



# GlowCore v3.0

# User Manual

Learn everything you want to know about your GlowCore dev board.

[glowcore.glowingkitty.com](https://glowcore.glowingkitty.com)



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Make sure you did read the **Quick Start Guide** first,  
with all the basic details on how to use GlowCore:



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glowingkitty

### Quick Start:

Control via WiFi:  
GlowCore  
letsglow  
[bit.ly/42onryr](https://bit.ly/42onryr)

Documents:  


GlowCore v3.0

# Quick Start Guide

Learn how to get started  
with your GlowCore dev board.

# Chapters

page

Introduction	5
Specifications	6
Safety & Maintenance	8
Safety advise	8
How to clean GlowCore	9
GlowOS	10
Overview	10
Segments	11
Effects	12
Colors	13
Presets	14
Backup & restore data	15
WiFi Setup	16
LED Preferences	17
More questions	18

<b>Smart Home</b>	19
Alexa	19
Home Assistant	19
<b>Write your own code</b>	20
Circuit Python	20
GlowOS Usermod	20
<b>Modify GlowCore</b>	21
Connect LED strips	21
Add additional components	22
<b>Troubleshooting</b>	23
Update/Reinstall GlowOS	23
<b>More documents</b>	24

Still have open questions?  
Write me an e-mail!

[support@glowingkitty.com](mailto:support@glowingkitty.com)

# Introduction



GlowCore is a development board for makers, to build their own LED projects with ease. Not limited by bulky PCBs that take up too much space for many of their projects, and without having to worry about flickering LEDs or random restarts, because of missing components that are recommended for running an LED project reliably. GlowCore contains all the components you would want for a basic LED project - from the beloved and powerful ESP32-S3 (with a dual-core processor, WiFi, Bluetooth, USB to Serial, JTAG via USB, and more), up to a level shifter for 5V LED strips (to prevent flickering), and MOSFETs to completely turn off the LEDs and disconnect them from power.

# Specifications

## Size & weight



**Width:** 20mm  
**Height:** 40mm  
**Thickness:** 4.5mm  
**Weight:** 4g

## Pads



Access a huge range of features for your projects:

- 15 GPIO pads
- 5V + 3.3V power
- I2C
- I2S
- SPI
- Analog to Digital
- Touch

## Microcontroller



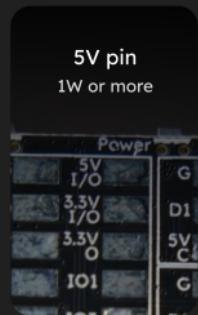
### ESP32 S3

- programmable via C++ & CircuitPython
- dual-core processor, up to 240MHz
- 8MB flash storage
- WiFi 802.11b/g/n
- Bluetooth 5 & Bluetooth LE
- USB to Serial
- JTAG via USB

## Power source



**USB-C**  
1W or more



**5V pin**  
1W or more

## Status LED



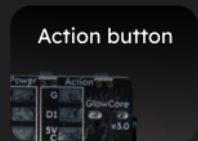
### SK9822

- RGB LED
- controllable just like regular WS2812B LEDs
- can be turned on/off - your choice

## Control options



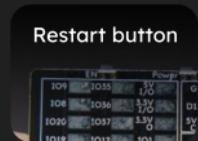
**WiFi**



**Action button**

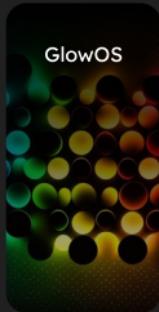


**Power button**



**Restart button**

## Firmware



- Control GlowCore via WiFi
- Over 100 LED effects
- Compatible with HomeKit, Alexa and other Smart Home services, using HomeAssistant

## System requirements

Re-installing GlowOS or uploading custom software to GlowCore requires a computer with one of the following operating systems:

- Windows 10 or later
- MacOS 12.0 or later
- Linux

Always make sure your operating system is up to date, before trying to flash firmware to the ESP32 S3.

# Safety & Maintenance

## Safety advise

### **USB-C power supply**

Do not use a damaged USB-C power supply with GlowCore. For additional safety, it's best to only use power supplies from well known brands like Anker, which follow strict safety standards. If your power supply is getting too hot to touch, stop using it immediately and replace it with a higher wattage model, from a well known brand.

