece of stone if you have a yard!

Now make sure to connect your soldering iron to the power source and prepare it for use by following the instructions provided.

You must be eager to start soldering by now! Go to the next chapter to see what you should be soldering, and we can start assembling!

Chapter One - Soldering the components

In the first part of the assembly process, you'll be mostly soldering.

Later on, you're going to leave your soldering iron aside and connect all the casings together - like a tiny puzzle!

Finally, you will finish the process with a little bit of bolt screwing and playing around with the batteries.

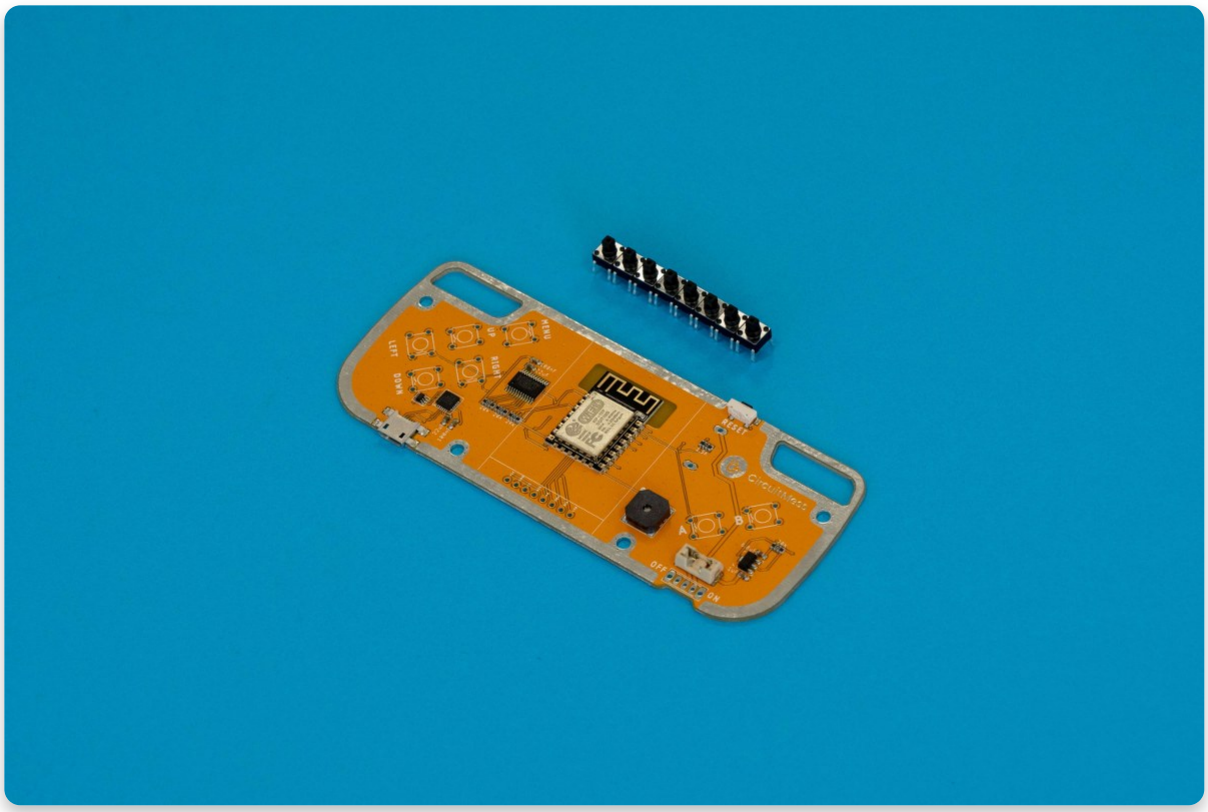
After that comes the easiest part - **playing games and enjoying the console!**

Of course, the learning is never over, since there will be plenty of time later to create and code your own games, share them with your friends and break all of the high scores to prove you're the best of all Nibble gamers!

But that will have to wait, for now...

Let's start!

Part One - The buttons



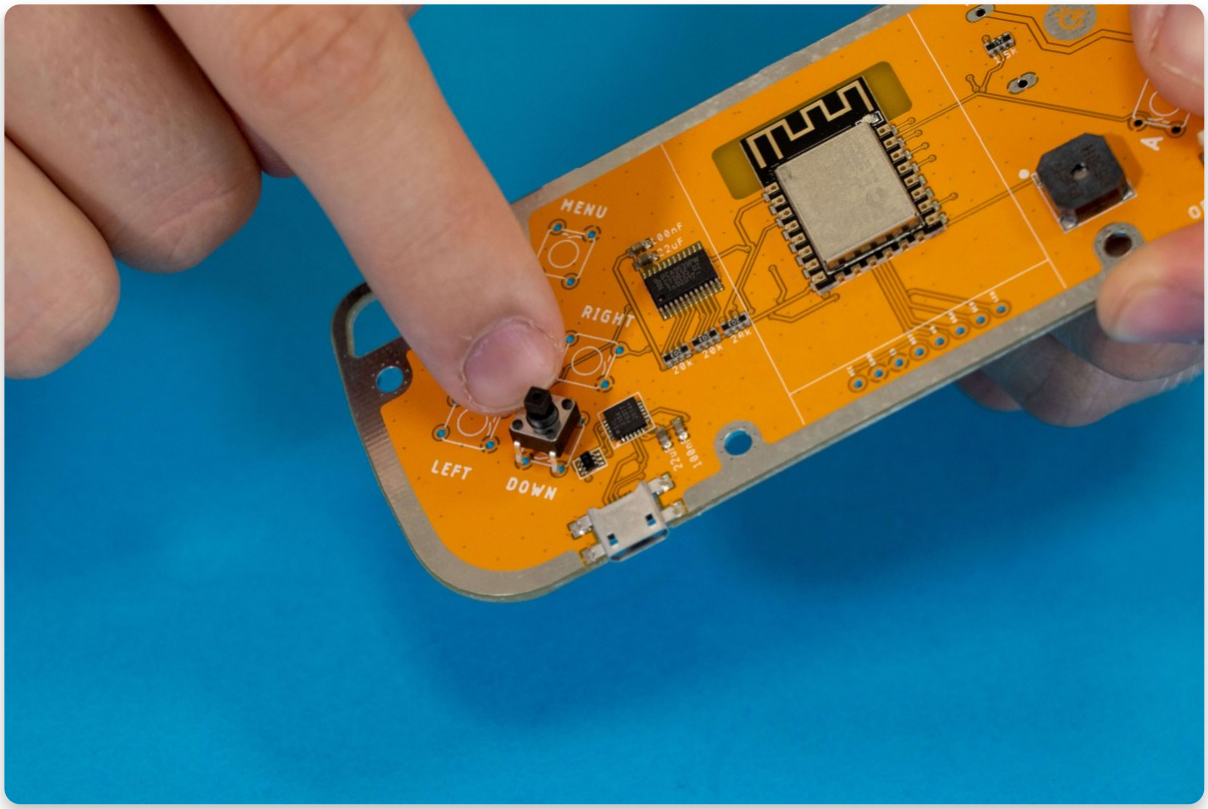
Here you will need the main board and all the buttons

The main part of the console, besides the screen, are the buttons. In order to move, shoot, dodge, jump, and pause in games, you need to have some kind of input.

Buttons are the most commonly used input and there are a total of seven of them (eight if you include the reset button, which is located at the top of the console and is already soldered on).

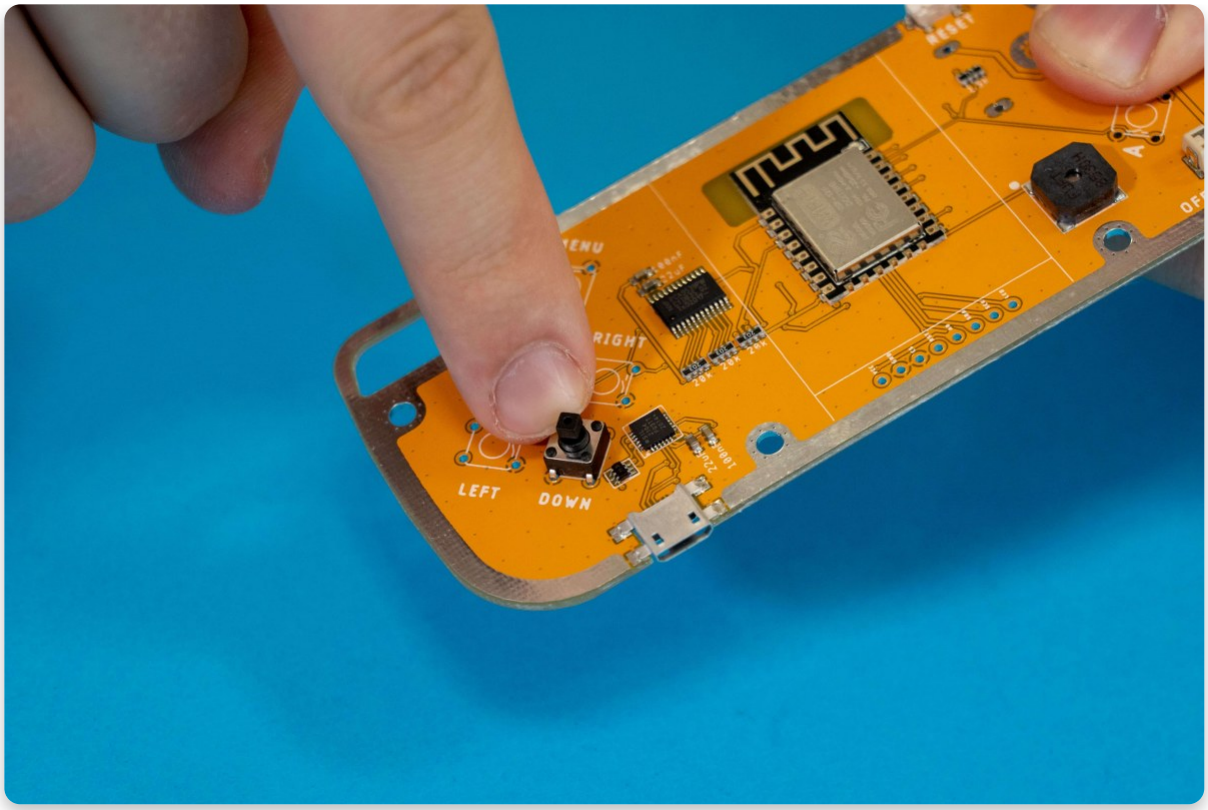
The buttons consist of two parts - mechanical button parts and the button caps. Buttons can work even without the caps, but pressing them with the caps on feels way nicer and they look a lot cooler.

Let's solder our first component - a button.



Take one of the mechanical button parts and put it through the holes. There are a total of **seven button placement locations**, each with four little holes, that mark the following buttons: **MENU, UP, LEFT, DOWN, RIGHT, A, and B.**

Make sure to place the buttons on the correct side. You should be able to see the little button text and white outlines when placing the buttons. The solder joint is located on the back of the console (the side with the white patterns on it!).



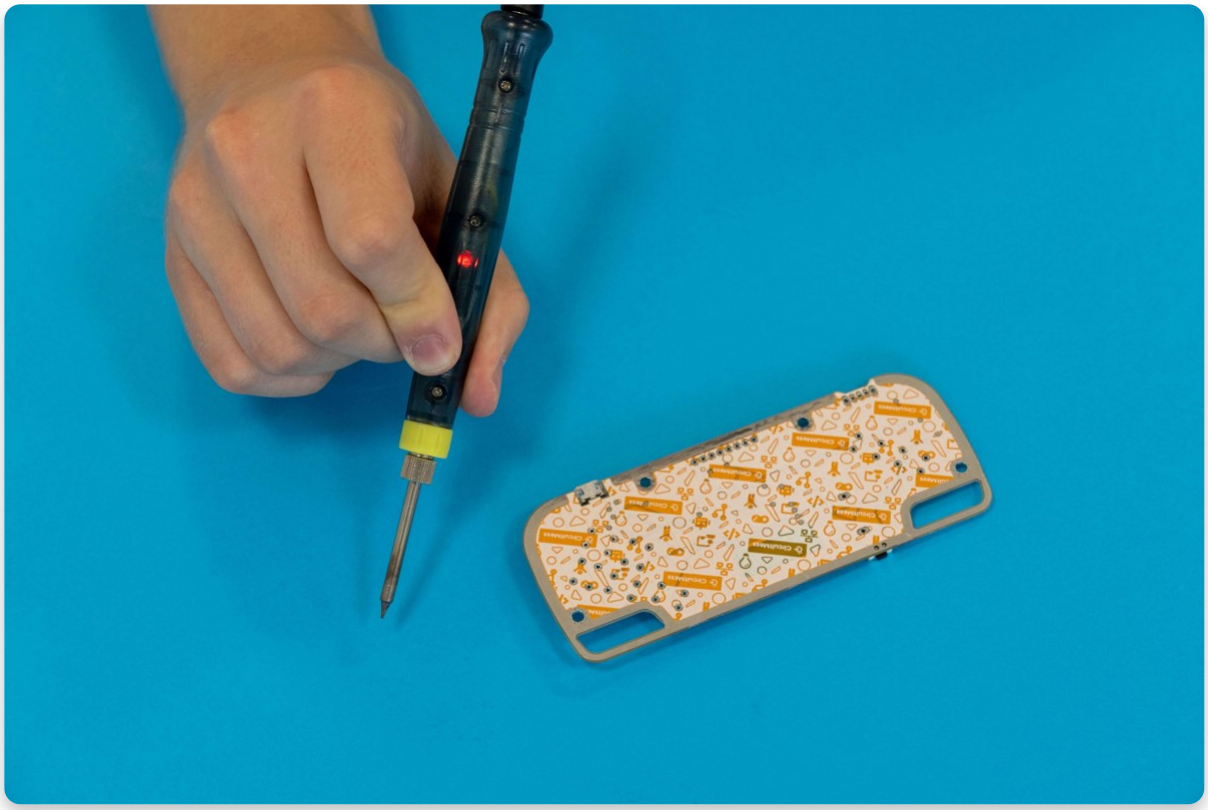
The button pins need to go through all the way

The buttons should go through the holes all the way and make a little click when it falls in place. **Got it? Awesome, now let's solder!**

You can also place all seven buttons and then solder them all at once since the buttons should be held in place even without soldering them (but they wouldn't work that way since there is no connection).

After getting the power to the soldering iron, turn it on by pressing the metal button or keeping your finger on the sensor. Wait for at least thirty seconds, so it can heat up.

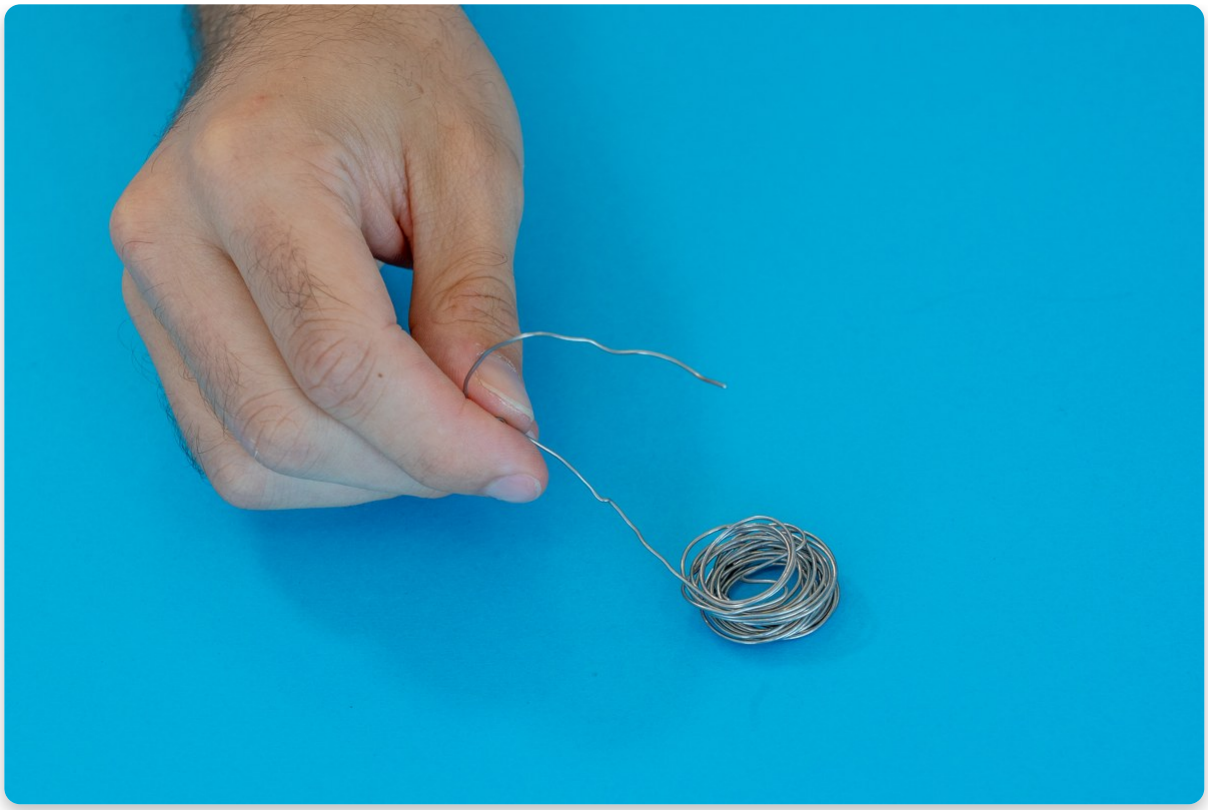
Make sure that all the buttons are sitting flat before you solder!



In case you have a soldering iron with a touch sensor, don't remove your finger from the sensor as long as you are soldering since removing the finger from the sensor will turn the iron off!

After placing the component in the proper place (pins through the little holes), place the main board on the surface in front of you and pick up the soldering iron.

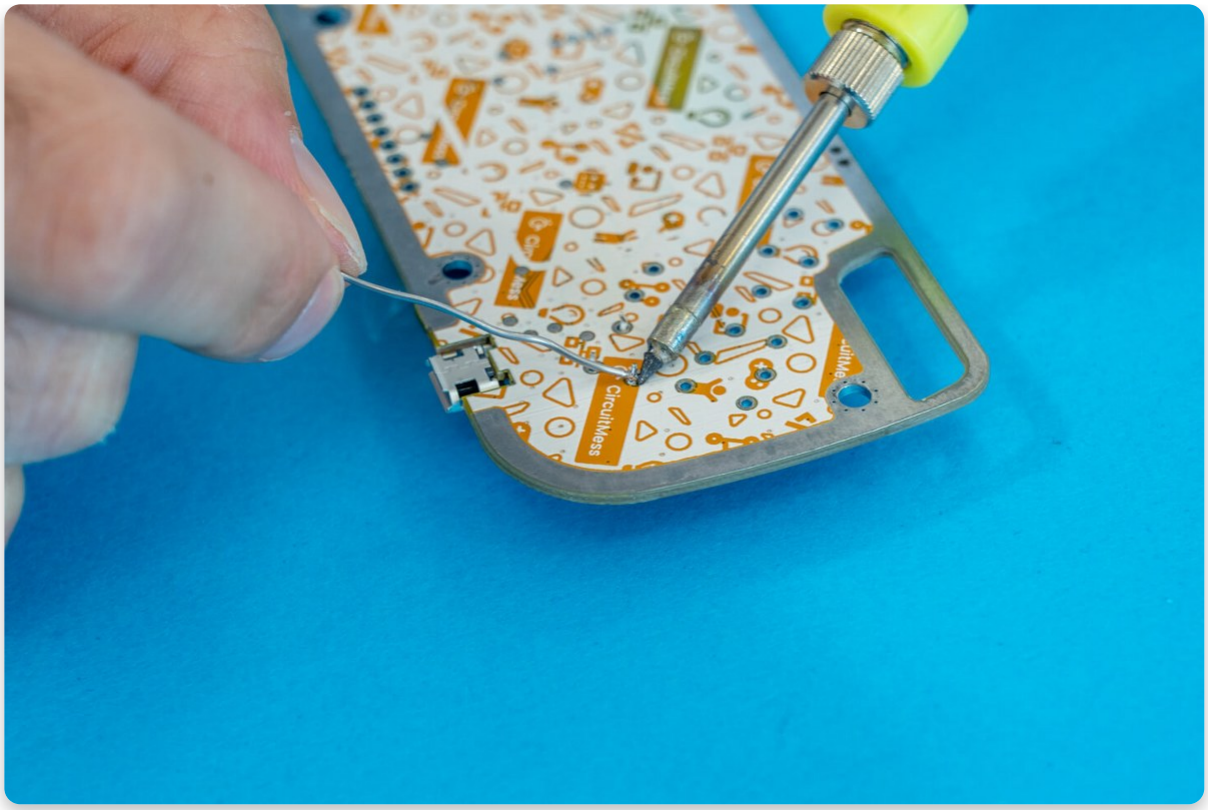
Turn the main board around, so that you’re facing the white patterned side, take a piece of solder & the soldering iron in your hands, and start heating it up.



The solder is needed in order to make an electric connection

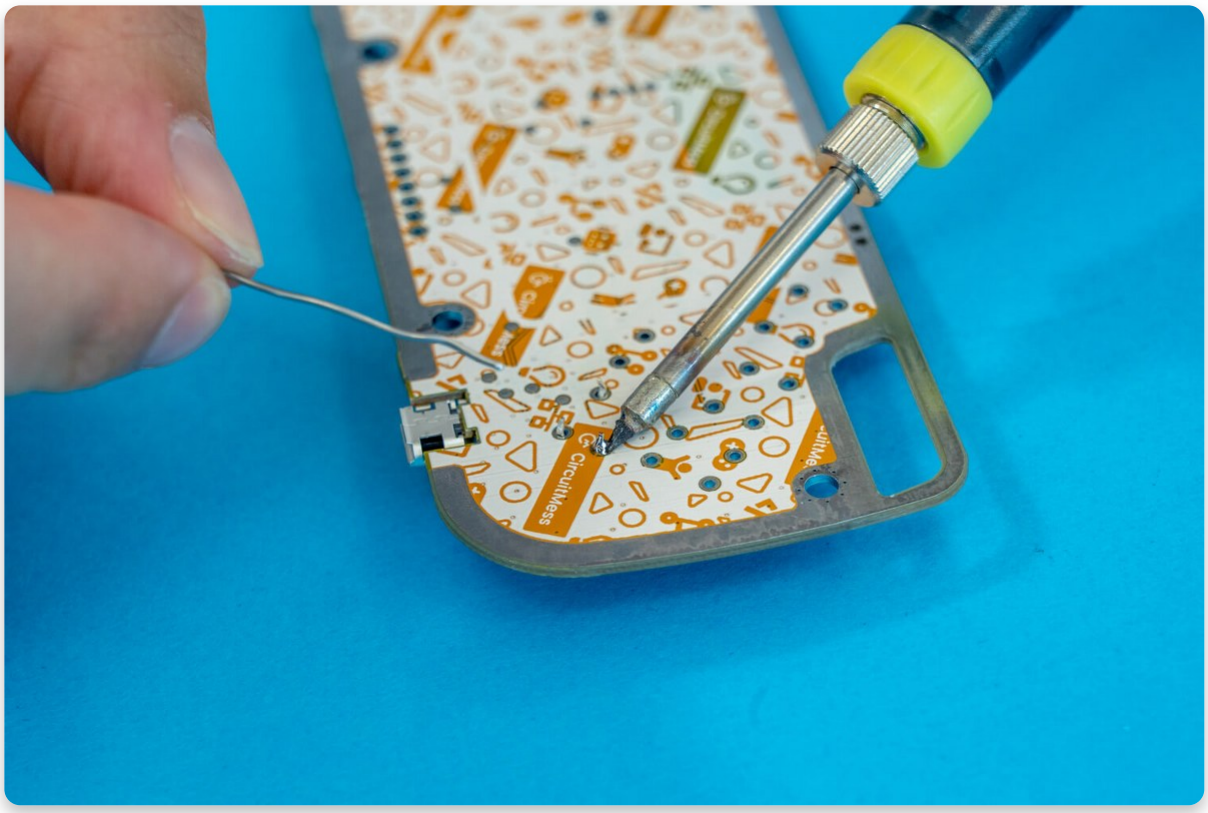
Firstly, carefully place the soldering iron on one of the pins, so that it's touching both the pin and the little plated area around the hole that the pin is going through.

Leave it like that for about five to ten seconds to allow it to heat up the pin/plate and then apply the tip of the solder to it. The solder should melt with ease and spread evenly around the joint.



Bring everything together and watch it melt

Make sure to create a volcano-like shape so that the base of the joint is filled with solder but the top is getting thinner and thinner.



A volcano-like shape is here!

Great! You've just created your first soldering joint on your Nibble!

Repeat the process for the other three pins. Make sure that the button is still sitting flat and fully pushed from the other side or hasn't moved sideways in any directions.

When all 4 joints are fully soldered, the button isn't moving and it can still be clicked - the first component is soldered!

