Het Spelen en ontwerpen , Programmeren met intelligente kleuren leds (led it bee deel 2b)

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Wat zijn intelligente Leds

Led’s met electronica ingebouwd

Neopixel (adafruit)

WS2812b

SK681RGBW

SMD 5050

APA 102

APA 104

APA 107 (clk en data) SMD Leds met 6 pootjes

Fob , Cob , Fcob Led Strip (nieuw)

Soorten van intelligente Leds

Rood, Groen en Blauw (RGB)

Rood, Groen, Blauw en Wit (RGBW)

Wit in verschillende tinten

Snelheid 400Khz / 800Khz (2,5 uSec /1,25 uSec)

Clock en data gecombineerd

Clock en Data gescheiden (tot 8 mega bit snelheid) (0,125 uSec)

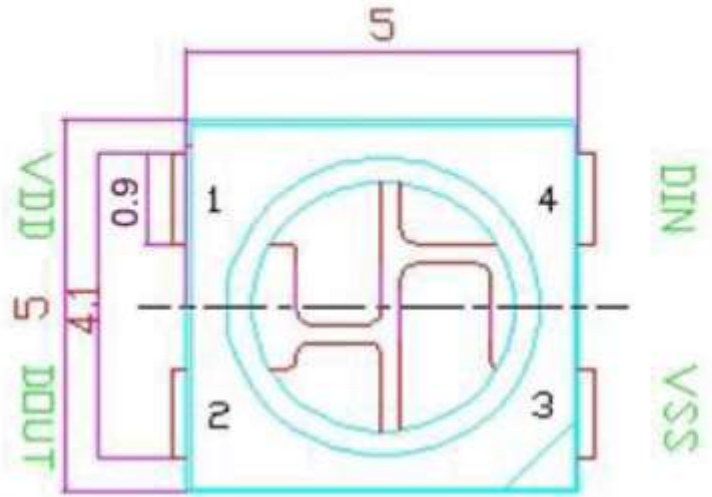
Smd leds

Gewone leds, transparent en mat kunststof

Led controllers met losse leds (nieuw)

RGB WS2812b 1

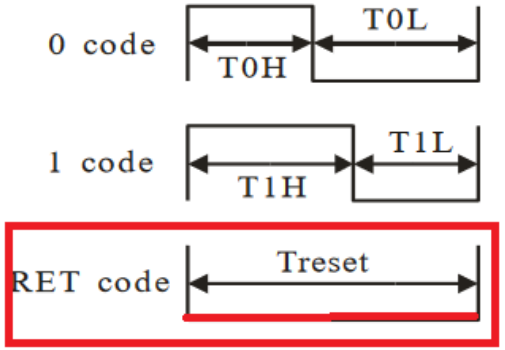
PIN configuration



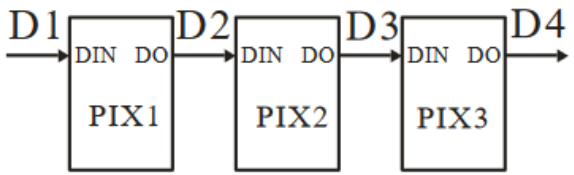
PIN function

NO.	Symbol	Function description
1	VDD	Power supply LED
2	DOUT	Control data signal output
3	VSS	Ground
4	DIN	Control data signal input

RGB WS2812b 2

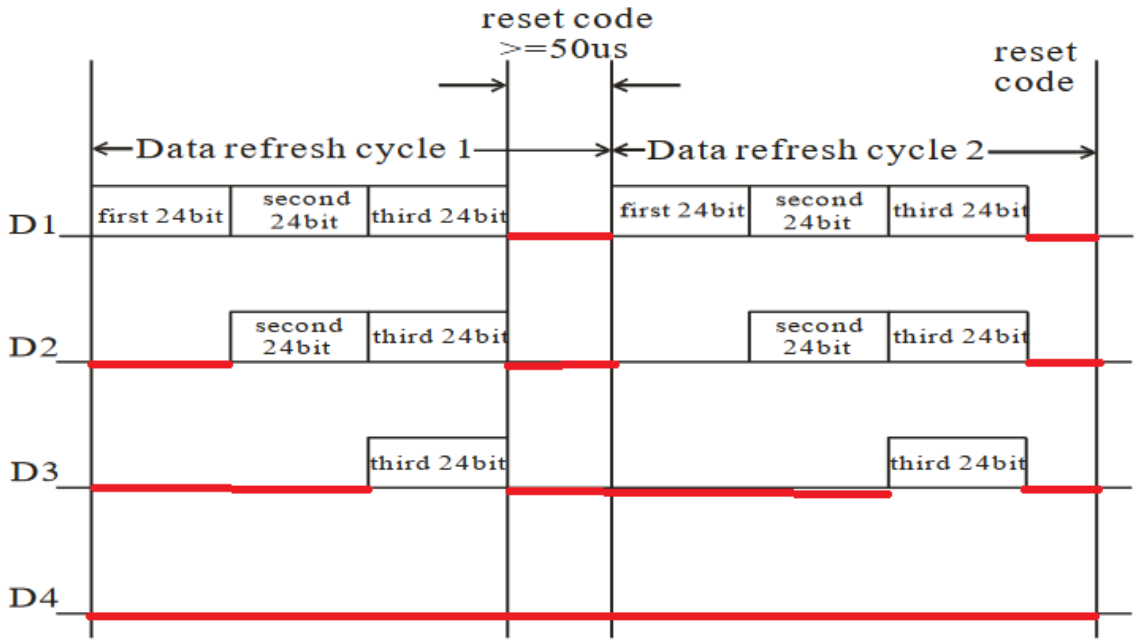


Cascade method:



*** NOTE RESET NOT USE FOR OS CPU,S**

Data transmission method:



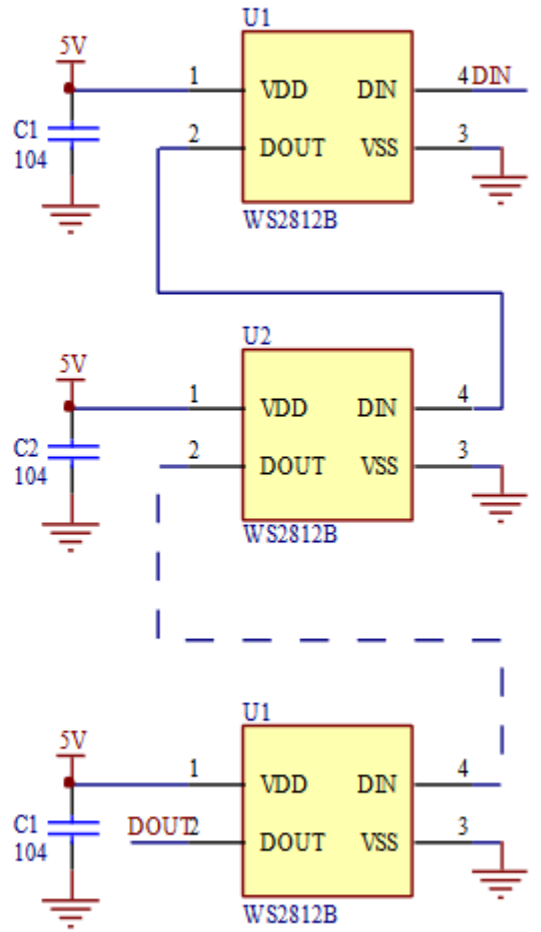
RGB WS2812b 3

Composition of 24bit data:

G7	G6	G5	G4	G3	G2	G1	G0	R7	R6	R5	R4	R3	R2	R1	R0	B7	B6	B5	B4	B3	B2	B1	B0

Note: Follow the order of GRB to sent data and the high bit sent at first.

Typical application circuit:



RGBW SK681RGBW 1

SK6812RGBW: The default is the chips with IC integration

R: RED 620-630NM

G: GREEN 515-525 NM

B: BLUE 460-470 NM

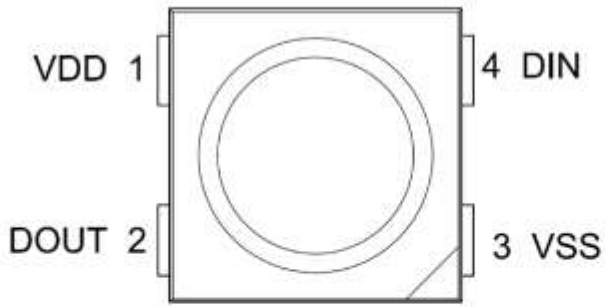
W : White Color

-xx BW Blue White 6000-7000K

NW Natural White 4000-4500K

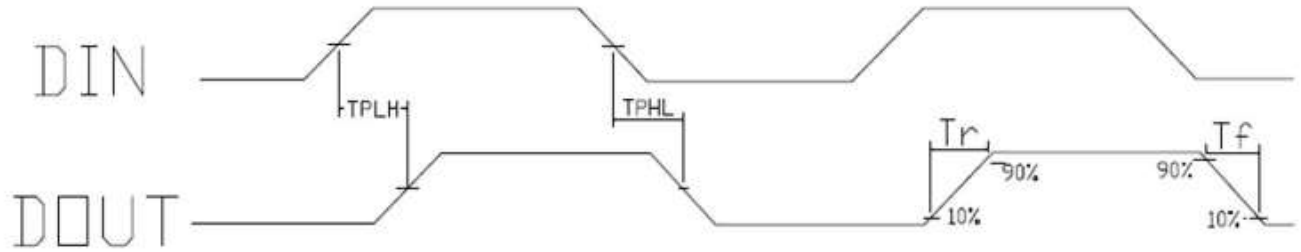
WS Warm Sunlight 2700-3000K

5. PIN configuration



NO.	Symbol	Function description
1	VDD	Power supply LED
2	DOUT	Control data signal output
3	VSS	Ground
4	DIN	Control data signal input

