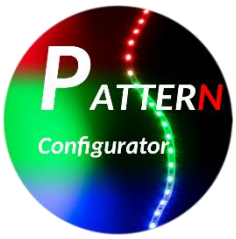




## Content

# Introduction

In December 2019, after an enthusiastic start with the MobaLedLib by Hardi Stengelin, I started to delve into the many possibilities that Hardi has presented us with. There are a lot of possibilities with the MobaLedLib.

Looking for an opportunity to project changing patterns in succession as happens at fairground attractions, for example, I found out that it was a bit complex. It is possible with the MobaLedLib by combining different commands. If you delve into it, you'll definitely get it working. I was just afraid that as I got older I would find this more and more difficult to configure.

Since I had some knowledge of Excel and its programming, I started looking for an opportunity to create a macro that would simplify this. In consultation and with the help of Hardi, a macro has been created that is easy to configure. This macro is called Multiplexer.

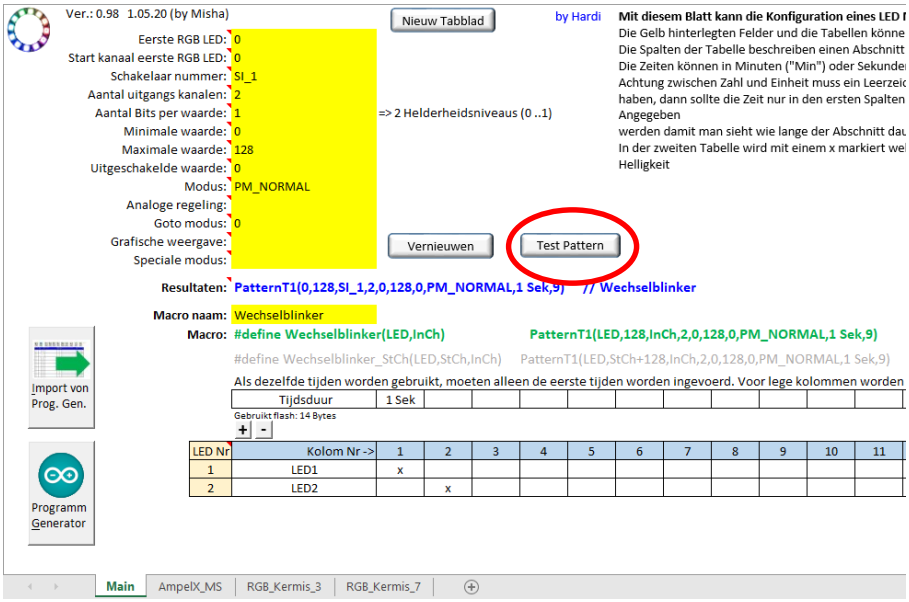
With the Multiplexer, it is possible to take multiple Patterns together in a group of Patterns that then alternately follow each other or randomly based on time or action. The Multiplexer Editor allows you to compose this group and make the chosen Pattern visible.

Hardi has suggested that the patterns used be visible in some way. This has resulted in a graphic representation of the patterns as they are created in the Pattern_Configurator.

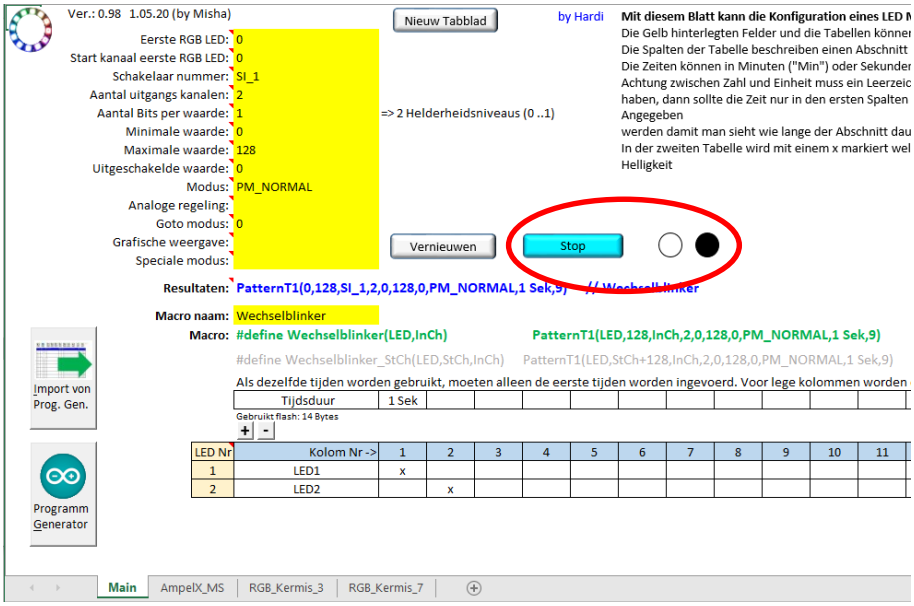
As a Spin Off of this, there is also an opportunity to test the patterns already in the Pattern_Configurator. This will be the first to be described below.