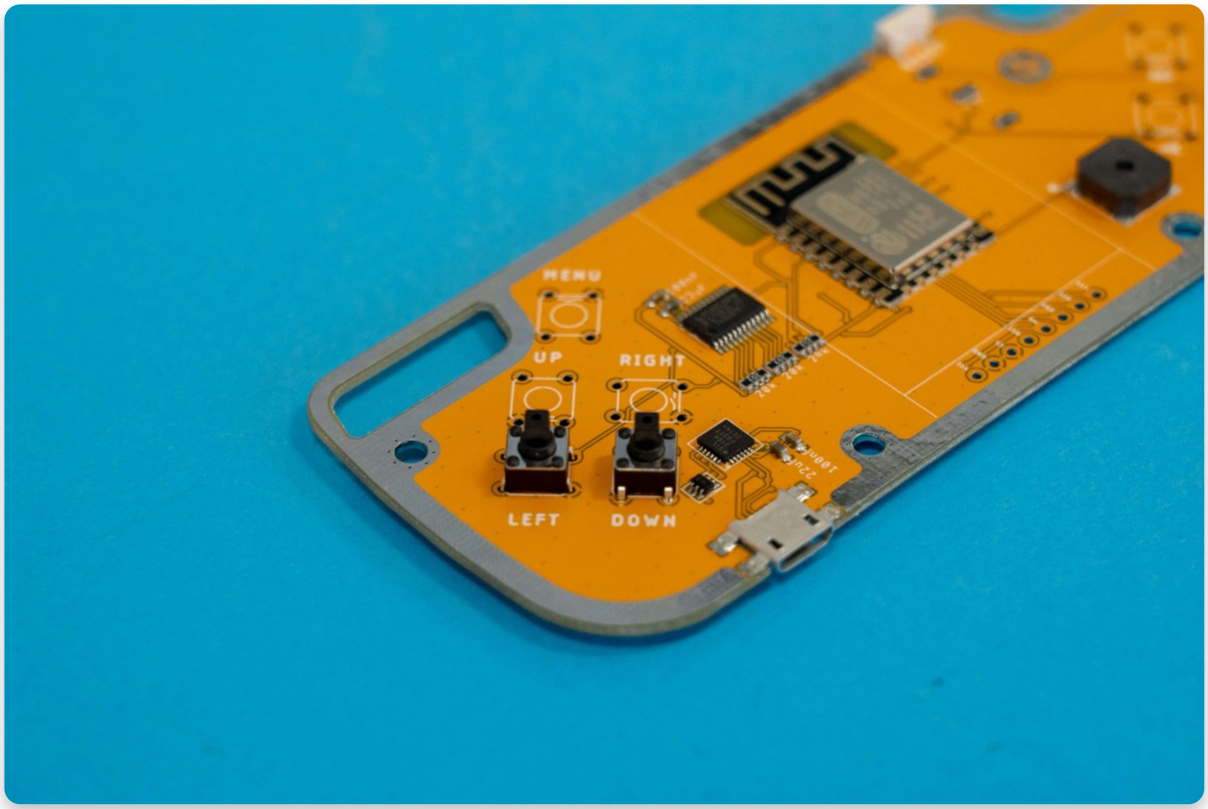
Only when all four pins are soldered the button will work properly

Congratulations! One down, many more to go.

If you accidentally got any solder on the part of the board that is not plated or if you just put too much solder, bring the soldering iron to it so it "sucks up" the solder you don't want on the pin. After that, clean the soldering iron by using your sponge. Repeat this until the pin is looking like the volcano-like shape mentioned before!

Cleaning the tip of the soldering iron

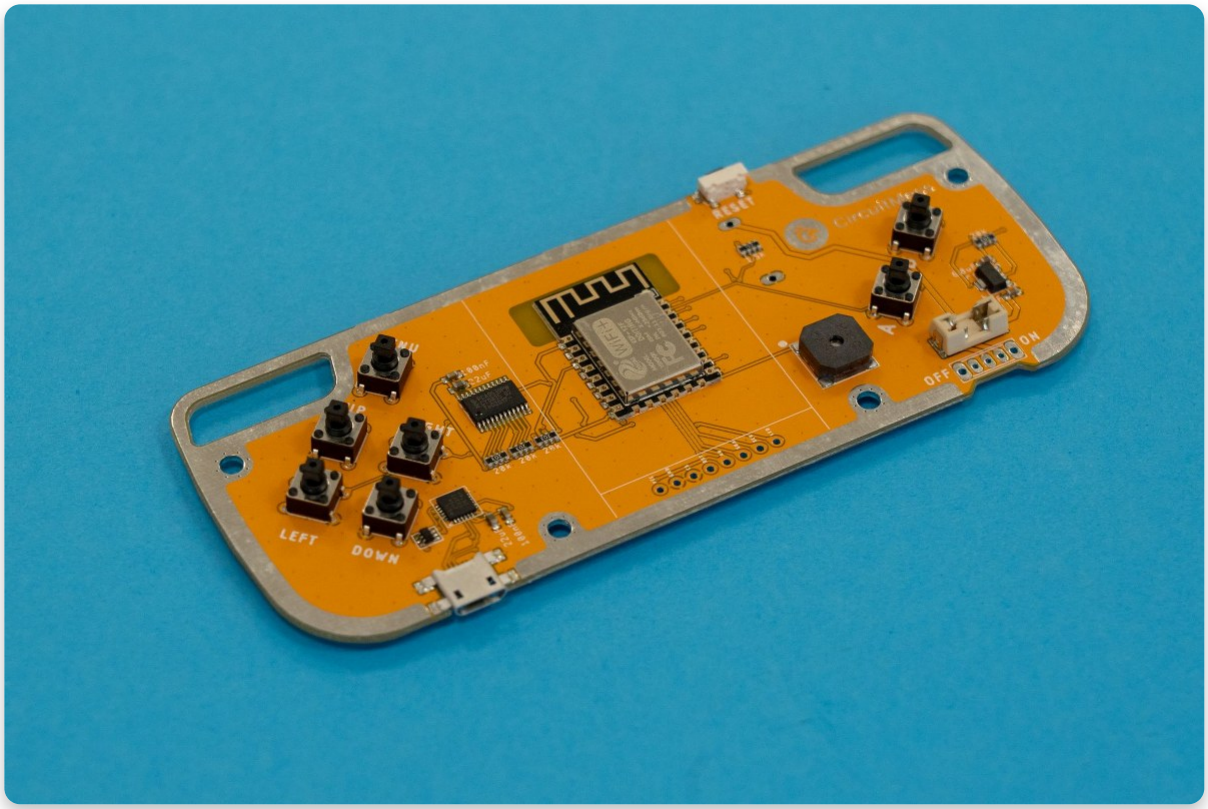
The same process must be applied to all of the buttons. Take your time, be patient, and remember - **always double-check your solder joints!**

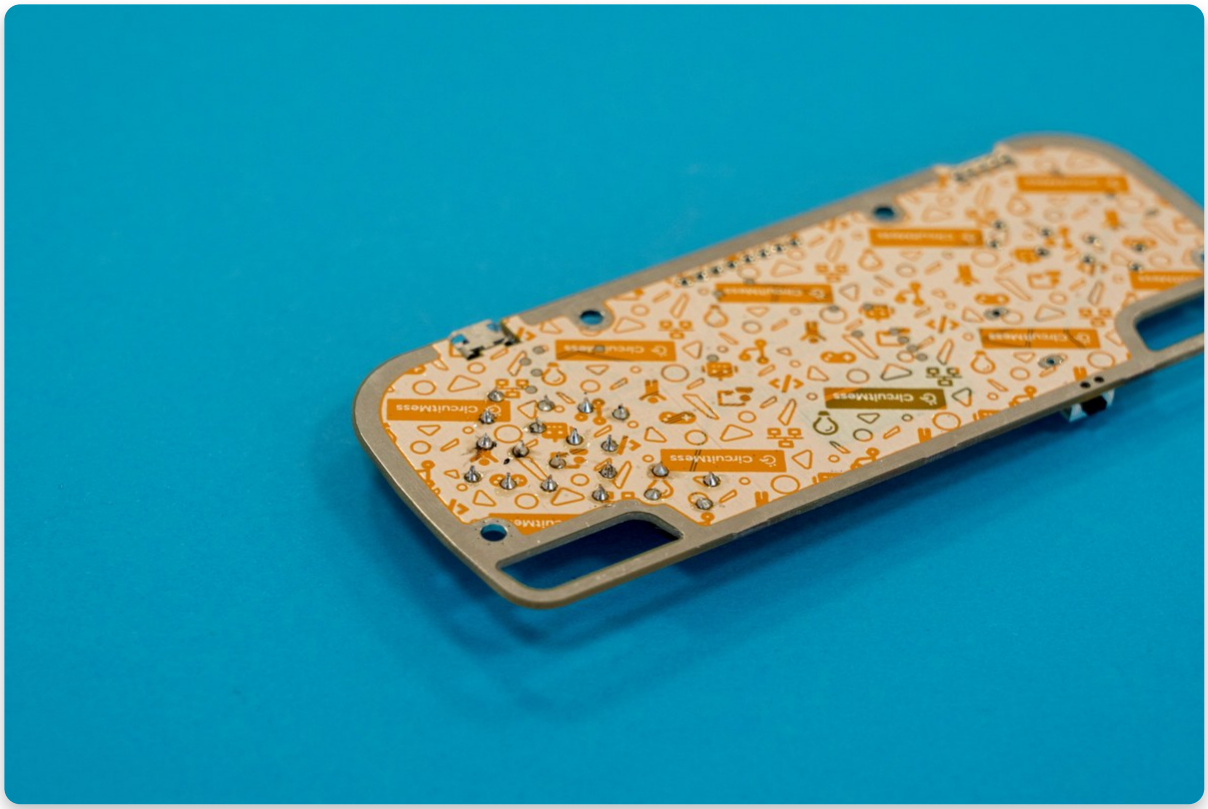


Soldering the rest of the buttons

After all seven buttons are soldered, a total of 28 connections must've been made. Check if all of the buttons can be clicked.

If all is well, move onto the next step. If you're unsure about some solder joints, it's always better to fix them rather than leaving them at "might" work. You should always make sure everything is as good as it can be.



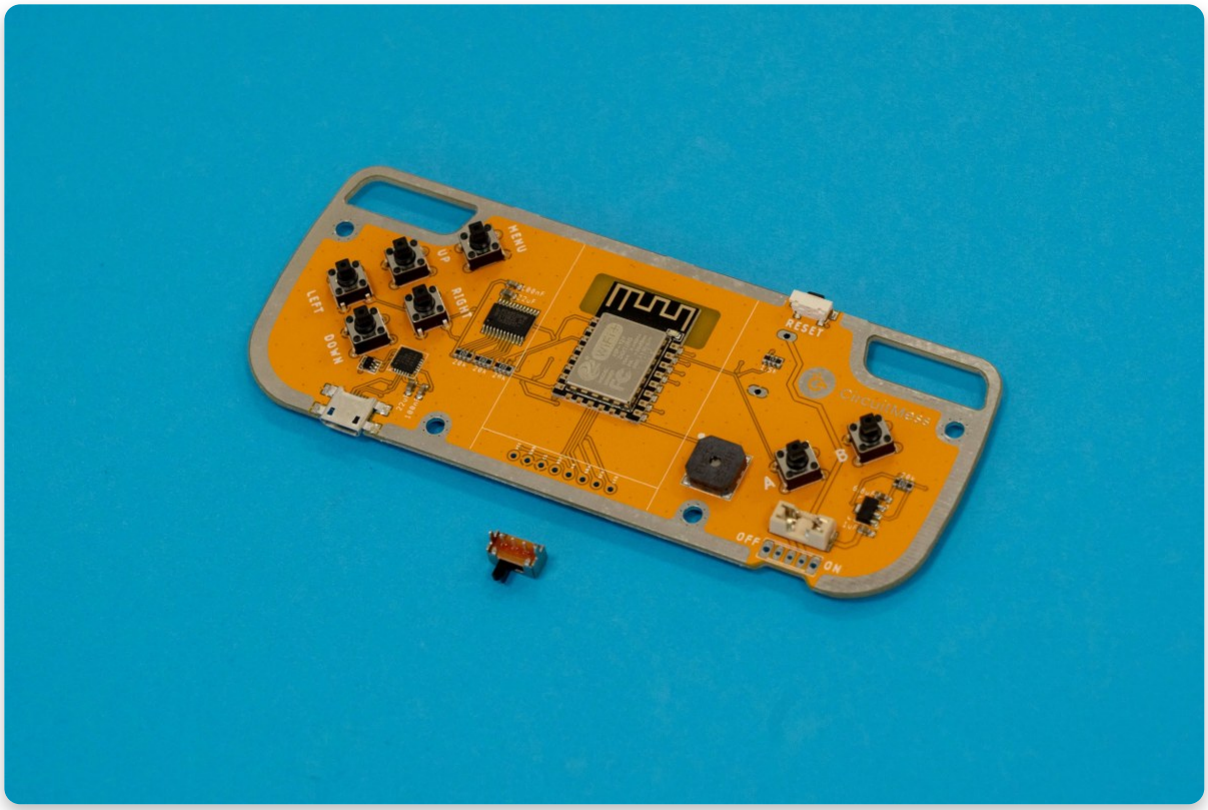


REMEMBER

Clean the soldering iron using the sponge and place it on the metal holder.

Part two - the switch

There is another type of input that you're not going to use as much as buttons, but it is still very important - **the power switch.**



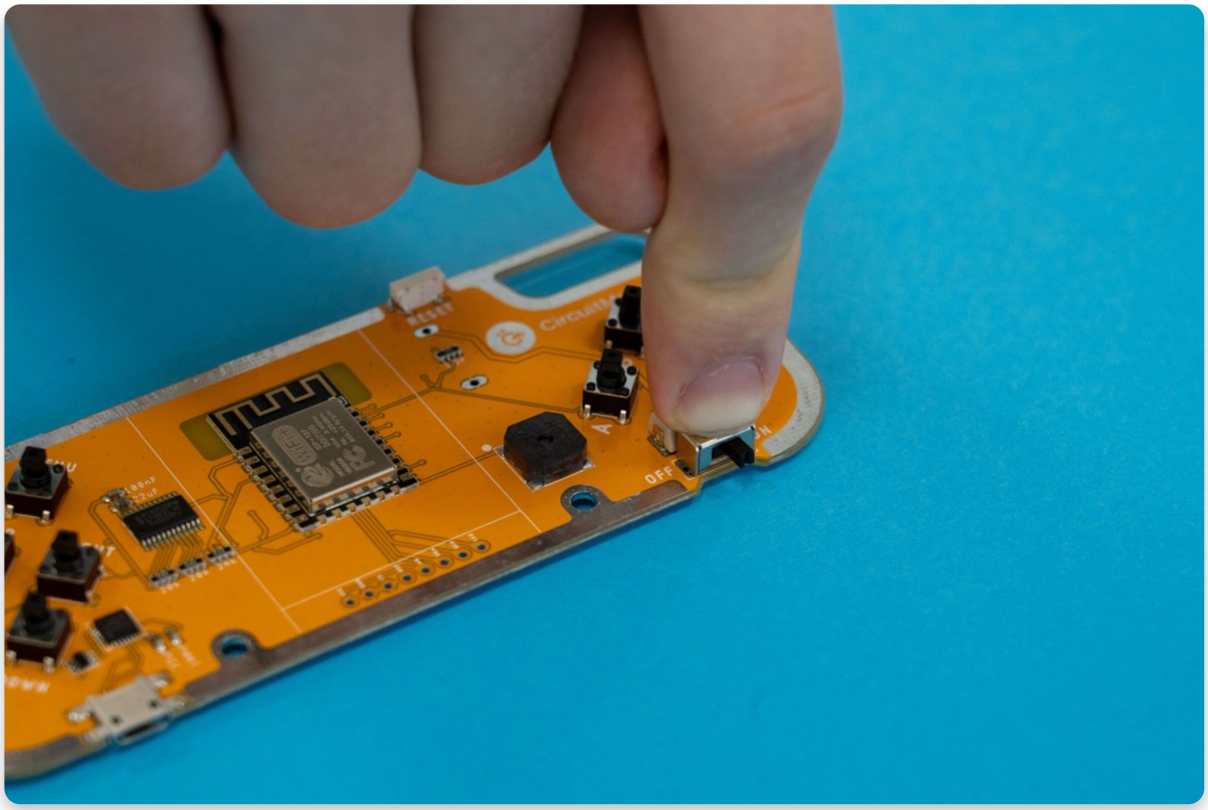
Unfortunately, the console cannot stay powered on all the time, and sometimes you have to switch it off. This is where the switch comes in. You can easily switch the console on and off with one simple push.

Before soldering this part, try to switch it around a few times. Each time the state of the switch changes, you should hear a loud click. So far, it's not really doing anything, but soon enough, it will give life to your Nibble whenever you want it to.

The process of soldering this component is exactly the same as the previous ones.

Take the switch and put the pins through the holes so that the switch lies on the front (yellow) part of the mainboard and the pins stick out of the back (mostly white side).

Try to wiggle the switch when pushing it inside since it may require a bit of force to fit in properly.



Make sure all the pins go through all the way so that the component is as close to the board as possible.

Turn your console around, take the soldering iron from the stand, clean it using the sponge, and begin to solder the pins in place.

Soldering these pins requires a little bit more precision since they are close together so it's a lot easier to bridge them accidentally - like this!

Example of a solder bridge

Bridging

Bridging is most common when you are soldering two pins very close to each other.

Bridging is where you're creating a connection between two pins that should not be connected, which will cause many problems inside a circuit and can ultimately lead to a short circuit that will damage your components!

If you bridge the pins, you must un-bridge them before continuing with the build.

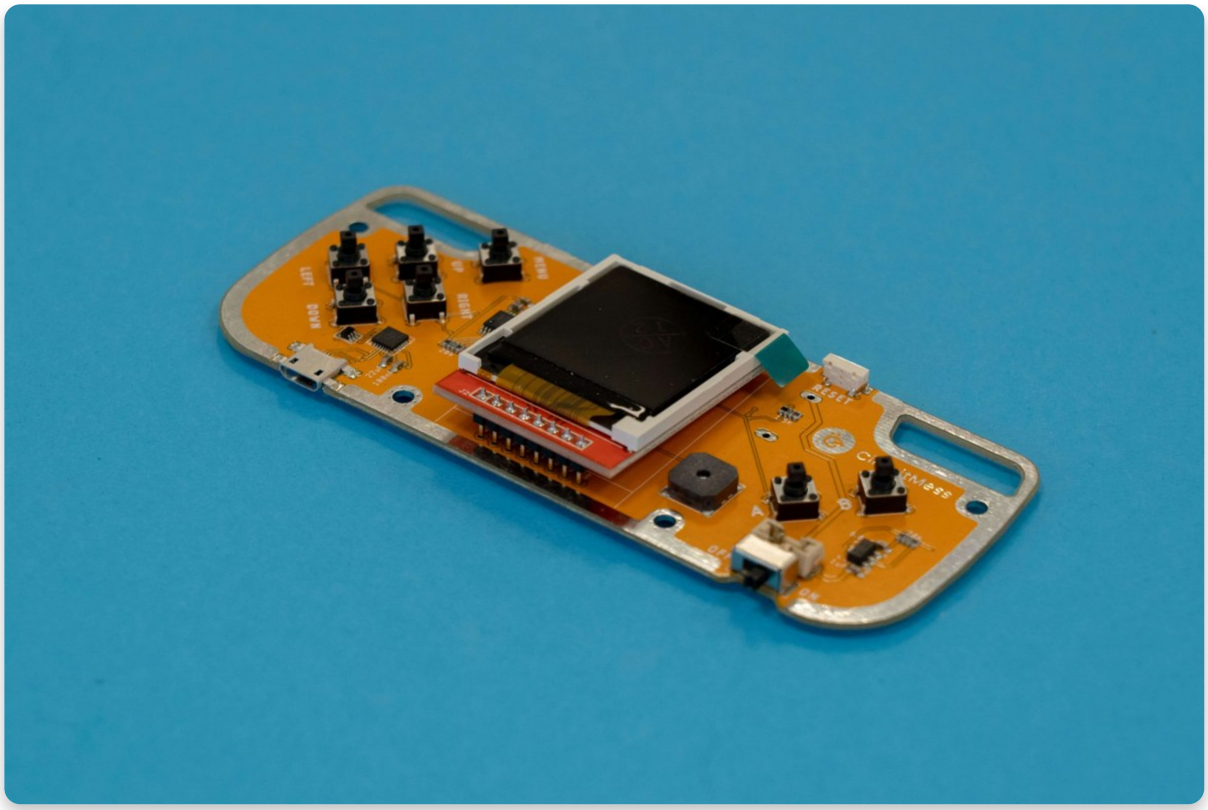
Breaking off the bridged joint is easy - just place the heated soldering iron in the middle, take the excessive solder off, and clean the iron on the sponge. Repeat the process several times if needed - heat & clean - until the bridge is removed. Clean the soldering iron so you don't have any residual solder on it.

Pins should look like this after the bridge has been removed (or if the bridge was never there)

After soldering all of the five pins, try the switch a few times. It should click when switched on/off. If everything seems alright, continue with the build.

Part three - The screen

Now onto the big one - the display! This thing makes everything that is happening inside the console actually come to life. All of the pixels, colors, characters, letters, and numbers are shown on this beauty.



The screen goes into the middle pins on the console

Since this is pretty much the most important part of the console, together with the processor, you should treat it with care.

You'll notice a little protective layer on top of it, which you can take off by pulling the little green part. Don't do that just yet, this ensures the screen stays protected all the way through the soldering part.

After you've done your soldering, take it off so your screen can really shine! Everything will work just as well even if the protector remains on, so don't worry too much about it.

Inserting the screen is pretty much the same as with the other components. Just make sure to push the pins all the way through so that the screen fits firmly in place.

Put all of the pins through the holes

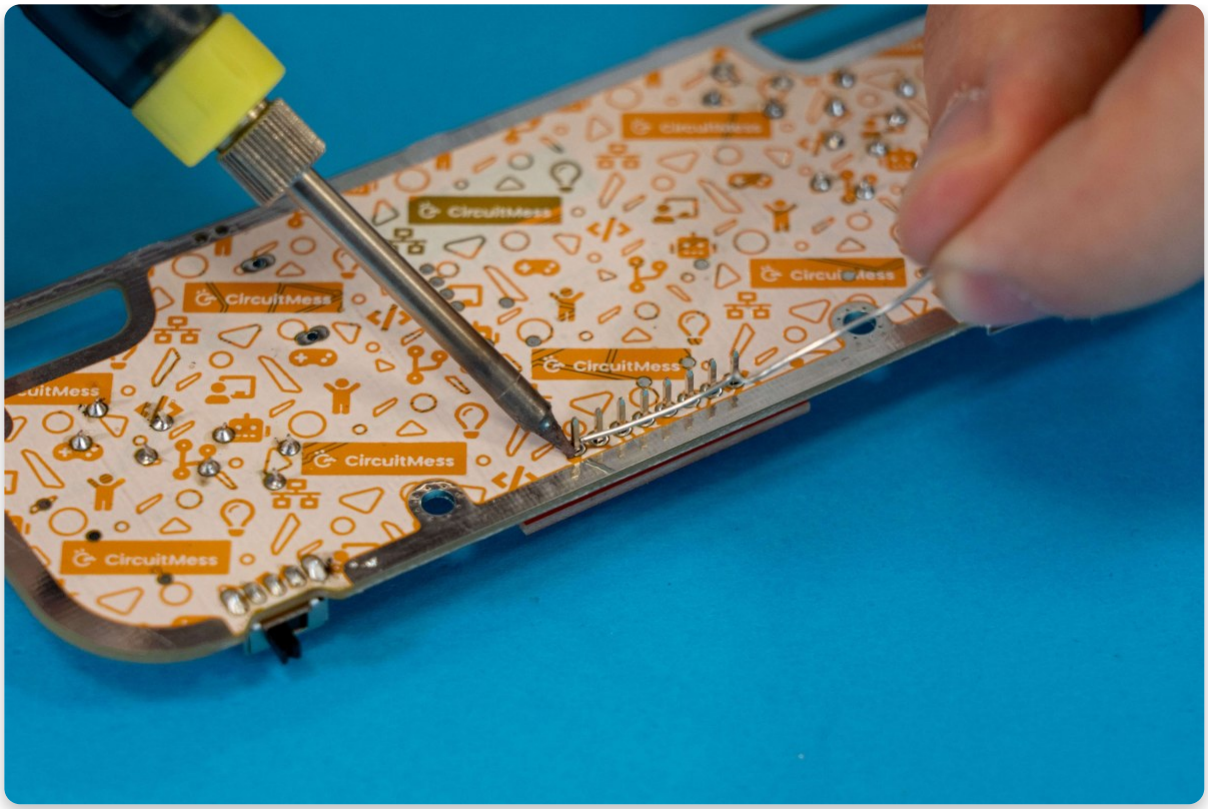
Even though the screen has its protector, try to touch the black part as little as possible, so that it doesn't get damaged. Especially avoid touching any part of the screen with the soldering iron, hot or cold (except the pins, duh!).

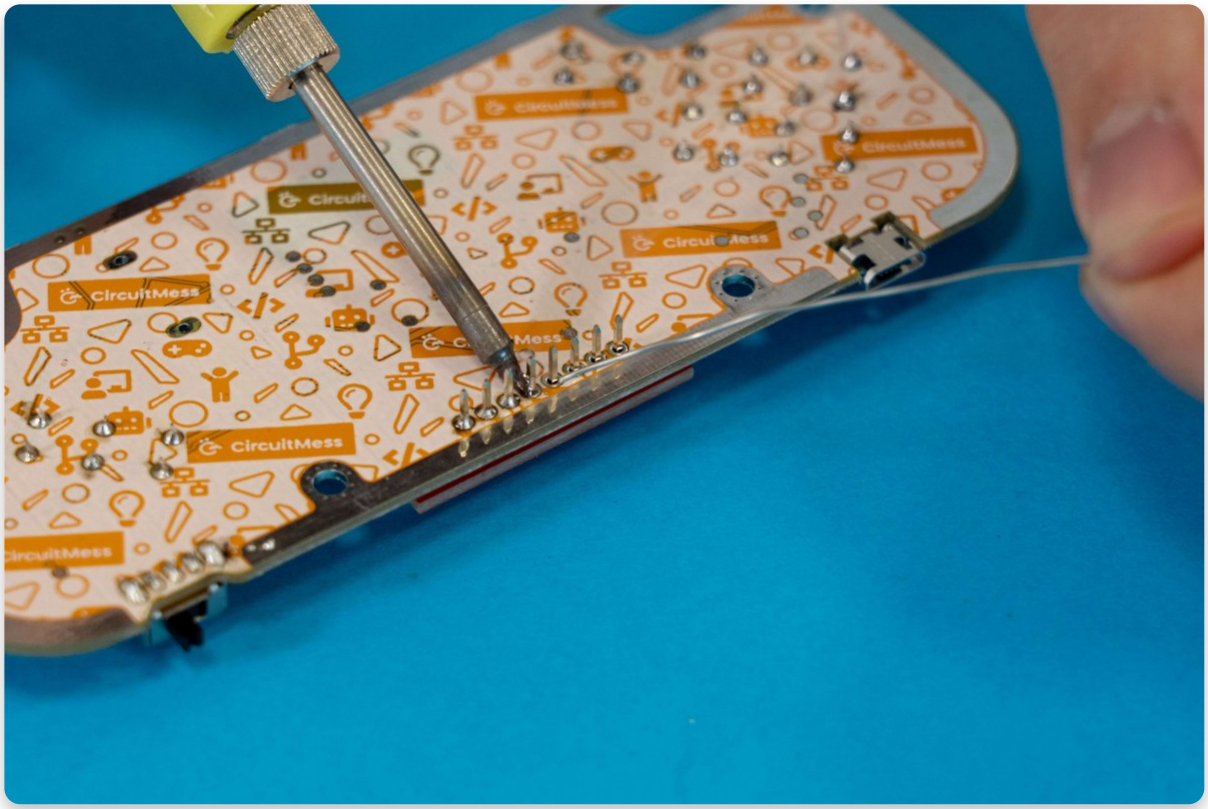
Turn the console around and solder all of the pins. Beware of the previously mentioned bad solder joints and solder bridges.

