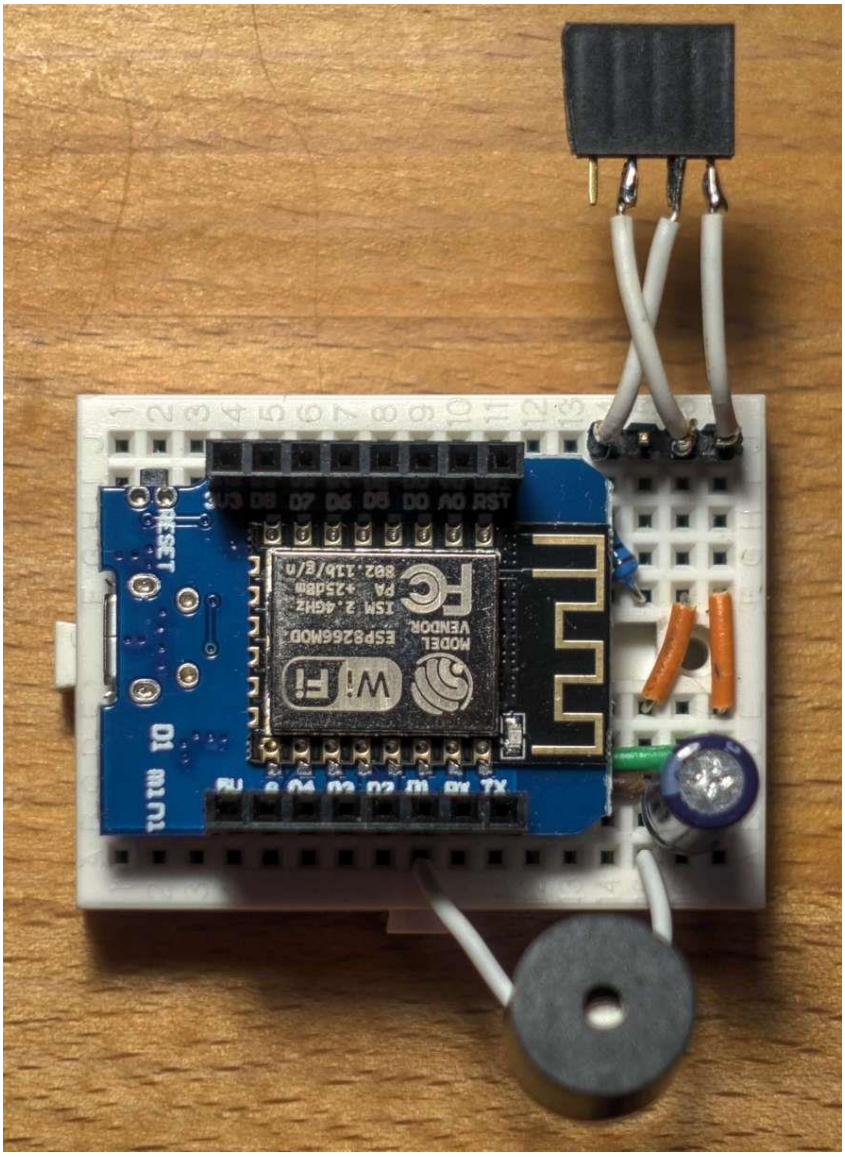
# LUMISCENE VERSION 138

## Manual



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# 2 General

## 2.1 Introduction

IMPORTANT: If you have older equipped boards that you would like to use with this software version, please note any additional necessary components in chapter 8. (Resistors).

With LumiScene you can create a wide variety of lighting scenarios for up to 39 Neopixel LEDs.

The main intended use is model houses.

This limitation results primarily from the EEPROM size of 4kB for storing the parameters.
On the other hand, the processing cycle should not exceed 50ms. However, there would still be reserves there.

A sequence with up to eight different phases can be individually defined for each LED.

Up to 6 different complete scenarios can be saved.

Operation takes place via a smartphone or laptop via the integrated web interface.
The connection from the smartphone to the controller is direct and does not require a WLAN router etc.

Optionally, the lighting can be switched on and off automatically depending on the ambient brightness.

Optionally, triggers can also be used that only activate the lighting for a limited time (staircase lighting principle).

Two gamma profiles are implemented for older and newer LED strips.

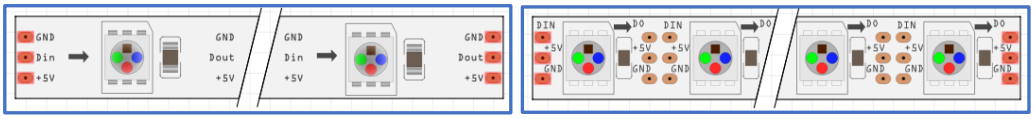
## 2.2 NOTE ON THIS VERSION

If you previously had a firmware version older than 120 on the controller, the parameterizations are no longer compatible with this version. If this is the case, it flashes and beeps for approx. 6 times in quick succession after switching on for the first time with this firmware. In this case, all parameter settings will be deleted and you will have to create them again.

The code was created with Microsoft Visual Studio Code and the PlatformIO plug-in. This has the advantage over the Arduino DIE, among other things, that the libraries used are included in the project.

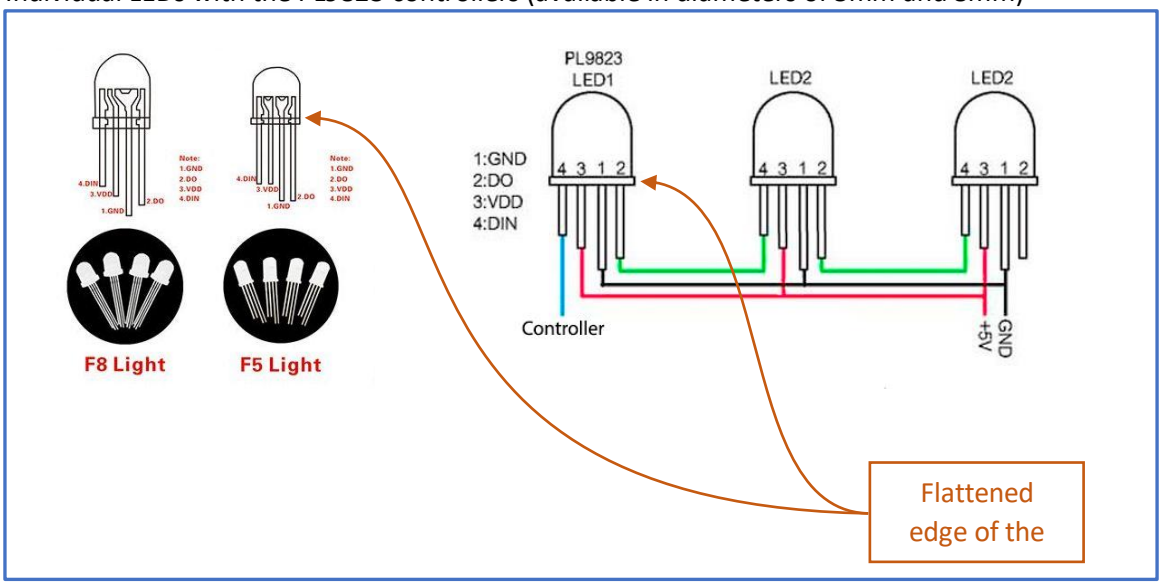
### 2.2.1 Usable LEDs:

- LED strips with the WS2812 / WS2812B controllersPlease note the different connection assignments depending on the manufacturer:




- Neopixel rings, rectangles and stripes in different shapes: These are usually provided with the WS2812 controller.

- Individual LEDs with the PL9823 controllers (available in diameters of 5mm and 8mm)




Note: If you are not sure about the functionality and compatibility, we definitely recommend a test setup before making any final wiring.