RGBW SK681RGBW 2

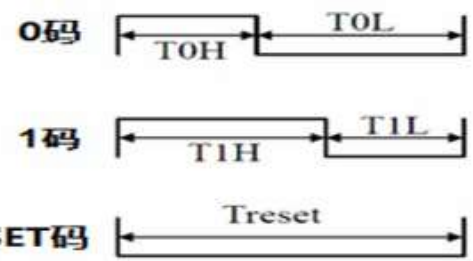


10. The data transmission time (TH+TL=1.25μs±600ns):

T0H	0 code, high level time	0.3μs	±0.15μs
T0L	0 code, low level time	0.9μs	±0.15μs
T1H	1 code, high level time	0.6μs	±0.15μs
T1L	1 code, low level time	0.6μs	±0.15μs
Trst	Reset code，low level time	80μs	

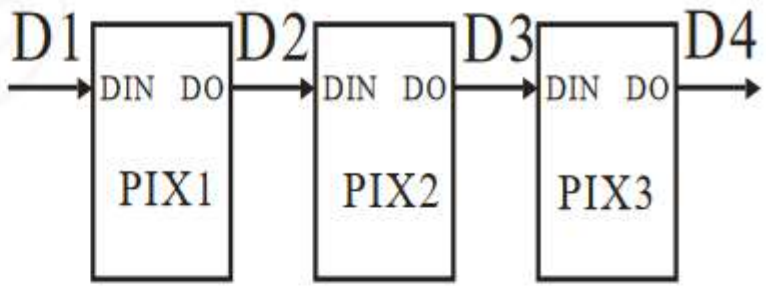
11. Timing waveform:

Input code:

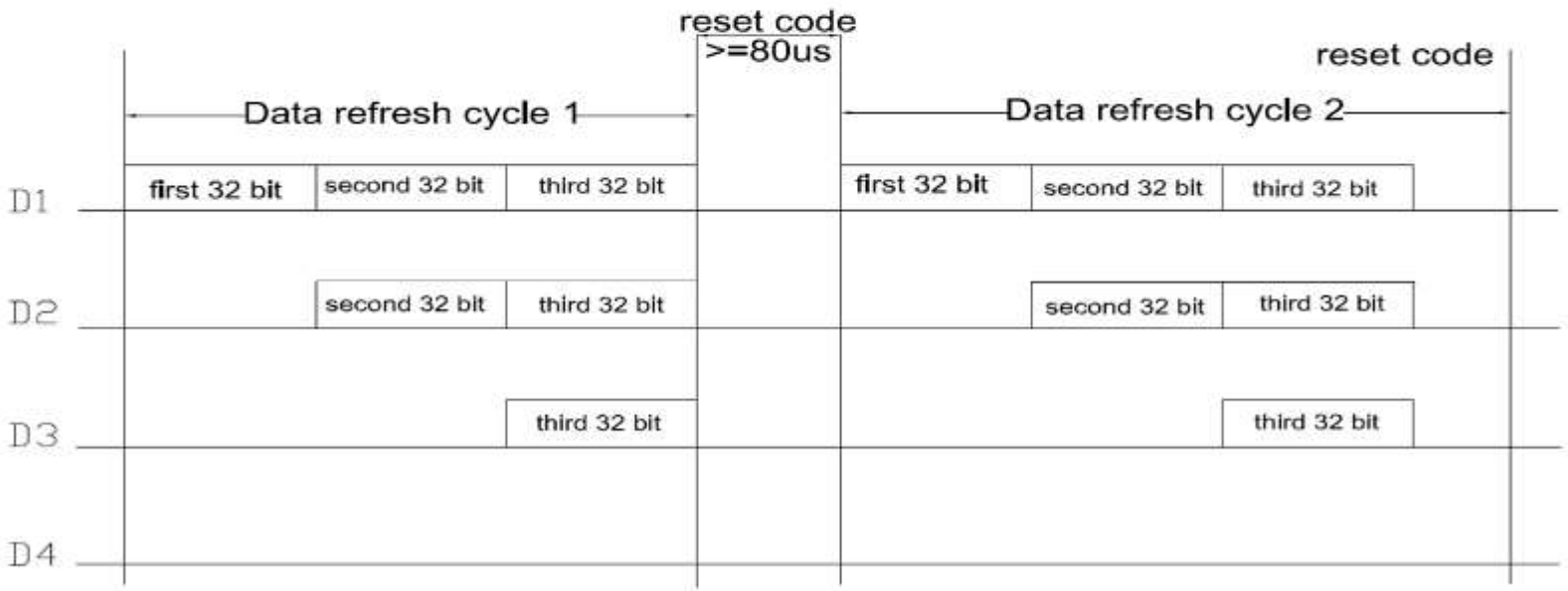


RGBW SK681RGBW 3

Connection mode:



The method of data transmission:



Note: the D1 sends data for MCU, D2, D3, D4 for data forwarding automatic shaping cascade circuit.

RGBW SK681RGBW 4

The data transmission time

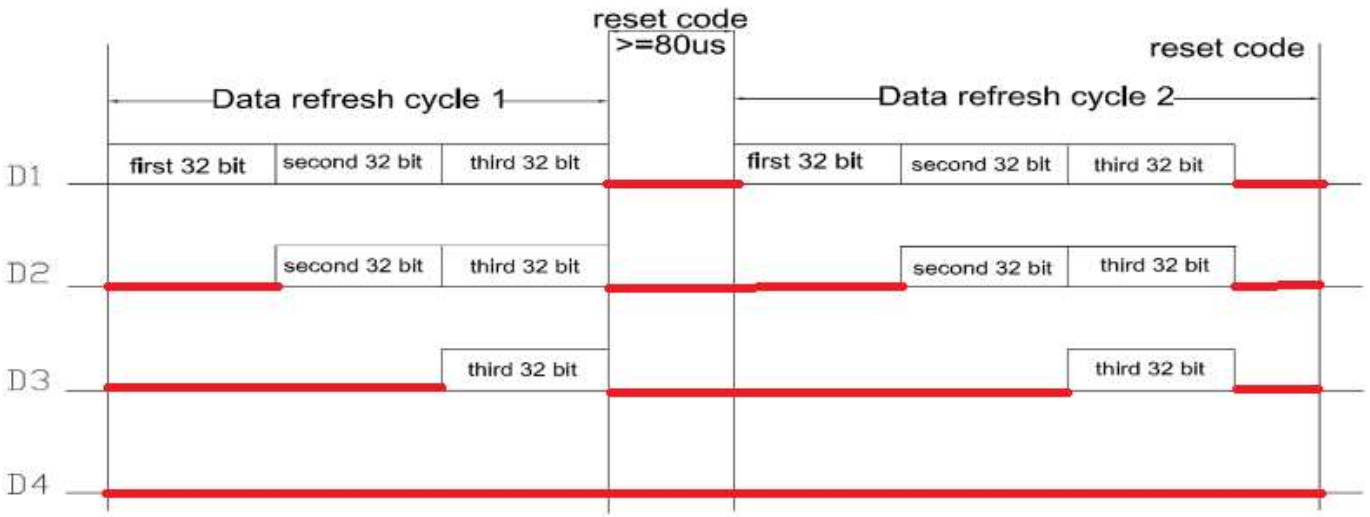
RESET

*** NOTE de data stroom mag niet worden onderbroken worden door bv een Interupt**

Trst	Reset code，low level time	80μs	

RESET Treset

The method of data transmission:



RGBW SK681RGBW 5

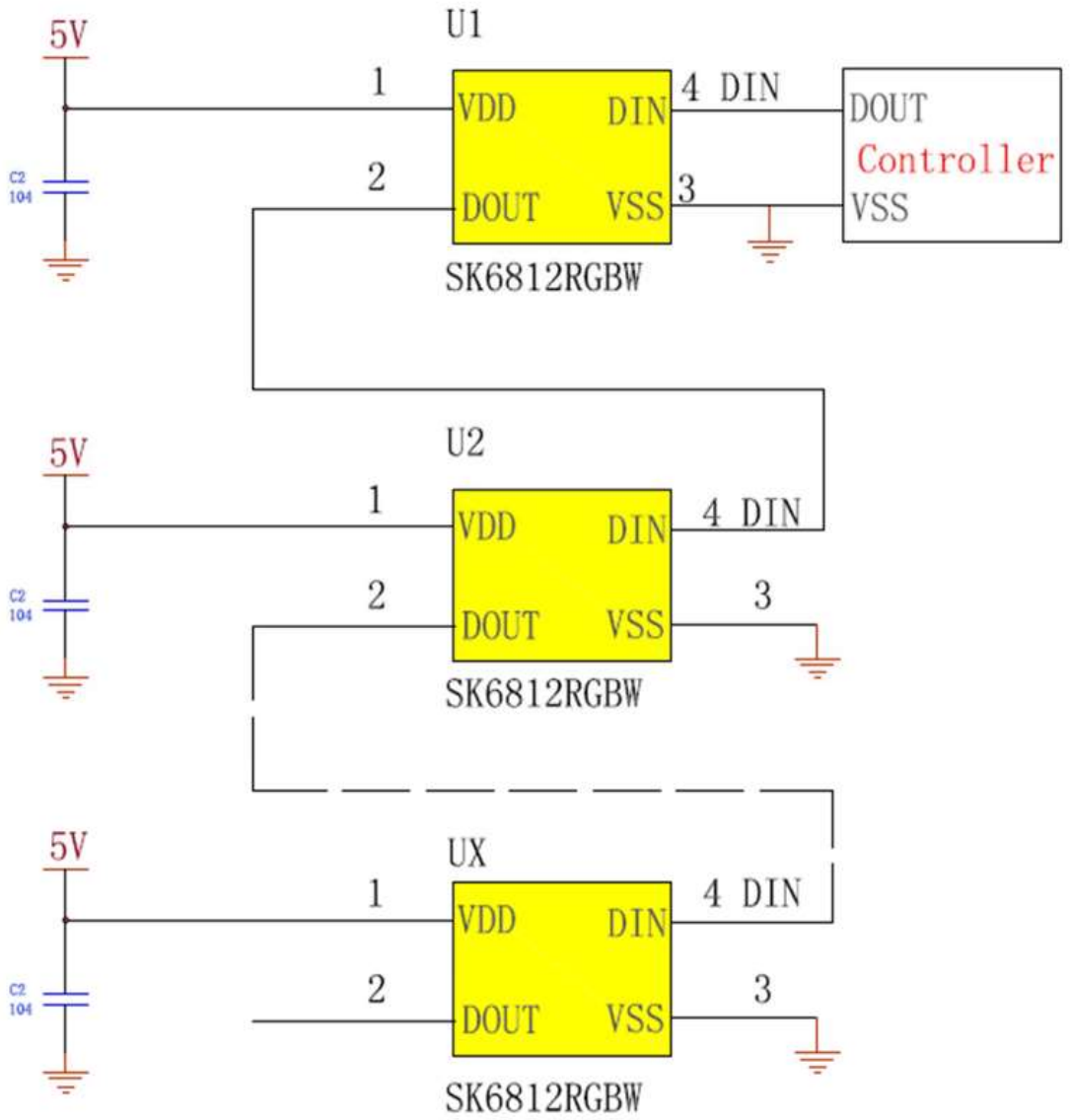
The data structure of 32bit:

R7	R6	R5	R4	R3	R2	R1	R0
G7	G6	G5	G4	G3	G2	G1	G0
B7	B6	B5	B4	B3	B2	B1	B0
W7	W6	W5	W4	W3	W2	W1	W0

Note: high starting, in order to send data (R7 - R6 - ....W0)

RGBW SK681RGBW 6

14. The typical application circuit:

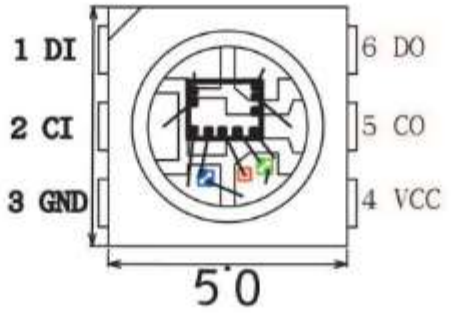


APA 102 1

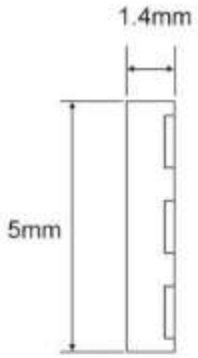
PRODUCT SPECIFICATIONS

Color	MCD	Refresh rate	Voltage	Power Consumption	Weight (g)	Angle	Dimensions (mm) L*W*H	Operating Temperature
Full color 1677216	R:500-650mcd G:370-530mcd B:120-165mcd	400 cycle	DC5V	0.2W (MAX:1 W)	1	160	5x5x1.4	-40-70℃

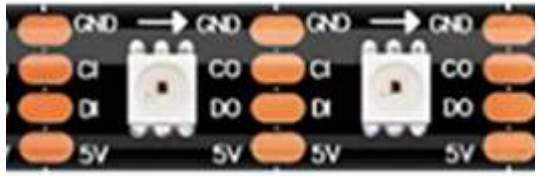
PHYSICAL DIMENSIONS



DI	: Data input
CI	: Clock input
DO	: Data output
CO	: Clock output
GND	: -
VCC	: + 5V



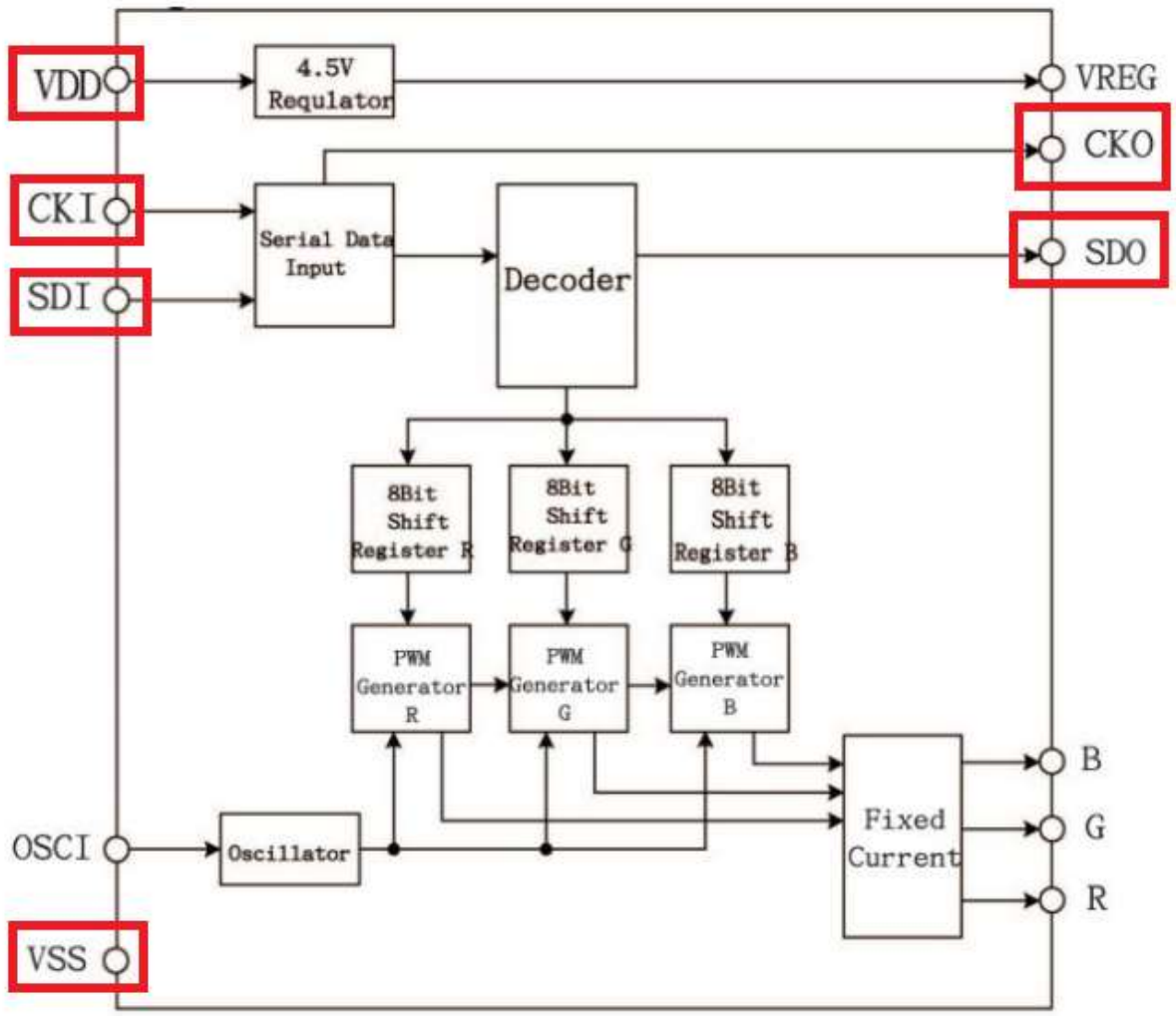
*NOTE DATA + KLOK 6 Pins 8MHZ bit Klock



APA 102 2

(Block diagram)