I would like to thank Hardi for supporting the creation of this expansion on the MobaLedLib.

# Pattern_Configurator Test function



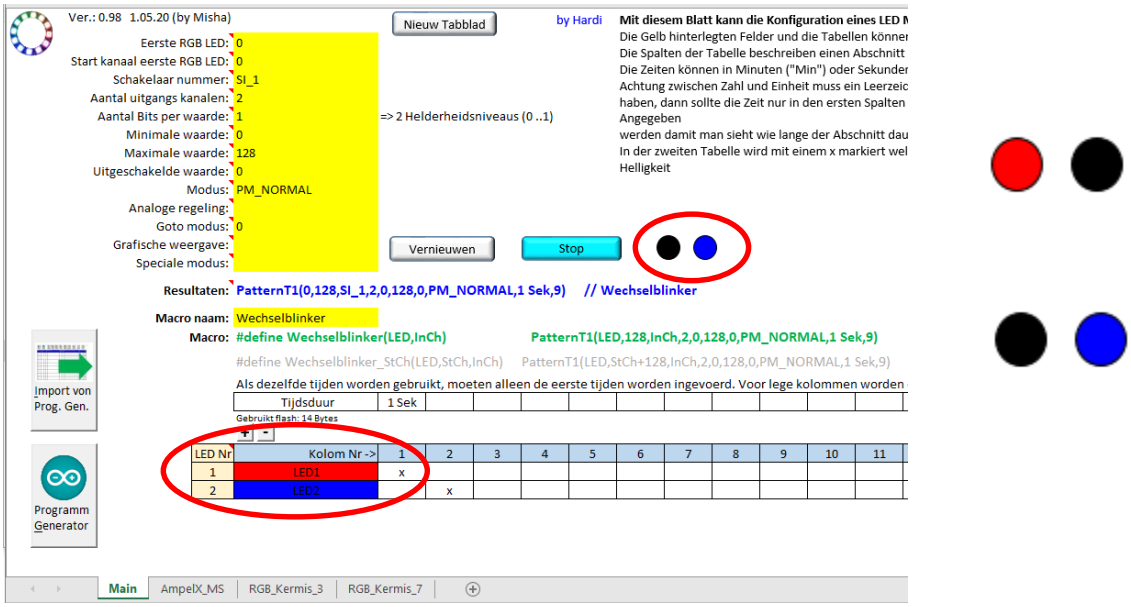

If you start the Pattern_Configurator, it is immediately noticeable that a button has been added. Here's that on the Main tab. If you press it, you can see its effect.




Two shapes now appear that LEDs should represent that flash alternately. You can see this because black turns white and vice versa.

The 'Main' tab displays two single LEDs. By default, no color is assigned to this.

If you color the cell in which the text is in, the LEDs in the test take over this color rendition.




In the MobaLedLib there are basically two types of LEDs. Single LEDs and RGB LEDs. For Single LEDs, the colours are determined by the applied LED itself. Therefore, when testing, the color is determined by the color of the cell.

For RGB LEDs, the color is determined by the settings in the pattern. The test function itself determines whether a single LED or an RGB LED is displayed in the pattern. If three consecutive names are the same, the test function assumes that this is an RGB LED.