Since the screen should be vertically soldered to the board, let's handle this part with care.

1. Solder the first pin in the row.
2. Check if the screen sits flat on the board and is vertically soldered to the board.
3. If needed, resolder the first pin in the row to make the screen more vertical or closer to the board.
4. Resume with soldering the rest of the pins.

Before starting the soldering process, make sure to place some soft material under the screen so that it doesn't get damaged or scratched while facing down on the table.



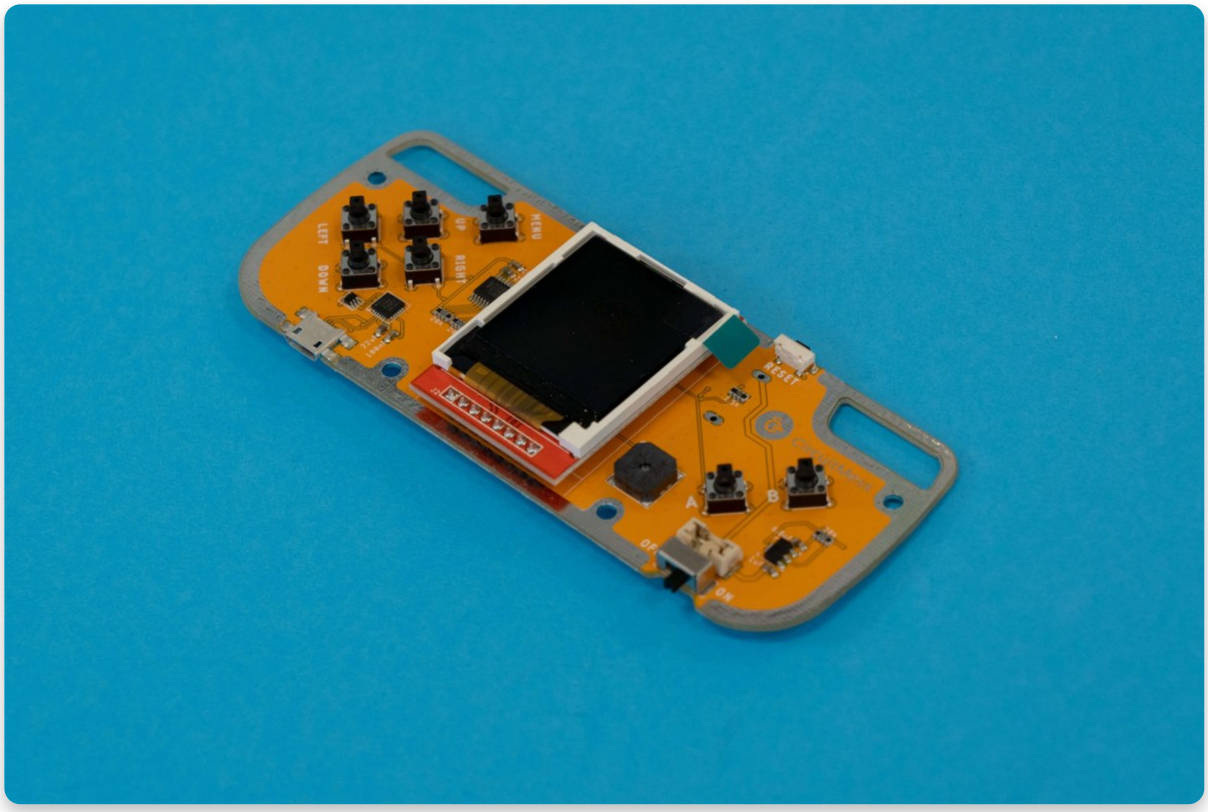


Soldering time!

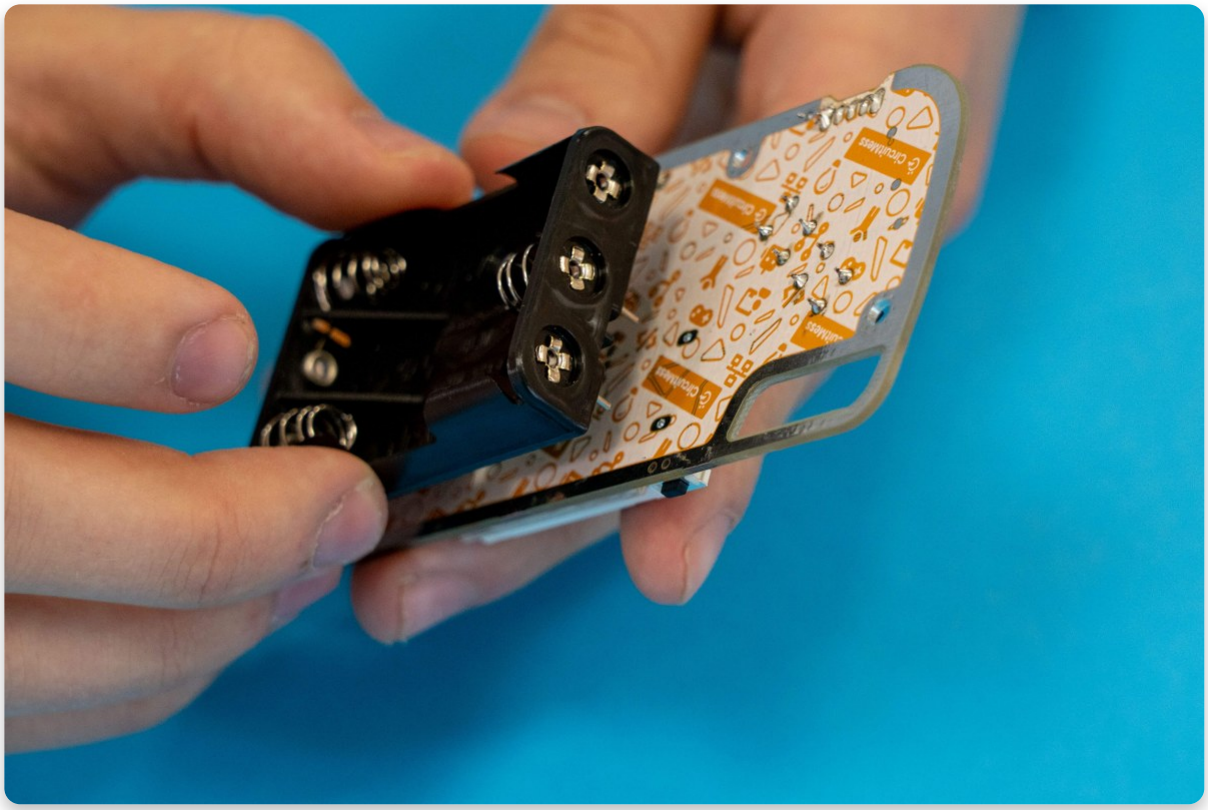
After you finish soldering, check all the joints and make sure the screen is sitting flat and firm on the mainboard. Any sideways movement is not good and should be checked and fixed.

Do not take off the protective plastic just yet! We know it’s satisfying to peel it off, but leave it for later.

Make sure your soldering joints are as clean as possible



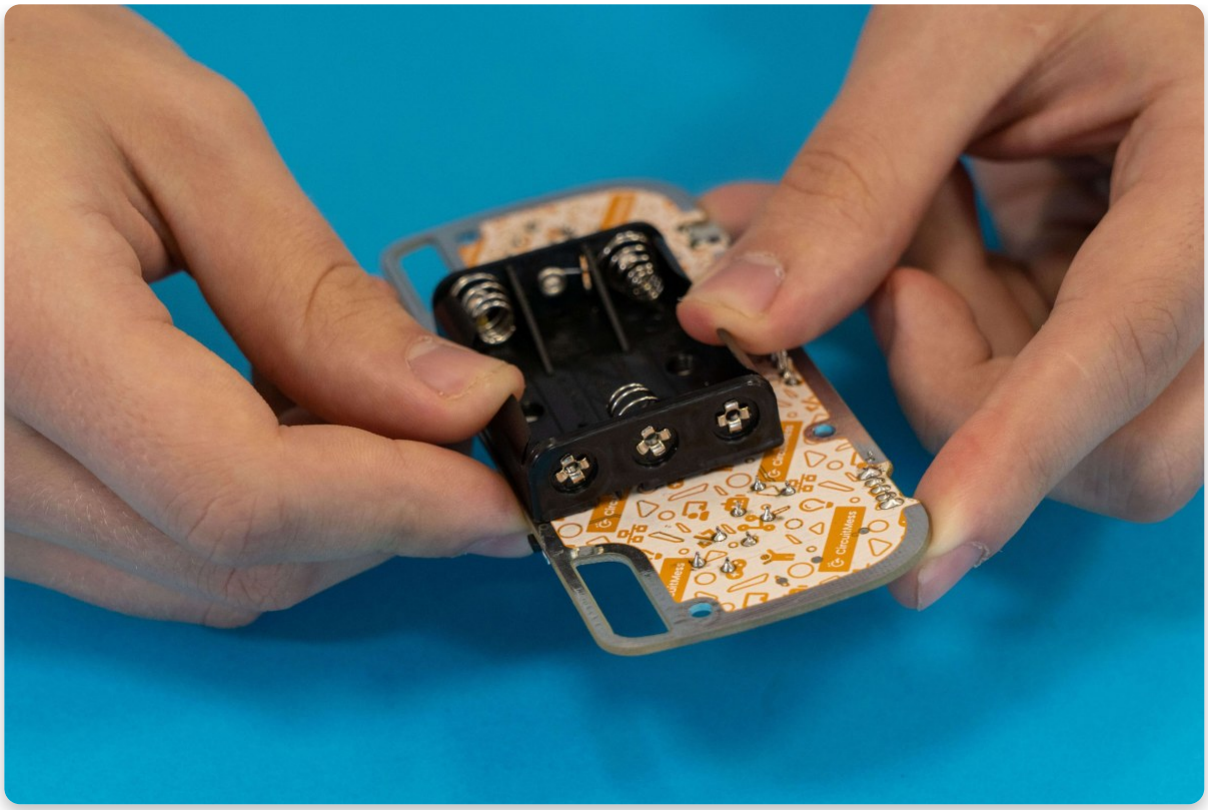
Part four - The battery holder



This part is probably the easiest one to solder in this whole process.

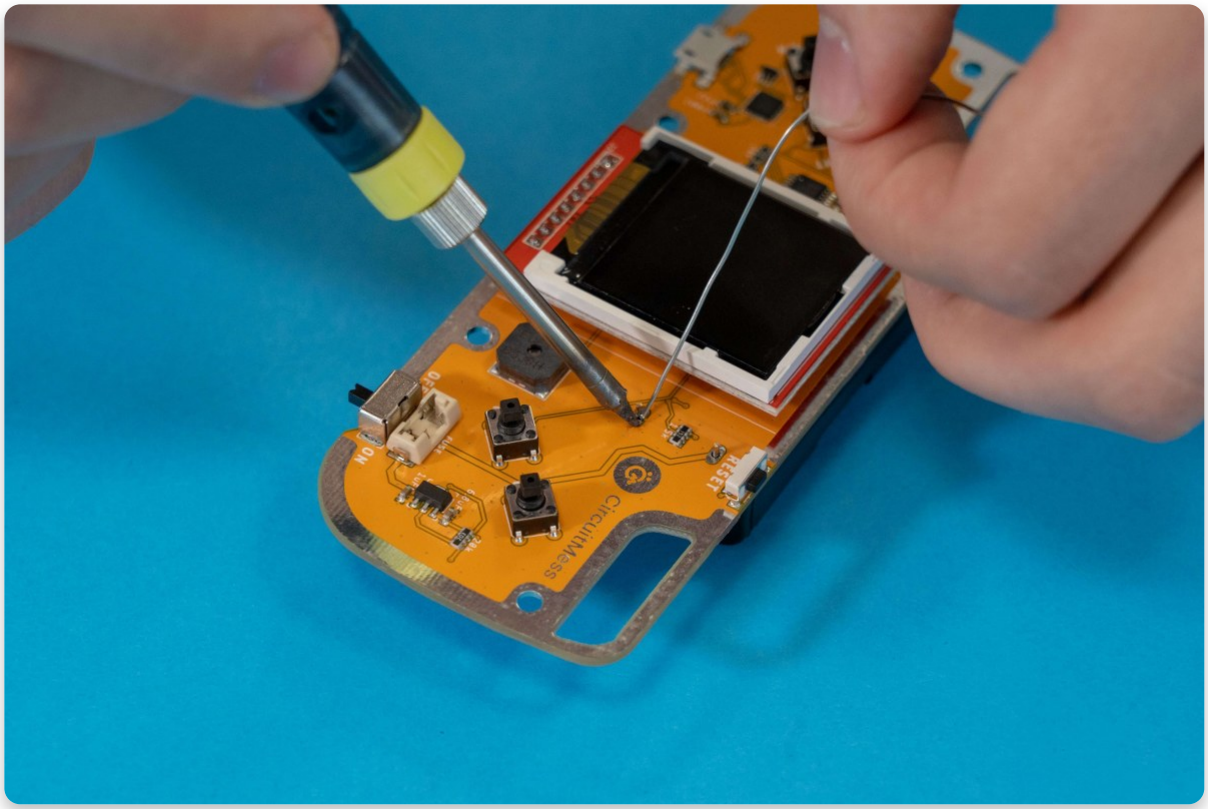
While it does take up a large part of the console, it only has two pins.

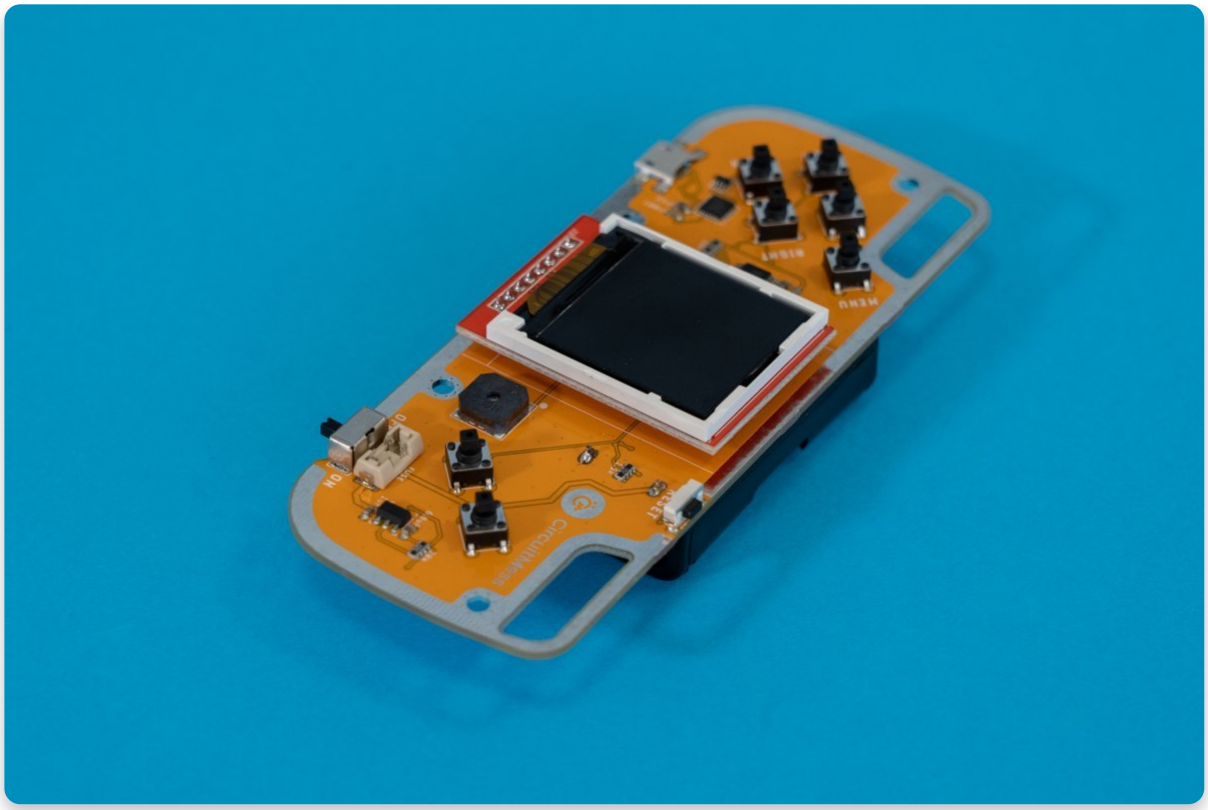
Unlike all of the other parts, this one goes onto the back of the console (the mostly white side). The pins should go through the holes so that they're visible from the front side, the one where the screen and the buttons are located.



Put the battery holder all the way through

Again, pick up the soldering iron and solder the two pins. As easy as it gets!





Clean the soldering iron and put it on the metal stand away from the console.

Even though the soldering process is pretty much over, do not unplug the iron just yet. We must first check if everything is working properly before doing that.

If you need help with cleaning the tip of your soldering iron, please check our **video tutorial**.

Chapter two - First check

Everything needed for the console to function is done - great!

Nibble should look like this at this point

The first thing to do next is to check everything!

Only after doing that should we go on with assembling the casings.

It would be a lot of work to disassemble the casings after we found out something doesn't work.

That's why it is important to do this simple check.

In the box, you received three batteries. You'll need to place these batteries inside the battery holder that you've just soldered.

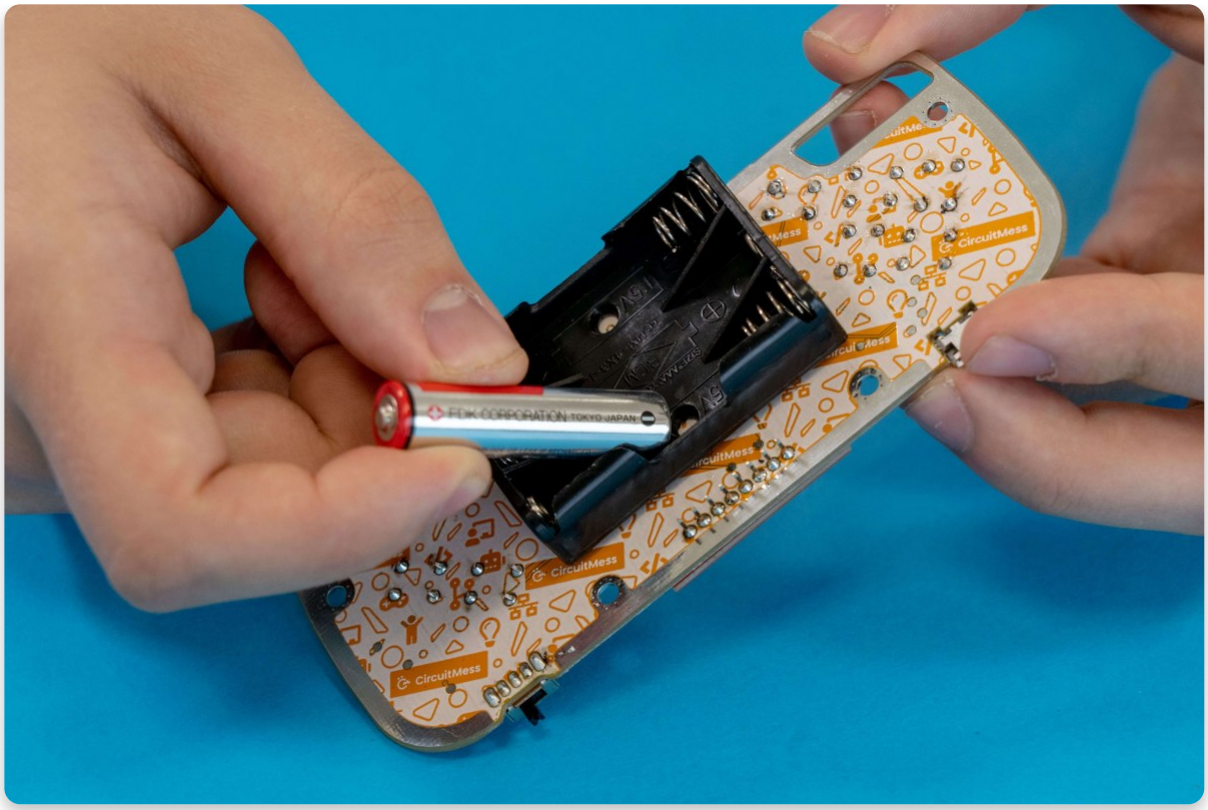
Nibble and the batteries

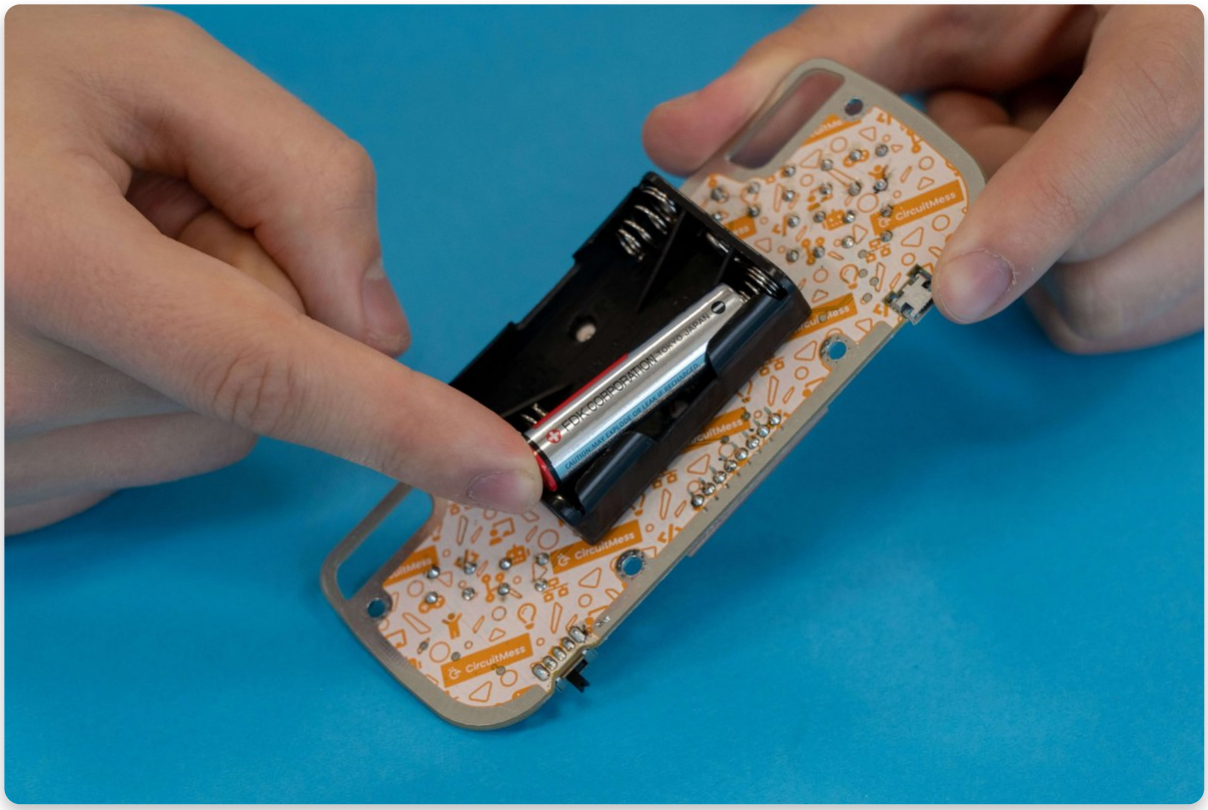
The batteries are marked with two little symbols - **plus (+)** and **minus (-)**, which represent the **polarity of the battery**. The **plus (+)** part has a **little metal bulge** at the end of it, while the **minus (-)** part has a little **dent**. This is really important since when inserting the batteries you'll have to be careful about which side goes where.

The first and the third slots in the battery holder are the same, which means that the batteries must be turned the same way when placing them inside these slots. The second (or the middle) slot, however, has the reversed polarities, which means that the batteries need to be rotated the other way round in the other two slots.

! Make sure that the little switch from the second step is set to OFF before inserting the batteries!

This part is really important: Take a battery and place it in one of the outer two slots so that the minus (-) symbol is closer to the little spring, and the plus (+) symbol is looking away from it. When inserting it, make sure to first insert the minus (-) part so that you push the spring with the battery and then lightly insert the other part inside the holder. You need to use a little bit of strength in this process. If you're unable to do so, ask someone older or stronger for assistance. (It's all about teamwork!)





Repeat the same process for the other outer battery slot.

Now for the middle battery slot, you have to do the same thing just the other way around. The battery needs to be reversed relative to the other two batteries.

You’re still placing the minus (-) part on the side where the spring is, and then lightly inserting the other side of the battery.

The batteries should be aligned just like in the picture.

Your batteries may not look like the ones in the photos. Make sure to follow the plus (+) and minus (-) markings for the proper insertion. Do not do any soldering while the batteries are inside the battery holder!

Removing the protective layer from the screen

If you’re very eager to take the plastic cover off the screen, you can do so now, or you can wait until the end of the assembly. That way taking the screen cover off marks the beginning of your Nibble gaming days. (We believe that this is the right way to do so.)

Fuse

Before turning your Nibble on, you have to insert the fuse that will keep all of the components untouched if something goes wrong inside the circuit.

There are a total of three fuses and they can be replaced if needed as well.

Take one of the fuses from the package.

It doesn’t matter which way you put the fuse, as long as the little black text on it is facing upwards.

Put the fuse in a little holder right next to the buzzer.

Remember!

Putting the fuse in its holder might be a bit tricky because you need to use a bit of force. Don't be afraid to push it inside. As long as it's facing upwards, your fuse should be fine.

Push the fuse inside

If you can put the fuse in by using your fingers, use a toothpick or another thin object to do so.

Now that the batteries and the fuse are both properly inserted, take the console in your hands and place the switch in the ON position.