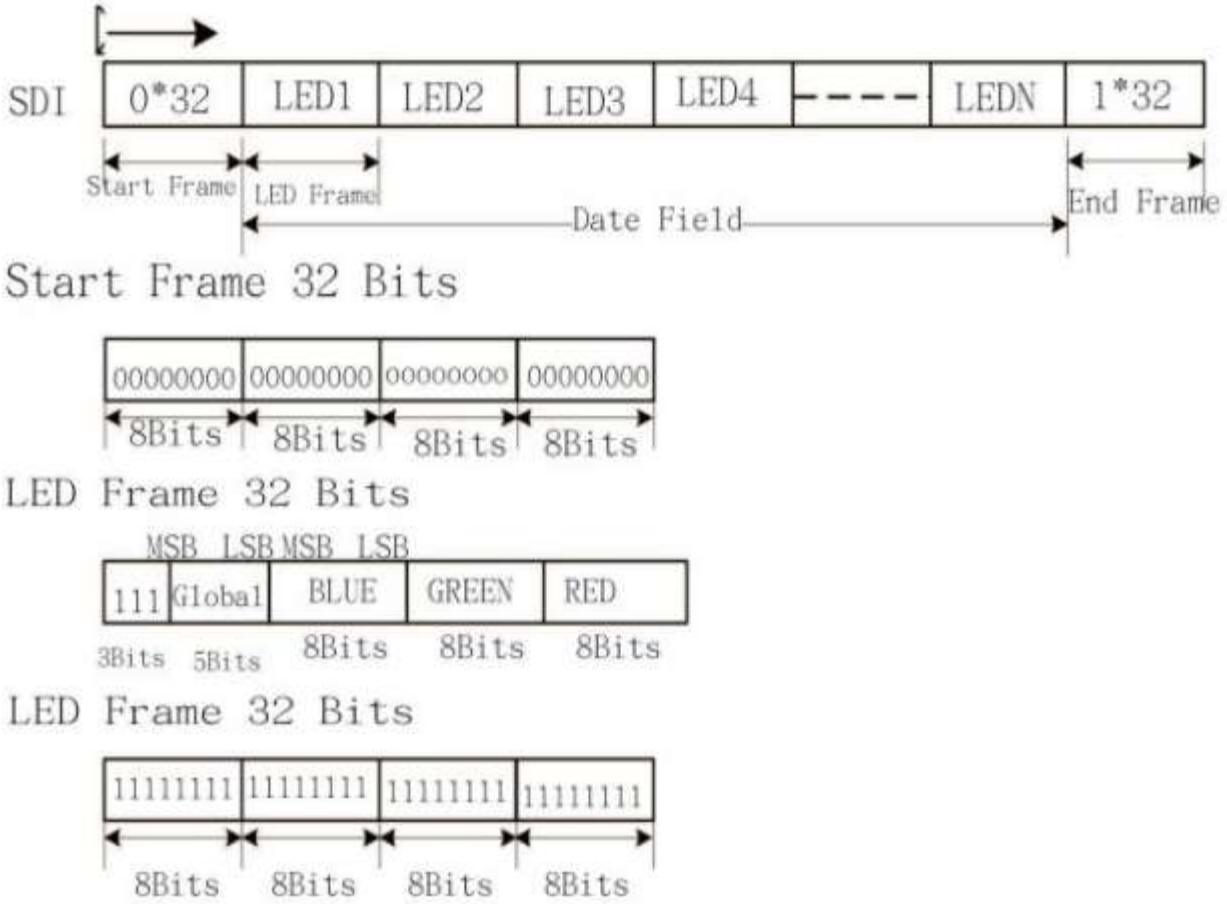
EXTERNE PINNING



APA 102 3

(1) cascading data structure

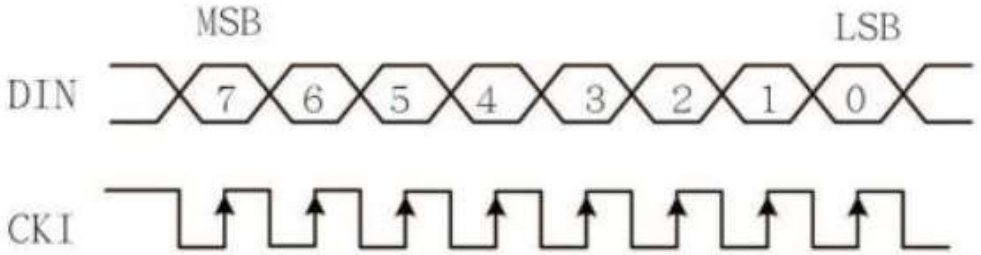
Tabdem N-LED



APA 102 4

DATA MSB←→LSB	Driving Current
00000	0/31
00001	1/31
00010	2/31
•••••	
11110	30/31
11111	31/31(max)

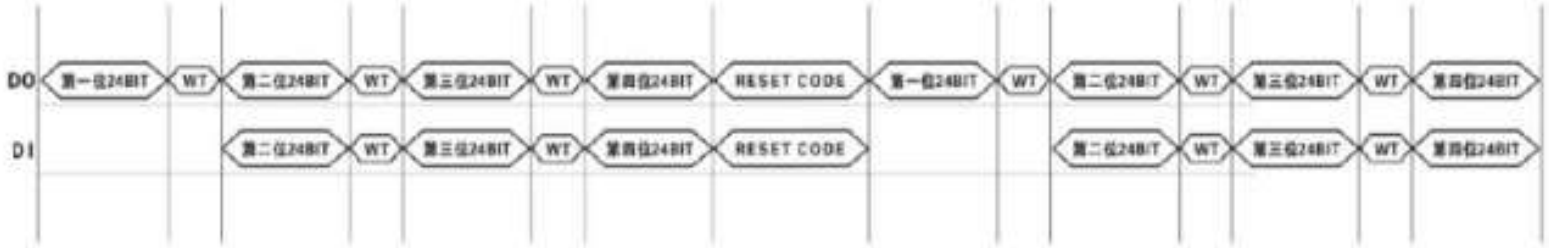
PWM input and output signals Relations



Data MSB--	Duty Cycle
00000000	0/256(min)
00000001	1/256
00000010	2/256
••••••••	
11111101	253/256
11111110	254/256
11111111	255/256(max)

APA 102 5

11. The method of data transmission:



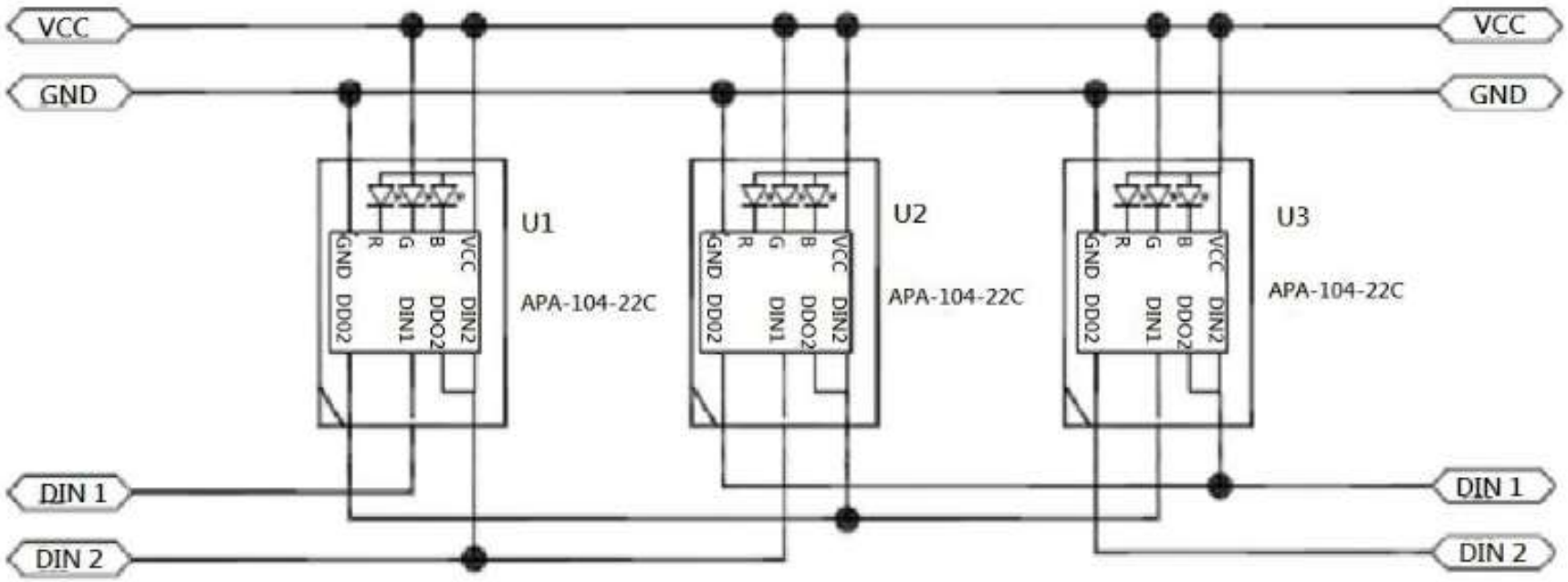
Note: where D0 and D1 for the MCU side of the data, the default D0 port signal, D1 chip will think that the signal is abnormal, which does not affect the signal transmission.

12. The data structure of 24bit:

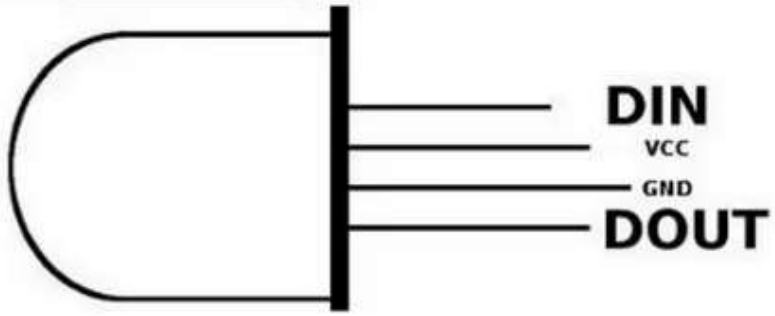
R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4
G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0

Note: high starting, in order to send data (R7 - R6 - ....B0)

APA 102 6


VCC
GND
DIN 1
DIN 2
U1
U2
U3
APA-104-22C
APA-104-22C
APA-104-22C
R
G
B
VCC
GND
DDO2
DIN1
DDO2
DIN2
VCC
GND
DIN 1
DIN 2

APA 106 1



APA-106

Feature

- Power supply: DC4.5V~6V
- Integrate RGB LEDs with Control IC at same body
- Support 256 dimming level for each color
- Internal frequency up to 800K Hz
- Single wire signal transmission(clock and Data)
- To be controlled by external MCU to achieve target image
- Available on ϕ5mm, ϕ8 mm
- No external component required