Example:

4x RGB LED

Als dezelfde tijden worden geb

| Tijdsduur | 103 ms |
|---|---|

Gebruikt flash: 61 Bytes

| LED Nr | Kolom Nr -> | 1 |
|---|---|---|
| 1 | LED 1 | |
| 2 | LED 1 | |
| 3 | LED 1 | x |
| 4 | LED 2 | |
| 5 | LED 2 | |
| 6 | LED 2 | |
| 7 | LED 3 | |
| 8 | LED 3 | |
| 9 | LED 3 | |
| 10 | LED 4 | |
| 11 | LED 4 | |
| 12 | LED 4 | |
| 13 | LED 5 | |

6x Single (Single) LED

Als dezelfde tijden worden ge

| Tijdsduur | 2 Sec |
|---|---|

Gebruikt flash: 25 Bytes

| LED Nr | Kolom Nr -> | 1 |
|---|---|---|
| 1 | Rot 1 | x |
| 2 | Gelb 1 | |
| 3 | Grün 1 | |
| 4 | Rot 2 | x |
| 5 | Gelb 2 | |
| 6 | Grün 2 | |

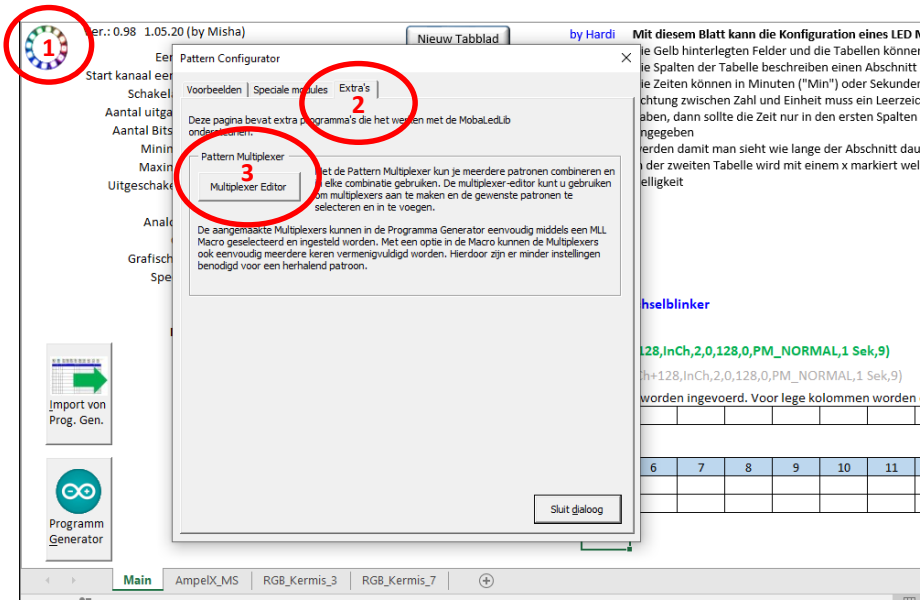
Testing combined single and RGB LEDs in a pattern will give an error message. The test function can't handle this.

A single (Single) LED is indicated by the symbol:

And an RGB LED is indicated by the symbol:

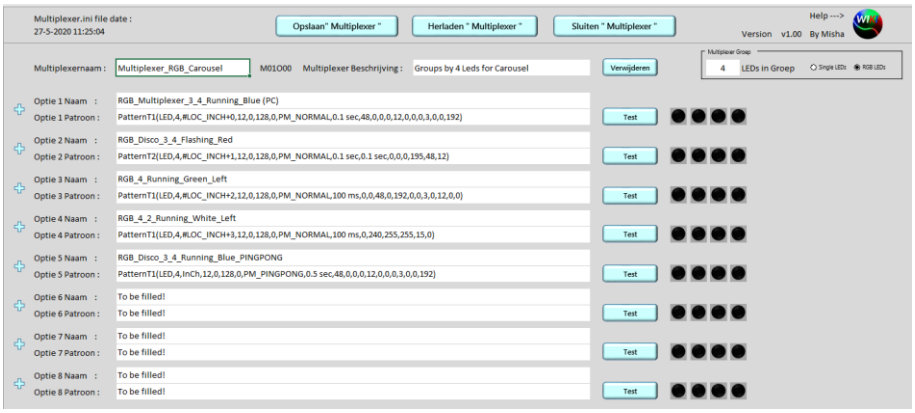
## Pattern_Configurator Multiplexer

If you press in a pattern on the round LED Circle (1) then a menu screen opens.




Then press the "Extras" tab (2), and then press "Multiplexer Editor" (3).

Now the Multiplexer opens.