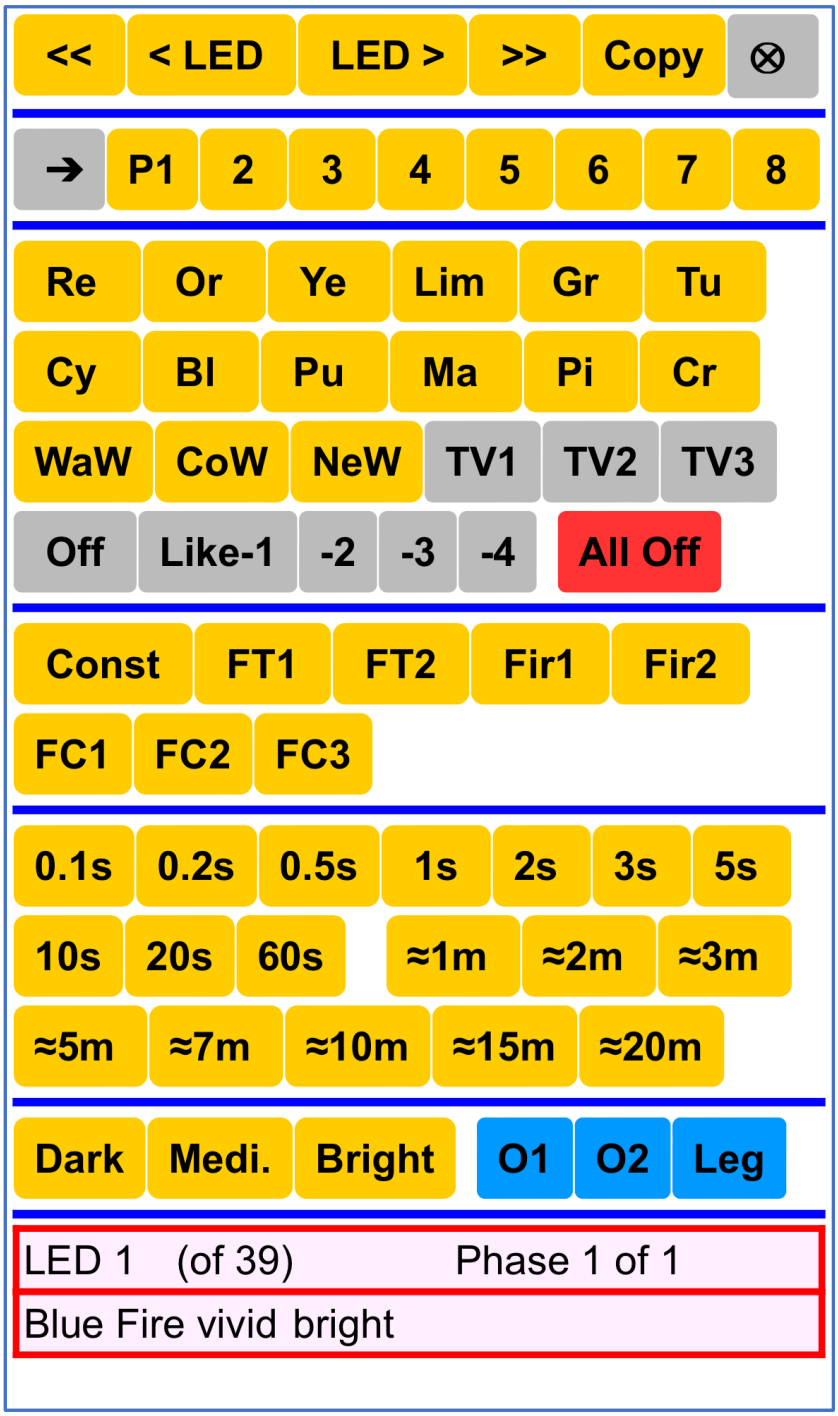
## 2.3 CABLING

Cabling See chap.8 & 9.

## 2.4 OVERVIEW OF THE WEB INTERFACE

You can change pages using the blue buttons.

### 2.4.1 The page for parameterizing the LEDs and the legend page



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| | |
|---|---|
| NOTE | If necessary, switch off activated triggers temporarily during configuration. Otherwise you may not see what you are parameterizing. |
| << | 5 LEDs jump backwards |
| < LED | 1 LED jump backwards |
| LED > | 1 LED jump forward |
| >> | 5 LEDs jump forward |
| ⊗ | Makes the current LED flash briefly as a search aid for finding the LED. |
| Copy | Copies the parameters from one LED to a group of LEDs.<br>1. Select the LED whose parameters should be copied.<br>2. Select Copy to memorize it.<br>3. Select the first LED of the target range and select Copy to memorize it.<br>4. Select the last LED of the target range and select Copy to trigger the copy prozess.<br>NOTE: If the parameters should only be copied to a single LED, then carry out steps 3 and 4 on the same LED. |
| ➔ | This defines how many phases you want to use for the selected LED.<br>1. Press ➔.<br>2. Press a phase button to define the desired number of phases.<br>NOTE: If only one phase is used, the times are irrelevant as no phase changes occur. |
| P1<br>…<br>8 | Phase 1 … 8.<br>Select the phase to be parameterized.<br>NOTE: By previously operating ➔ define the desired number of phases. |
| Re<br>…<br>Cr | Colours: Red / Orange / Yellow / Lime / Green / Turquoise / Cyan / Blue / Purple / Magenta / Pink / Cherry Red |
| WaW | Warm white |
| CoW | Cold white |
| NeW | Neutral white |
| TV1 | TV program with small color jumps. Pale colors.<br>E.g. discussion show.<br>No additional effect applicable. |

| | |
|---|---|
| TV2 | Television program with medium color jumps. Medium strong colors.<br>E.g. feature film.<br>No additional effect applicable. |
| TV3 | Television program with large color jumps. Strong colors.<br>No additional effect applicable. |
| Off | Turned off.<br>No additional effect applicable. |
| Like -1<br>- 2<br>- 3<br>- 4 | LED behaves identically to the LED before or 2, 3, 4 LEDs before.<br>LED has no behavior of its own.<br>E.g. for identical behavior of a group of LEDs or for running light effects.<br>No additional effect applicable. |
| All Off | Turn off all LEDs.<br>E.g. to start parameterizing a new scene. |
| Const | Constantly on (without effect). |
| FT1 | Fluorescent tube with a startup flicker. (old mechanical starter) |
| FT2 | Fluorescent tube with a continuous flicker (defective mechanical starter) |
| Fir1 | Fire quietly (e.g. fireplace). |
| Fir2 | Fire lively (e.g. campfire). |
| FC1 | Longer flickering contact every 30...60 seconds |
| FC2 | Medium flickering contact every 8...15 seconds |
| FC3 | Short flickering contact every 1...6 seconds |
| 0.1s<br>…<br>60s | Waiting time with precise duration (e.g. also for flashing cycles and running lights over several LEDs).<br>Only a single phase is used for an LED, then no time is applicable since no phase changes occur. |
| ≈1m<br>…<br>≈20m | Waiting time of imprecise duration (time spread +-50%).<br>If only a single phase is used for an LED, this is no time applicable.<br>Ie selecting a time has no effect in this case. |
| Dark<br>Medium<br>Bright | Brightness level |

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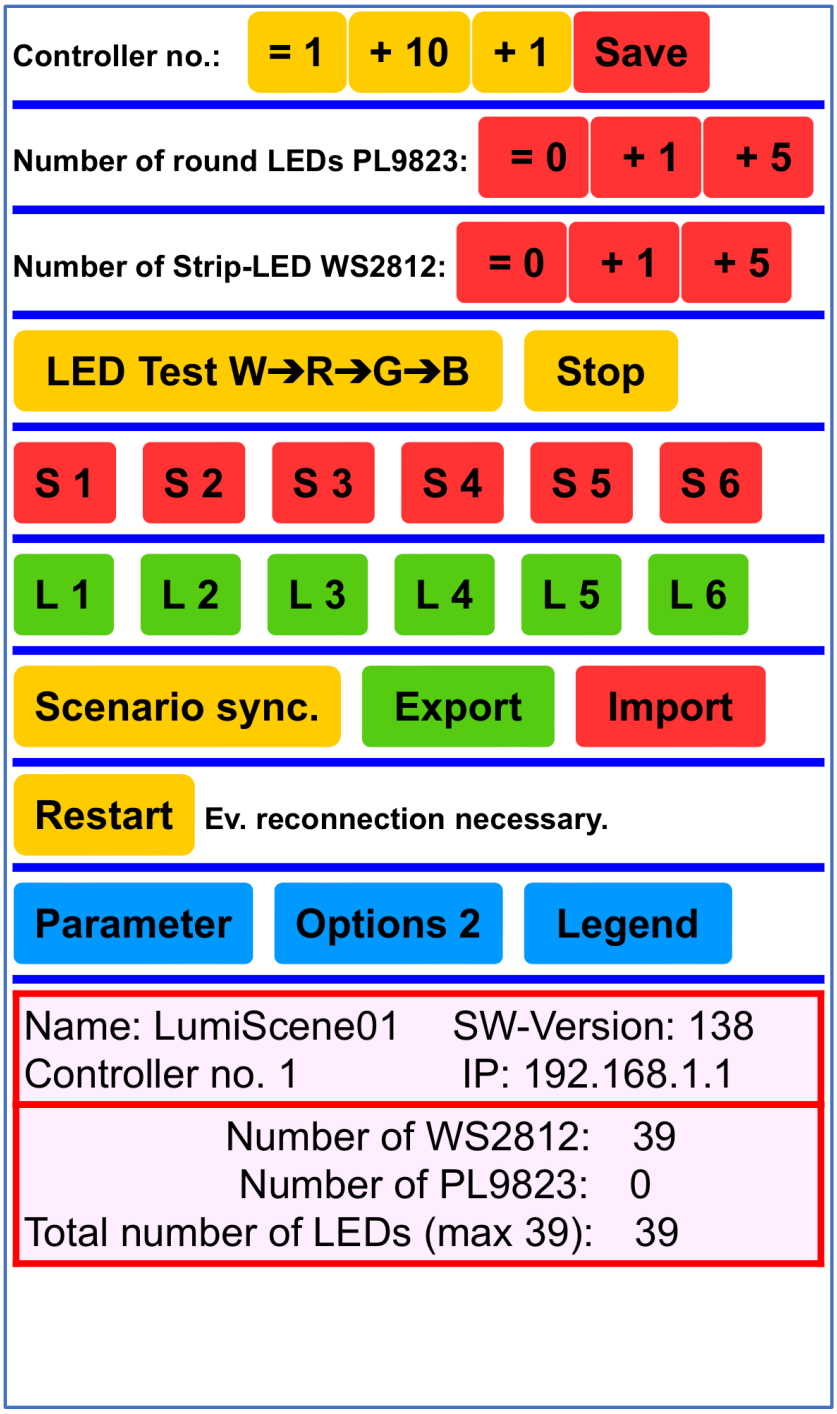
### 2.4.2 The options page 1 with legend