Package Type

1.DIN
2.VDD
3.GND
4.DOUT

APA-106-F8

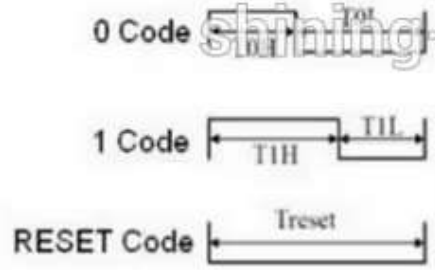
1.DIN
2.VDD
3.GND
4.DOUT

APA-106-F5

Package selection

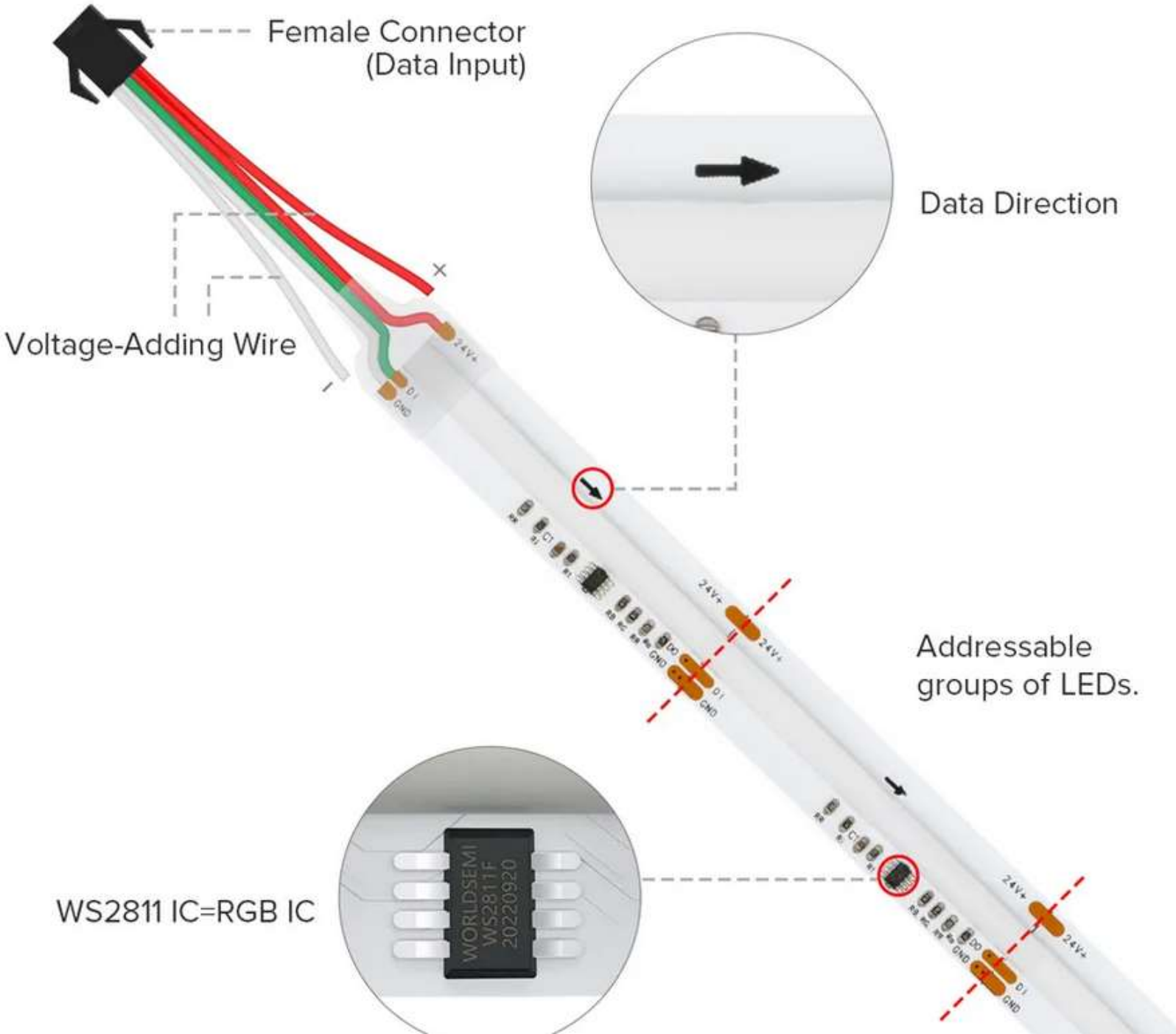
PART No.	Package
APA-106-F8	ϕ8
APA-106-F5	ϕ5

Timing waveform



Name	Description	Typically	Allowable error
T0H	0 code, high level time	0.35μs	±150ns
T1H	1 code, high level time	1.36μs	±150ns
T0L	0 code, low level time	1.36μs	±150ns
T1L	1 code, low level time	0.35μs	±150ns
RES	RESET code	50us	

WS2811 IC 1


Female Connector
(Data Input)
Data Direction
Voltage-Adding Wire
Addressable
groups of LEDs.
WS2811 IC=RGB IC
WORLDSEMI
WS2811F
20220920