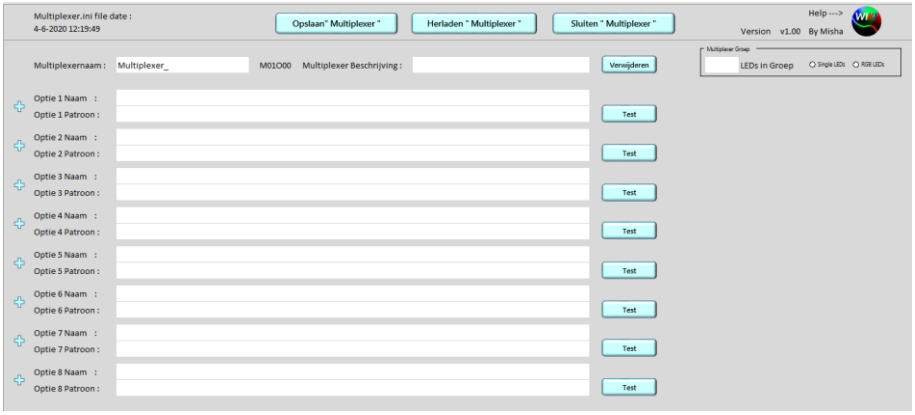



With the Multiplexer, it is possible to take multiple Patterns together in a group of Patterns that then alternately follow each other or randomly based on time or action. The Multiplexer Editor allows you to compose this group and make the chosen Pattern visible.

A next chapter describes how to use the group in the Program_Generator.

When the Multiplexer opens for the first time, there is a notification that the configuration file cannot be found. The configuration file is then created with default settings.

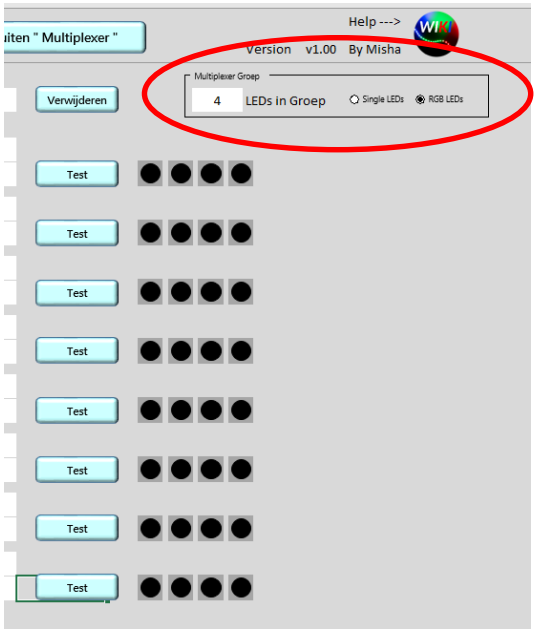
## Create group in the Multiplexer




When the Multiplexer is open for the first time, all fields are still empty and the default settings apply.

It is important to consider now which application the Multiplexer Group will be used for. Also, you have to think about how the LEDs are distributed to the application. For example, groups of 4 Single LEDs switched in parallel or an RGB LED strip where your software creates moderate groups. The number of LEDs in this group must be filled in by 'LEDs in Group'.

You also need to determine whether you are using Single ( Single) – or RGB LEDs. You can indicate this by selecting the right option in the 'Multiplexer Group' framework.

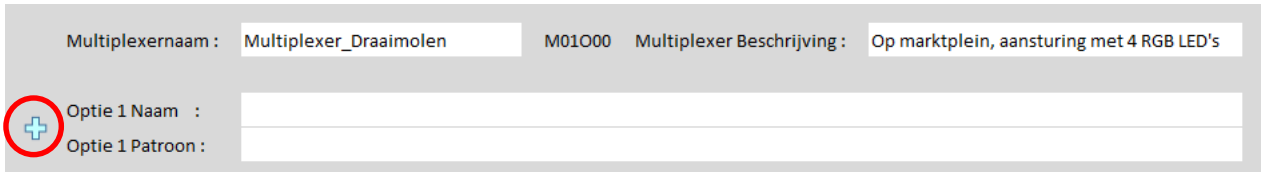



Once they have been completed, the associated LEDs are created and can be seen.


Then enter a name for the Multiplexer. This should always start with "Multiplexer_"! For example, you could put the name of the application here.