Turning ON

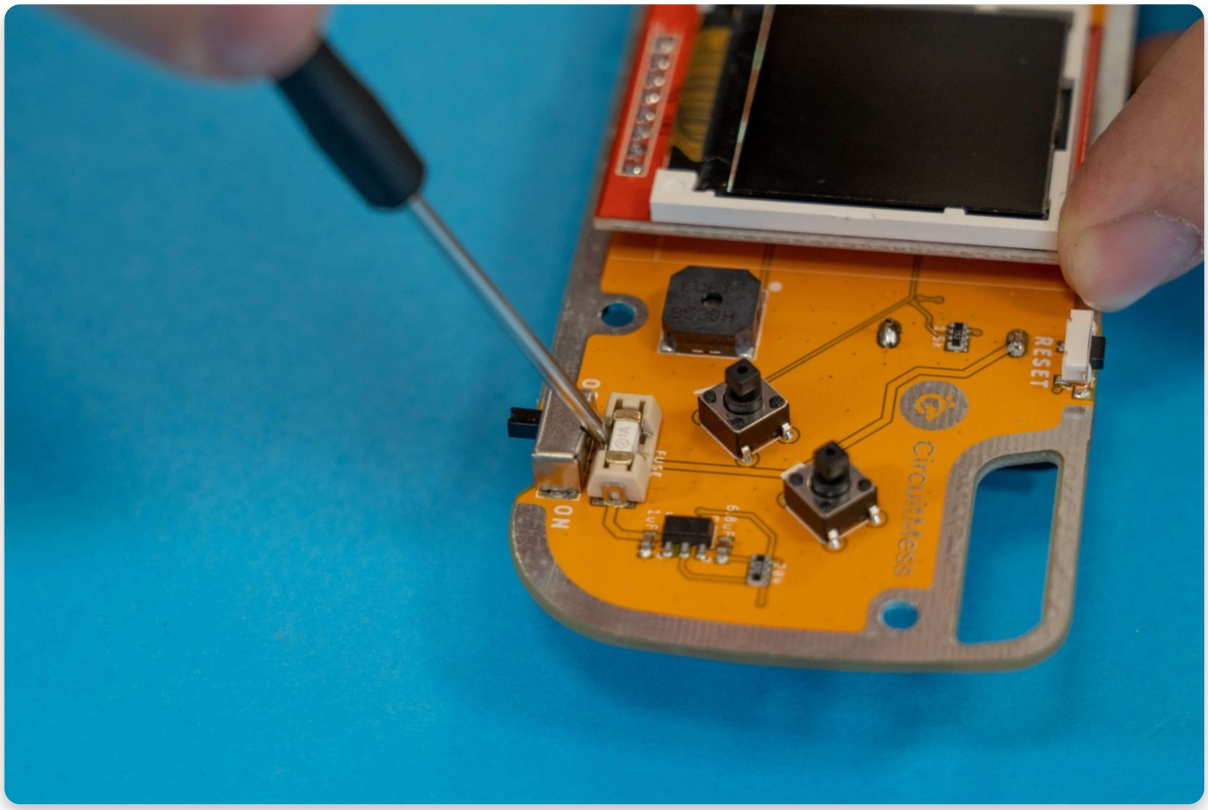
The screen should turn on and you should see something like this!

Starting menu

If the screen remains black, that could mean one of the two things:

- **The batteries are empty** - even though we check each battery before putting it in the package, it is possible that some of the batteries are plain empty. Try to get another set of AAA (triple-A) batteries and place them in the same way as these ones.
- **One of the components is not properly soldered** - Check for any bad solder joints, solder bridges, unsoldered pins, and residual solder somewhere on the board. **ALWAYS remove the batteries and set the switch to OFF before starting the soldering process!**

If you've found a mistake in soldering, it is likely that you've created a short circuit. In order not to fry any of the components, we've added an additional fuse that should stop the circuit from creating any permanent damage to the components.



Replacing the fuse

After fixing the solder joints, it's necessary to replace the fuse so it can provide the same short circuit protection again. Carefully remove the fuse with a toothpick or some similar tool and replace it with another one (there are a total of three fuses in the package).

Now, reinsert the batteries, turn the switch back to ON, and everything should work!

If the screen is showing the starting menu, that means that the soldering part is over.

Turn ON

You can finally unplug the soldering iron from the power and from the device itself so that you have a completely free cable.

Leave the soldering iron to cool off completely

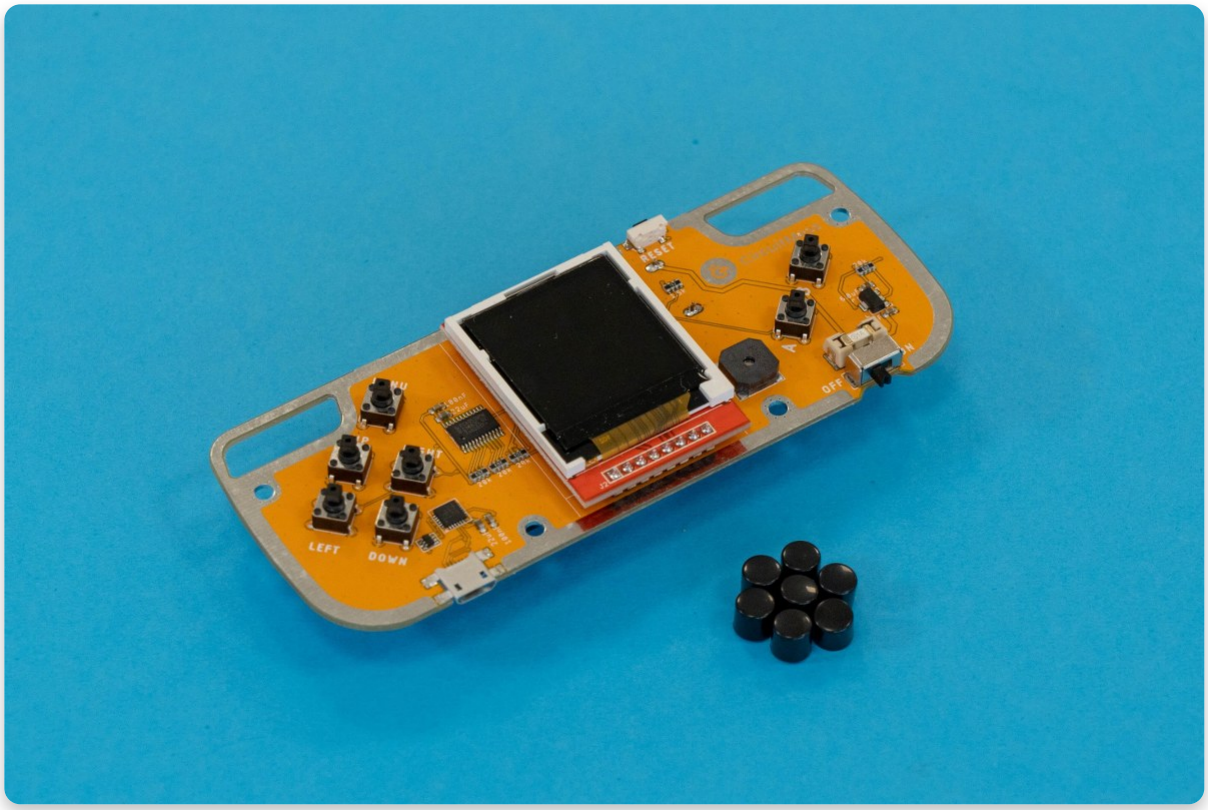
Do not touch the tip of the soldering iron - **leave it to cool down for at least five minutes (ten would be even better).**

Move it aside since you won't need it for the rest of the assembly process.

Chapter three - Button caps

Even though the console can work as-is, it can look and feel much better. The buttons themselves are rather small and are not the most comfortable thing to hold.

That's why we've included eight button caps (you really need seven, one is for good luck!) to cover those little buttons and make them more clickable!



The process of putting them on is nothing too complicated. Just take a button cap and put it on top of the button. Press hard so the button cap properly clicks on. If the button cap remains on after you release it, and the button can still be clicked, you've put the cap on properly!

You should hear a 'click' when you put the cap on the button

Repeat this process for each button. After you've done so, **check again if all the buttons are easily clickable.**

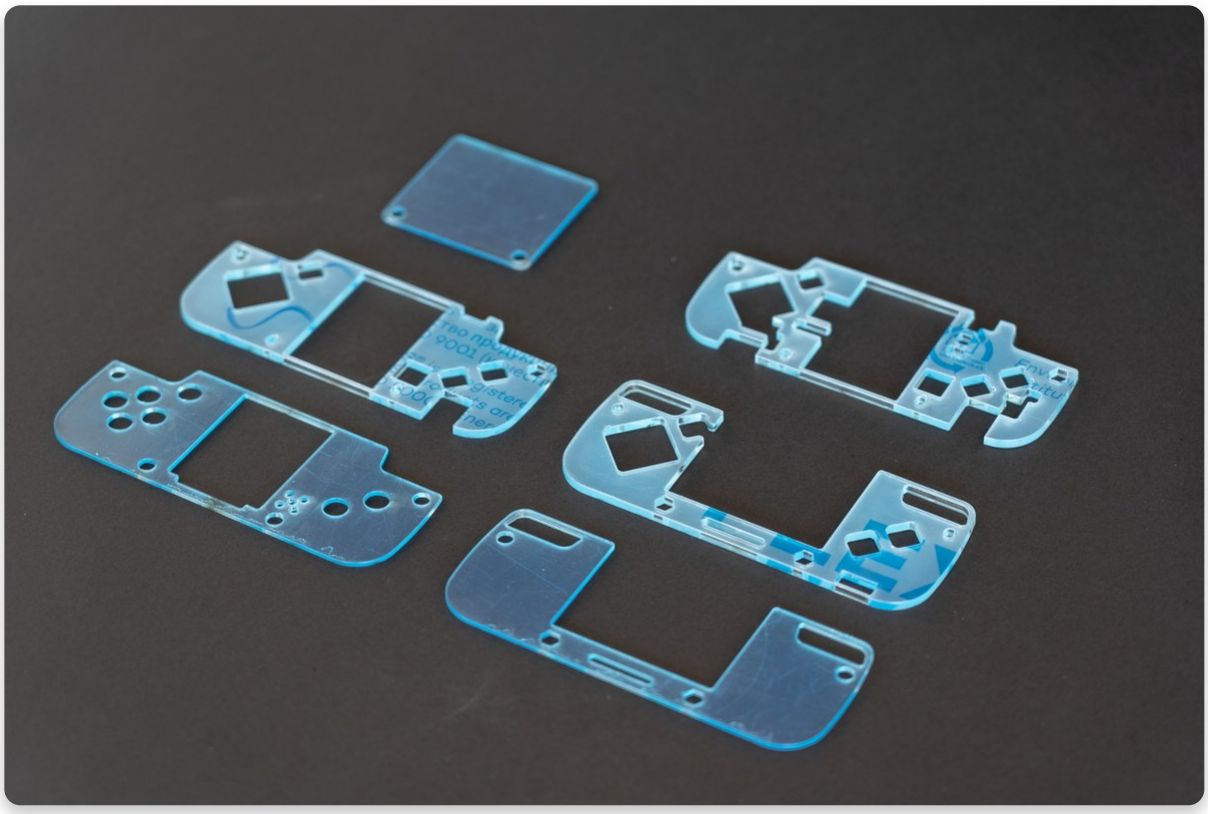
All button caps in their place

Great! Now let's focus on the casing.

Chapter four - Casing up

Now comes the most fun part of assembling Nibble - putting these neat, cool, transparent casings on it!

You might be wondering - why does it have a total of six plastic parts? But each and every one of them is there to keep the console not only safe from falling but also to make the console comfortable to hold.

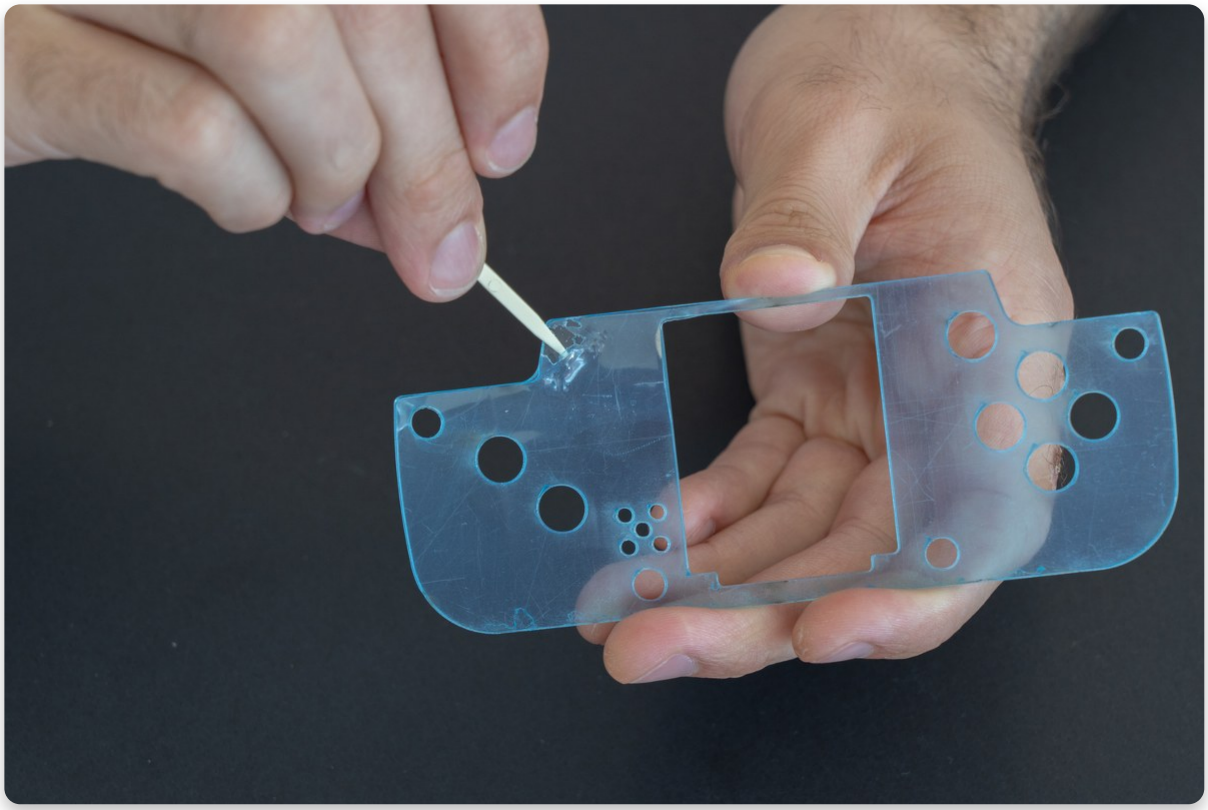


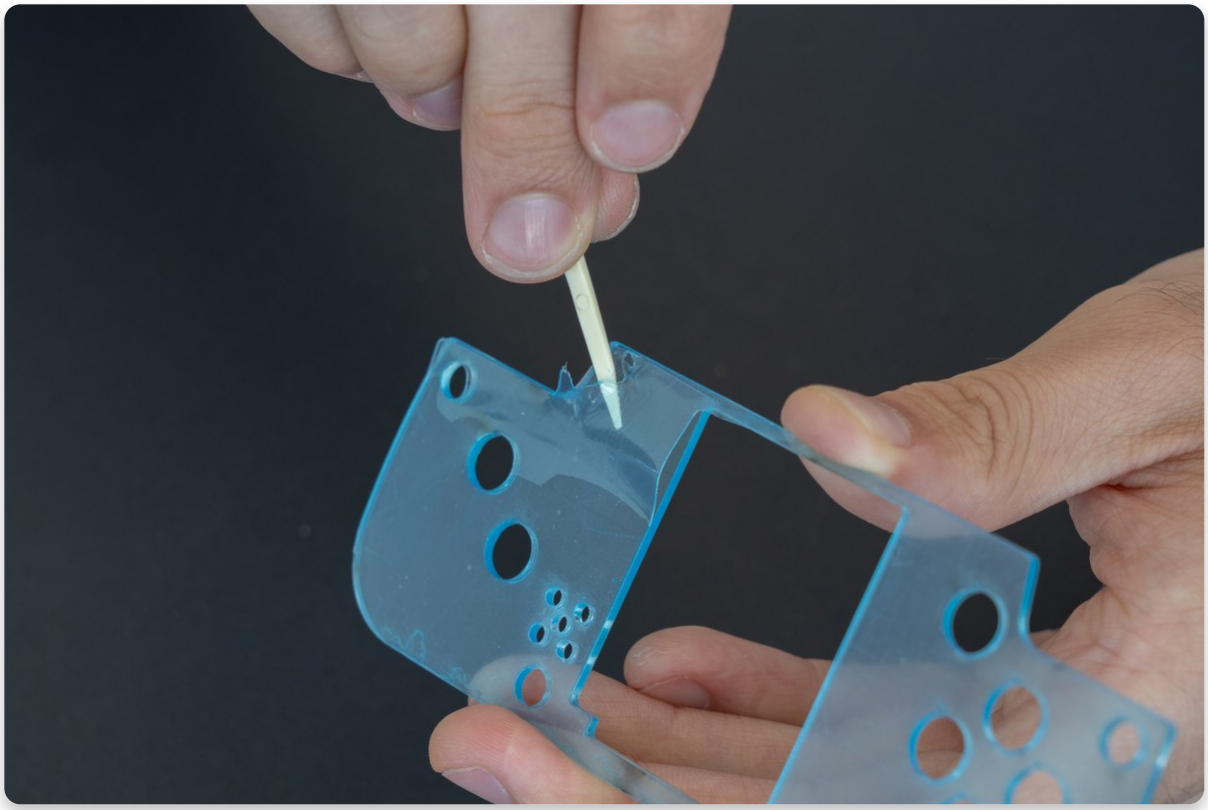
All six of the transparent protective Nibble casings in one place (with the protective layer on)

Removing protective layers

Right now you'll notice that all of the casings look a bit bluish and are not quite transparent. That is because each casing has a little protective cover that keeps them safe from scratches until they are ready to be used.

So before starting the casing assembly, it's important to remove this protective layer.



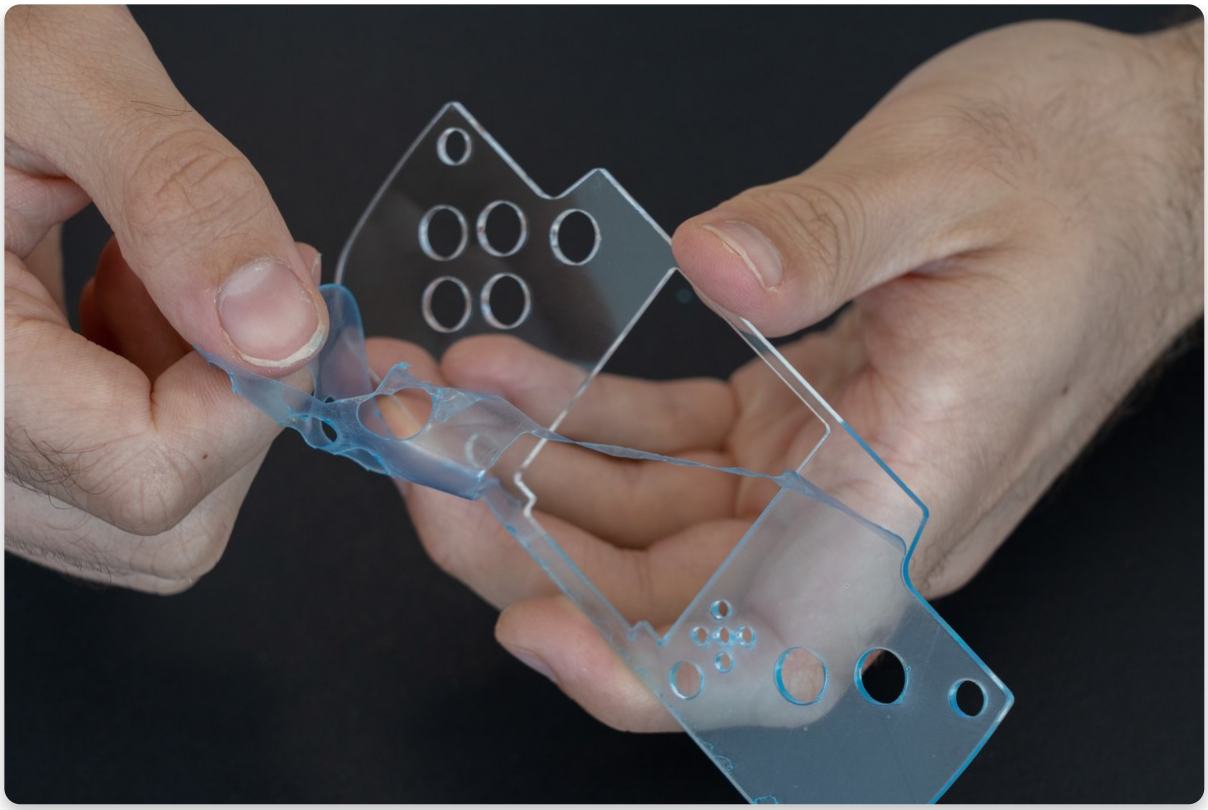


Peeling off the edge of the layer is the easiest way to go

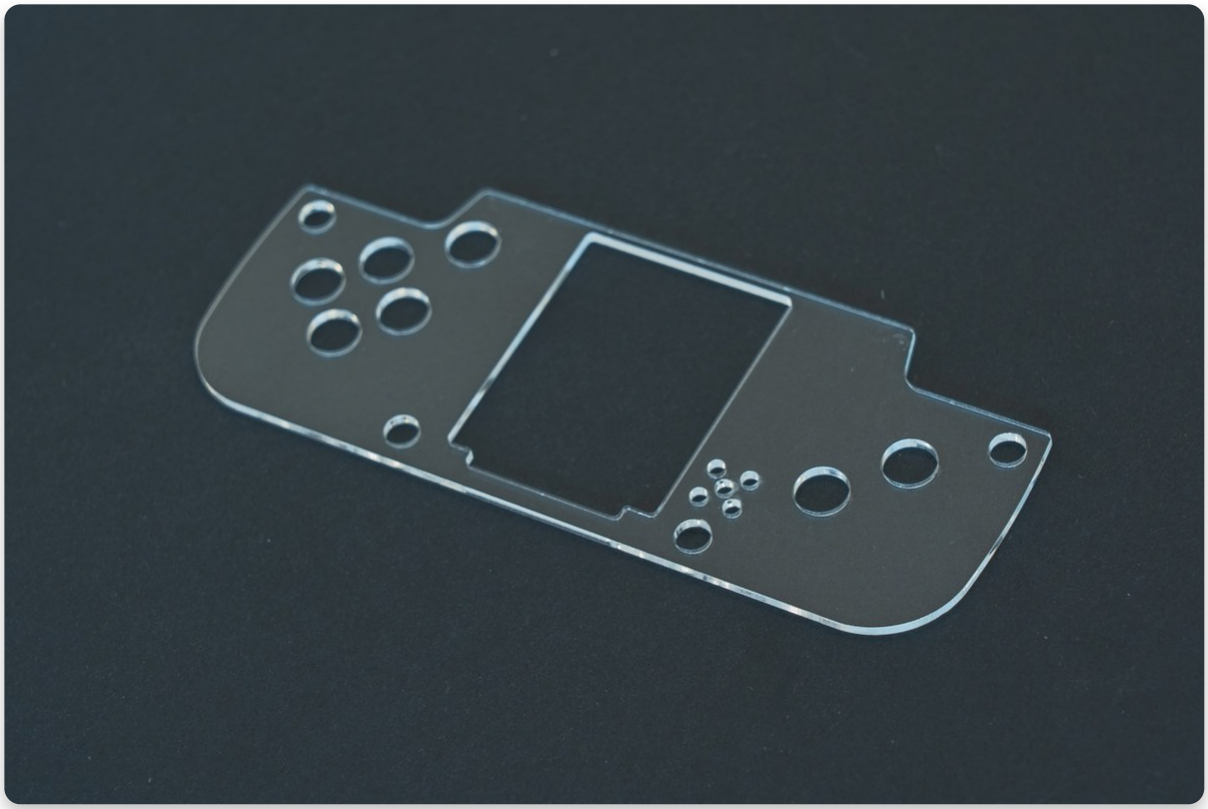
In order to peel them off, take a toothpick, or your nail, (**but not any metal or other sharp objects)** and carefully scratch off a bit of the cover from one of the corners of the casing. Once that is done, take the plastic with your fingers and slowly peel it off the casing. Satisfying? Oh yeah!

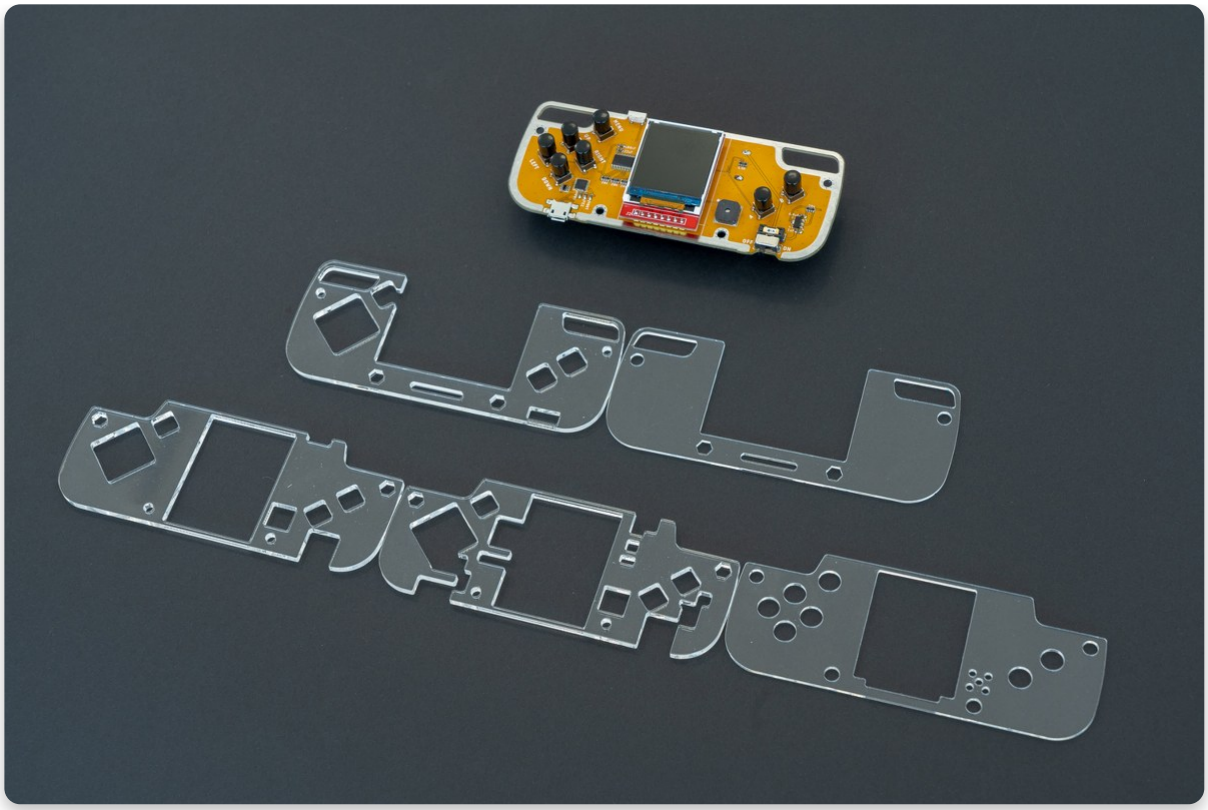
Slowly take off the protective layer so it doesn't break midway

You'll notice that the casing is still not completely clean. There is also a layer of this plastic on the other side. Each casing has two of these protective films, one on each side. That means that you have to take off a total of twelve plastic covers before continuing.