WS2811 IC 2

1.**power supply is 5V with 1 LED and constant current (18.5mA) driving**

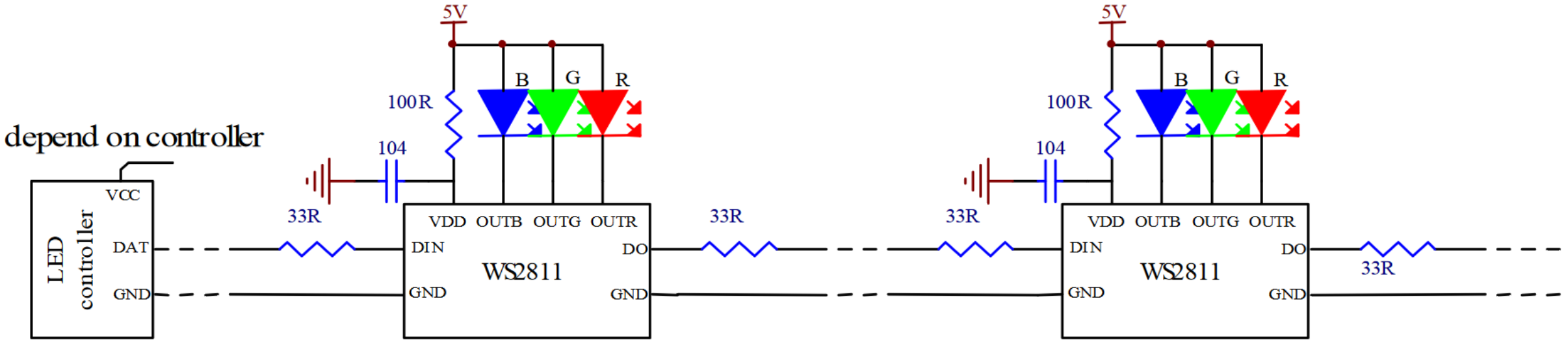


Fig 1

WS2811 IC 3

2.power supply is 12V with 3 LED and constant current(18.5mA) driving

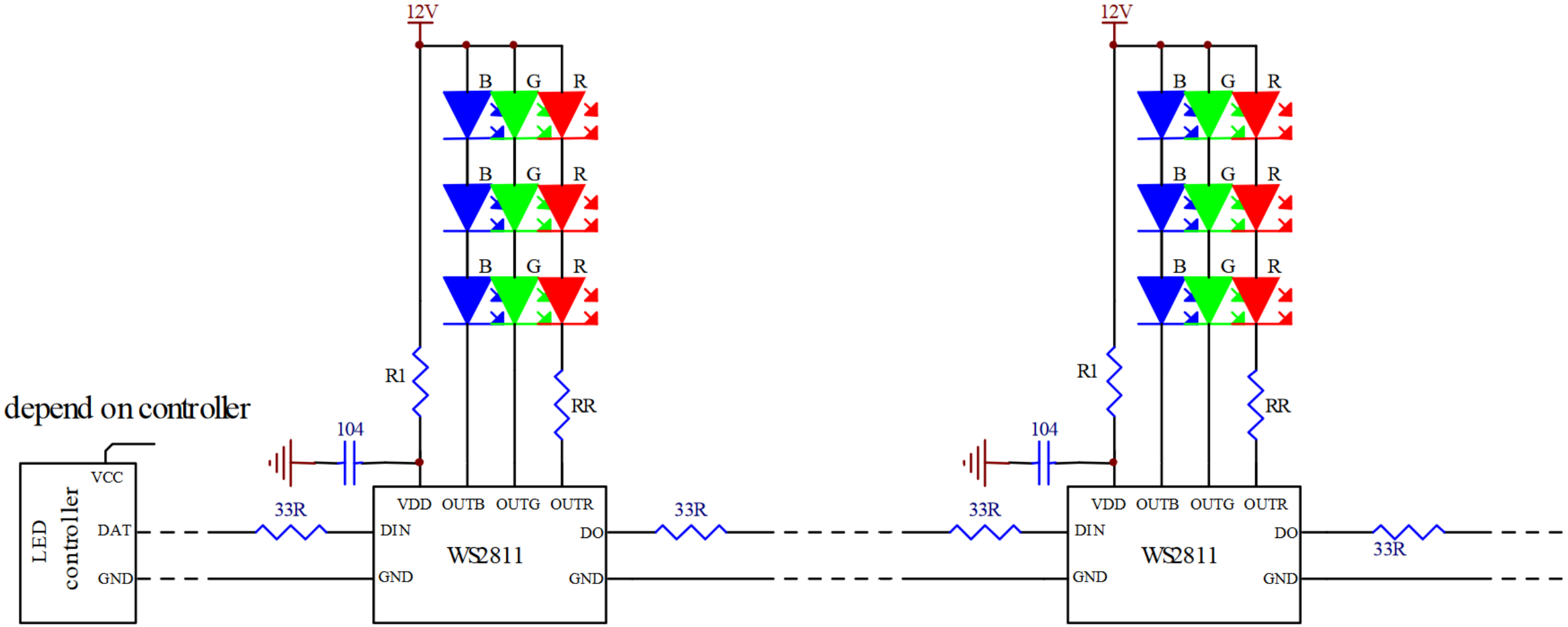


Fig 2

WS2811 IC 3

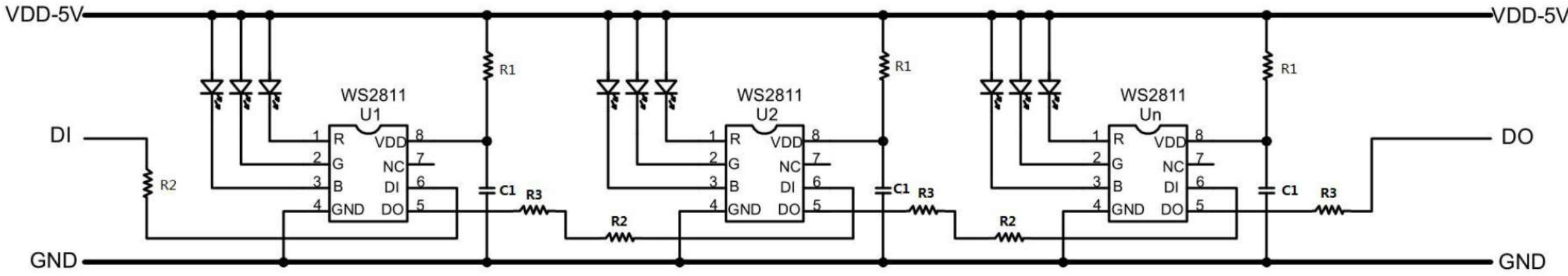
Low Speed mode time

T0H	0 code,high voltage time	0.5 μs	±150ns
T1H	1 code,high voltage time	1.2 μs	±150ns
T0L	0 code,low voltage time	2.0 μs	±150ns
T1L	1 code,low voltage time	1.3 μs	±150ns
RES	low voltage time	Above 50μs	

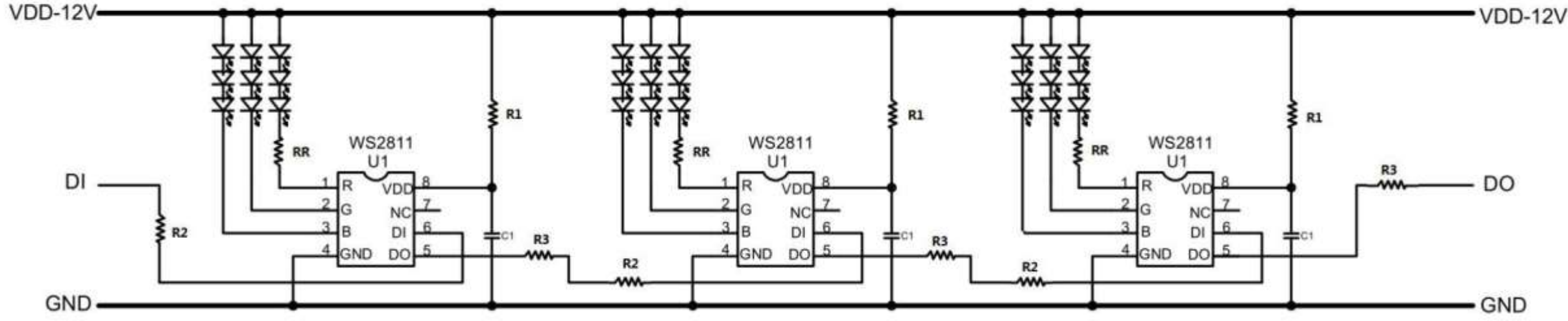
Note: It is one half of the time when high speed mode(reset time unchanged)

WS2811 IC 4

1. **Supply voltage=5V, 1 LED for each channel and Constant Current driving of 16.5mA**



2. **Supply voltage=12V, 3 LED for each channel and Constant Current driving of 16.5mA**



WS2811 IC 5

Data Transfer Time

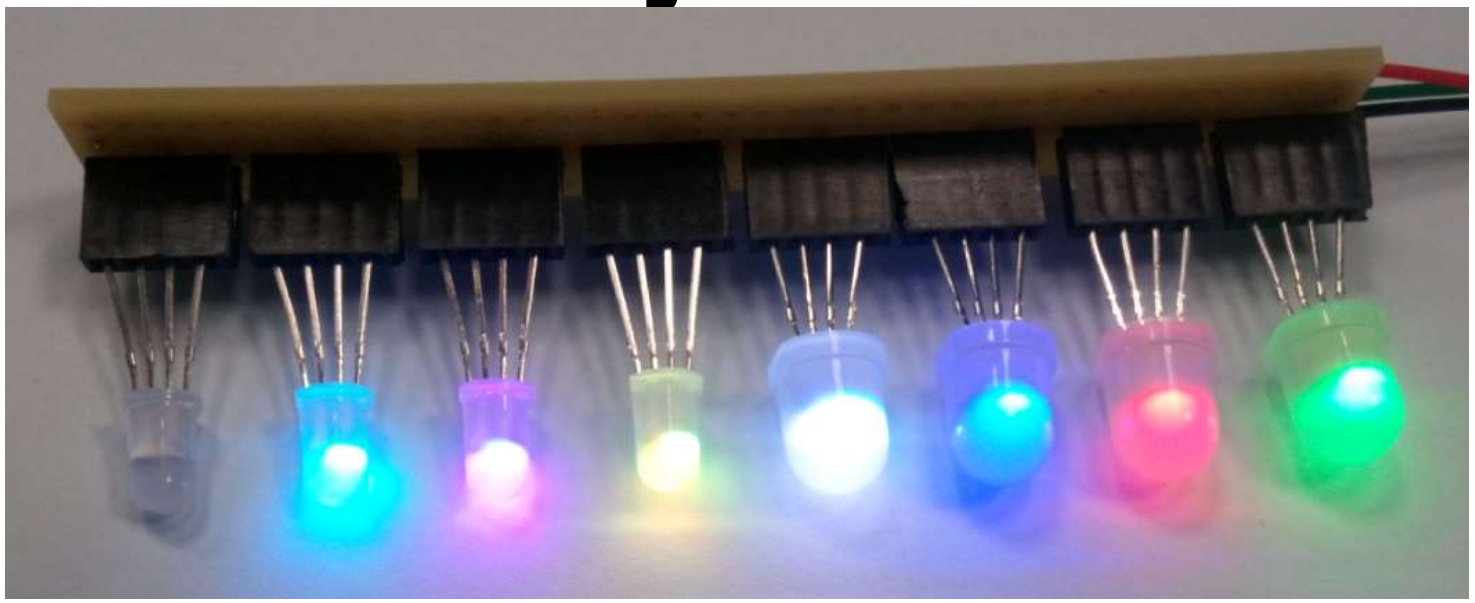
T0H	0 code, high voltage time	220ns~380ns
T1H	1 code, high voltage time	580ns~1.6μs
T0L	0 code, low voltage time	580ns~1.6μs
T1L	1 code, low voltage time	220ns~420ns
RES	Frame unit, low voltage time	>280μs