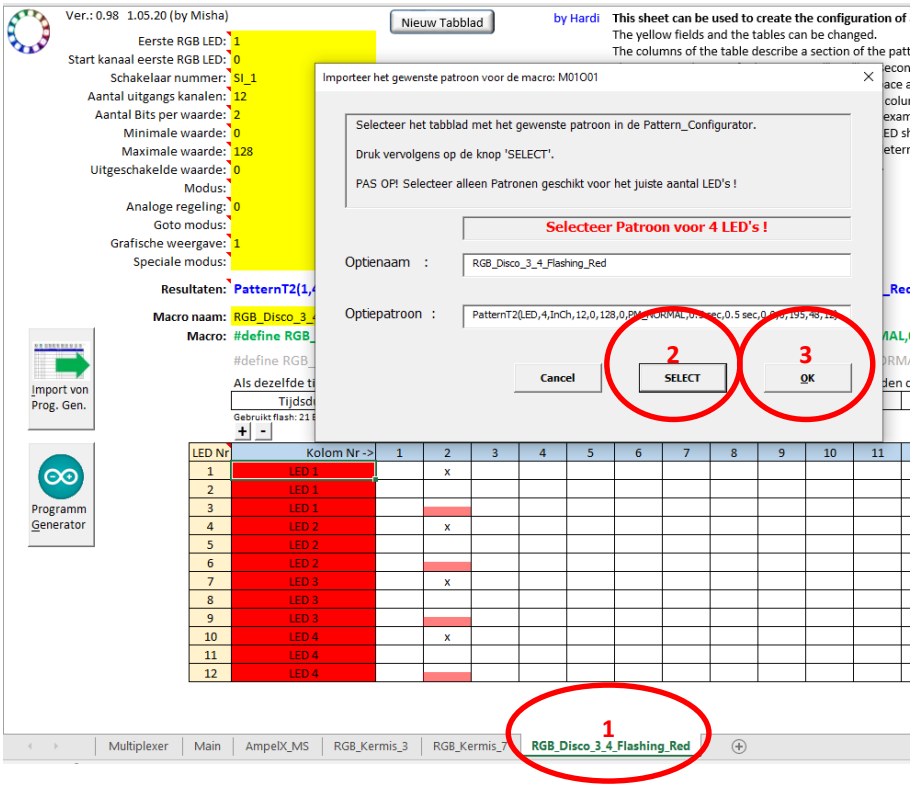
Then make a description of the Multiplexer Group. For example, bet here that it is a group intended to control groups of 4 LEDs.

Click on the plus of the first option.

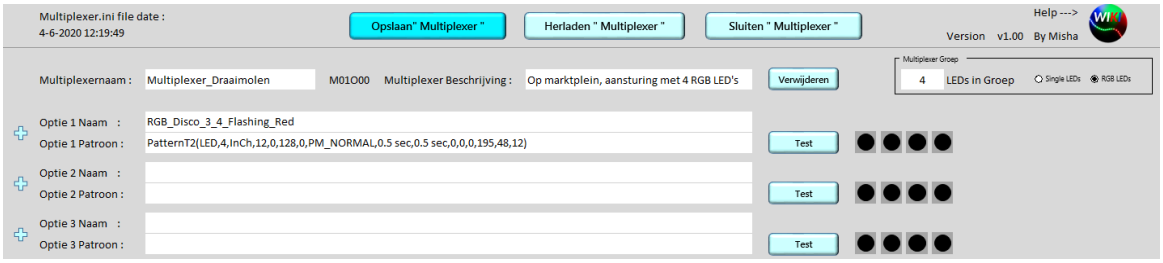


The next Import Screen Pattern then appears.


Then select the Tab Sheet with the pattern already created and desired. Please note that the number of LEDs in the Pattern should be the same number as was chosen from the Multiplexer Group.

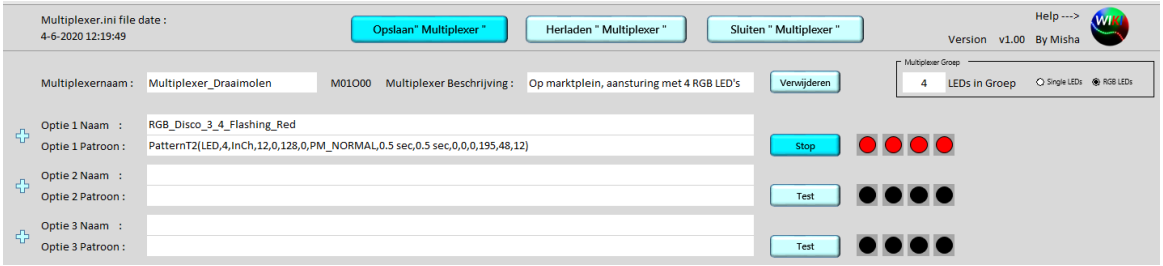



Do that by following steps 1, 2 and 3.




Repeat for each Pattern you want to add to this Multiplexer Group.

To see what the Pattern looked like, you can press the Test button.