### **5V power supply**

Do not use a damaged 5V power source. For additional safety, it's best to only use power supplies from well known brands like Mean Well, which follow strict safety standards. It is also good practise to add additional fuses between your power supply and GlowCore. If your power supply is getting too hot to touch, stop using it immediately and replace it with a higher wattage model, from a well known brand.

### **Temperature & Humidity**

GlowCore is designed for indoor use only and room temperatures up to 27 degrees. Keep the board in a dry environment. Usage in bathrooms or rooms with high air humidity could damage GlowCore over time. Outdoor use at your own risk.

### **Water**

Keep GlowCore away from water. It is not built to resist water exposure, including rain or immersion. Water can cause immediate and irreversible damage to both GlowCore and your USB-C power source, potentially creating a safety hazard.

# GlowOS

## Overview

GlowOS is based on the famous software WLED. Currently, GlowOS has some extra functionalities for all LED products by glowingkitty. For example: press the action button to cycle between presets, generate wifi name based on product name + the devices unique color code, and more. In future software updates, GlowOS will add more features and long term also add a completely redesigned user interface.

## Open Source

Just like WLED, GlowOS is also open source. This means you can take a look at the code, understand it and modify it if you like. If you plan on modifying GlowOS, first check out the WLED Discord community and the WLED wiki for more details on how to write your own usermods. The open source code of GlowOS can be found on GitHub.

If your modified software stops working reliably, you can always reinstall GlowOS on [install.glowingkitty.com](https://install.glowingkitty.com).

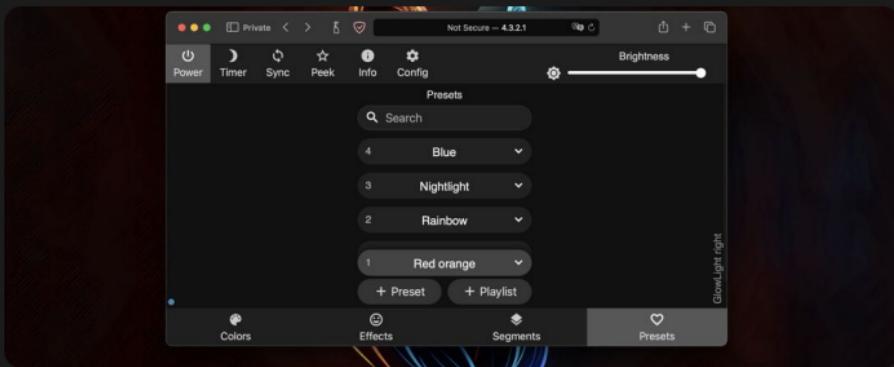


# Colors

Once you selected the segment and effect, you can change the colors of the effect. For some effects, like **Solid**, you can change the color via the the color wheel or the sliders and buttons under it.

For most effects, you can choose from a large selection of color palettes, which the effect will use. For the color palettes **\* Color 1**, **\* Color Gradiant**, **\* Colors 1 & 2** and **\* Colors only** you can also select custom colors for the palettes, by pressing **Fx**, **Bg** and **3** and then the color of your choice.

If you want to change the brightness, you can do so with the slider in the top right.



## Presets

Happy with the way your LEDs glow? Then save the current settings as a preset, so you can easily switch back to those settings later. Simply press the **+Preset** button and give your preset a name and press **Save**.

If you want your LEDs to start with the preset after it turns on, remember the number of your preset, go to **Config** (button in the top menu), then **LED Preferences**, then scroll all the way down to **Apply preset ... at boot** and enter the number of your preset and press **Save** at the top.

## Playlists

If you want to let the LEDs cycle automatically between multiple presets, you can also setup a playlist, by pressing the **+Playlist** button, select the effects, their duration and the transition time between time, before pressing **Save**.



## Backup & restore data

It's always a good practice to backup your data. The same applies to your presets and configuration on your device. Especially before you update the software or if you want to install CircuitPython, you should make a backup of your presets and configuration before. For that, open [Config](#), then [Security & Updates](#) and scroll down to [Backup & Restore](#). Here you can backup your presets and configuration as a json file, and also restore them later.



# WiFi Setup

To access all settings related to WiFi, click on **Config** and **WiFi Setup**.