Make sure to remove the layer from both sides of the casing





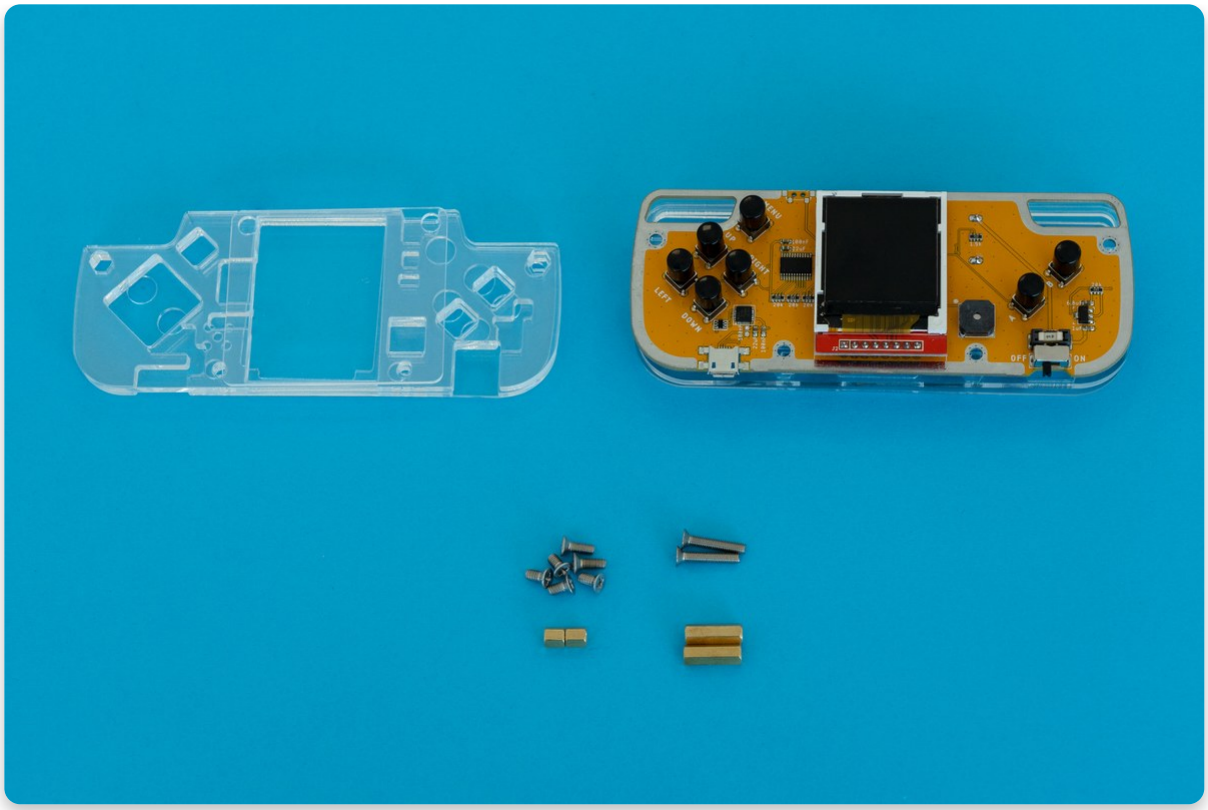
Casings after the protective layers have been removed

When all of the casings are nice and clear, continue to the next step.

Placing the casings

For this part of the assembly, you’re going to use three different types of bolts and two different types of spacers.

Make sure that you always use the correct sized bolt - this is really important so that the whole casing can fit together nicely!



Everything needed for these next few steps

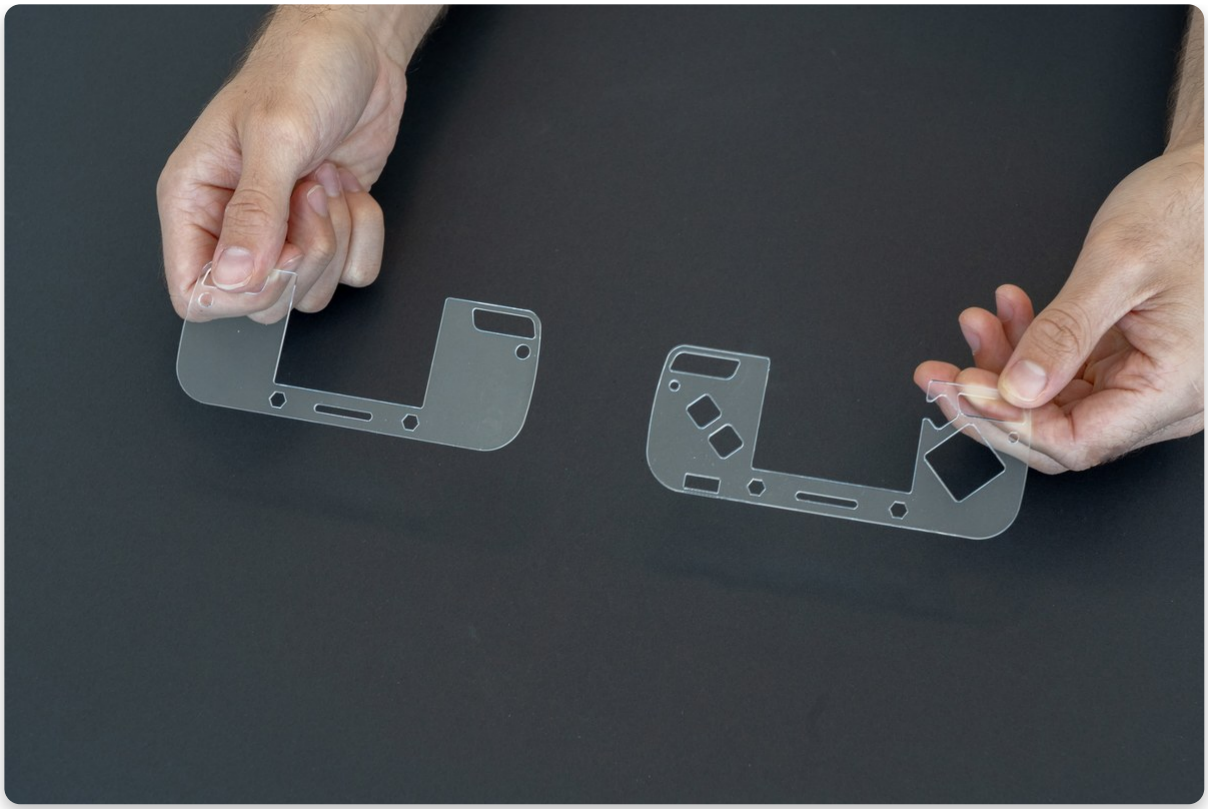
Firstly it's important to separate the back casings from the front ones. You'll notice that the back casings have a much bigger middle cut out and that the two sides of plastic are **only connected on the bottom.** On the contrary, the front casings have rectangular holes in the middle of the casings and the **sides are connected both on the top and the bottom.**

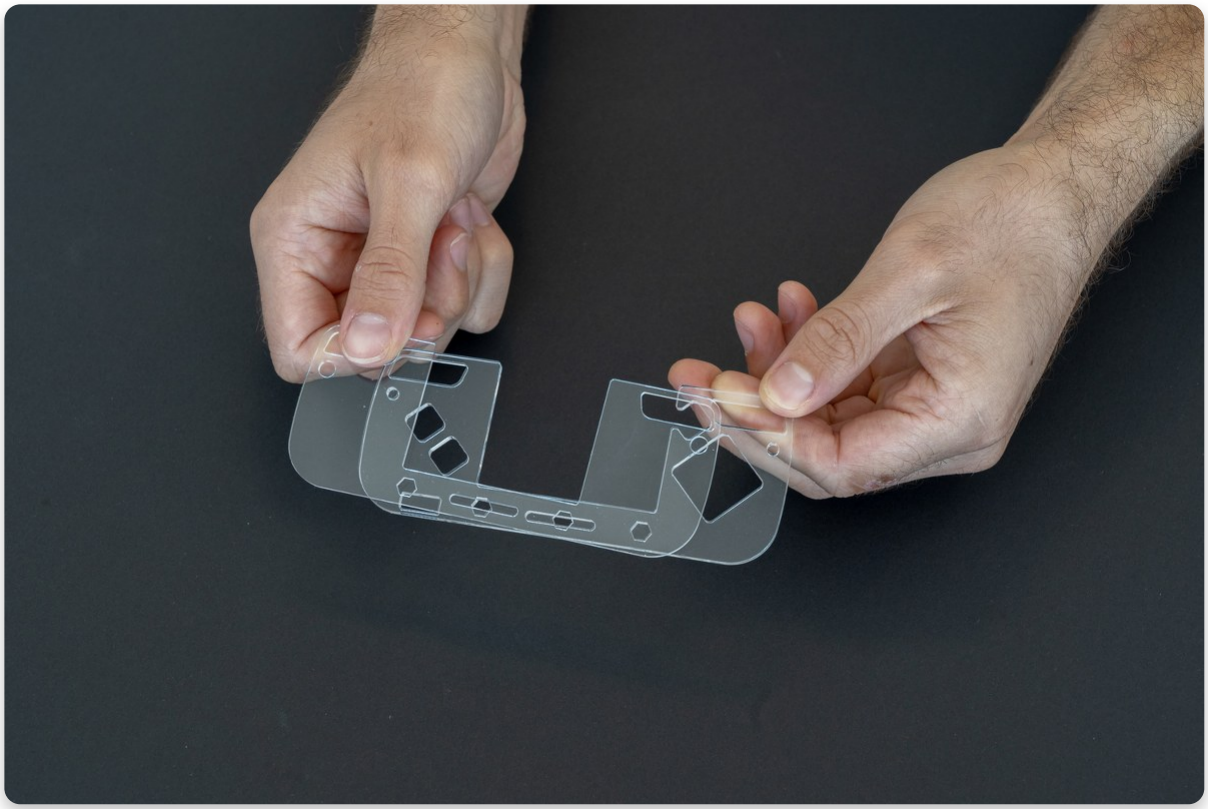
Since these casings are stacked on top of one another (remember the sandwich design), **you have to make sure to stack them in the correct order.**

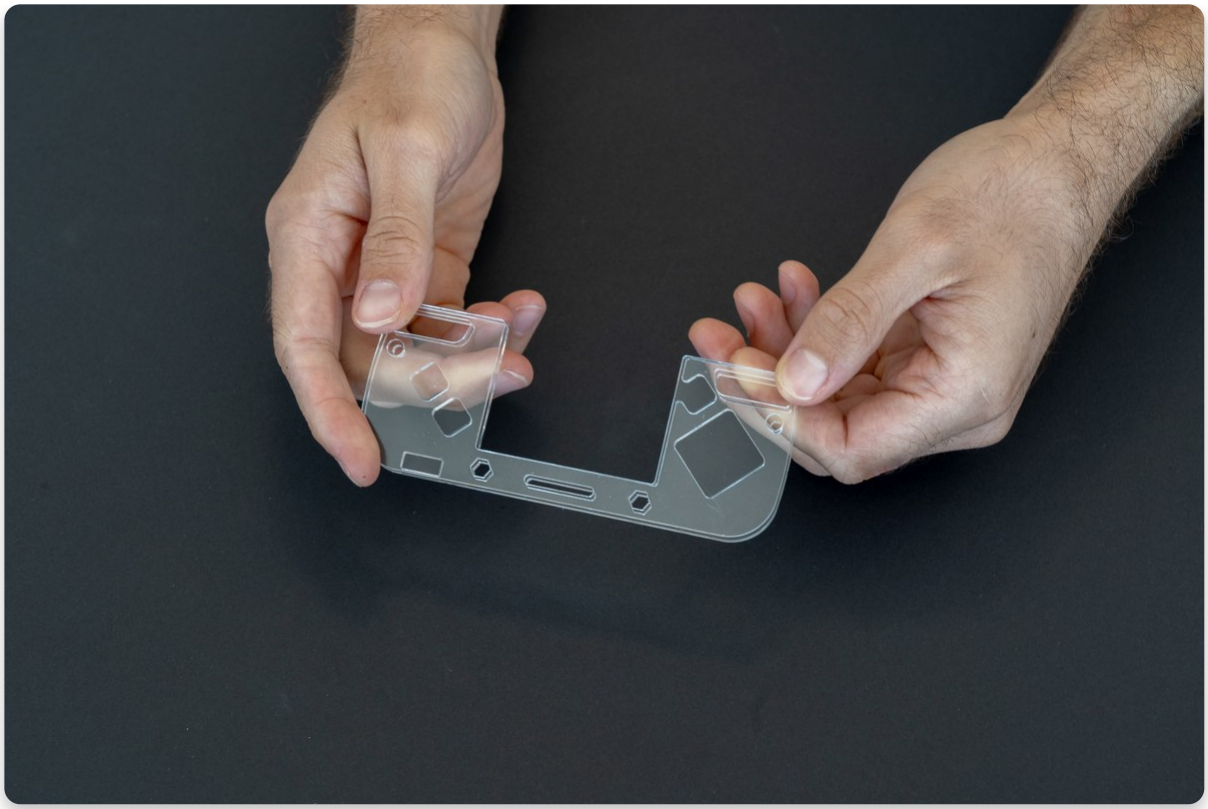
The easiest way to do this is to remember one simple rule - a layer with more holes goes closer to the mainboard.

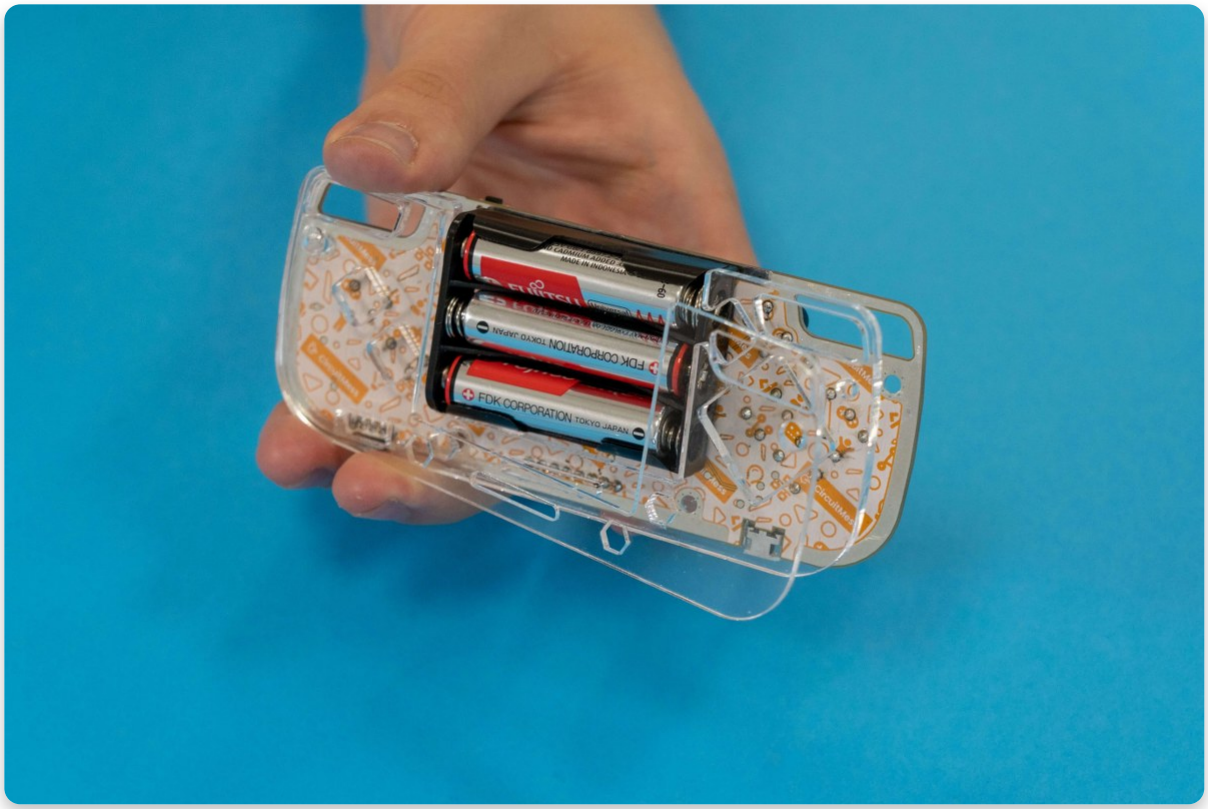
Let's place the back casings first!

You'll notice that one of the **back casings** has two small rectangular holes on one side and one big rectangular hole on the other side. Those holes are there so that the case can fit on top of the back pins of the buttons. Therefore, this part of the casing goes first, with the other part going on top of it.

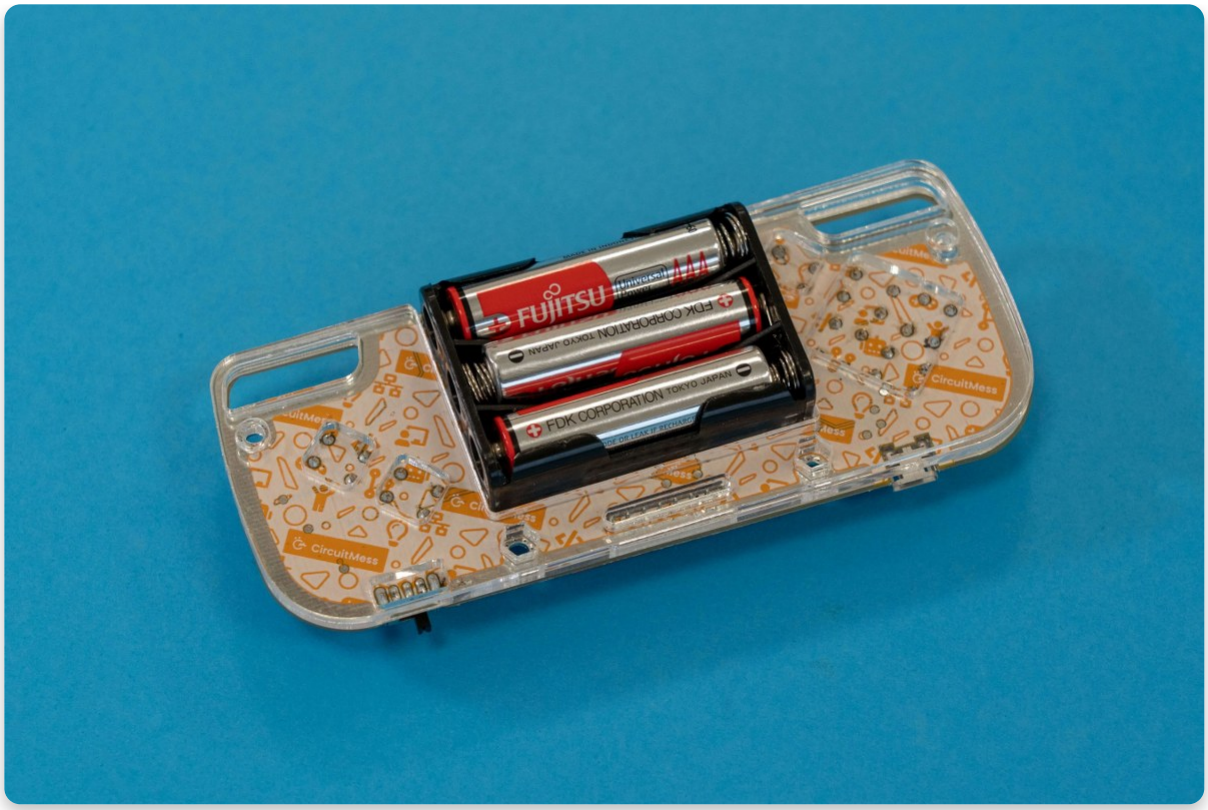






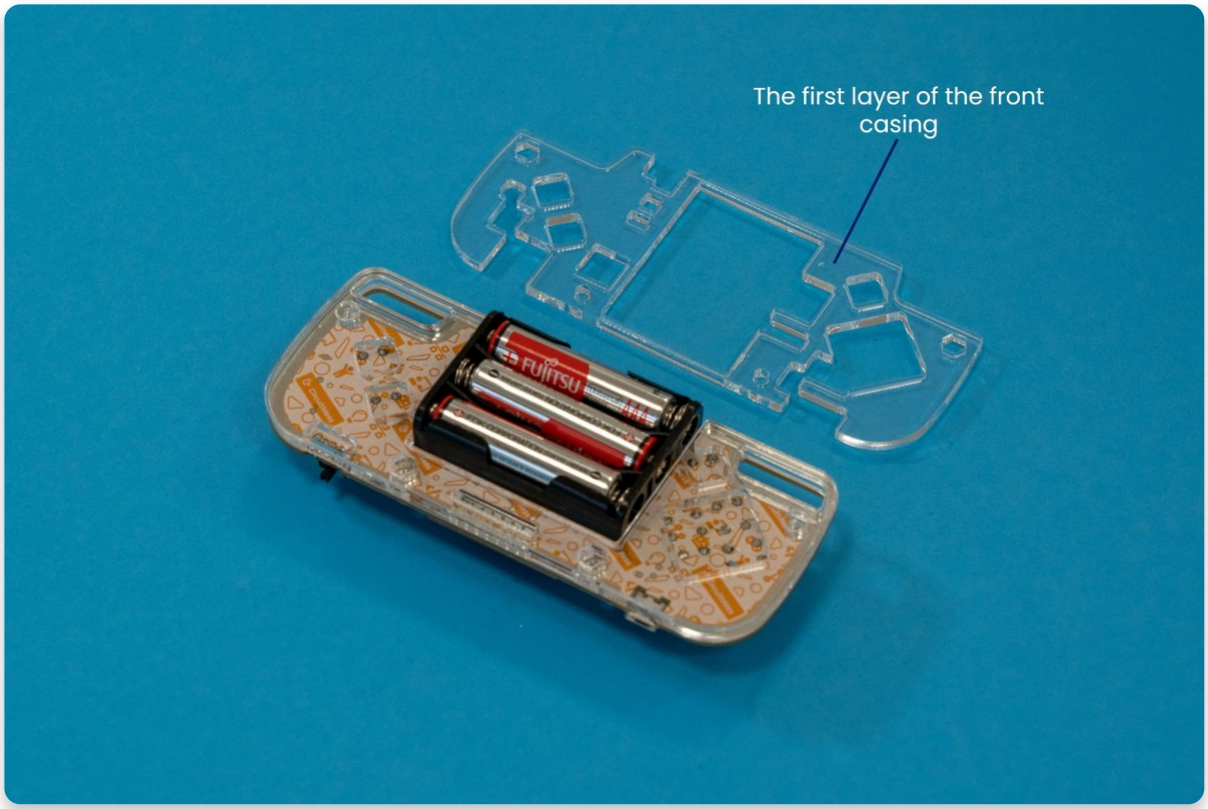


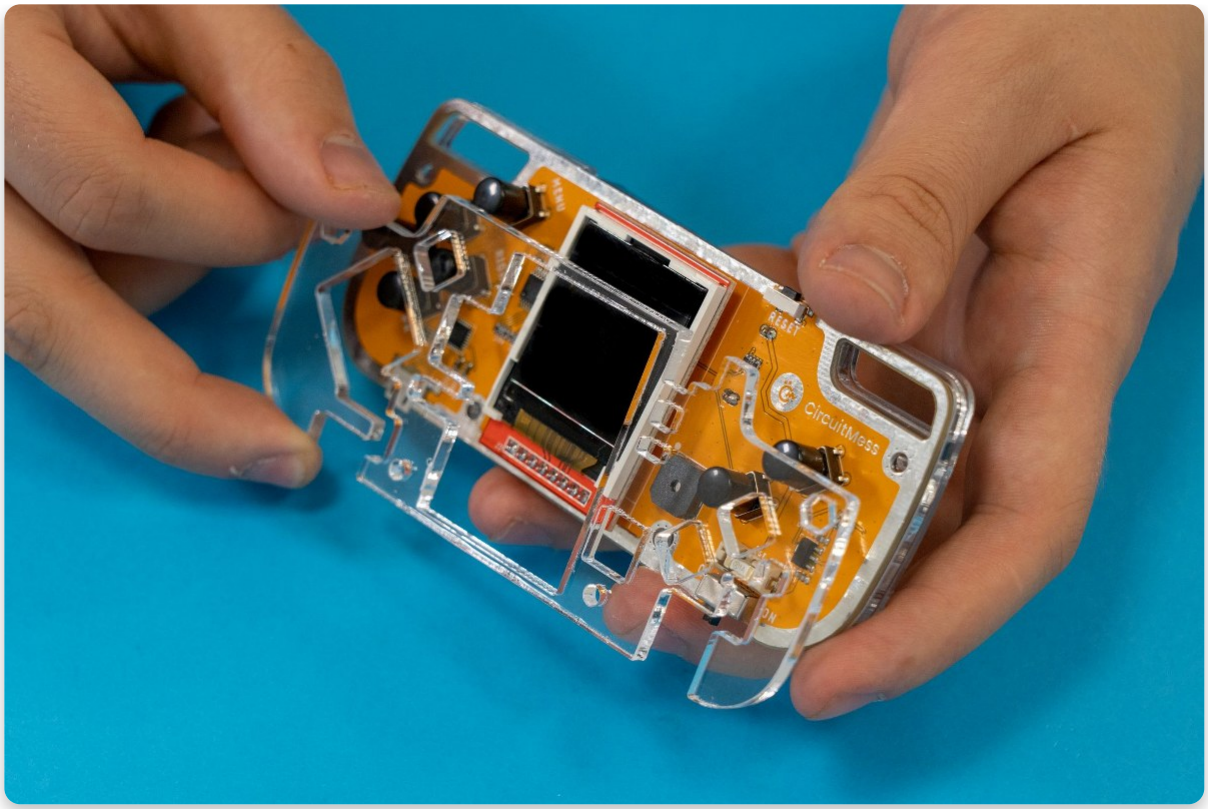
The back casings in the correct order

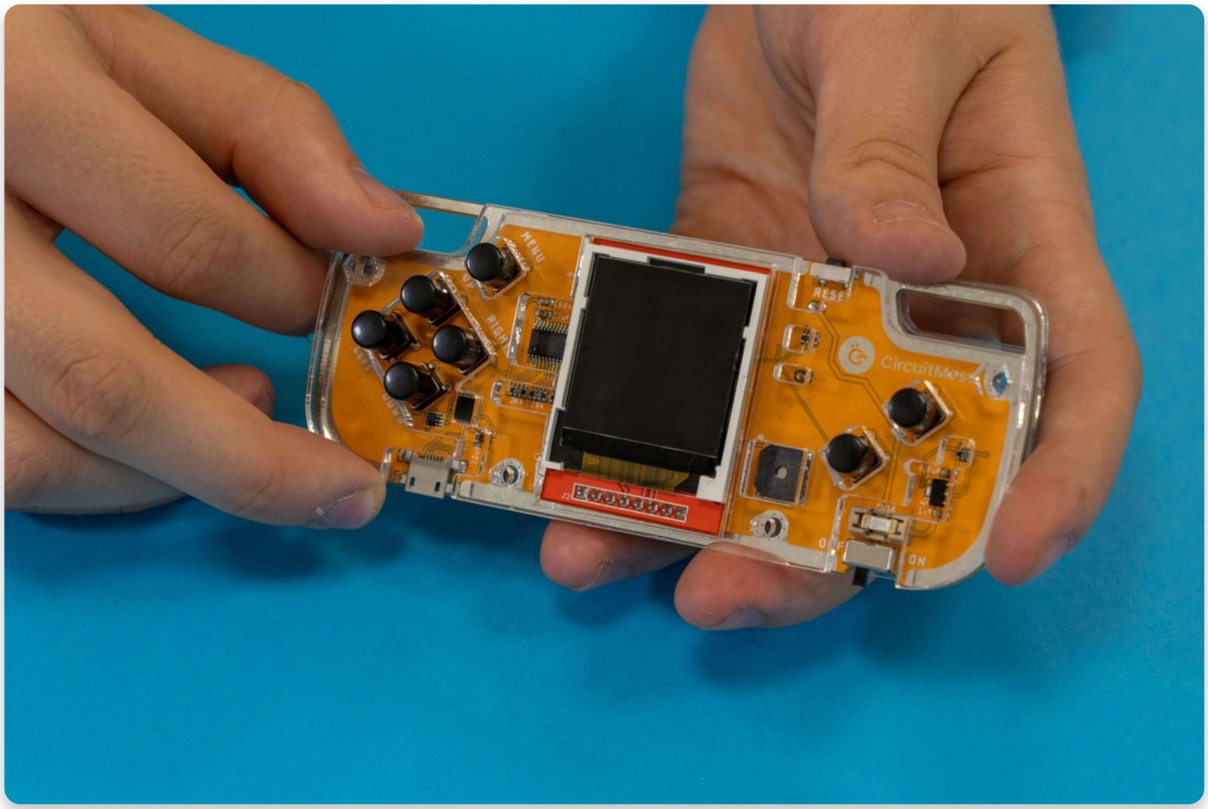


After you layered the back casings, take the first layer of the front casing and place it at the front while holding the ones in the back.