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| | |
|---|---|
| = 1 | Controller no. = 01<br>Name = LumiScene01<br>IP address = 192.168.1.1 |
| + 10 | Controller no. increase by 10<br>Name = LumiScene11 etc.<br>IP address = 192.168.1.11 etc.<br>Up to a maximum of 99. |
| + 1 | Controller no. increase by 1<br>Name = LumiScene02 etc.<br>IP address = 192.168.1.2 etc.<br>Up to a maximum of 99. |
| Save | Controller no. and adopt the IP address and restart the controller.<br>Reconnection necessary. |
| NOTE | Password is always = 12345678 |
| = 0 | Number of LEDs used = 0.<br>If no such LEDs are used or as a start for setting the number of LEDs used. |
| + 1 | Increase the number of LEDs used by 1.<br>The last selected LED flashes briefly. |
| + 5 | Increase the number of LEDs used by 5.<br>The last selected LED flashes briefly. |
| LED Test WRGB | Test all LEDs with white, red, green, blue.<br>Each operation changes to the next color.<br>Can also be done during parameterization the number of LEDS can be used. |
| Exit | Stop LED test.<br>Can also be used while parameterizing the number of LEDs. |

| | |
|---|---|
| L 1<br>…<br>L 6 | Load complete lighting scenario from memory bank 1 … 6.<br>NOTE: Scenario L1 always runs after switching on. (Autostart) |
| S 1<br>…<br>S 6 | Save complete lighting scenario in memory bank 1 … 6. |
| Scenario Sync. | Synchronizes the start of the scenarios (such as after a restart or loading of scenarios).<br>Is only needed to turn on flashing cycles or running lights on different LEDs after parameterization To check synchronicity without restarting the controller. |
| Export | Exports all parameterizations to the SD card (if SD card is available).<br>The SD card must be formatted FAT32.<br>The naming of the file is according to Name of the controller.<br>Lumi01.csv for Lumiscene01,<br>Lumi02.csv for Lumiscene02 etc.<br>An existing file will be overwritten. |
| Import | Imports all parameterizations from the SD card (if SD card is available and file is available). |
| Restart | Controller restart (corresponds to pressing the reset button.<br>Normally not needed. |

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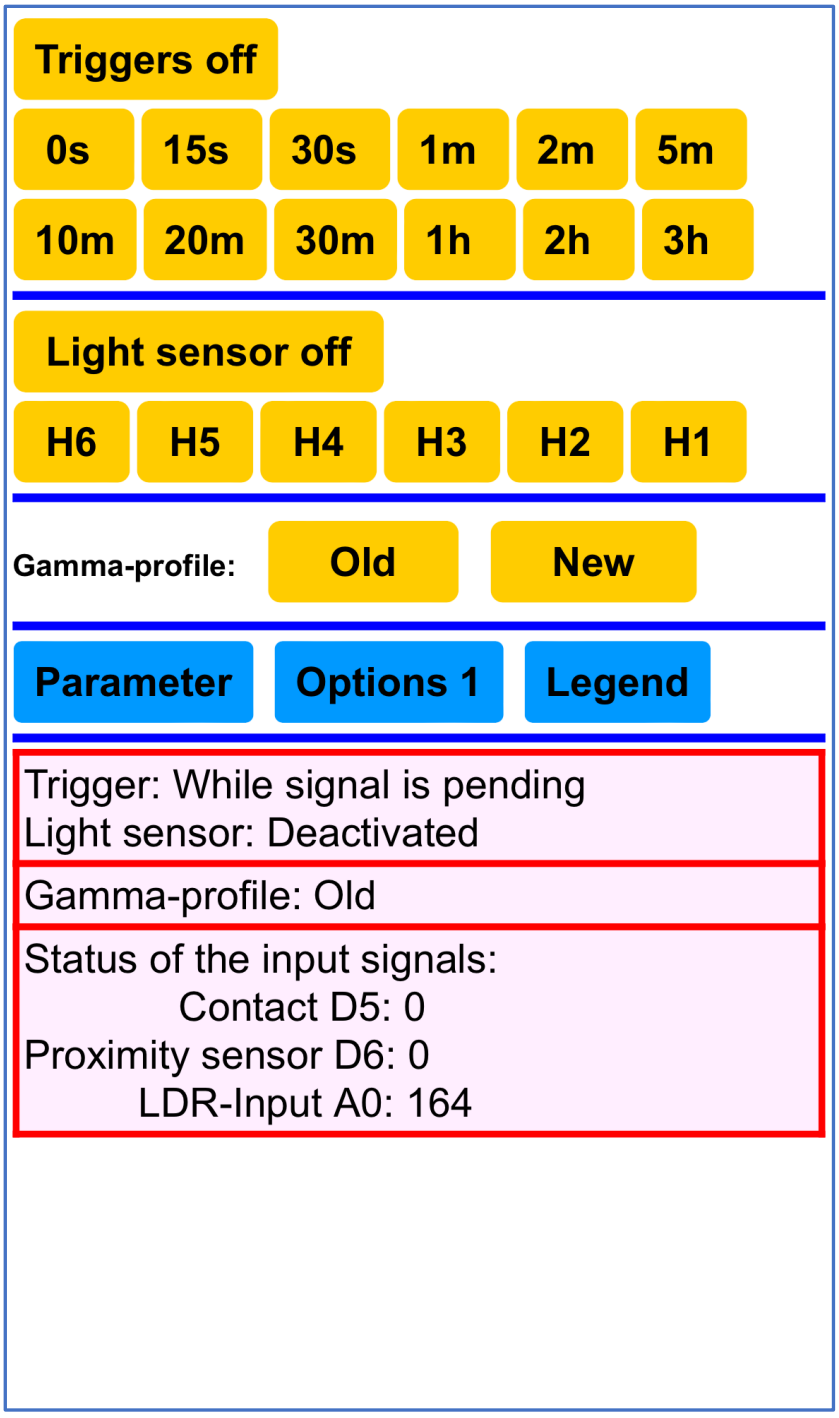
### 2.4.3 The options page 2 with legend



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| | |
|---|---|
| NOTE | If both the trigger and the light sensor ar activated in the options, both must respond so that the lighting switches on.<br>Exception: Testing the LEDs is possible at any time. |
| Trigger off | Disables triggers such as PIR sensors, radar sensors, contact input, button input. The triggers have no influence on the lighting. |
| 0s<br>...<br>3h | Activates triggers such as PIR sensors, radar sensors, contact input, button input.<br>A trigger causes the lighting to turn on the selected switch-on timer.<br>Re-triggering during the switch-on phase restarts the time, thus extending the switch-on phase.<br>The time 0s can ideally be used if the time is to be specified purely by the trigger. |
| Light sensor off | Deactivates the light sensor.<br>The light sensor has no influence on the lighting. |
| H6<br>…<br>H1 | The light sensor is activated.<br>It switches on the lighting when the surrounding area is darkened accordingly.<br>The switch-on point for the lighting can be selected from relatively bright (H6) to relatively dark (H1).<br>The lighting is only active as long as the environment is darkened accordingly. |
| Old | Use of the old gamma profile (for older LED strip order in older projects) |
| New | Use of the new gamma profile (for newer LED strip order in newer projects) |
| Status | For analyzing hardware problems.<br>Shows the states at the controller inputs.<br>D5 & D6:<br>0 = not triggered.<br>1 = triggered.<br>A0 shows the values 0...1024. |

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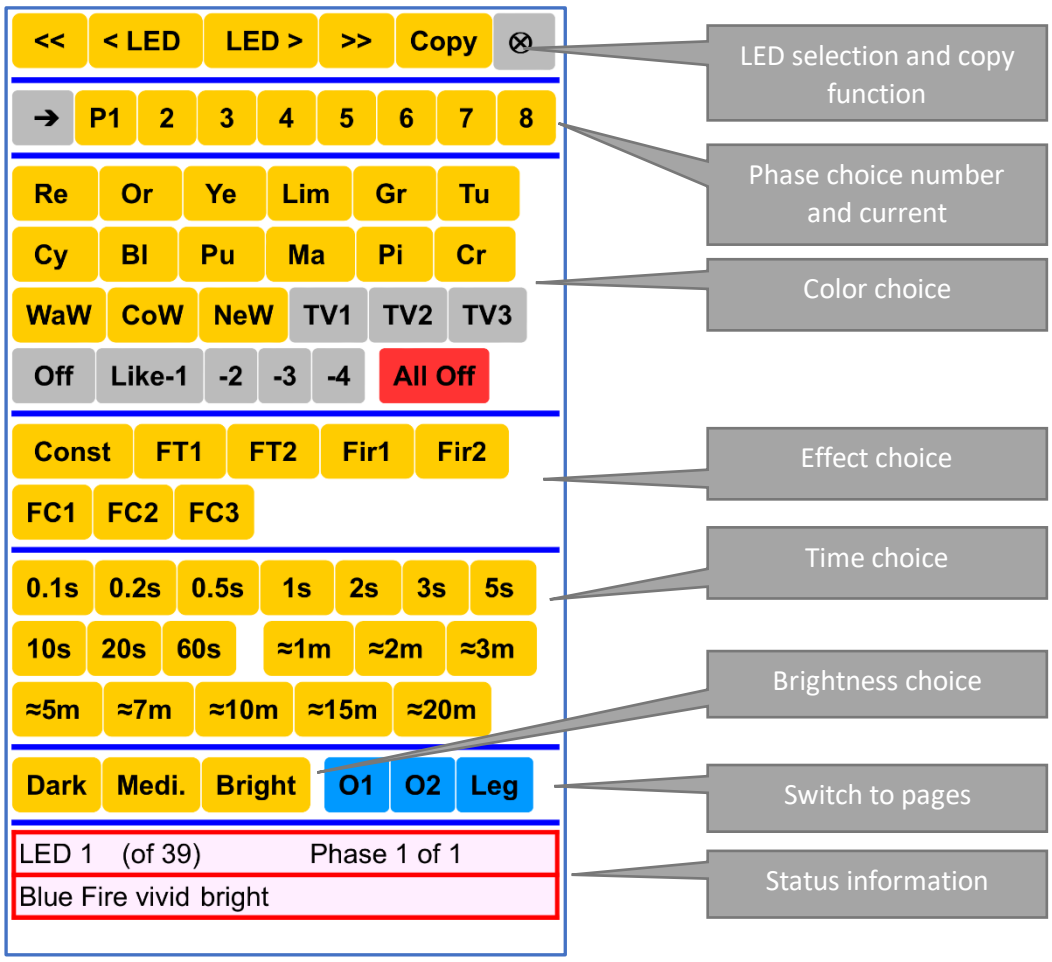
## 2.5 INSTRUCTIONS FOR OPERATION