## Connect GlowCore to WiFi

To connect GlowCore to an existing WiFi (so you can control it via the WLED app or via it's mDNS address or Client IP in your web browser), enter the network name (SSID) and password at the top and press **Save & Connect**. Restart GlowCore to apply the changes.

## Change hotspot name + password

By default, GlowCore starts a WiFi hotspot with it's name and unique color code and the password **letsglow**. You can change the hotspot name and the password when you scroll down to **Configure Access Point** and change the **AP SSID** to the new hotspot name and the **AP password** to the password of your choice, before pressing **Save & Connect**.  
Restart GlowCore to apply the changes.



# LED Preferences

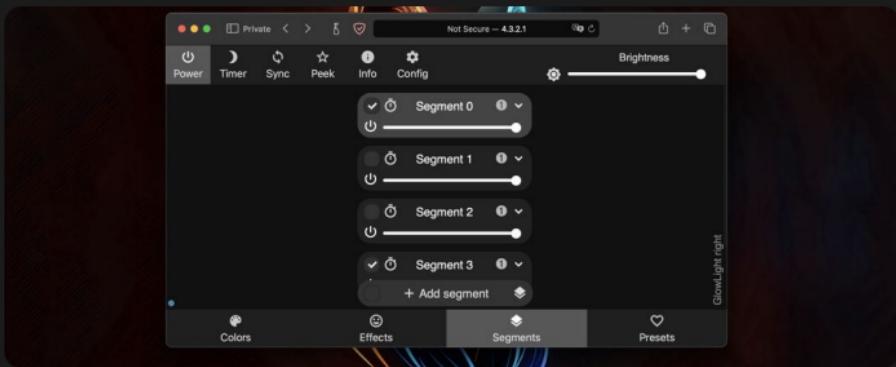
To access all settings related to the LED strips, click on “Config” and “LED Preferences”.

## Config new connected LED strips

By default, GlowLight comes with WS2812B LED strips with 60 LEDs per meter. If you replace the LED strips with a different kind (different model or different LEDs per meter density), scroll down to “Hardware setup” and change the four connected LED strips here - the type, the “Start” and the “Length” of each strip. Press “Save” to then apply those changes.

## Apply preset at boot

Scroll further down and you see the option to enter the number of a preset which you have saved. This preset will then be started, each time GlowLight turns on.



# Segments

LEDs are arranged in segments. A segment can consist of any number of LEDs connected to your device, ranging from a single LED to all LEDs, and everything in between. Each segment can operate a distinct effect with different colors.

You also have the flexibility to alter the effect direction using the **Reverse direction** option or allow an effect to run from the center in both directions with **Mirror effect**.

When you save a preset, it retains all the segments you had at that moment. This implies that you can have varying segments for different presets. For instance, one preset might have only one segment, running entirely **Solid** in **red**, while another preset might have four segments, each running a different effect and color.

Bear in mind, the LED count begins from 0, so if you have a strip of 100 LEDs, the last LED will be number 99. Additionally, the segments can overlap, which means you can have two segments that include some of the same LEDs. This feature can be beneficial for generating more complex lighting effects.

# Smart Home

## Alexa

To control GlowCore via Alexa, go to **Config, Sync Interfaces** and then scroll down to **Alexa Voice Assistant**, activate **Emulate Alexa device** and adapt **Alexa invocation name** to how you want to call your lamp, when controlling it via Alexa. Click **Save** and restart GlowCore to apply the changes.

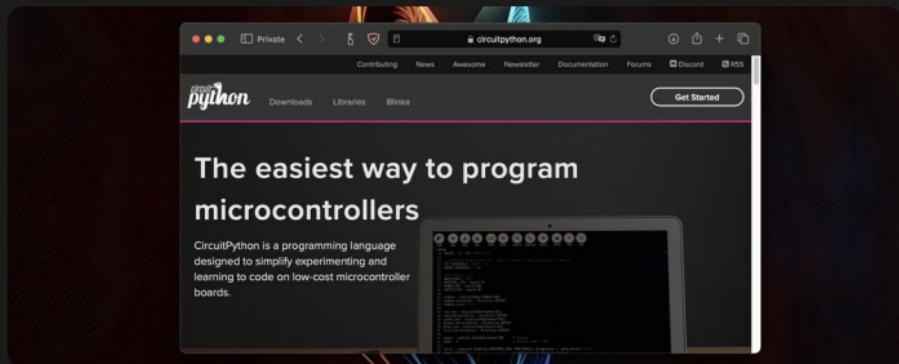
Next, go to your Alexa app, add a new device and select **Philipps Hue Lightbulb**, since this is what WLED (and therefore GlowOS) emulates. If it asks you if the lightbulb has Bluetooth, you can press yes.