Don't forget to save the made Multiplexer Group!

When you're done configuring the Multiplexer, close the Multiplexer Editor with the "Close " Multiplexer" button.

## Removals in the Multiplexer

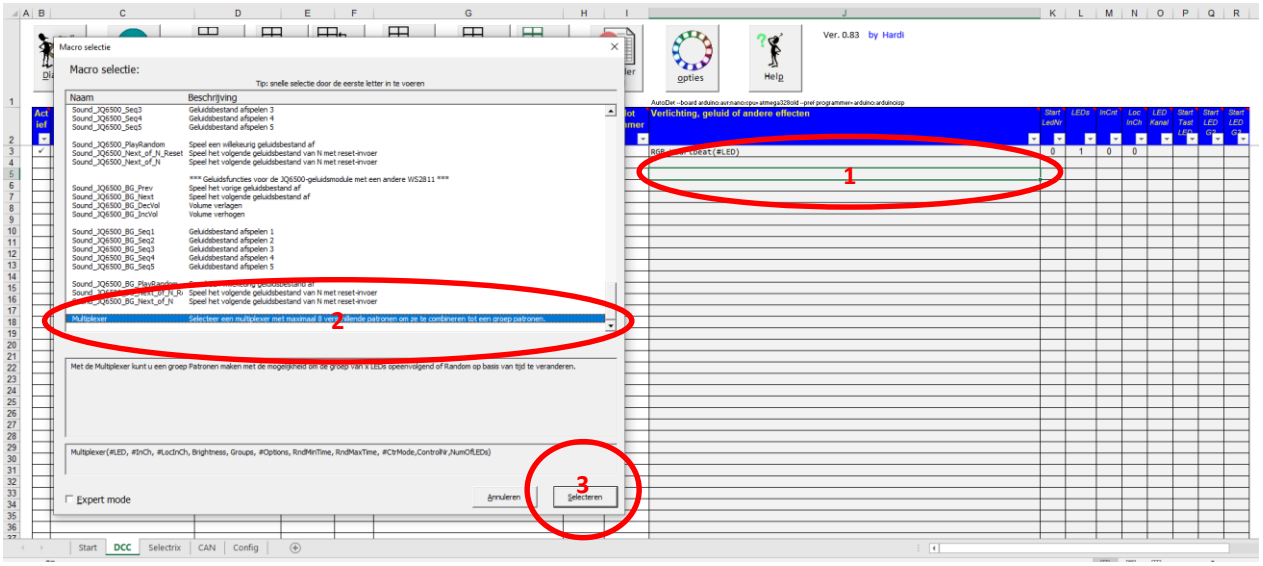
If you want to remove a Multiplexer Group option, you can do so by emptying the Fields option with the "Delete" button on your keyboard. If you then save the Multiplexer, the Option is permanently removed.

If you want to delete an entire Multiplexer Group, use the "Delete" button next to the Multiplexer Group framework. The entire Multiplexer Group will then be removed. After saving, the changes are final.

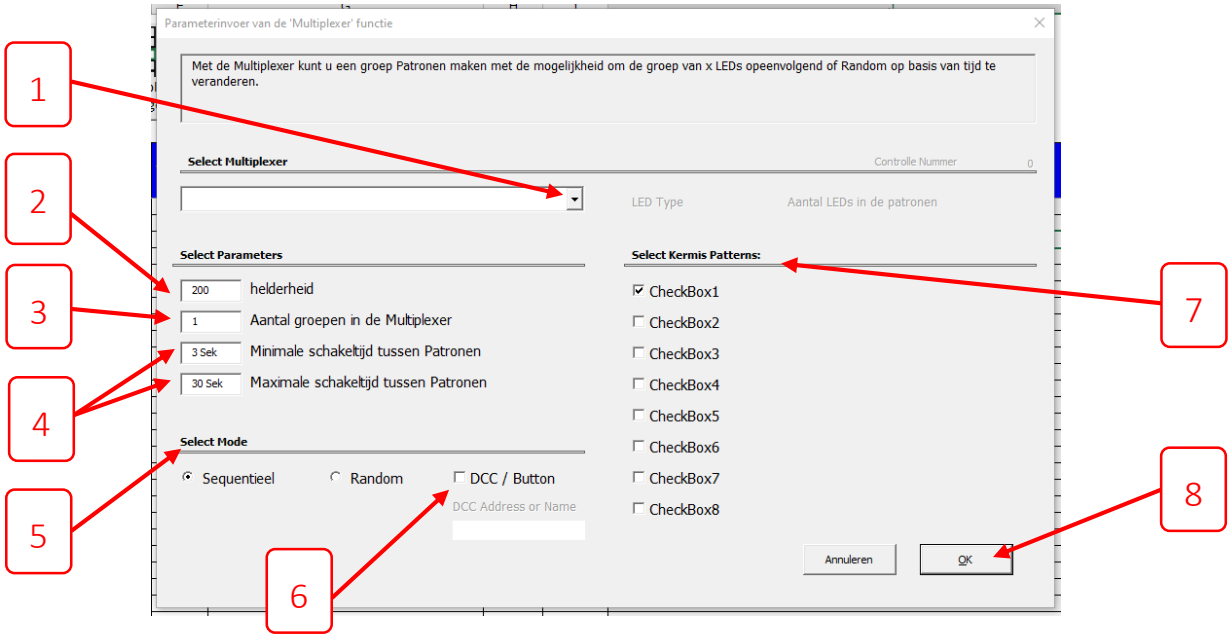
When removing Multiplexer Groups, the child Multiplexer Groups slide upwards.