### 2.5.1 Generally

Information on the operations on the options page and trigger page can be found in the screenshots of the website (chap.0) or the website directly.

The parameterization of the lighting scenarios is presented as an overview below and from Chapter.4 also illustrated with examples.

Basically, an LED is parameterized in phases. Each LED can use up to 8 phases. The order of operation is generally from top to bottom from category to category.
Ie "select LED", "select phase", "select color", "select effect", "select time", «Select brightness».
Parameterization page overview:



# 3 INSTALLATION

## 3.1 POWER SUPPLY

The arrangement requires 5VDC.
The arrangement can be powered via USB or separately. In both cases, check that the voltage source has sufficient power (especially when powering a laptop, for example).

The following power consumption can be expected depending on the number of controlled LEDs:

**Current without LED: approx. 0.06A**
**Current with 20 LEDs: approx. 0.23A**
**Current with 39 LEDs: approx. 0.4A**

The currents are measured in permanent cold white light at the highest level. If you need more precise values for your arrangement, you must measure them. In any case, you are on the safe side with a 5VDC / 1000mA power supply.

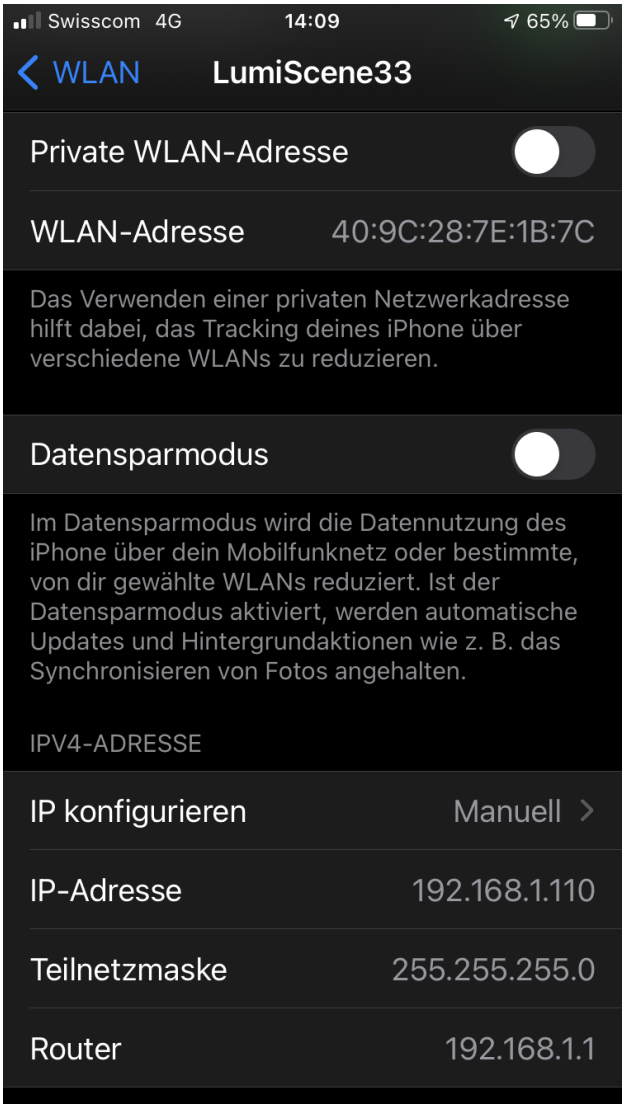
As a rule, with these currents, the arrangement can also be operated directly on a computer via a USB interface (e.g. to load a new software version). But if necessary, check this for your device first.

## 3.2 CONNECT SMARTPHONE

LumiScene has an integrated web interface with which you can operate the control. No WiFi router is necessary. You can connect your smartphone or laptop to the controller directly via the WiFi settings. By default, you can access a newly loaded controller under the name LumiScene01. The password is always the same: 12345678.

It may take a long time to establish the connection the first time. If the connection cannot be established at all, manually configuring an IP address and switching off the private WLAN address usually helps. Please try the settings in the example.

Example:



## 3.3 SET CONTROLLER NUMBER

If the software is loaded into a controller for the first time, then the controller number is =1.
The WiFi device name is called LumiScene**01.**
The web interface is accessible via the IP address 192.168.1.**1.**
If you want to operate and operate several controllers geographically close to each other, you must assign a separate controller number to each controller.
Otherwise, you won't know which controller you are connected to because each controller has the same device name and IP address.

**Note**: You can assign controller numbers from 1-99.

| Controller number | WiFi device name | IP address address |
|---|---|---|
| 1 | LumiScene01 | 192.168.1.1 |
| 2 | LumiScene02 | 192.168.1.2 |
| 3 | LumiScene03 | 192.168.1.3 |
| Etc. | Etc. | Etc. |
| 98 | LumiScene98 | 192.168.1.98 |
| 99 | LumiScene99 | 192.168.1.99 |

### 3.3.1 Proceed

Please note the status information at the end of the website

First press =1.

Press buttons +10 +1 up to the desired controller number.

Then press Save.

Now you have to register the device again in the WiFi settings under the new name (for example previously LumiScene01 is now LumiScene04).

## 3.4 SET NUMBER OF LEDS

In order for LumiScene to work correctly, you must set the number of connected LEDs.

Note: You can connect a maximum of 39 LEDs to a controller. You can split this number into round LEDs and strip LEDs.

### 3.4.1 Procedure for both LED types

Please note the status information at the end of the website

First press = 0. If LEDs are connected, the first LED flashes briefly to confirm operation.

If you have not connected an LED, the action is completed. Otherwise…

Press + 1 + 5 repeatedly until you have reached the last LED used.

During this promotion you can also via LED Test W→R→G→B turn on the LEDs.
Then all LEDs used light up at the same time. End this again if necessary Stop.

## 3.5 SELECT GAMMA PROFILE

The two gamma profiles are only different with regard to the flat LED strips.
So far, LEDs from 2 different deliveries have been used, which differ greatly in terms of color behavior.
The round LEDs are not affected by this.
Here you can choose which of the two calibration profiles you use would like to come with Old or New.

## 3.6 STATUS OF INPUT SIGNALS

These represent the direct input signals of the controller. They can help analyze hardware problems.

For the digital inputs D5 and D6...

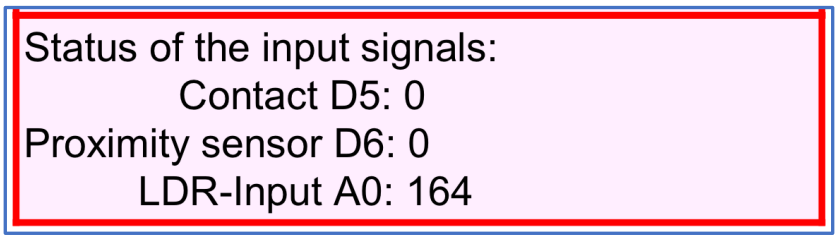
0 = Not triggered.

1 = Triggered.

The contact D5 would actually be inverted because it is active when switched to GND.

The value of the LDR input from 0…1024 can be seen at A0.

The values do not update automatically. To update the values you must refresh the website.



# 4 LED PARAMETERS

## 4.1 PHASES

You can define up to eight phases for each LED. The phases are played one after the other in an endless loop.

To define the number of phases for an LED, press first → and then the phase number.
Example: To select 3 phases for LED number 5, first navigate via << < LED LED > >> to LED No.5. Then press → and 3.

## 4.2 PARAMETER

Each phase consists of (see also chap.0)

- **The phase number**
- **One color**
- **Maybe an effect**
- **One brightness level**
- **Maybe a period of time**

If you only use a single phase for an LED, then you do not need a time period because there is no subsequent phase used that could run afterwards.