If Alexa cannot find the light on the first try, try it again. It often takes a second try to find WLED powered lamps in Alexa.

## Home Assistant

GlowCore can also be added to Home Assistant, and this way be controlled via Siri and integrated into many home automations. Open your Home Assistant interface, scan for devices and GlowCore should show up as a WLED device, which you then can add just like any other WLED powered lamp.

# Write your own code



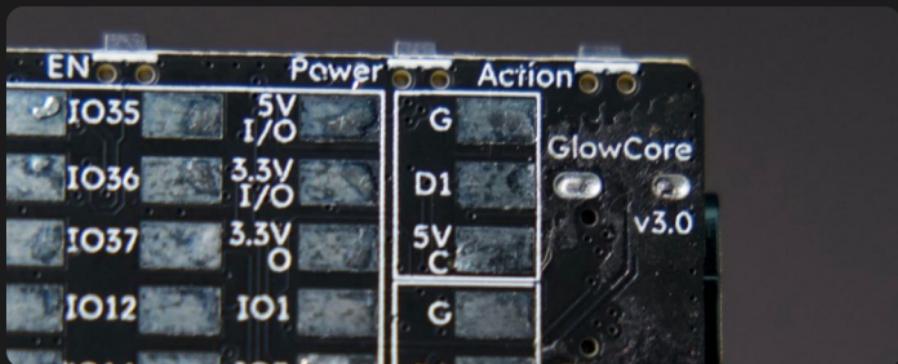
## CircuitPython

If you are a programming beginner and want to write code for your GlowCore from scratch, using the Python programming language - you can install CircuitPython on it. Be aware that by doing this, by default there won't be any LEDs glowing that are connected to GlowCore - you would need to code that yourself in Python. For example using the NeoPixel library. To install CircuitPython, first install the bootloader, as described on [https://circuitpython.org/board/adafruit\\_qtpy\\_esp32s3\\_nopsram/](https://circuitpython.org/board/adafruit_qtpy_esp32s3_nopsram/) under **Install, Repair, or Update UF2 Bootloader**, then download the .UF2 file via the download button at the top and copy it over to the GlowCore storage. From there on, you should follow the [CircuitPython tutorial from Adafruit](#) for more details.

## Modify GlowOS code

If you want to modify GlowOS instead, [clone it from GitHub](#) and follow the example in the folder `GlowOS/usermods/EXAMPLE_v2`, to create your own usermod.

# Modify GlowCore



## Connect LED strips

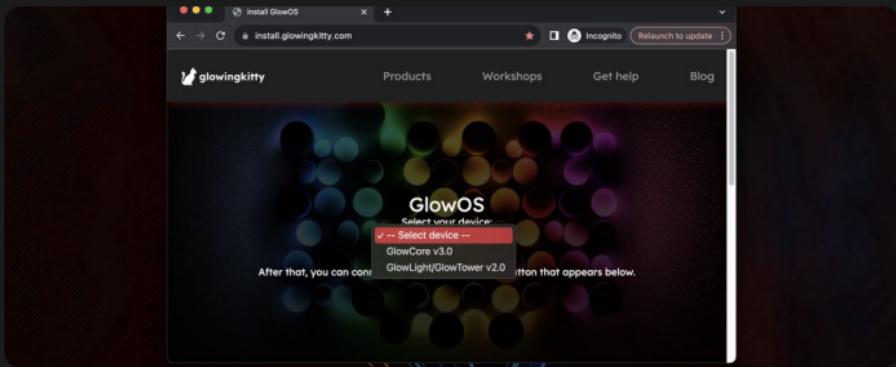
GlowCore can control a wide range of LED strips. From WS2812B (the most commonly used LED strip with individual addressable LEDs), up to WS2813 with an extra backup data channel, and many more. Checkout the [WLED wiki entry about supported LED strips](#) for more details.