Remember, a layer with the most holes goes closer to the board!

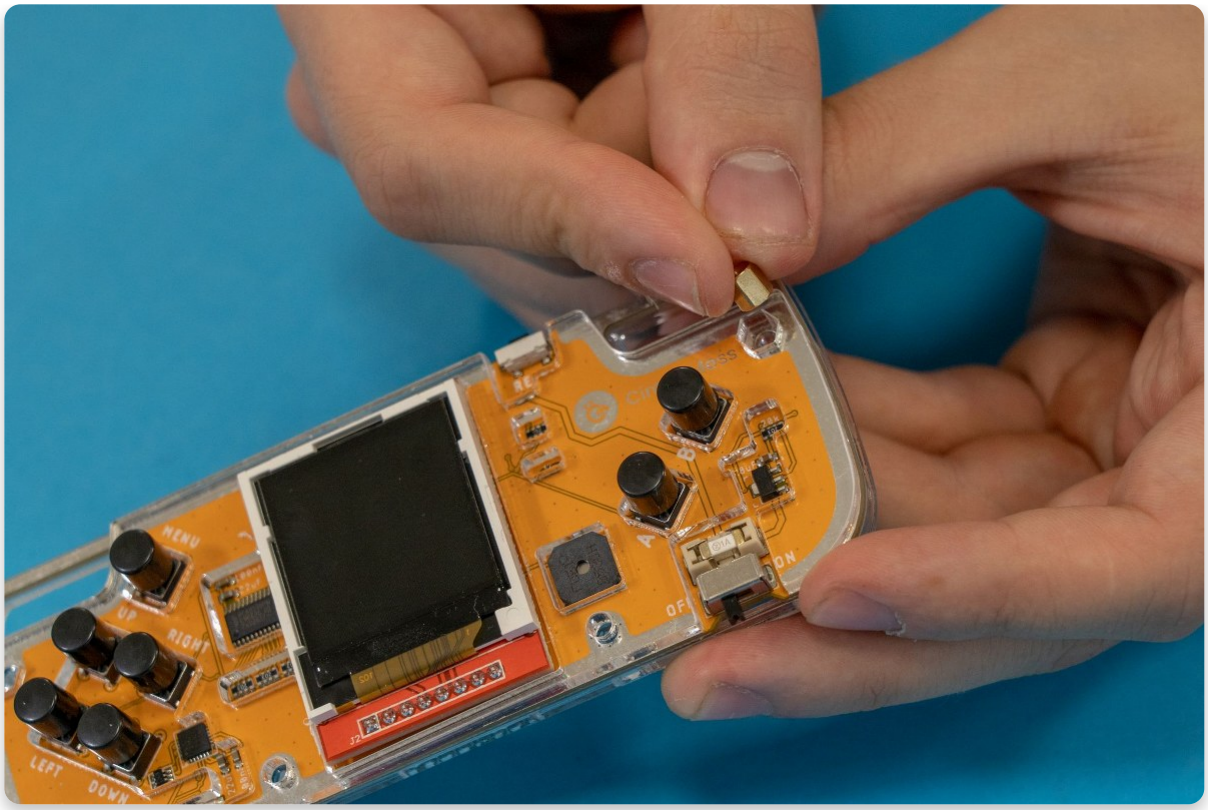


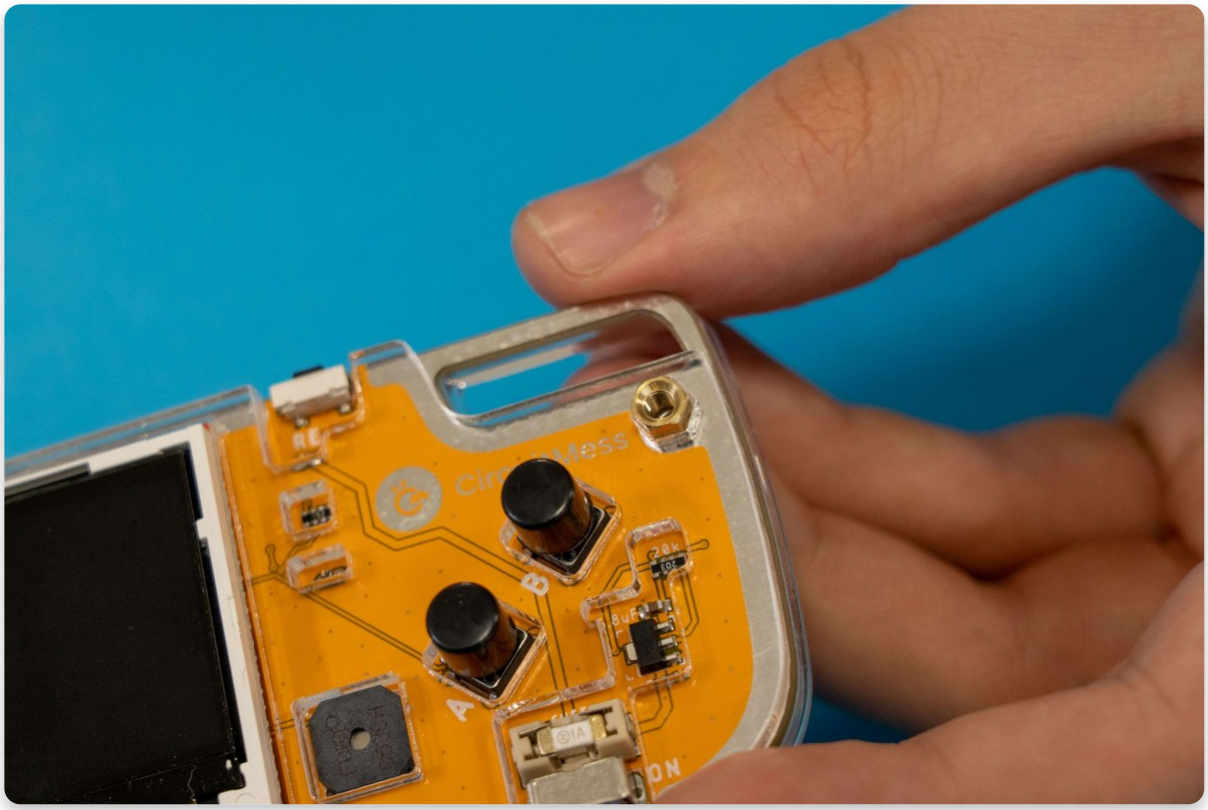




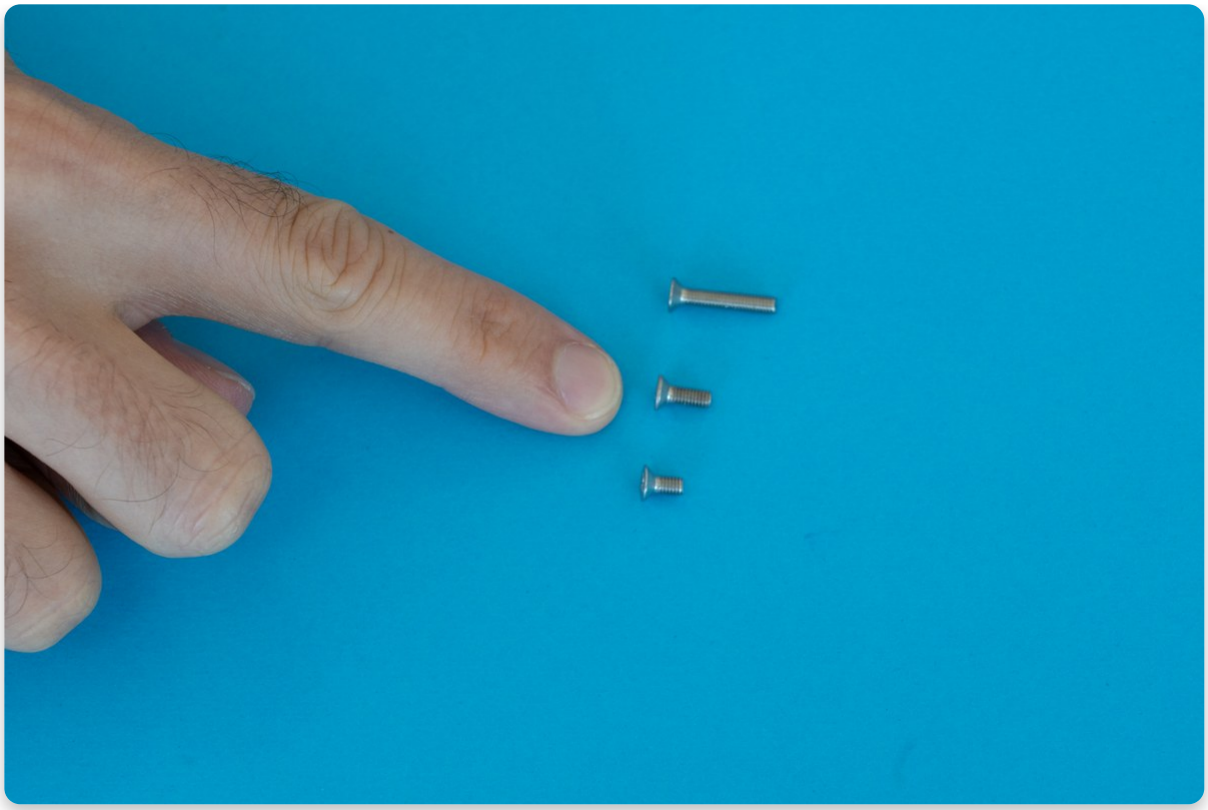
The first layer of the front casing

While you're holding the back layers of the casing and the one layer at the front, take the 4mm golden spacer (the smaller one) and it through one of the holes on the upper side of the board, close to the side edge.





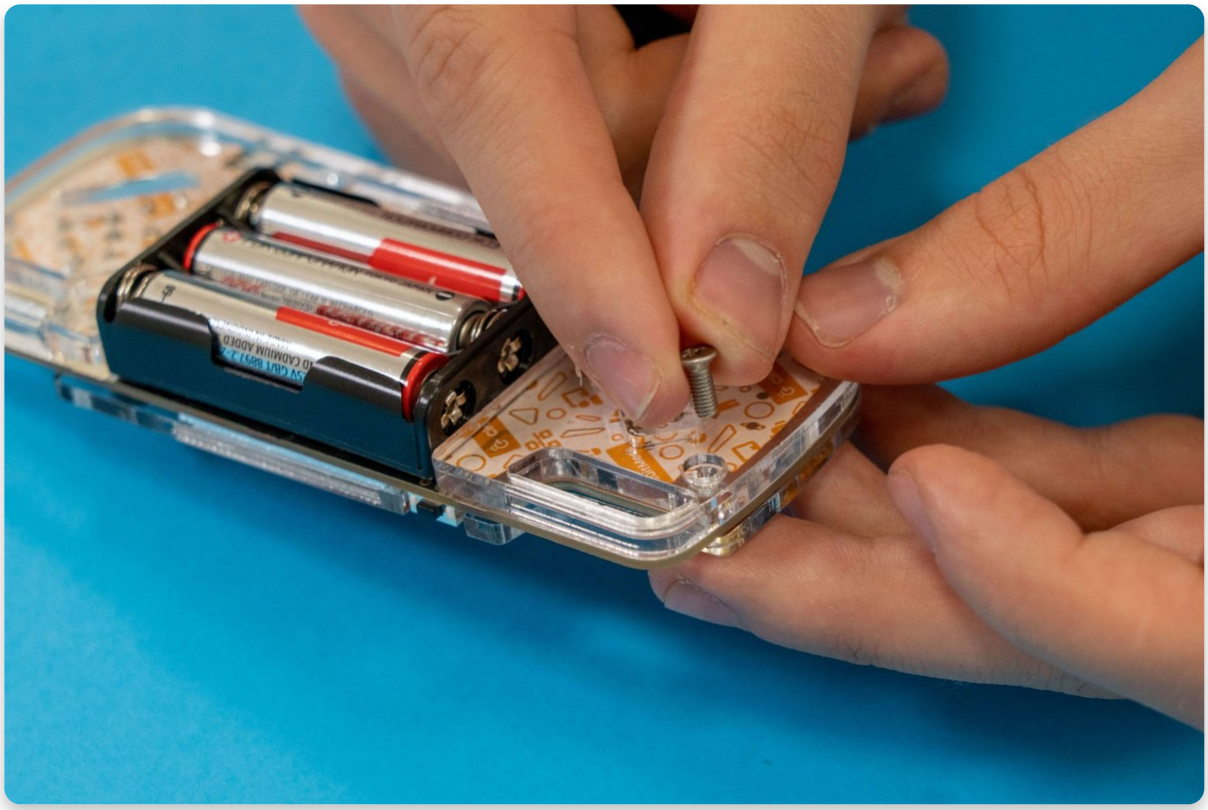
Now it's time to take one of the bolts. **For this one, take the 8mm metal bolt, the one that is not the shortest, but also not the longest.**



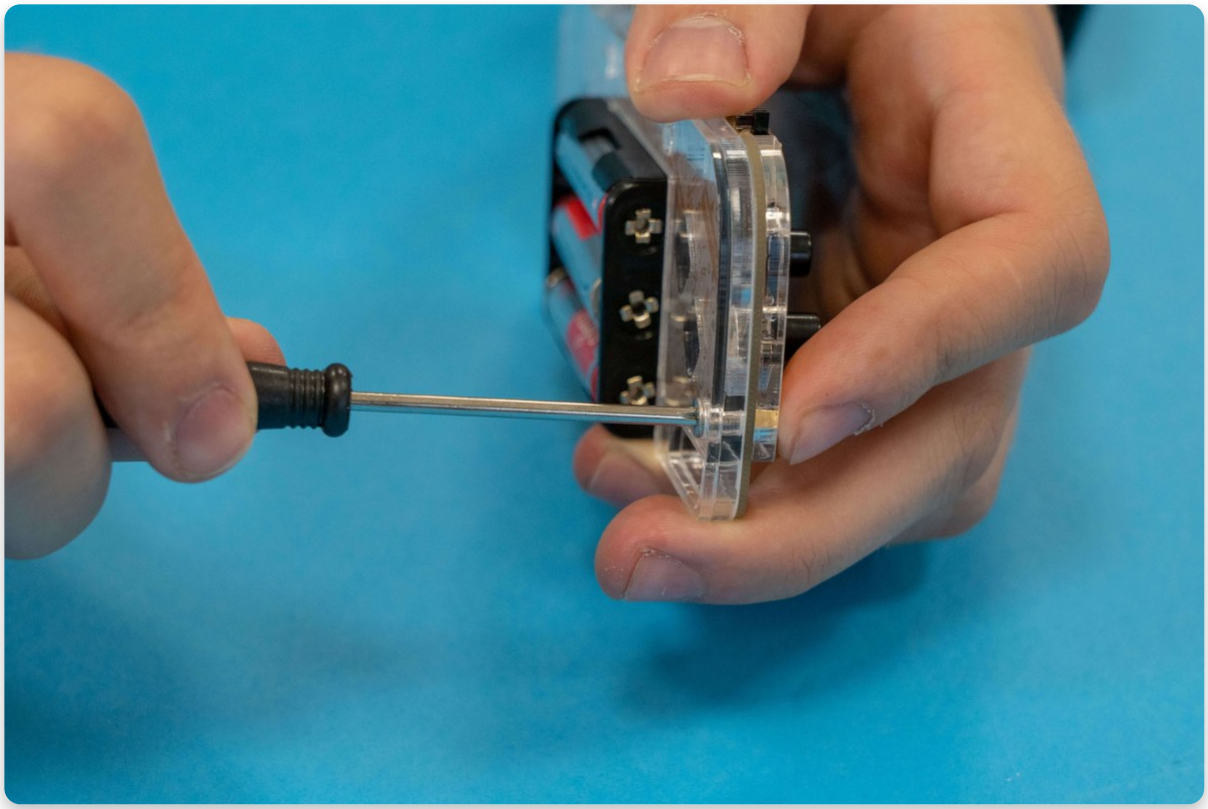
The 8mm metal bolt

Place the bolt through the hole on the back side of the board where you just placed the golden spacer.

Once you make sure that the bolt fits into the golden spacer, you can use the screwdriver to tighten the casings. Tighten the bolt by holding the golden spacer tightly with one hand and screwing the bolt from the other side with the screwdriver like in the photo.



Placing the bolt into the hole



Tightening the metal bolt

Repeat the same process on the other side of the board, with the same sized bolt and spacer.

Both bolts and spacers placed and tightened from the back

Both bolts and spacers placed and tightened from the front

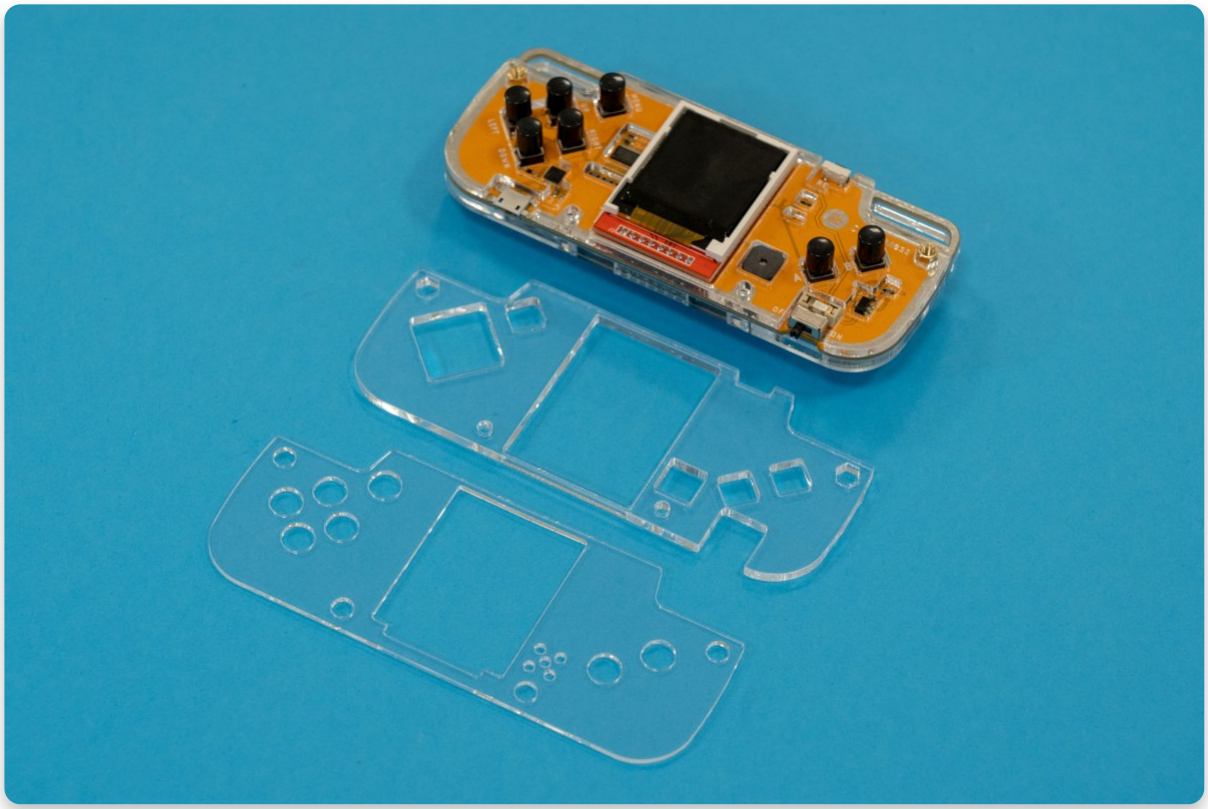
You're doing great! Half of the job is done!

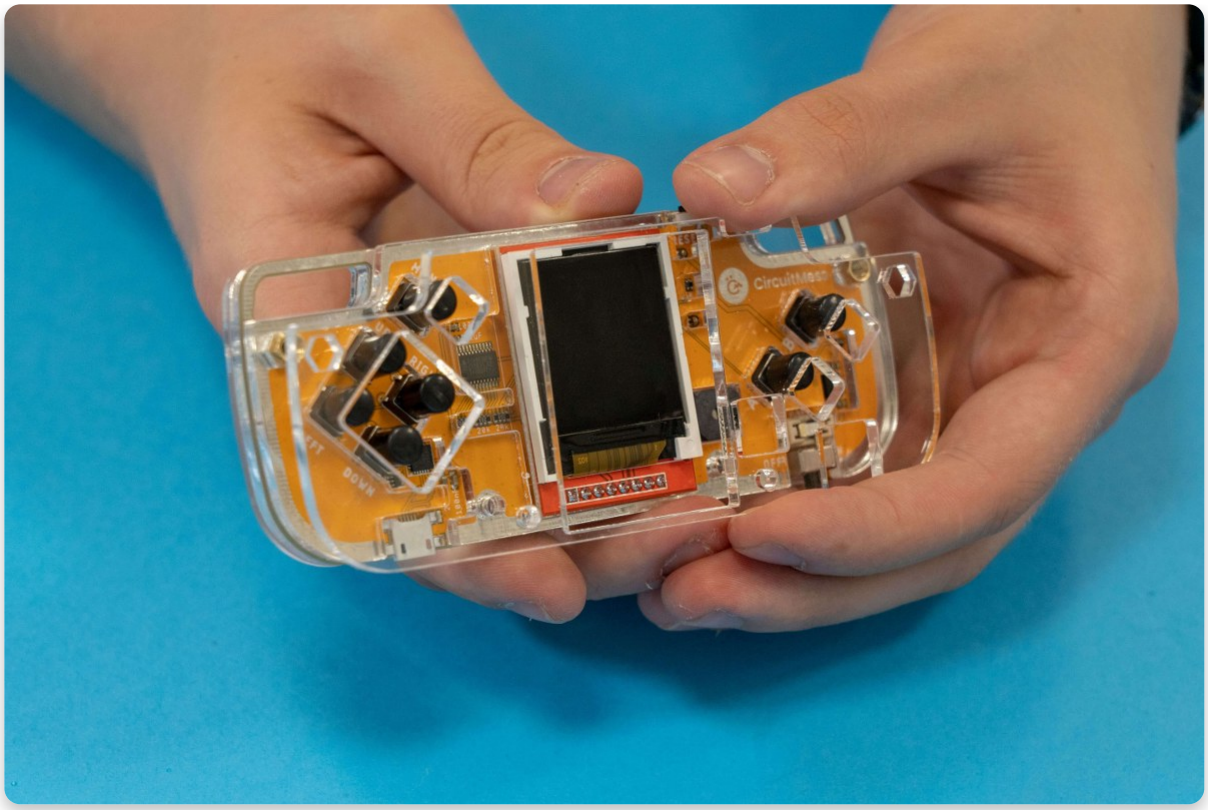
Before putting the bolts in the remaining two holes, you need to layer the rest of the front casings first.

This one is going to be easy since you already tightened the first front layer of the casing. Remember the rule? **Always put the part with more holes closer to the board!**

Find the layer with big empty rectangular holes on both sides, and put it on the board.

The part with little circular holes for the buttons and the buzzer is the last one and goes on top.