No effect is applicable for colors with grey buttons.

There is no explicit save button.
To complete (save) and activate a parameterization for an LED, select via << < LED LED > >> another LED.

## 4.3 COPY FUNCTION

If you have created a relatively complex parameterization for an LED with, for example, six or eight phases, you may want to use the same parameterization for a range of other LEDs.

So that you don't have to type in the entire parameterization for the additional LED again or even several times, you can use the copy function.

First select the LED from which you want to copy the function using the buttons << < LED LED > >>.

Then memorize them Copy.
The LED lights up white and that is what you want to copy.

Now select the first LED where you want to paste the parameterization using the buttons << < LED LED > >>.

Then memorize them again with Copy.
This LED now also lights up white.
This defines the beginning of the Range of LEDs where you want to copy the parameterization.

Now you have to select the end of the range up to where you have to copy the parameterization.

If you only want to copy the parameterization to a single LED instead of to an area, you can skip the following step. i.e. they remain on the same LED. To do this, select the end of the range LED using the buttons << < LED LED > >>.Then serve again Copy.With this third operation of Copy, the copying process is now carried out and the LEDs light up with the newly assigned parameters.

Copied parameterizations have their own times and therefore run independently of the LED from which they were copied.

## 4.4 REFERENCED LEDS

Referenced parameterizations by Like-1 -2 -3 -4 differ significantly from copied parameterizations by Copy.

The LED will have no own independent behavior.
With the functions Like-1 -2 -3 -4 the LED runs identically to the correspondingly referenced LED.
These are used, for example, to achieve brighter lighting in one place for parameterization using several LEDs, or to parameterize running lights using a series of LEDs.

## 4.5 EXAMPLE 1 (SIMPLE CONTINUOUS LIGHT)

You want an LED to shine with a constant warm white light.

First select the LED you want to operate << < LED LED > >>.

Then operate in sequence…

→ P1 to define 1 used phase.

P1 WaW Const (no time applicable if there is only one phase) Bright

You complete the parameterization by clicking on << < LED LED > >> change to another LED.

## 4.6 EXAMPLE 2 (CHANGING BEHAVIOR)

You want to let an LED simulate fire for about 5 minutes,
then turn off the LED for about 3 minutes,
then have a constant cool white light for about 10 minutes,
then switch off the LED again for approx. 3 minutes.

First select the LED you want to operate << < LED LED > >>.

Then operate in sequence…

→ 4 to define 4 used phases.

P1 Or Fir1 ≈5m Bright

2 Off (no effect applicable) ≈3m (Off does not require brightness)

3 CoW Const ≈10m Medi.

4 Off (no effect applicable) ≈3m

You complete the parameterization by clicking on << < LED LED > >> change to another LED.

## 4.7 EXAMPLE 3 (BLINKING)

For example, you want to simulate an aircraft warning light, such as those used on high-rise buildings.

To do this you want the LED to turn off for 2 seconds followed by 1 second of red.

First select the LED you want to operate [<<] [< LED] [LED >] [>>].

Then operate in sequence…

[➔] [2] to define 2 used phases.

[P1] [Off] (no effect applicable) [2s] (Off does not require brightness)

[2] [Re] [Const] [1s] [Bright]

You complete the parameterization by clicking on [<<] [< LED] [LED >] [>>] change to another LED.

## 4.8 EXAMPLE 4 (PULSATING COLOR)

You want to emulate a yellow construction site light that alternates between dark, medium and bright yellow. Each phase should last 1 second

First select the LED you want to operate << < LED LED > >>.

Then operate in sequence…

➔ 3 to define 3 used phases.

P1 Ye Const 1s Dark

2 Ye Const 1s Medi.

3 Ye Const 1s Bright

You complete the parameterization by clicking on << < LED LED > >> change to another LED.

## 4.9 EXAMPLE 5 (RUNNING LIGHT)

You want 9 LEDs in a row to light up cyclically with different colors for 0.5s (e.g. red, blue, green).
This means that first the first, fourth and seventh LEDs light up red for 0.5s.
Then the second, fifth and eighth LEDs light up blue for 0.5s.
Then the third, sixth and ninth LEDs light up green for 0.5s.
This process should be repeated so that a continuous running light results.

First select the first LED that should be the start of the running light [<<] [< LED] [LED >] [>>].

Then operate in sequence…

For the 1st LED we need a red phase of 0.5s and an off phase of 1s (wich correspons to 2 off phases of 0.5s):

[➔] [2] to define 2 used phases.

[P1] [Re] [Const] [0.5s] [Bright]

[2] [Off] (no effect applicable)(Off does not require brightness) [1s]

[LED >] (This means that LED No. 2 is selected and the parameters for LED No. 1 are saved)

For the 2nd LED we need an off phase of 0.5s, a red phase of 0.5s and an off phase of 0.5s:

[➔] [3] to define 3 phases as a number.

[P1] [Off] (no effect applicable)(Off does not require brightness) [0.5s]

[2] [Bl] [Const] [0.5s] [Bright]

[3] [Off] (no effect applicable)(Off does not require brightness) [0.5s]

[LED >] (This means that LED No. 3 is selected and the parameters for LED No. 2 are saved)

For the 3rd LED we need an off phase of 1s (wich correspons to 2 off phases of 0.5s) and a red phase of 0.5s:

[➔] [2] to define 2 phases as a number.

[P1] [Off] (no effect applicable)(Off does not require brightness) [1s]

[2] [Gr] [Const] [0.5s] [Bright]

[LED >] (This means that LED No. 4 is selected and the parameters for LED No. 3 are saved)

For all other LEDS we only need one phase that does exactly the same as LED 4 before it:

[➔] [P1] to define 1 phase as a number.

[P1] [-3]

LED > (This means that LED No. 5 is selected and the parameters for LED No. 4 are saved)

You can now parameterize LED No. 6 to 9 identically (continue here) or alternatively transfer the parameterization of LED No. 4 to LED No. 5 to 9 (chapter4.10)

→ P1 to define 1 phase as number as number.

P1 -3

LED > (This means that LED No. 6 is selected and the parameters for LED No. 5 are saved)

→ P1 to define 1 phase as number as number.

P1 -3

LED > (This means that LED No. 7 is selected and the parameters for LED No. 6 are saved)

→ P1 to define 1 phase as number as number.

P1 -3

LED > (This means that LED No. 8 is selected and the parameters for LED No. 7 are saved)

→ P1 to define 1 phase as number as number.

P1 -3

LED > (This means that LED No. 9 is selected and the parameters for LED No. 8 are saved)

→ P1 to define 1 phase as a number.

P1 -3

You complete the parameterization by clicking on << < LED LED > >> change to another LED.

## 4.10 TRANSFER PARAMETERS TO OTHER LEDS

Copy the parameterization of LED No. 4 to LED No. 5 to 9.

Alternative for example 5 to parameterize LEDs 5 to 9:

< LED (this means that LED number 4 is selected)

Copy (this means that the parameters of LED 4 are marked for copying)

LED > (this means that LED no. 5 is selected)

Copy (This means that LED number 5 is marked as the start of the area to be copied)

LED > LED > LED > LED > (this means that LED number 9 is selected)

Copy (this means that LED number 9 is defined as the end of the area to be copied and the copying process is carried out)

### SAVE AND LOAD SCENARIOS

If you have parameterized a whole series of LEDs, you can save the entire set in one of the memory banks S1 S2 S3 S4 S5 S6.

**Notice**: The scenario in memory bank S1 is automatically loaded when you supply power to the controller (Autostart).

About the buttons L1 L2 L3 L4 L5 L6 you can load manually one of the saved sets.

Tip: You can, for example, save sets in S2 to S6.
If you now want to use one of these sets as the default after switching on, load the corresponding set, e.g load set with L2 and save it in S1.

## 4.11 SYNCHRONIZE SCENARIO

After restarting the controller, flashing cycles on different LEDs start at the same time.
You can design different flashing cycles to be dependent on each other by that.

**Example:**
LED1: red 0.5s, green 0.5s
LED2: green 0.5s, red 0.5s

After parameterizing LEDs, the flashing cycles of the various LEDs start at random times.
i.e. Flashing cycles run at random times with each other. When the controller is restarted, these are synchronized in time. To avoid restarting the controller, you can use the button Scenario sync. initiate the synchronization manually without restarting the controller.

**Notice**: after loading scenarios using the buttons L1 L2 L3 L4 L5 L6 the scenarios are always automatically start synchronized without the need of restarting the controller.