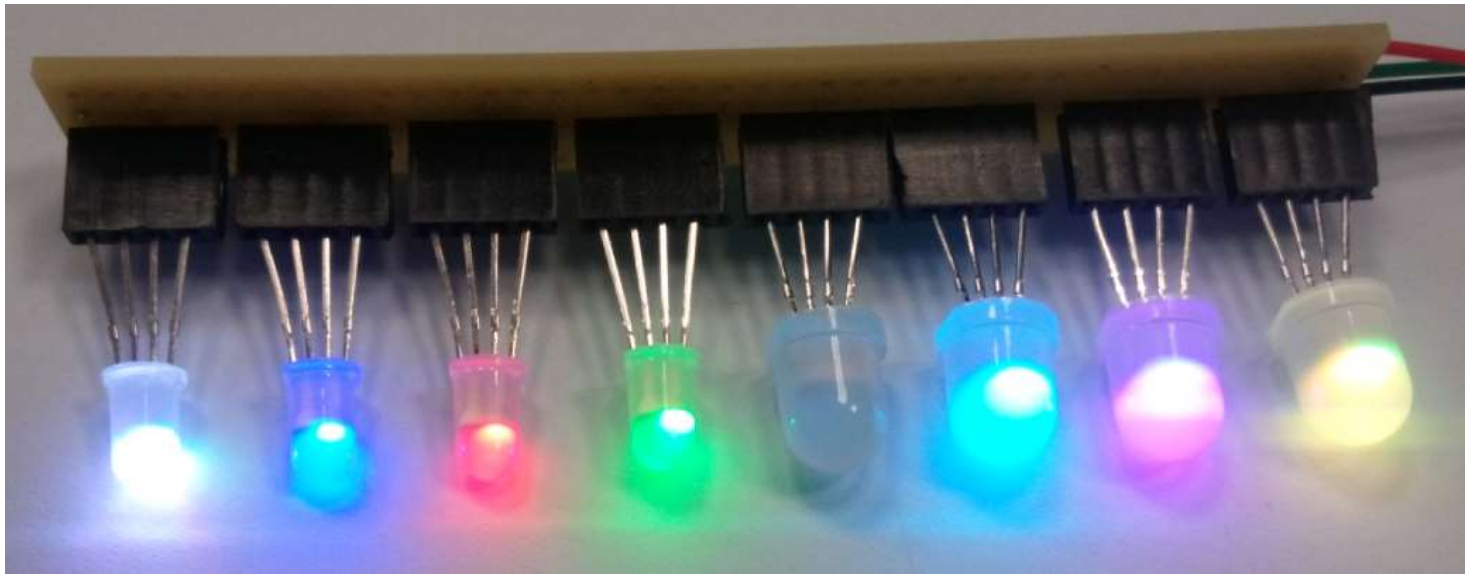
Een enkelijke kleuren led 1

NeoPixel

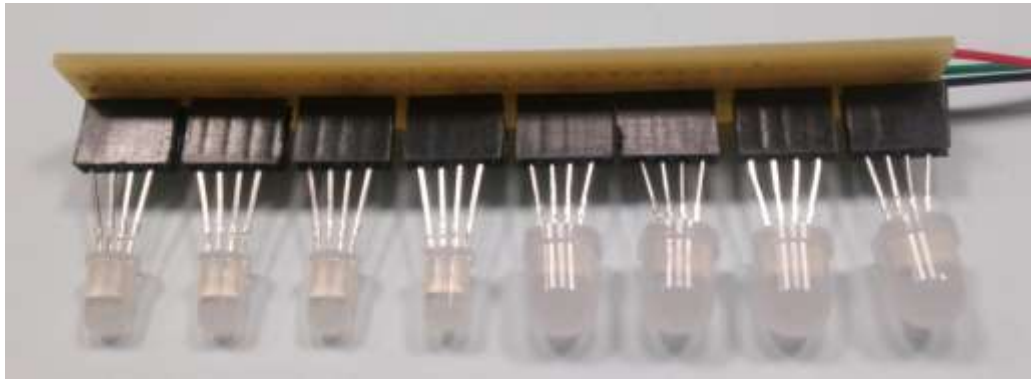
NeoPixel RGBW LEDs

Een enkelijke kleuren led 2





leds 5mm en 8mm

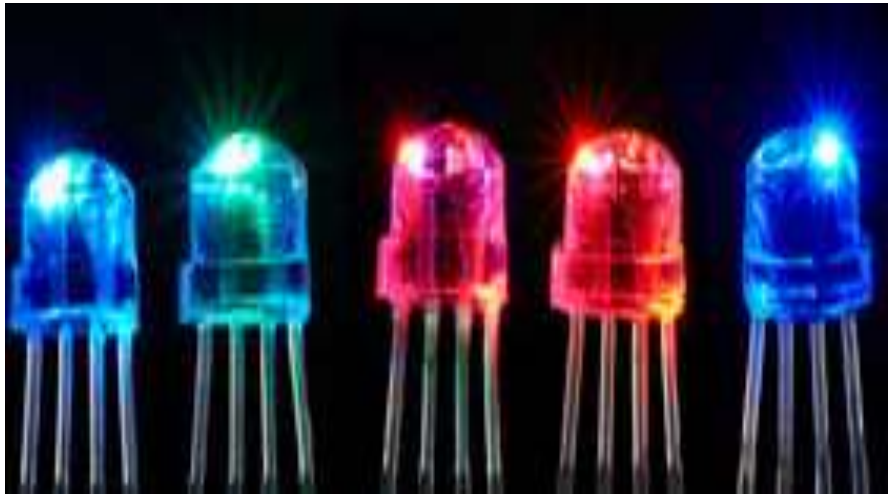


Leds vlake kant clear en fuzzy

Een enkelijke kleuren led 3

NeoPixel Diffused 5mm

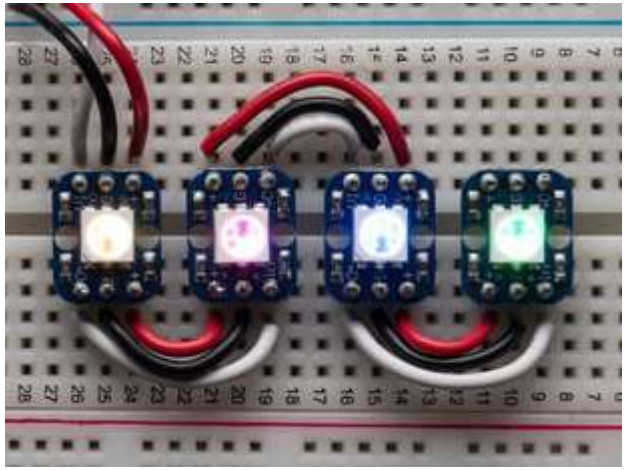
NeoPixel Clear 5mm



Keten van leds

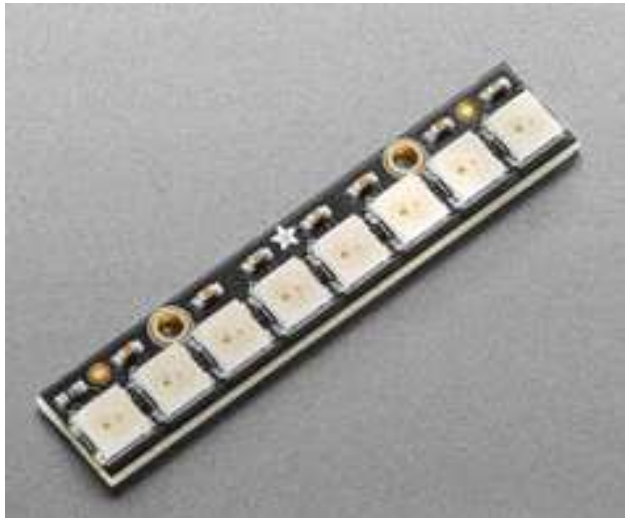
Breadboard-friendly

RGB Smart NeoPixel



RGB LED Strip

NeoPixel Stick - 8



Twee dimensionale leds 1