If you want to connect LED strips that don't require 5V, remember that you need to connect a step up or step down converter to GlowCore as well, or connect the LED strips directly to a power source with the correct voltage.

GlowCore has two data outputs for 5V LED strips (with a levelshifter connected, for a reliable data signal). Assuming an WS2812B LED strip, solder the green **data** wire to **D1 (GPIO 42)** or **D2 (GPIO 41)**, the **red** voltage wire to **5V O(5V output)** and the **white** ground wire to **G**.

If you use an LED strip with an additional clock wire, solder that to another GPIO pin of your choice.

# Troubleshooting



## Update/Reinstall GlowOS

If you want to reinstall GlowOS again on your device or you want to update GlowOS to the latest version, first make a backup of your data. As explained in the chapter [Backup & restore data](#).

Next, visit [install.glowingkitty.com](https://install.glowingkitty.com). There select you select your device and follow the installation instructions.

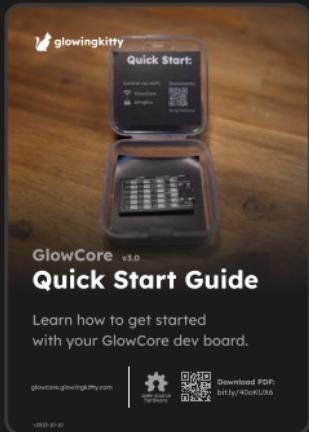
### Remember:

All your data on the ESP32 S3 will be deleted, when GlowOS is installed.

Afterwards, you can connect to your device again and upload the backup of your presets and config.

In the future, there will also be alternative options to update the firmware. For example by downloading the .bin file from the web installer (so you can update GlowOS without deleting your presets and config) and even updating the software directly via the GlowOS interface.

# More documents



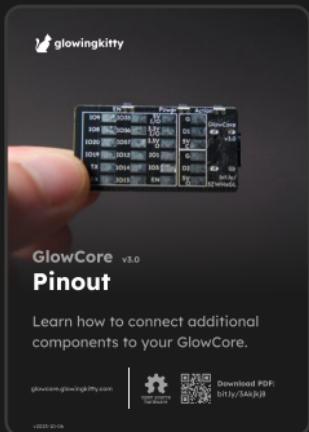
The image shows the front cover of the "GlowCore v3.0 Quick Start Guide". The cover is white with a black border. At the top left is the glowingkitty logo. In the center, there's a small image of the GlowCore dev board with its "Quick Start" guide open. Below this, the text "GlowCore v3.0" and "Quick Start Guide" is printed. A short description follows: "Learn how to get started with your GlowCore dev board." At the bottom, there's a URL "glowcore.glowingkitty.com", a "Get Started" button, a QR code, and the text "Download PDF: bit.ly/40oKUX6". A small "V3.0-01-X" is at the very bottom.

## Quick Start Guide

Learn all the basics of your GlowCore, the fast way.



**Download PDF:**  
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The image shows the front cover of the "GlowCore v3.0 Pinout" booklet. It has a dark background with a white border. The glowingkitty logo is at the top left. In the center, there's a photograph of a hand holding the GlowCore dev board with its pinout diagram visible. Below this, the text "GlowCore v3.0" and "Pinout" is printed. A short description follows: "Learn how to connect additional components to your GlowCore." At the bottom, there's a URL "glowcore.glowingkitty.com", a "Get Started" button, a QR code, and the text "Download PDF: bit.ly/3Akjkj8". A small "V3.0-01-X" is at the very bottom.

## Pinout

Learn how to connect additional components to your board.



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### GlowCore v5.0 Schematic

Learn what electronic components your GlowCore is made of.