# 5 MISCELLANEOUS

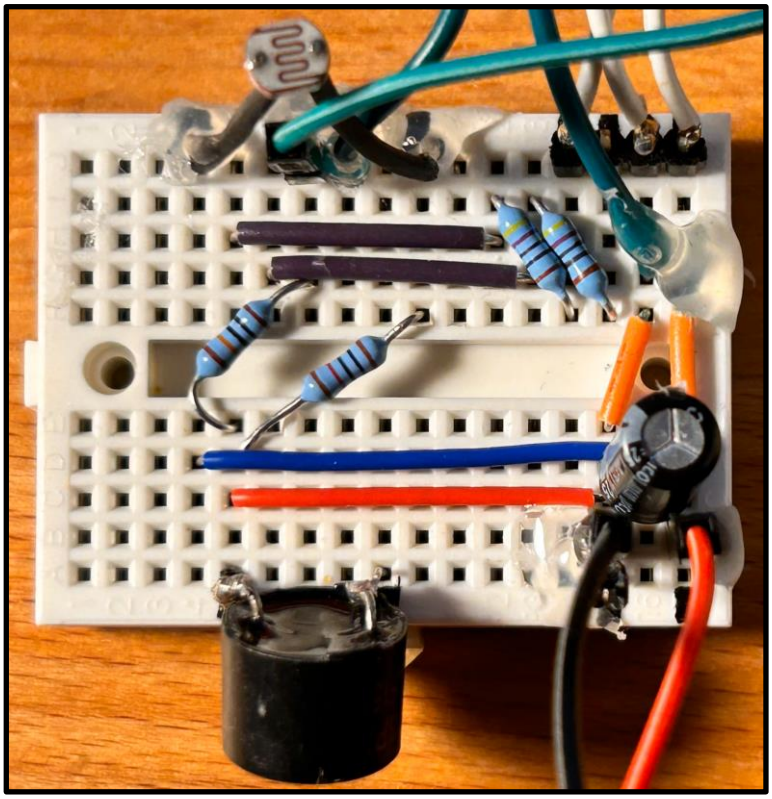
## 5.1 TRIGGERS (PROXIMITY SENSORS, BUTTONS, CONTACTS)

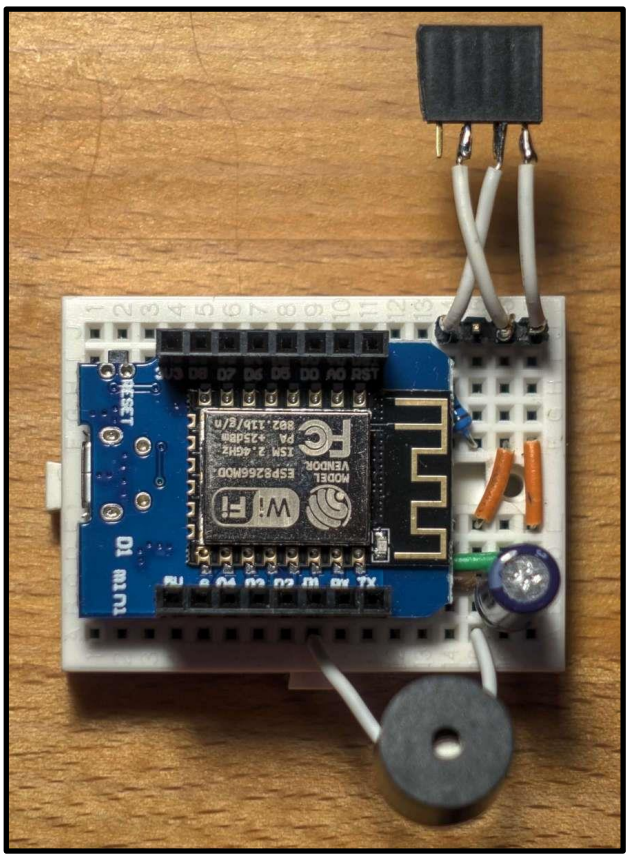
**Notice**: If you make parameterizations on the LEDs, it is recommended to use the button beforehand **Triggers off** to deactivate and after the parameterization again using the buttons **0s** **15s** **30s** **1m** **2m** **5m** **10m** **20m** **30m** **1h** **2h** **3h** to activate.

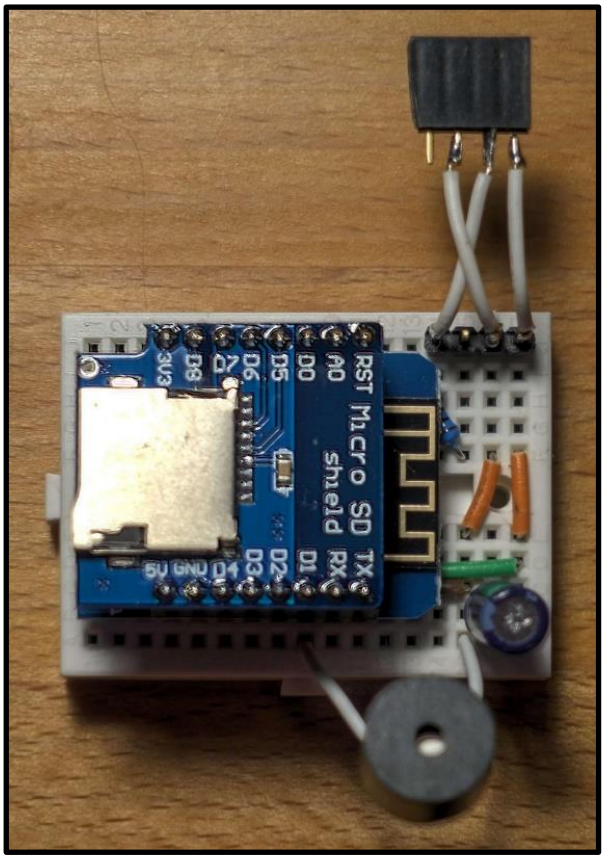
## 5.2 AMBIENT BRIGHTNESS AND PHOTORESISTANCE

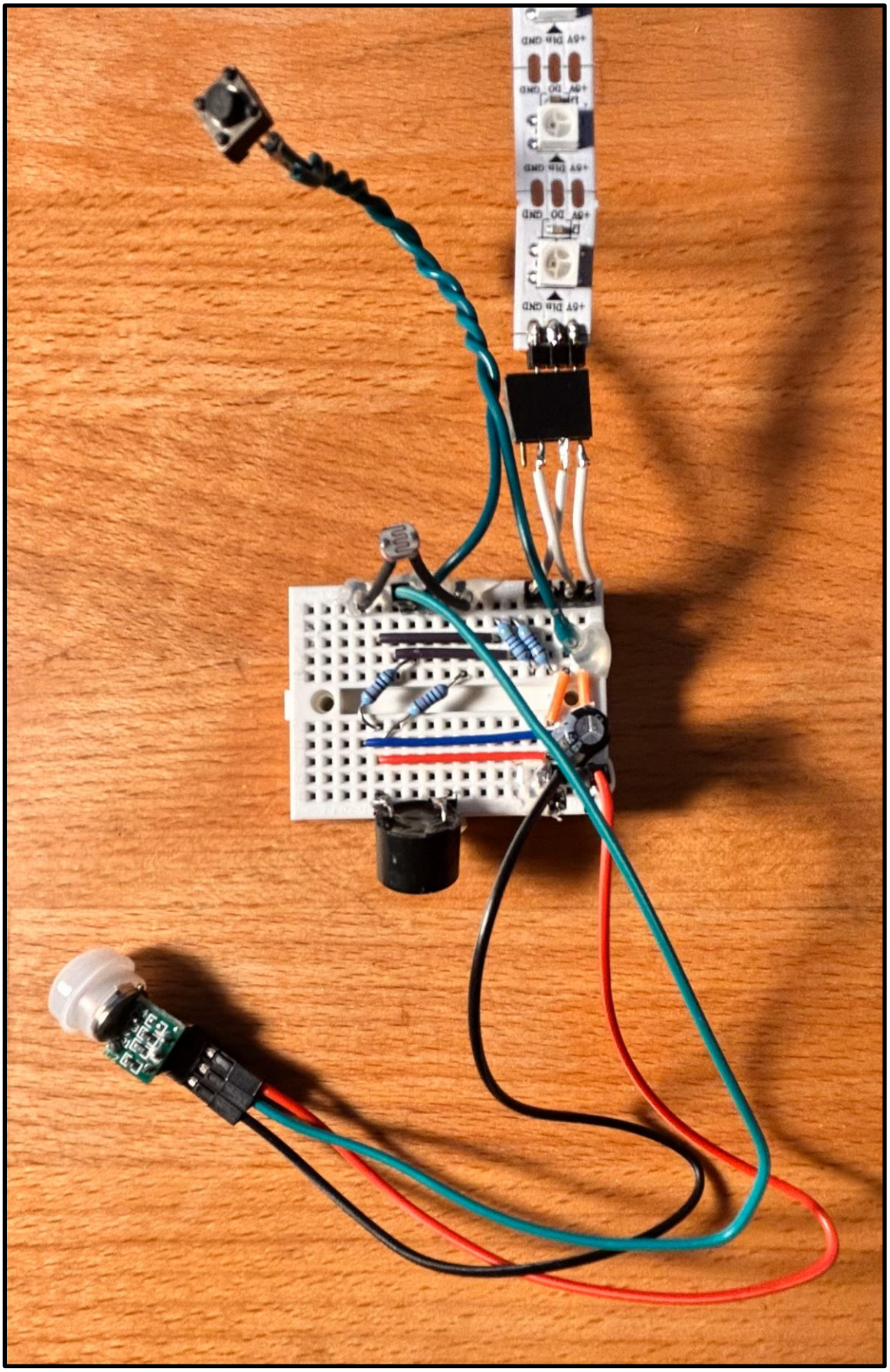
**Notice**: If you make parameterizations on the LEDs, it is recommended to use the button beforehand **Light sensor off** to deactivate and after the parameterization again using the buttons **H6** **H5** **H4** **H3** **H2** **H1** to activate.