## Program_Generator Multiplexer Macro

In the Program_Generator double-click a line (1) in the column "Lighting, sound, or other effects." Then the 'Macro Selection screen' opens. Go all the way to the bottom line of the screen and select the "Multiplexer" macro (2). Press select (3).




Now the Multiplexer macro's 'Parameter Input' screen opens with the default settings. These can now be customized to your wishes. Follow the 7 steps for this.




Step 1 : Select 1 of the Multiplexer Groups previously created with the Multiplexer Editor.

Step 2 : Provide a group value for brightness for the entire Multiplexer Group.

Step 3 : Specify here how many groups of the number of LEDs of the selected Multiplexer Group need to be created by the macro.

Step 4 : Specify the switching times here for the changes of the Patterns.

Step 5 : Select whether the changes should take place sequentially (Sequential) or randomly.

Step 6 : Here you can indicate whether you want the changes to take place through time or by means of an action. If you check the DCC /Button, a name of a switch or a DCC address must be specified. In Multiplexer version 1.01 this is not yet active!

Step 7 : In this Multiplexer Group, select which Patterns present to create by this macro.

Step 8 : When you're done, click 'OK'.

Something similar to the image below should now be as a rule.

| Activ | Filter | DCC address | Type | Start-val | Description | Distribution-number | Connector-number | Lighting, sound, or other effects | Start LedNr | LEDs | InCnt | Loc InCh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ✓ | | [Multiplexer] | | | Draaimolen | | | Multiplexer(#LED, #InCh, #LocInCh, 1, 3, 31, 3 Sek, 5 Sek, CF_ROTATE, 4923, 4) | 150 | 12 | 1 | 5 |

If you are not satisfied with the settings double click on the just created rule and adjust the settings.

# Parameters in the 'Mutliplexer.ini' file

```
[Multiplexer_Macro]
INI_File_Production_Date=11-6-2020 13:56:02
Version=v1.01
MaxLEDs=4
Number_Of_Multiplexers=3
Number_Of_OptionsLEDs=4
ThreeD=Waar
LED_Nrs_OnOff=Waar
DisplayLEDs=Onwaar
WiKi_URL=https://wiki.mobaledlib.de/anleitungen/spezial/multiplexing


[Multiplexer_RGB_Carousel]
Description=Groups by 4 Leds for Carousel
Number_Of_LEDs=4
LED_Type=RGB LEDs
Enable_DCC_Button=0
Option 1 Name=RGB_Multiplexer_3_4_Running_Blue (PC)
Option 1 Pattern=PatternT1(LED,4,#LOC_INCH+0,12,0,128,0,PM_NORMAL,0.1
Option 1 SingleLED_Colors=
Option 2 Name=RGB_Disco_3_4_Flashing_Red
Option 2 Pattern=PatternT2(LED,4,#LOC_INCH+1,12,0,128,0,PM_NORMAL,0.1
Option 2 SingleLED_Colors=
Option 3 Name=RGB_4_Running_Green_Left
Option 3 Pattern=PatternT1(LED,4,#LOC_INCH+2,12,0,128,0,PM_NORMAL,100
Option 3 SingleLED_Colors=
/\
|
\/
ControlNr=4923

[Multiplexer_BumpCars]
Description=SingleLEDS For 6 LEDs
Number_Of_LEDs=6
LED_Type=Single LEDs
Enable_DCC_Button=0
Option 1 Name=SGL6_Running_Blue_PingPong
Option 1 Pattern=PatternT1(LED,4,InCh,6,0,128,0,PM_PINGPONG,0.5 sec,3
Option 1 SingleLED_Colors=0,00, 00, 255,00, 00, 255,00, 00, 255,00, 0
Option 2 Name=SGL6_Running_Green_PingPong
Option 2 Pattern=PatternT1(LED,4,InCh,6,0,128,0,PM_PINGPONG,100,255,2
Option 2 SingleLED_Colors=0,00, 180, 00,00, 180, 00,00, 180, 00,00, 1
Option 3 Name=SGL6_ConstWarnLight
Option 3 Pattern=PatternT1(LED,12,InCh,6,0,255,0,PM_NORMAL,200,102,10
Option 3 SingleLED_Colors=0,255, 255, 00,255, 255, 00,255, 255, 00,25
```