glowcore.glowingkitty.com



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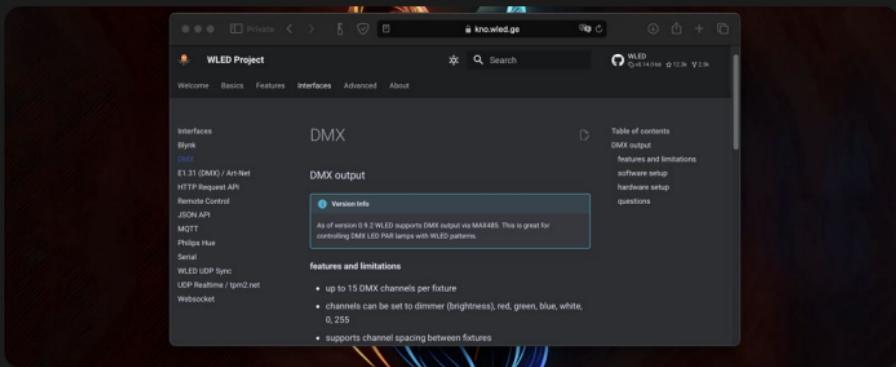
v0.05-09-06

# Schematic

An overview of all electronic components on the GlowCore PCB and how they are connected.



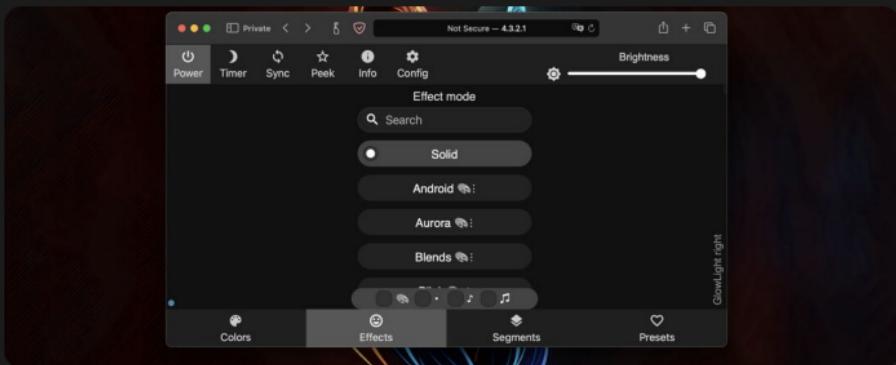
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## More questions?

GlowOS is based on WLED. So if you still have more questions related to GlowOS, you should also check out the WLED wiki:

<https://kno.wled.ge>



# Effects

GlowOS has over 100 LED effects for each of your LED segments to choose from. Scroll down through the list, to explore them all.

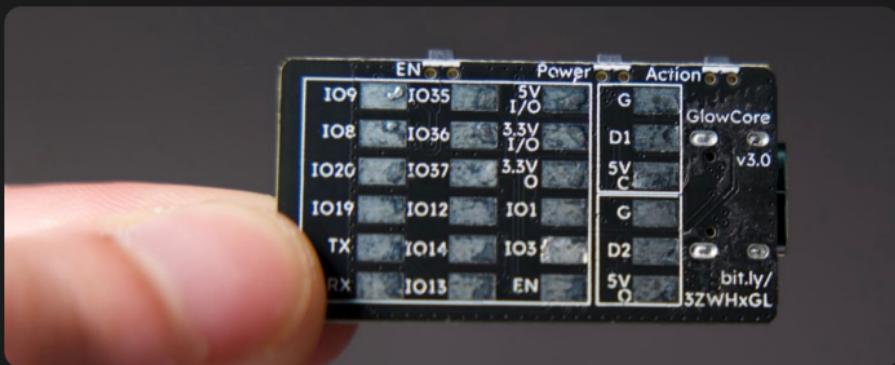
Most LED effects can be further customized by changing the speed of the effect and the intensity. Remember that those changes only apply to the segments you currently have selected.

## **Short circuit**

Always double check GlowCore / your project for short circuits (using a multimeter) before connecting it to power. Also do not place GlowCore directly against a conducting surface (like a metal tube). Always add at least some non conducting material (like tape or a case) on top.

# **How to clean GlowCore**

Clean GlowCore using isopropanol (99.9%, cleaning alcohol) and ideally Kim wipes (from Kimtech Science). Alternatively you can use cotton swaps or paper towel. Clean GlowCore gently and don't apply too much pressure, to make sure you don't damage components on GlowCore. Make sure there is no liquid isopropanol visible anymore on the surface of GlowCore, before you turn it on again or solder to it.



## Add additional components

You can also connect additional components to your GlowCore, for example sensors, microphones, step up and step down converters and more. To connect them, solder them with some wires to the PCB.

Checkout the [GlowCore Pinout](#) for more details on the pins.