# 6 CONTROLLER ILLUSTRATIONS








+5V DIN GND
+5V DO GND
+5V DIN GND
+5V DO GND
+5V DIN GND

# 7 PARTS LIST

Basic equipment

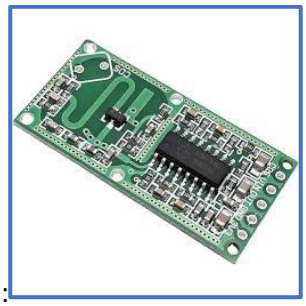
| Designation | Number | Cost |
|---|---|---|
| **Breadboard with 17 rows of 2 x 5 contacts** | 1 | |
| **Controller Wemos D2 mini (ESP8266)** | 1 | |
| **Resistor 470 ohms** | 2 | |
| **Connection pins 4 pin** | 1 | |
| **Electrolytic capacitor approx. 330uF** | 1 | |
| **Wire jumper with length 3 units** | 2 | |
| **Wire jumper with length 7 units** | 2 | |
| **Wire jumper with length 10 units** | 1 | |
| **Wire jumper with length 13 units** | 1 | |
| **Plug-in power supply 5VDC / >=500mA with Micro USB plug** | 1 | |

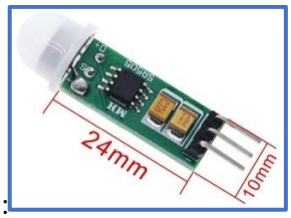
Optional for brightness control

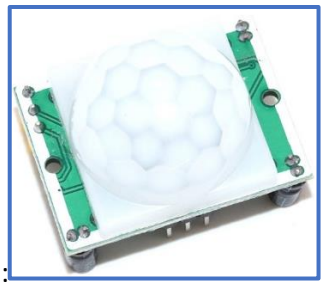
| Designation | Number | Cost |
|---|---|---|
| **Resistor 10kOhm** | 1 | |
| **Photoresistor 5537** | 1 | |
| **Connection pins 1 pin (for placing the photoresistor)** | 2 | |
| **Cable 2-wire (for wiring the photoresistor)** | 1 | |

Optional for the proximity sensors

| Designation | Number | Cost |
|---|---|---|
| **Proximity sensor (PIR or radar) (RCWL-0516 or HC-SR505 is recommended here)** | 1 | |
| **For the radar sensor optional for sensitivity adjustmens: Potentiometer 1MOhm** | 1 | |
| **Connection pins 1 pin (for wiring the proximity sensor)** | 2 | |
| **3-wire cable (for wiring the proximity sensor)** | 1 | |

RCWL-0516: 

HC-SR505: 


HC-SR501: 

AM312: 

SR602: 

Optional for separate power supply

| Designation | Number | Cost |
|---|---|---|
| **Connection pins 3 pin** | 1 | |
| **Cable 2-wire** | 1 | |
| **Ev. Power supply 5VDC / >=500mA (if the basic power supply cannot be used or no other voltage source is available)** | 1 | |

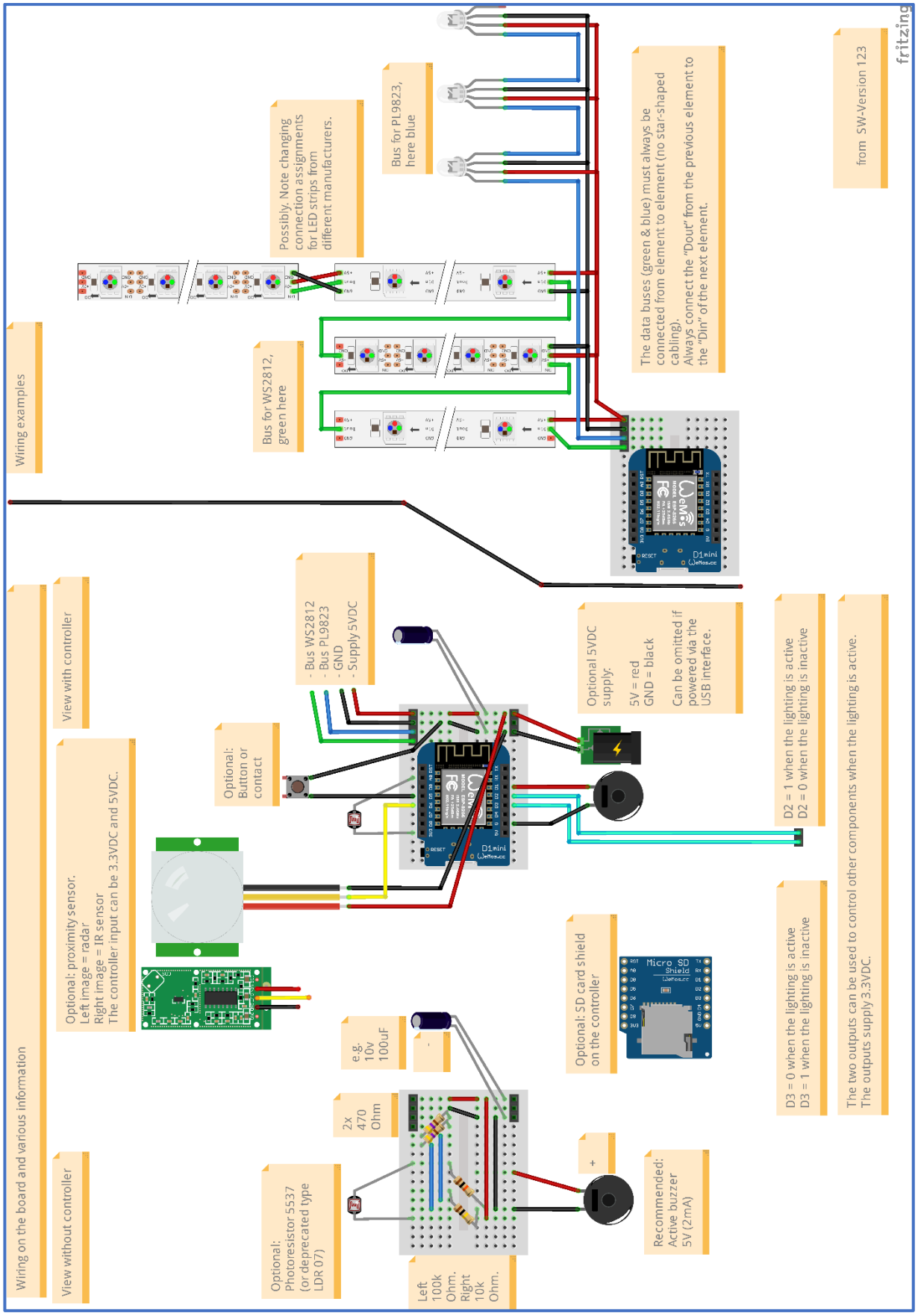
Optional for pipers

| Designation | Number | Cost |
|---|---|---|
| **Active beeper 5V (2mA) 12mm** | 1 | |
| **Short connecting wires** | 2 | |

Optional for SD card

| Designation | Number | Cost |
|---|---|---|
| **SD card shield** | 1 | |
| **Micro SD card (smallest available size is sufficient)** | 1 | |