## [Multiplexer_Macro]

General parameters for the Macro.

INI_File_Production_Date

Date that the "Mutliplexer.ini" file is saved.

Version

Internal Multiplexer version number of the Multiplexer Macro.

MaxLEDs

Is no longer used and will be deleted in a subsequent version.

Number_Of_Multiplexers

Number of Multiplexers on the worksheet. Do you want more than you need to raise this parameter.

Number_Of_OptionsLEDs

Internal parameter that specifies the default number of LEDs used to make LEDs visible in an Option Rule. This does not affect the number of LEDs per Multiplexer group.

ThreeD

True or False. Specifies whether the LEDs should be displayed in 3D (Where) or flat by default (False). It might make the slower computer a little faster.

LED_Nrs_OnOff

True or False. Indicates whether or not you want to make the numbering on the LEDs visible.

DisplayLED's

True or False. By default, all LEDs on the Multiplexer worksheet are made visible. This gives you a direct view of the LEDs in the Multiplexer group. However, building up the large number of LEDs takes time and takes about 4 seconds on a fast computer. As a result, the computer reacts slowly.

You can speed this up by creating "DisplayLEDs=False". The LEDs will no longer be visible by default and will only become visible if the 'Test' button is clicked.

WiKi_URL

This is the help page on the MobaLedLib WiKi.

Should this ever change, this can be adjusted here.

## [Multiplexer_RGB_Carousel]

This is the name of a Multiplexer group. All parameters below up to the next [..] belong to this group. Changes to these groups are made by the Multiplexer Macro.

Description

Description of the Multiplexer.

Number_Of_LED's

Number of LEDs in this Multiplexergoep.

LED_Type

The type of LED for which this Multiplexer group is intended. These can be RGB LEDs or Single LEDs.

Enable_DCC_Button

In a later Multiplexer version it will probably be possible to control the Multiplexers via DCC or with a control button. In anticipation of this, this is already prepared but turned off because it does not work yet. Not working yet in Multiplexer version 1.01.

Option 1 Name

Option Name.

Option 1 Pattern

The Pattern in this Option.

Option 1 SingleLED_Colors

Used only with the LED Type 'Single LEDs'. It takes a series of color values used to display a Pattern in the Multiplexer.

With the LED Type 'RGB LEDs' this parameter is empty!

ControlNr

This is a control number for the Multiplexer group Macro. If the Pattern_Configurator the Multiplexer Group changes, the Control Number is recalculated. This parameter can be observed by the Program_Generator. In the Program_Generator is a different Control number. The Program_Generator can ask if the Multiplexer Macro needs to be updated with the changes made. Not working yet in Multiplexer version 1.01.

## Restrictions Multiplexer v 1.01

- Still 'small' bugs possible. Please report this!
- No support for Analog mode.
- No support for Modes (PM_SEQUENCE_W_RESTART | PM_SEQUENCE_W_ABORT | PM_SEQUENCE_NO_RESTART)
- No support for flags (PF_SLOW | PF_INVERT_INP)
- Adding or removing Multiplexers can still be improved.
- (Still) No support for controlling via DCC or controlling buttons.
- (Still) No control on mutliplexers in the Pattern_Configurator modified.
- No support for led positions to be chosen by the user. For example, on an image of a signal or a traffic light. This is complicated and needs to be investigated. This may be possible in the next version.
-

## Release comments

### Multiplexer Version 1.01

15-06 2020 Initially released Multiplexer version 1.01.