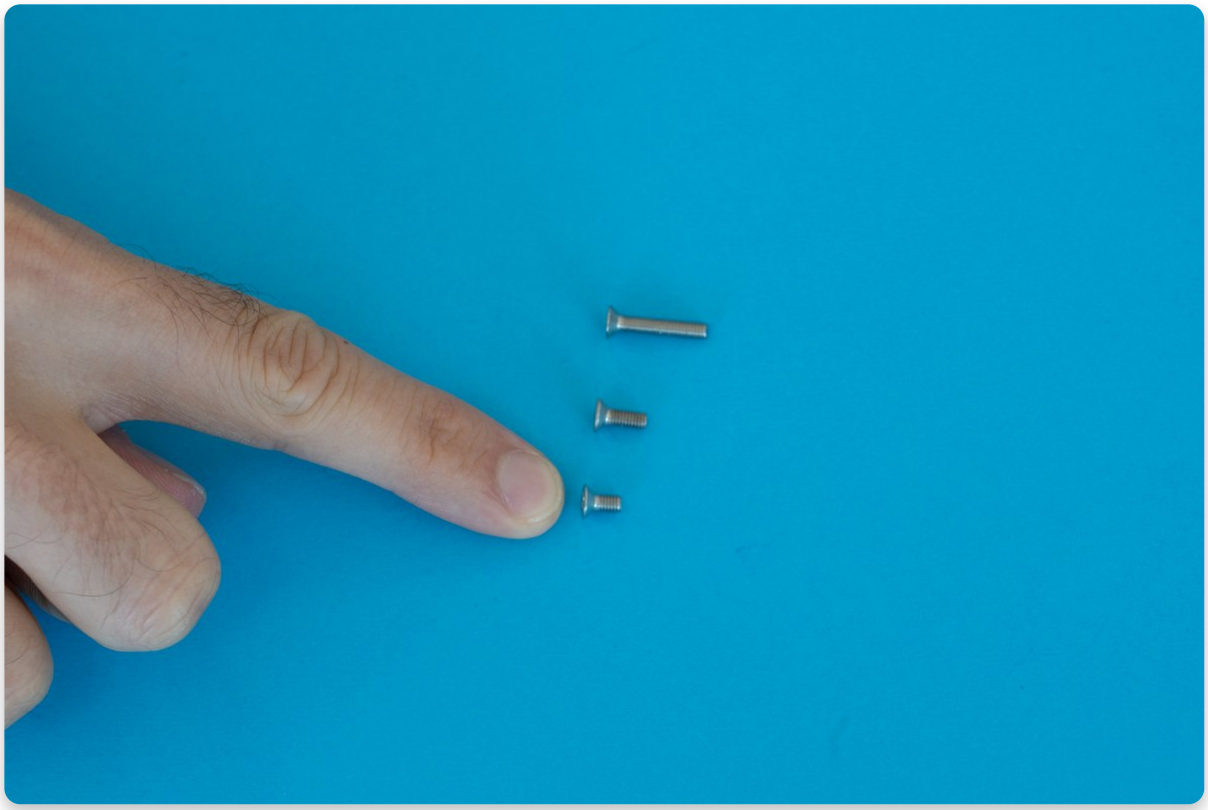




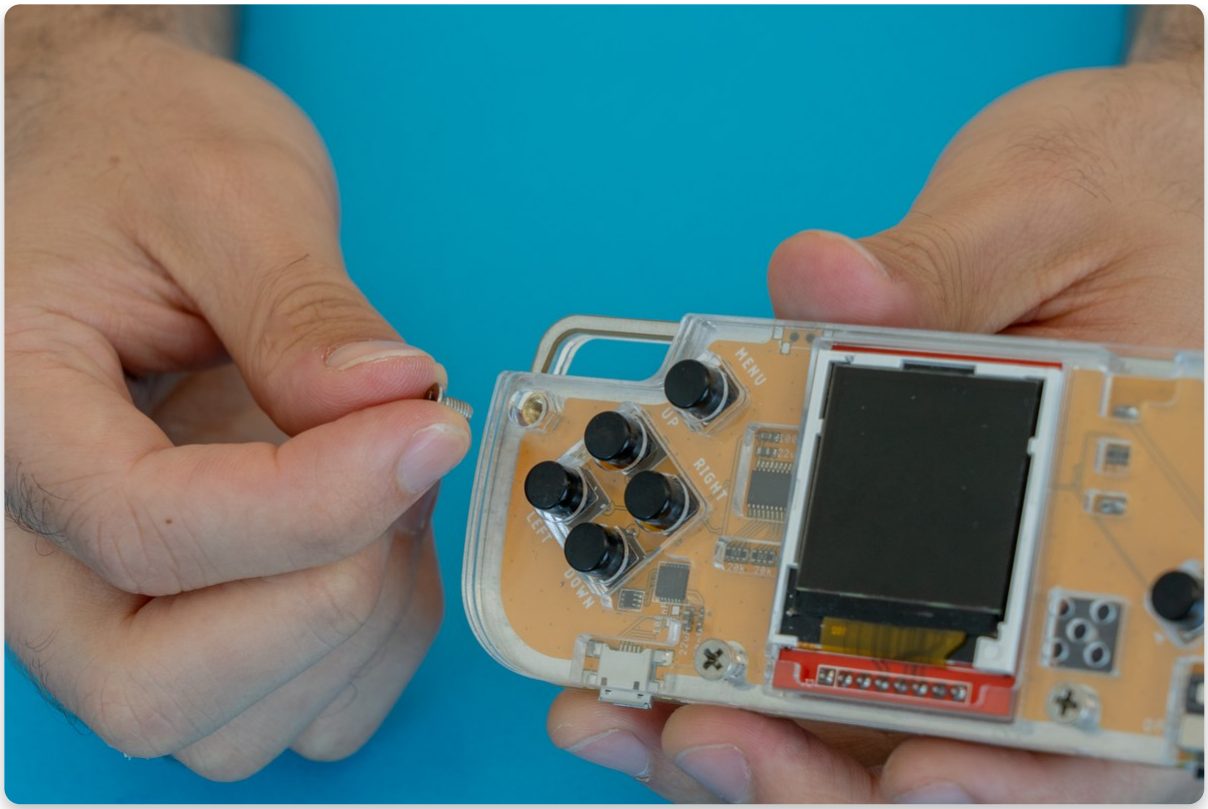
Placing the middle layer

Placing the top layer - the final layer of the "sandwich"

These casings are probably going to fall off pretty easily now. That's why we need to make them stick. Take two of the smallest 6mm bolts and place them inside two golden spacers that you've already put in place in the previous step. Tighten them using the screwdriver.



The 6mm bolt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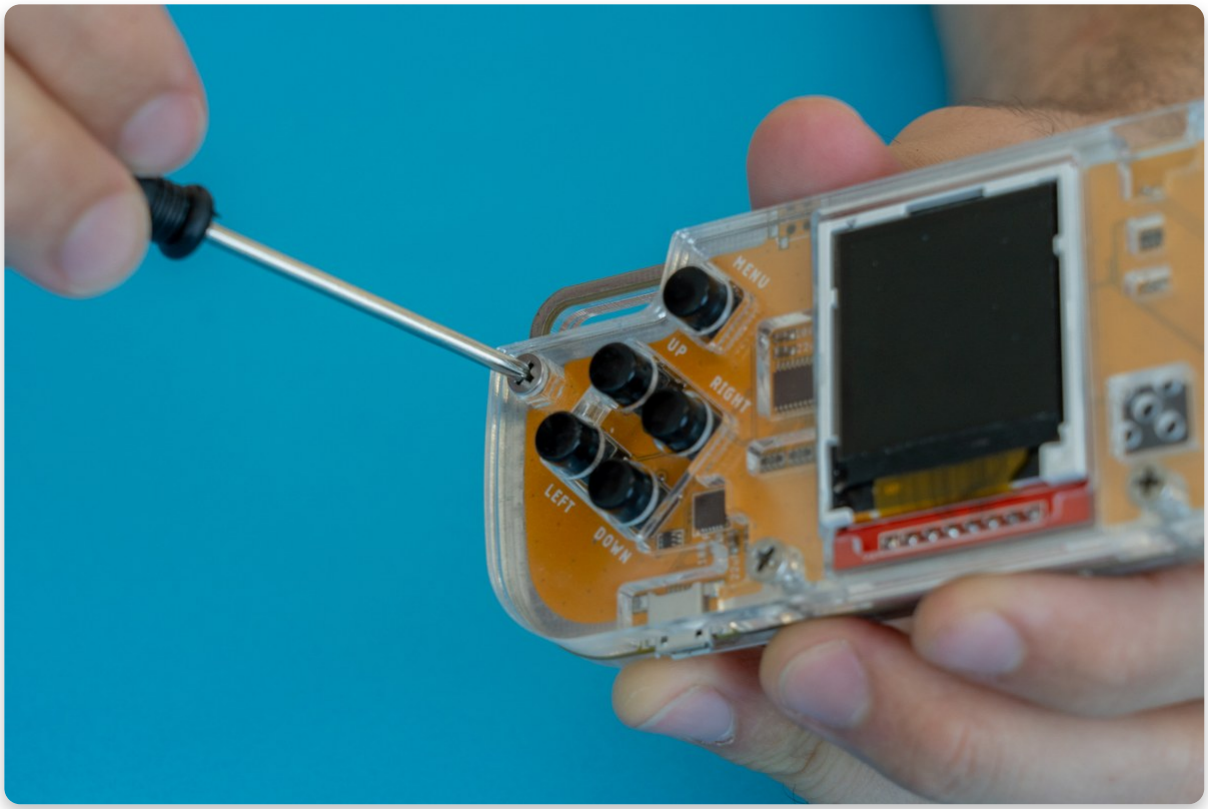
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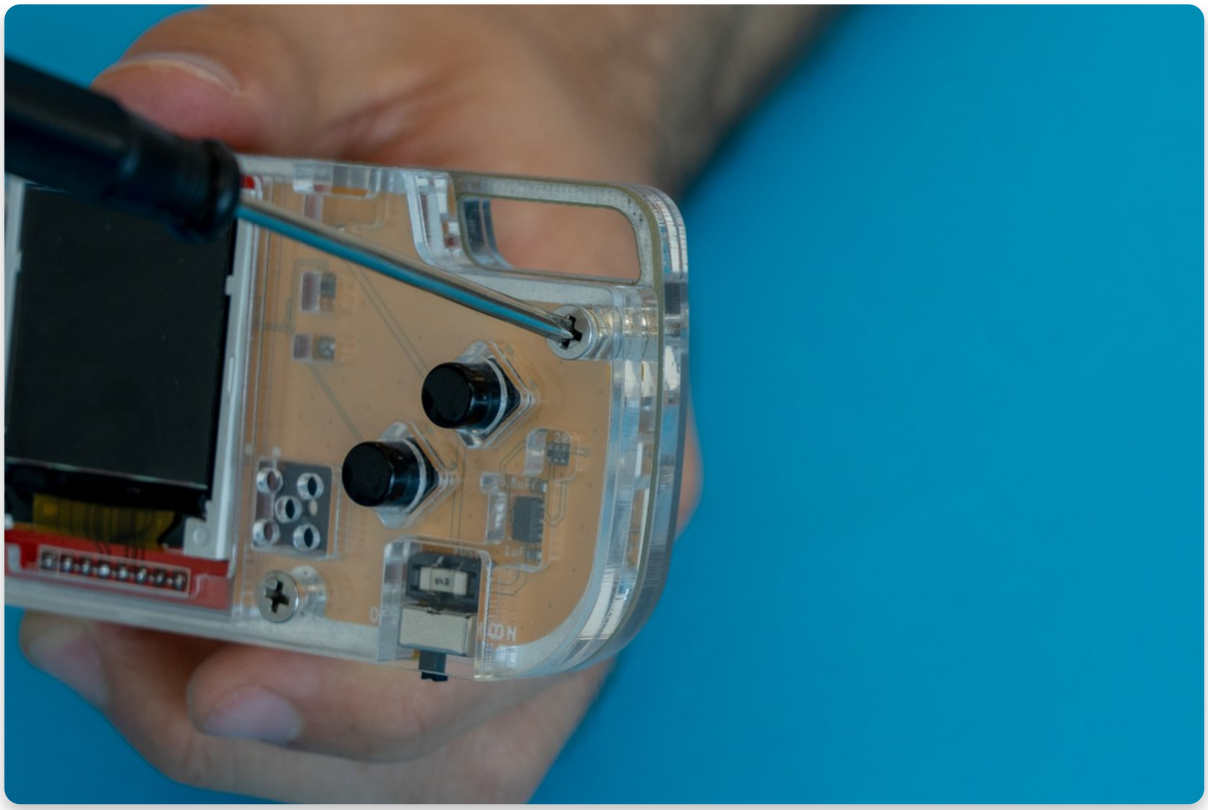
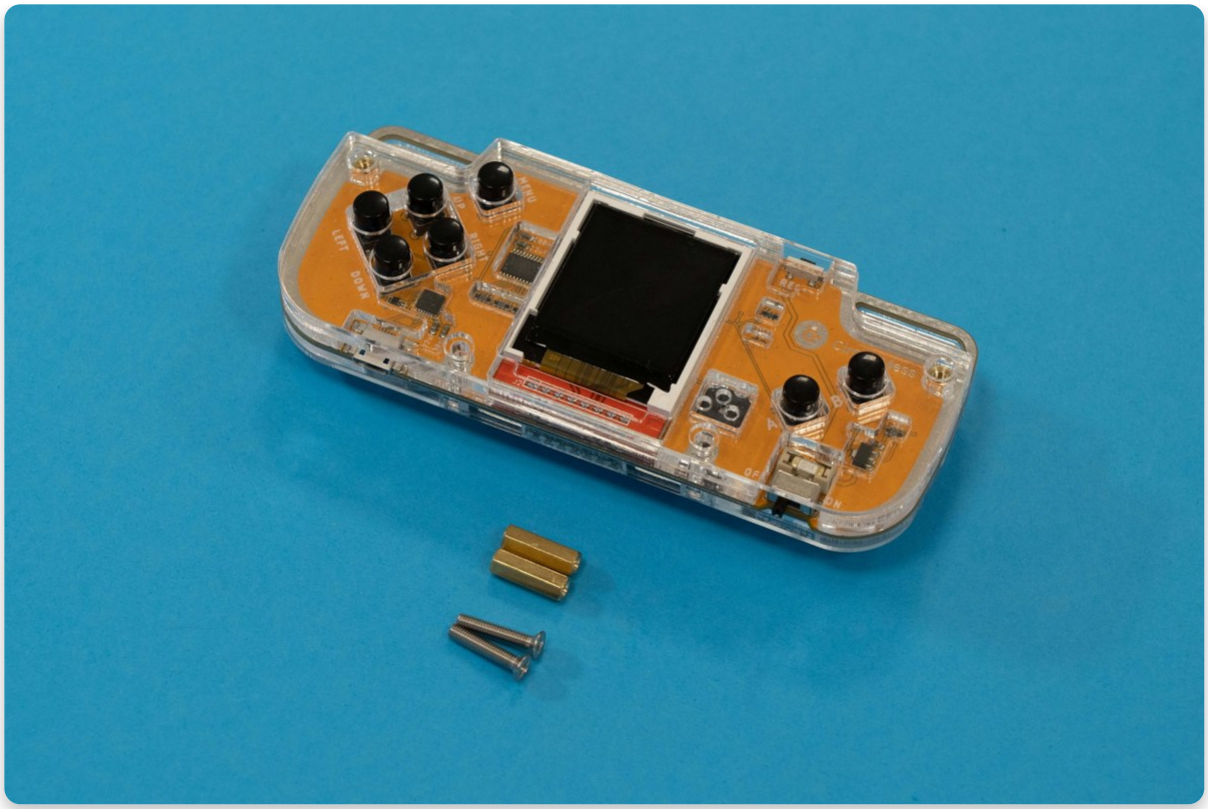


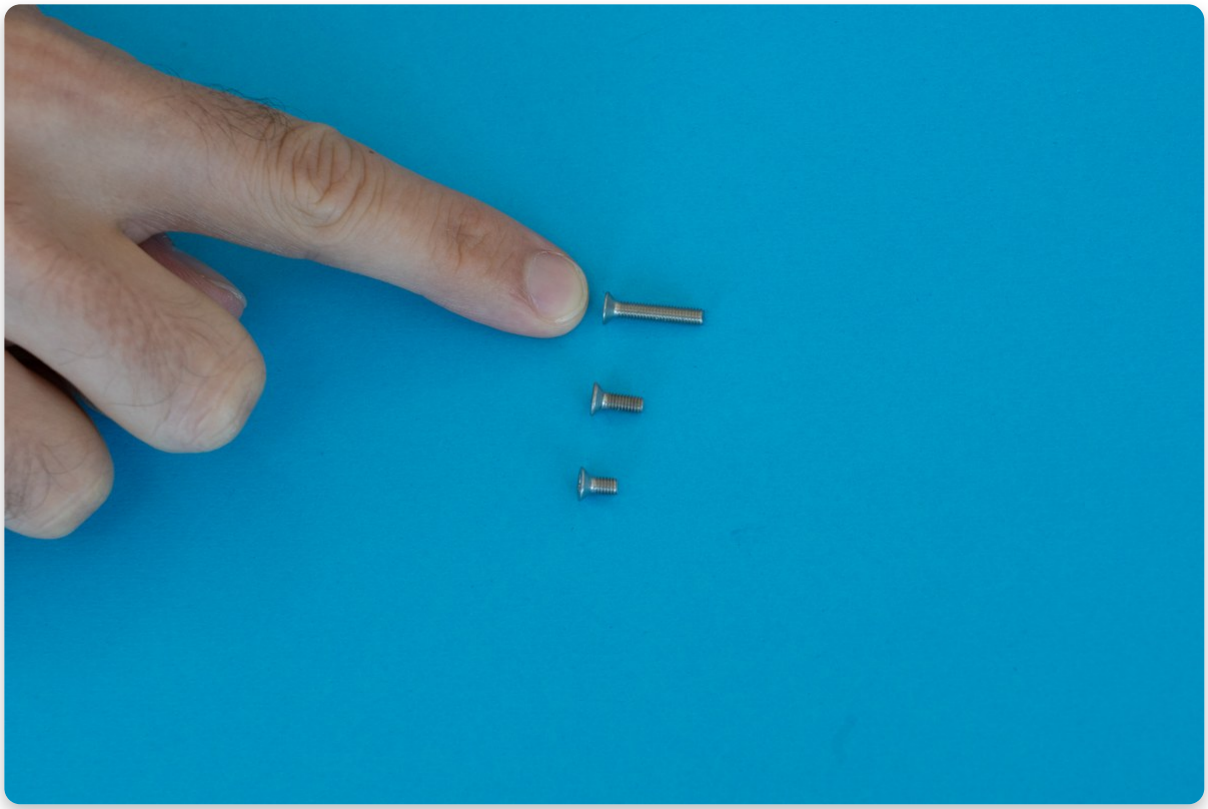
Making sure everything stays in place while placing the rest of the bolts and spacers

Now both casings are in place and won't go anywhere.

However, there are still a few more bolts to tighten.

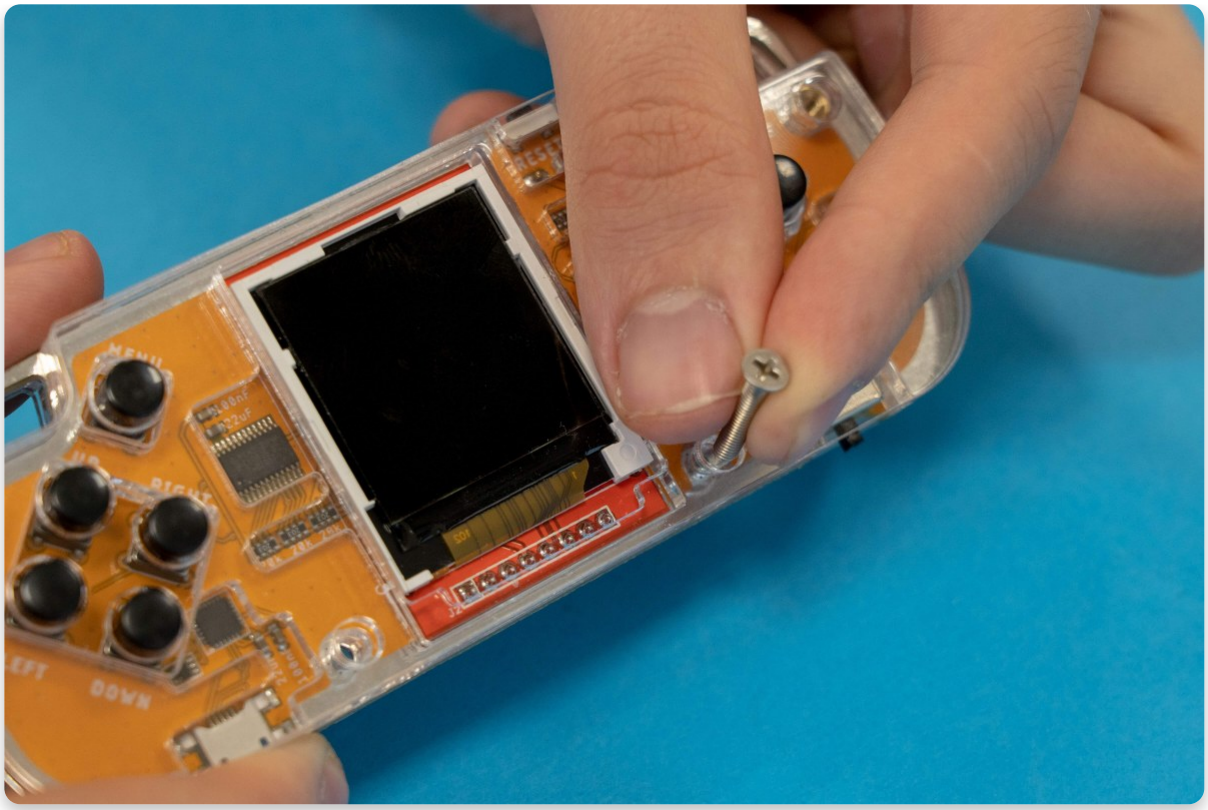
Let's fill the holes on the bottom of the console, right next to the bottom part of the screen. For this one, you're going to need the longest bolts (16mm) and the longest spacers (14mm).



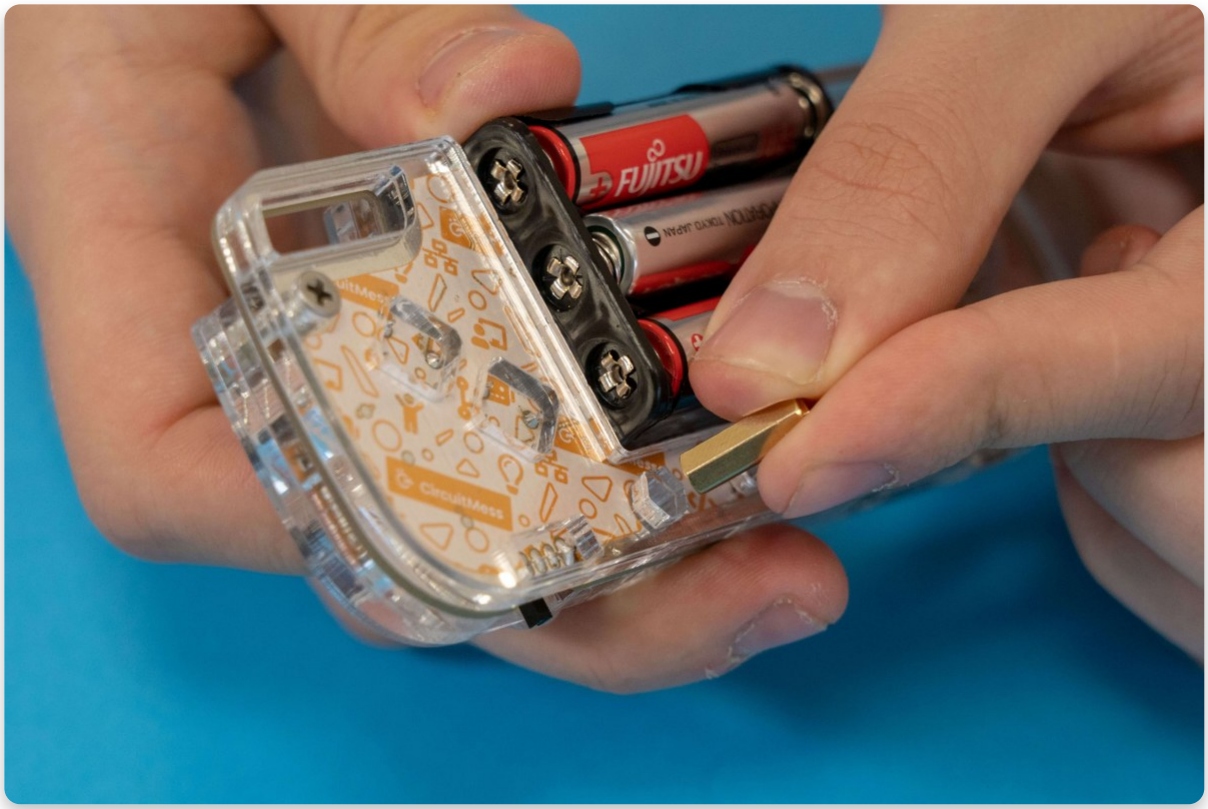


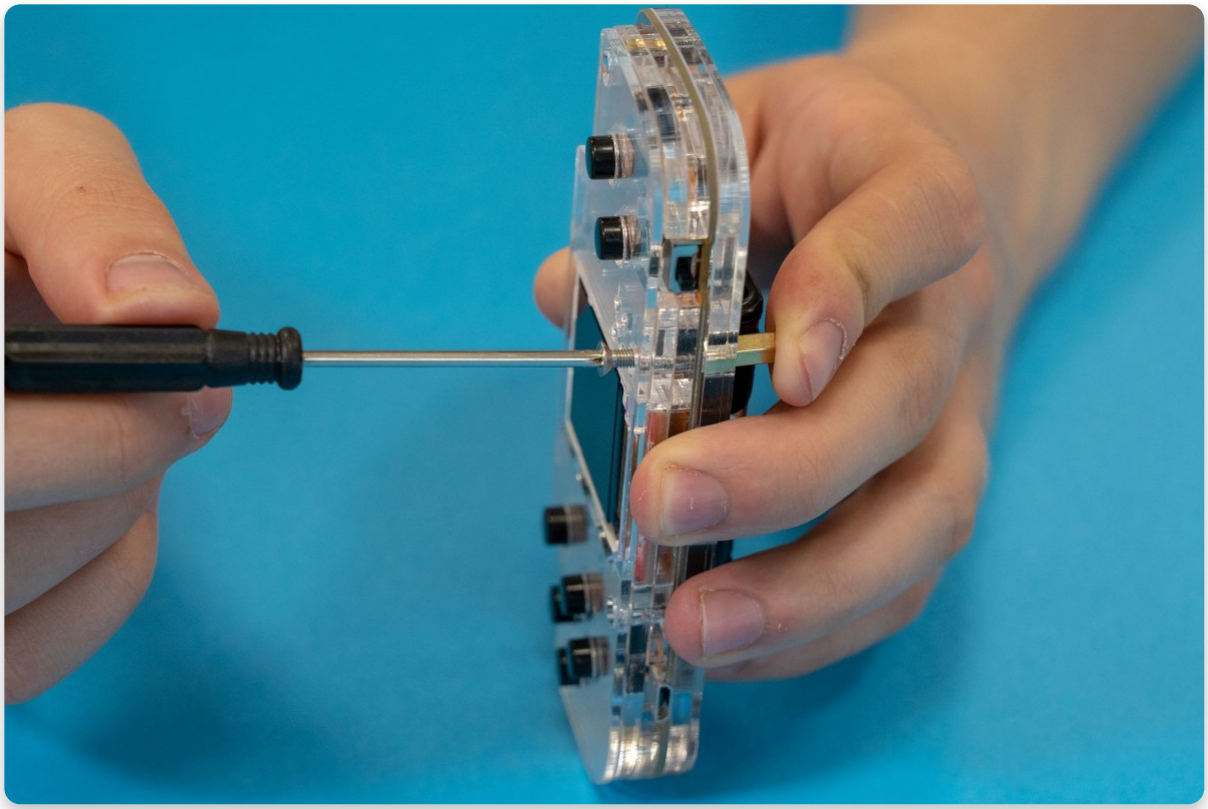
The 16mm bolt

Put the bolt in one of the holes in the casing from the front side (the side where you can see the screen).