# 8 SCHEMATIC AND WIRING EXAMPLE

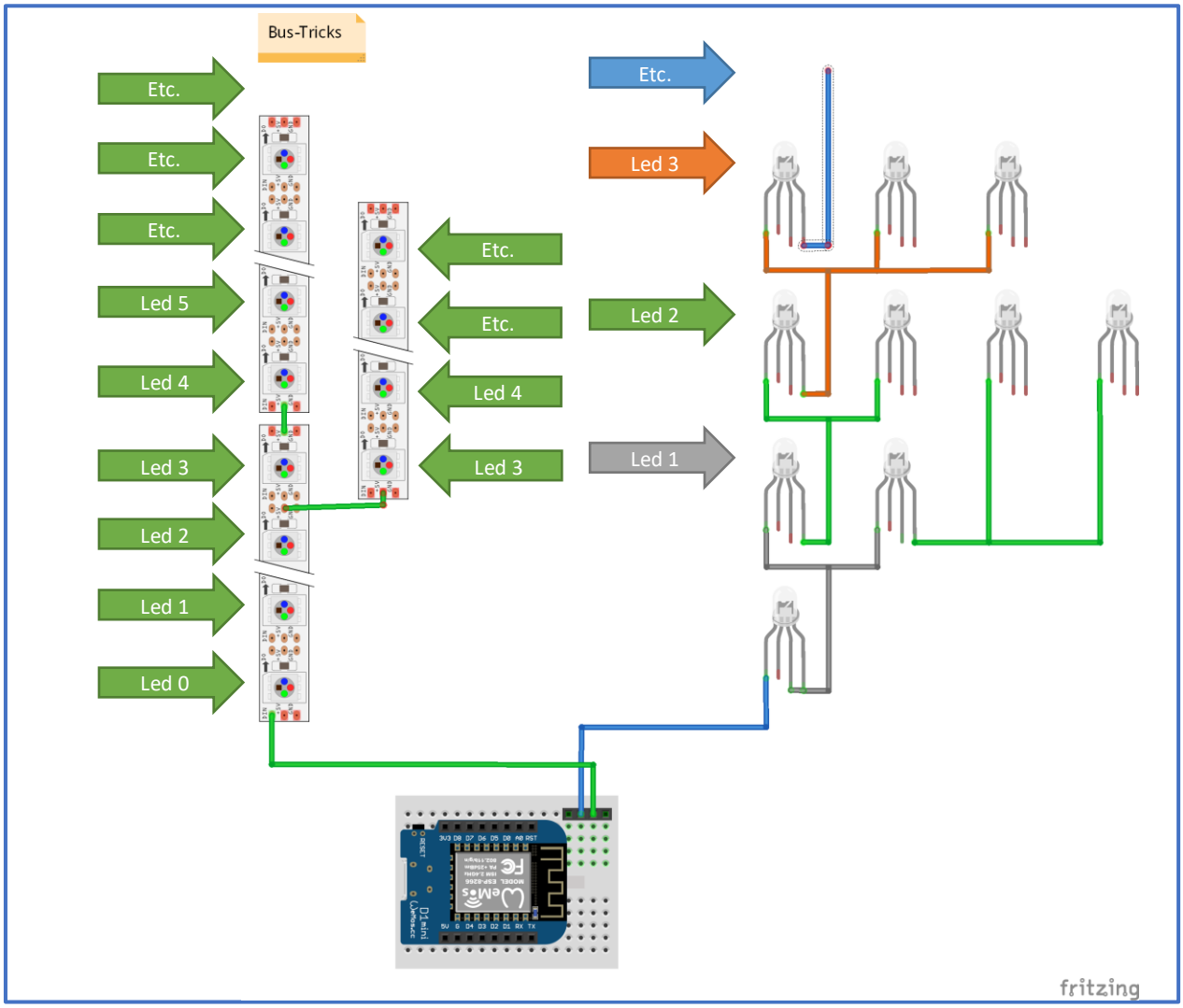

Wiring examples
Bus for WS2812, green here
Possibly. Note changing connection assignments for LED strips from different manufacturers.
Bus for PL9823, here blue
The data buses (green & blue) must always be connected from element to element (no star-shaped cabling).
Always connect the "Dout" from the previous element to the "Din" of the next element.
from SW-Version 123
fritzing
Wiring on the board and various information
View without controller
View with controller
Optional: proximity sensor.
Left image = radar
Right image = IR sensor
The controller input can be 3.3VDC and 5VDC.
Optional: Button or contact
- Bus WS2812
- Bus PL9823
- GND
- Supply 5VDC
Optional 5VDC supply:
5V = red
GND = black
Can be omitted if powered via the USB interface.
D2 = 1 when the lighting is active
D2 = 0 when the lighting is inactive
D3 = 0 when the lighting is active
D3 = 1 when the lighting is inactive
The two outputs can be used to control other components when the lighting is active.
The outputs supply 3.3VDC.
Optional: SD card shield on the controller
e.g. 10v 100uF
2x 470 Ohm
Optional: Photoresistor 5537 (or deprecated type LDR 07)
Left 100k Ohm. Right 10k Ohm.
Recommended: Active buzzer 5V (2mA)
D1 mini
Micro SD Shield

# 9 BUS TRICKS

If necessary, you can use the following trick to wire LEDs so that several LEDs behave identically but only have to be parameterized once. This can also be helpful if you want to operate more than the maximum 39 LEDs with one controller.

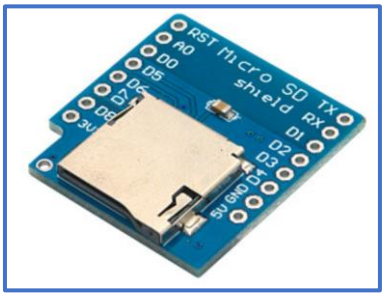
The first LED on the bus always receives the number = 0.
Each subsequent LED receives the next number of the predecessor.
Each LED can have several successors.
All LEDs with the same number behave identically.

**Example**: For better understanding, no power lines are shown here, only the bus lines.
The numbering of the LEDs on the left is independent of the numbering of the LEDs on the right.



# 10 BACKUP AND RESTORE

This means securing the lighting scenarios.
In order to export configurations to an SD card or import from an SD card, an SD card shield must be plugged into the controller.




To do this, you have to solder sockets with long pins on the controller instead of simple plug-in pins.
Both should normally be included in the scope of delivery of the controller.
The SD card must be formatted FAT32.

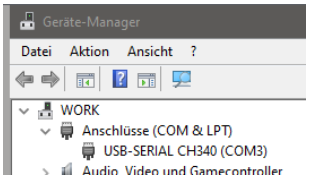
Export and import are carried out using the two buttons Export Import.
Manual editing of the exported file is not recommended. This is only intended as a backup.

# 11 DISASTER RECOVERY

Disaster recovery here means loading a new controller with the executable program (e.g. after a defect).
You do not need a programming environment to recover from a controller defect.
The fully compiled file is available as a BIN file in the project in the ".pio\build\d1_mini" subfolder and can be loaded directly onto the new controller without any programming.
The controllers can be reloaded as follows…

Connect the controller to the PC via USB.

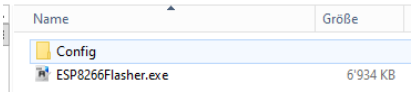
In Windows Device Manager this should appear as a CH340 device.



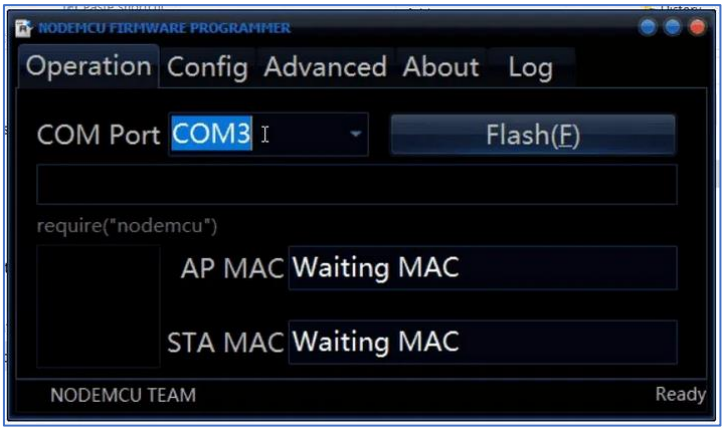

If this is not the case, you must install a CH340 driver.
http://www.wch.cn/download/CH341SER_ZIP.html(or Google search).
Then you need the bin file and the

https://github.com/nodemcu/nodemcu-flasher(or Google search).
Extract the files.

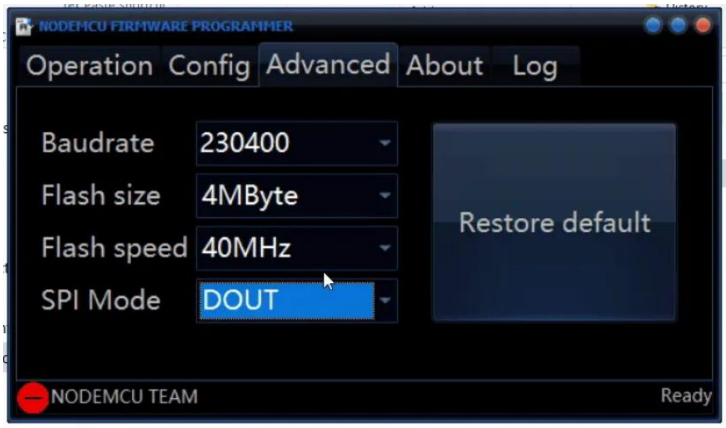
You can find the program you need in the Win64 or Win32 subfolder.



Start the program and select the COM interface.
COM number see Windows device manager).

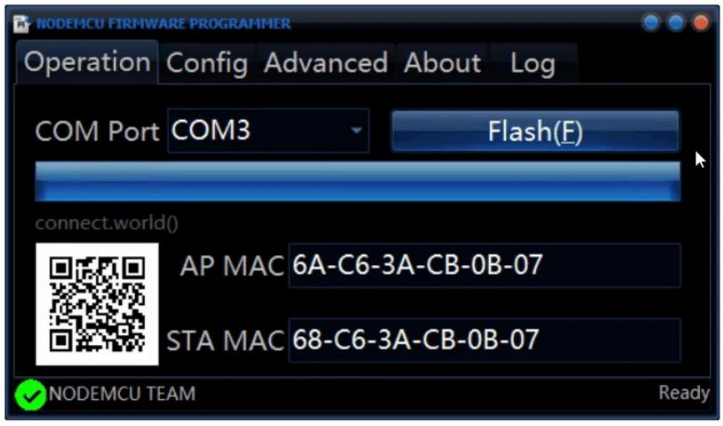



In the “Advanced” tab select DOUT.




In the “Config” tab, select the BIN file using the gear.

Start the upload in the “Operation” tab using the Flash button.




# 12 SOFTWARE CODE

The program is freely available.

The project can be edited using «Microsoft Visual Studio Code» with «Platform-IO» plugin.
Concise installation instructions are easy to find on the web.
The required Adafruit Neopixel library is included in the project.

Alternatively, the code can also be edited with the Arduino IDE.
However, to do this, the esp8266 boards must be added via the board manager then.
The Adafruit Neopixel library must also be installed.
The ".cpp" file in the "src" subfolder of the project can then be renamed are with the file extension «.ino».