Take the spacer and place it on top of the bolt from the back (mostly white side of the board). Tighten the bolt and the spacer using the screwdriver. Repeat the same process for the other hole.



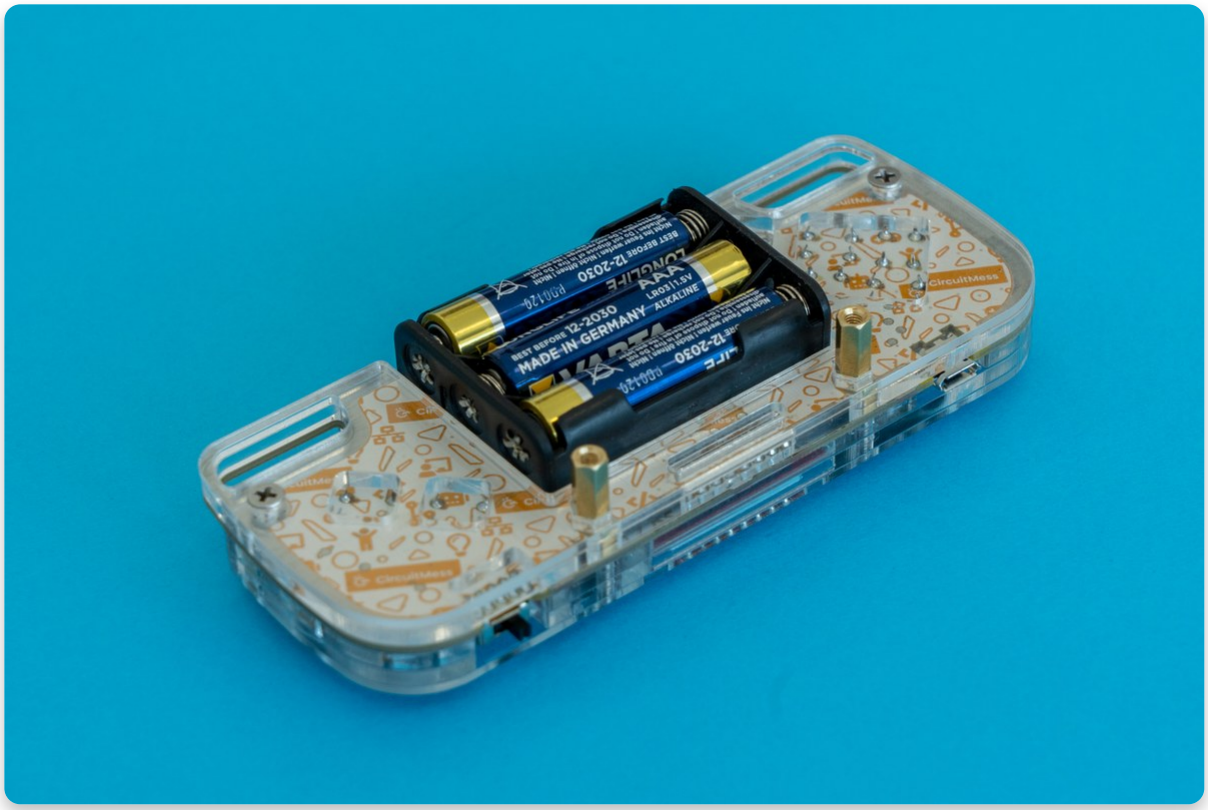


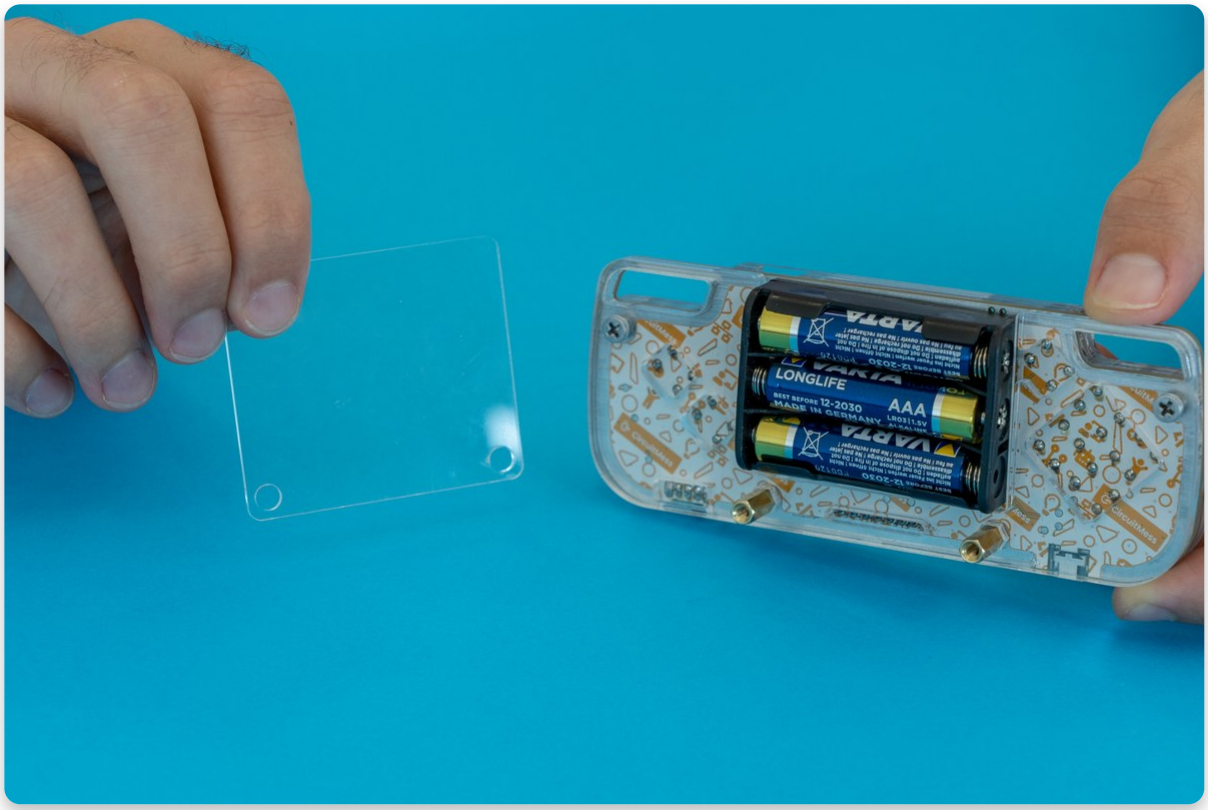
Tighten them with a screwdriver

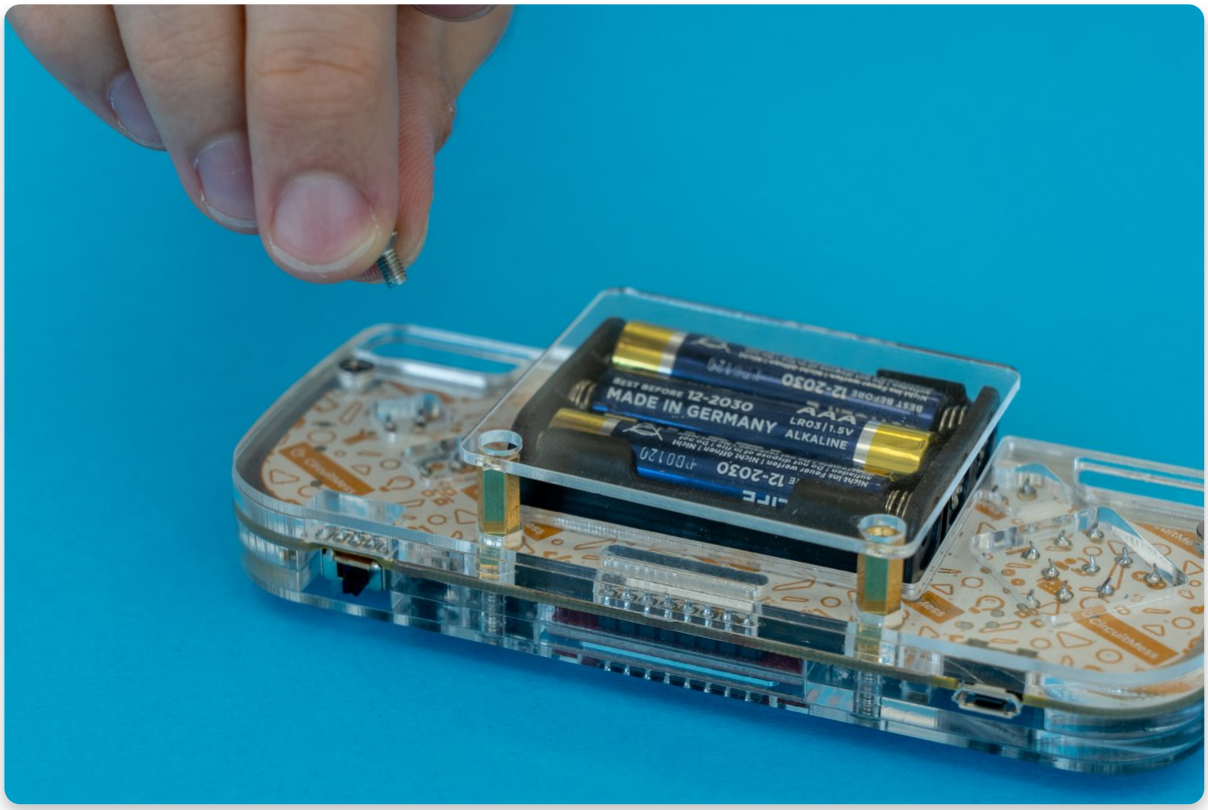
If the batteries are already inside the battery holder (which they should be from the chapter - first check) then you just have one final step left!

If you've taken them out in the meantime, or just never did the check, now is the time to place the batteries in the holder.

Now for the final touch, take the last piece of the transparent casing, the small rectangle, and place it on top of the batteries so that the holes are aligned with the golden spacers.

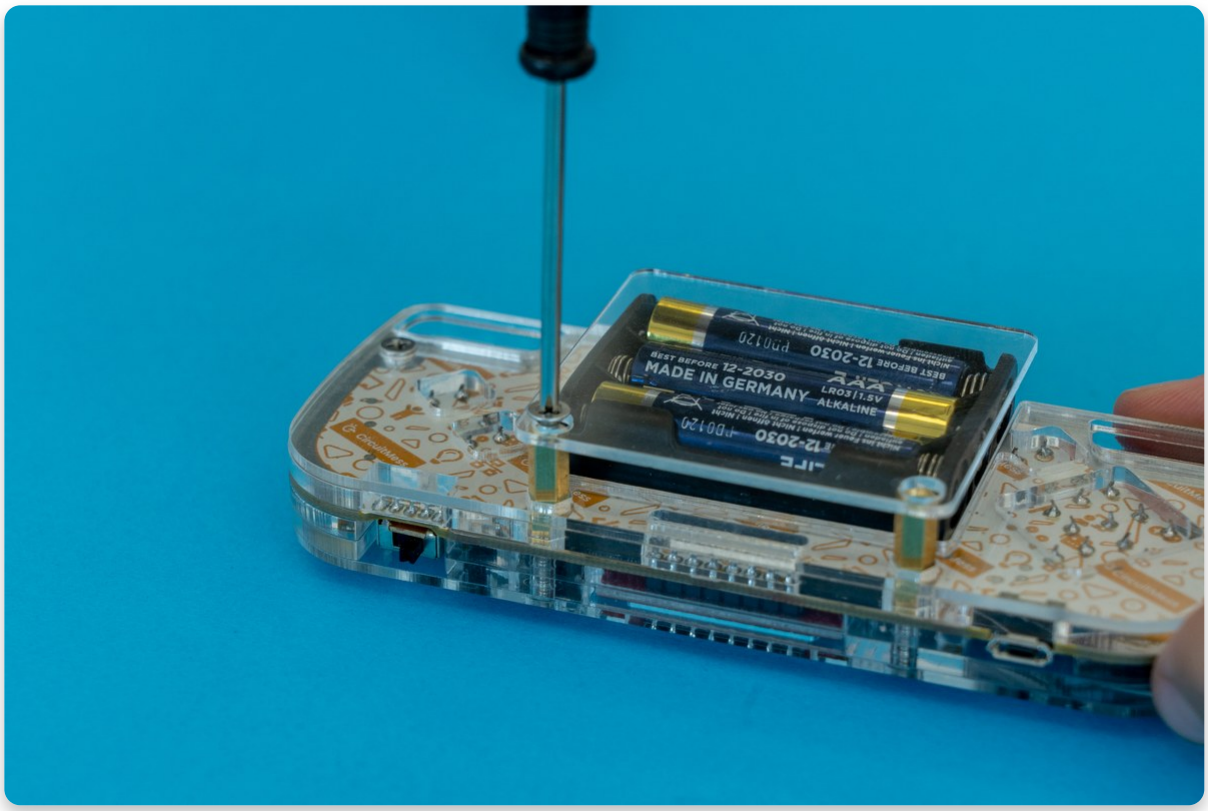


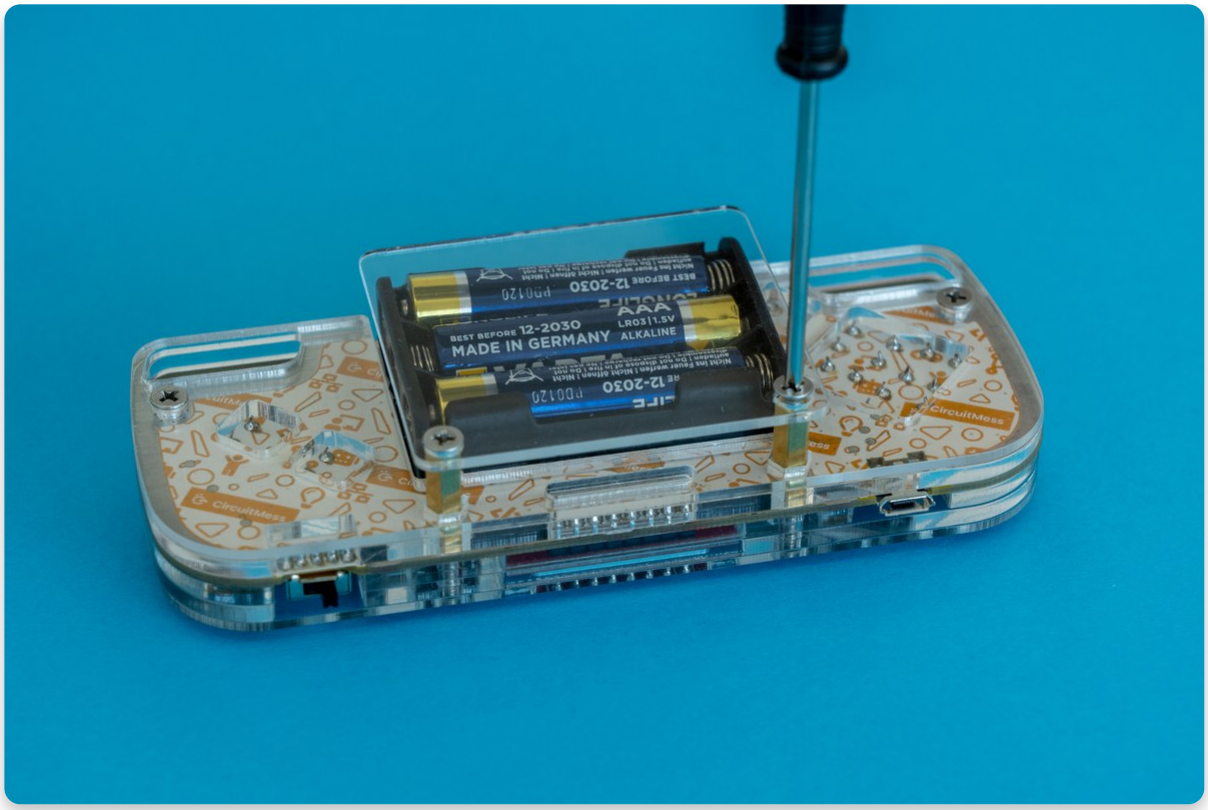




Putting the plastic cover on top of the batteries

Take another two smallest 6mm bolts and screw them into the spacers, so that the battery plastic cover gets nicely tightened up.





Tightening the bolts on the battery cover

Use the screwdriver to tighten all of the bolts if necessary additionally.

Voila! You have just completed the assembly of your own brand new gaming console - Nibble!

REMEMBER

Only one more final step to do before turning it on. You can now finally take off the plastic peeling from the screen (if you haven't already). Just grab the little green part and peel it off.

Turn the console ON and start enjoying your Nibble!

The assembling is done, but programming and gaming are just beginning.

You should be proud of yourself - it's game time!

> ! Make sure you turned off your soldering iron! Unplug it from the power source, place it on the soldering iron stand and let it cool off for at least 5 minutes before you put it away in your tools box.

What's next?

Good to know

There are a couple of additional things you need to keep an eye on while using the console.

The micro-USB to USB cable is used to connect the console to your computer and to download new software updates as well as to upload your own games created using CircuitBlocks!

Micro USB cable

Connecting your Nibble to the computer

What is CircuitBlocks you say?

CircuitBlocks is a graphical programming interface that helps newbies get into embedded programming.

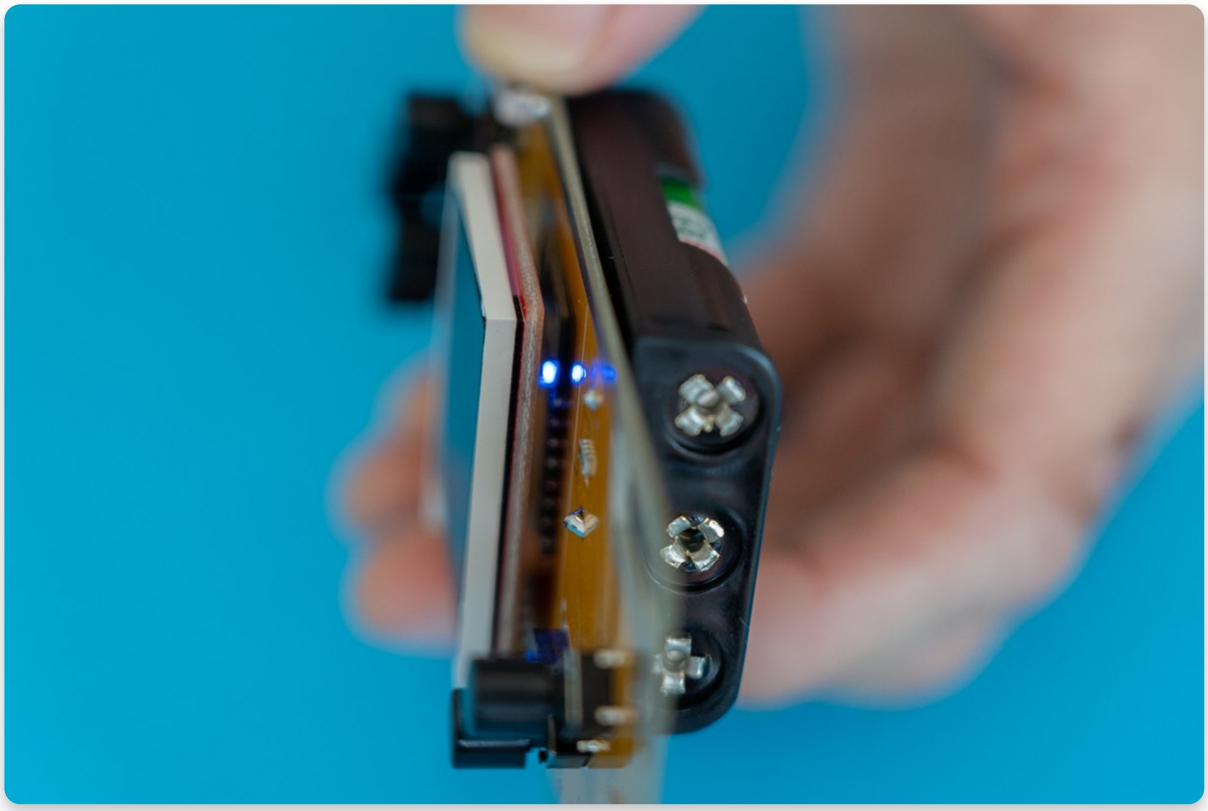
It's based on Microsoft's MakeCode and PXT-Blockly (Google Blockly fork) and it presents the user with a slick Scratch-like interface in which they connect logic blocks to generate code for their MAKERphone and Nibble (and soon other CircuitMess devices).

You can find more about CircuitBlocks **here.**

Once connected to your computer, make sure to turn the console on so it gets recognized.

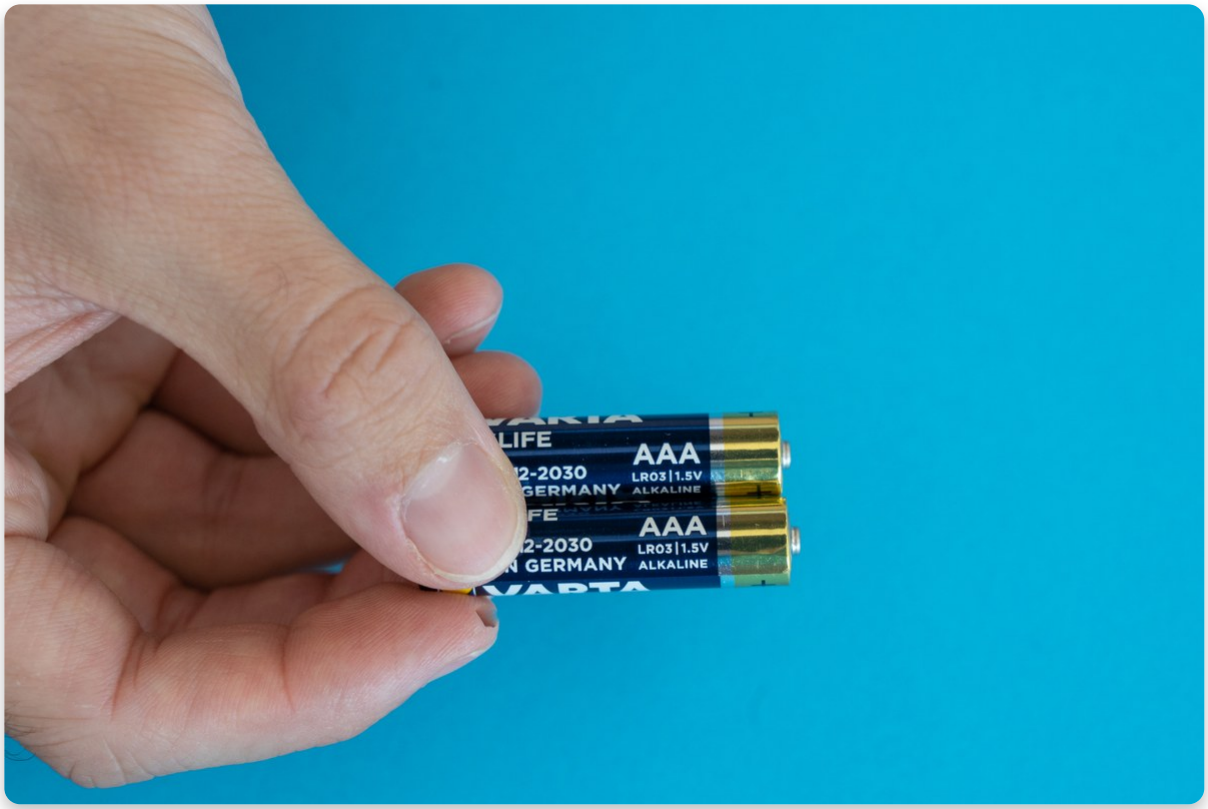
Additionally, there is also a small button on top of the console, which is used to quickly **reset** the console. Use that button whenever the console gets stuck or if it's loading for too long. However, do not touch this button while playing the games since it will erase your game progress!

There is also a small blue light underneath the screen that should be blinking while the console is on. You probably won't see it from all these casings, but if you do, don't be surprised - it's an indicator that your console is working.



The blue blinking light - an indicator of a working console

Finally, if your batteries ever run out of juice, make sure to replace them with AAA (triple-A) batteries. It's best to use the batteries from the same pack since they are all going to last for the same amount of time.



Now enough talking, let's get playing!

You can play one of the four games that are already pre-loaded on your Nibble, or **create your own custom games** which is even more fun.

If you're not sure how to start with programming your own game, check out our **Nibble coding guide** that will guide you through coding your first game:

- **Nibble coding - First steps**