Adafruit NeoPixel NeoMatrix 8x8

Adafruit NeoPixel Shield for Arduino
40 RGB LED Pixel Matrix

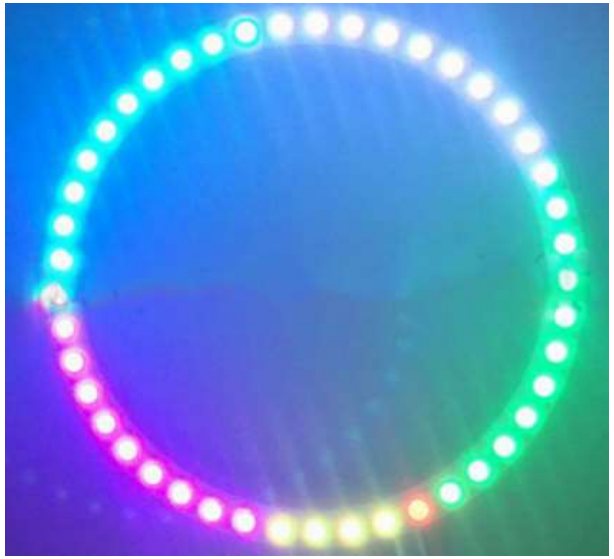
Twee dimensionale leds 2

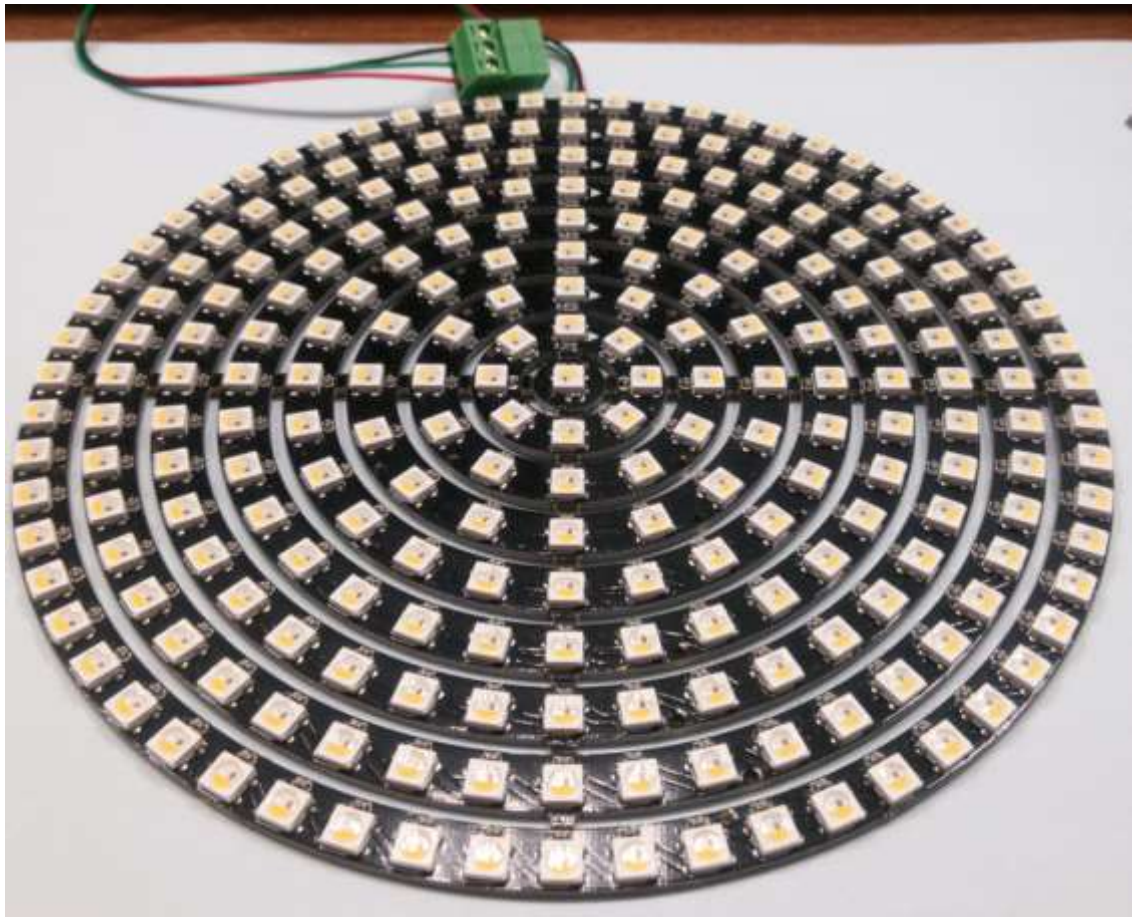
NeoPixel Ring - 16

NeoPixel Jewel

Twee dimensionale leds 3

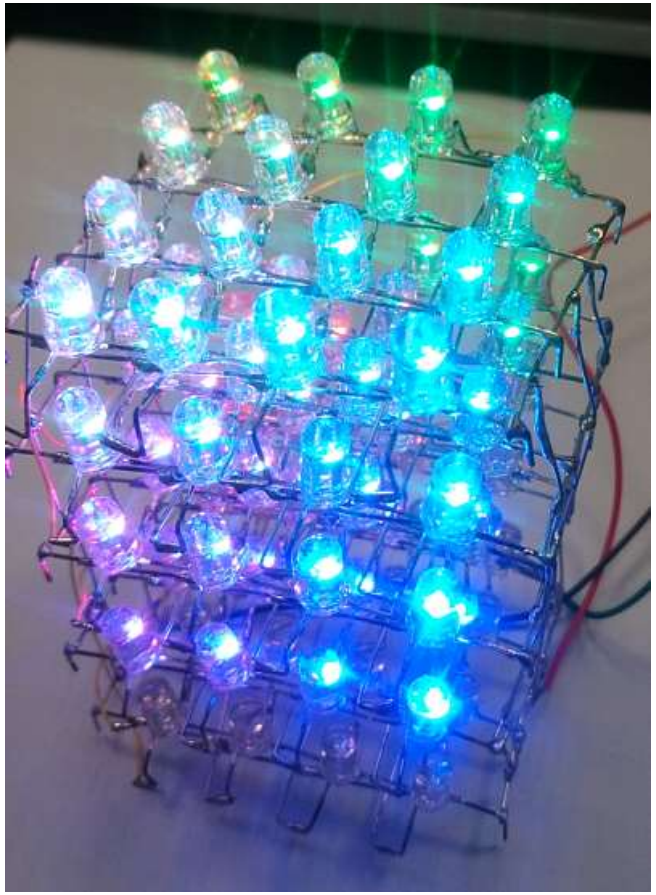
60 led ring voor oa KLOK

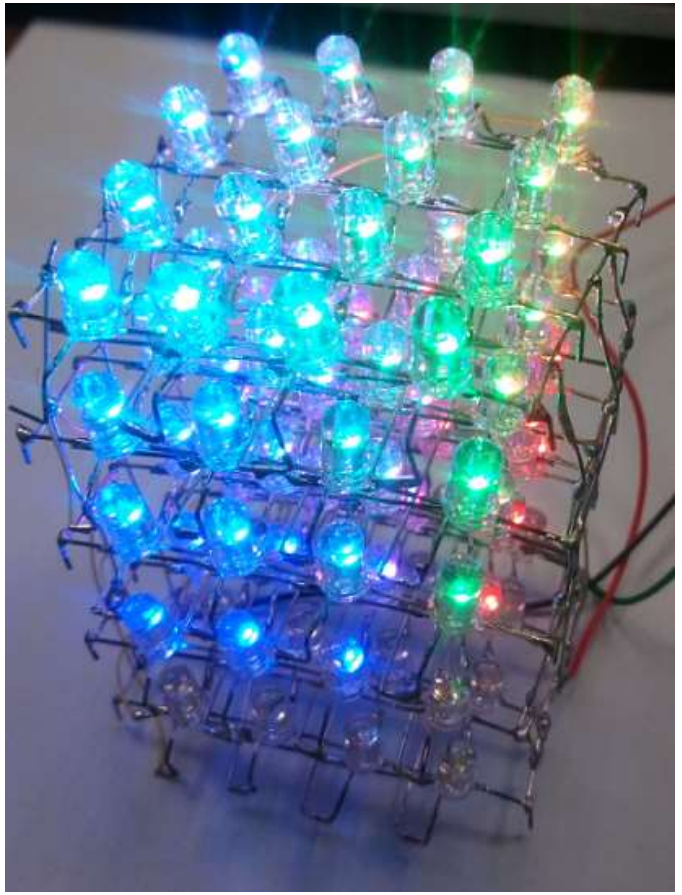




Drie dimensionale leds 1

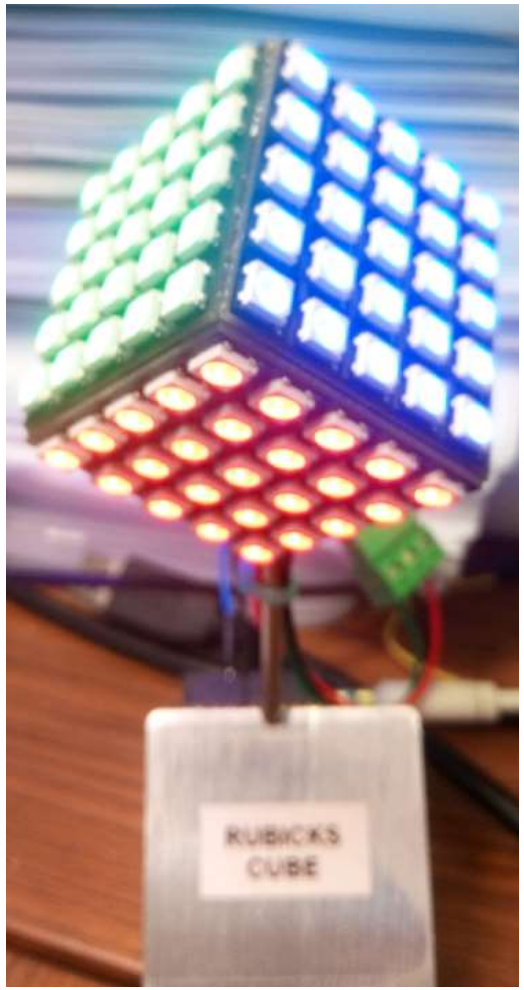
4 x 4 x 4 leds gevuld

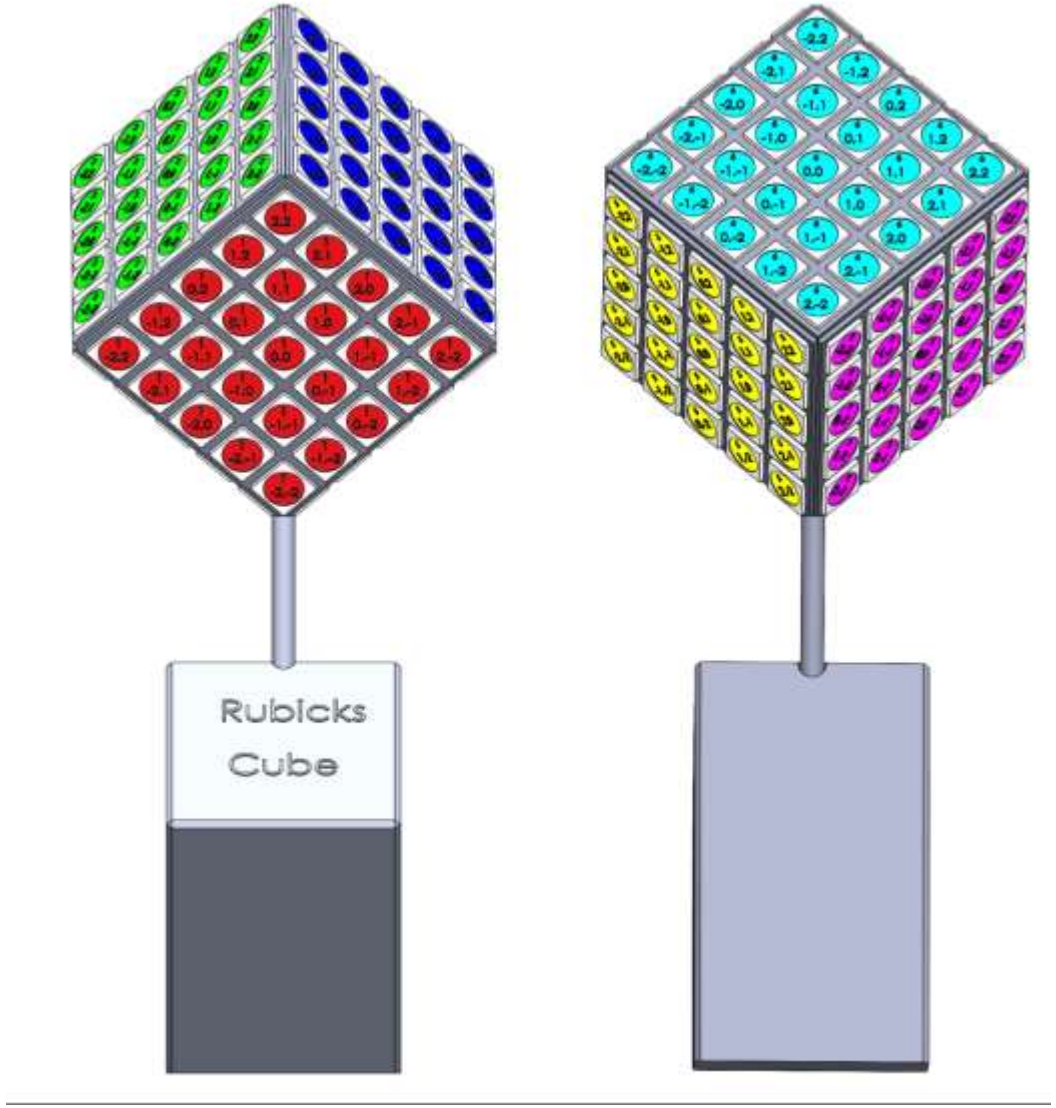




Drie dimensionale leds 2

Rubic Cube 5 x 5 6 vlaken



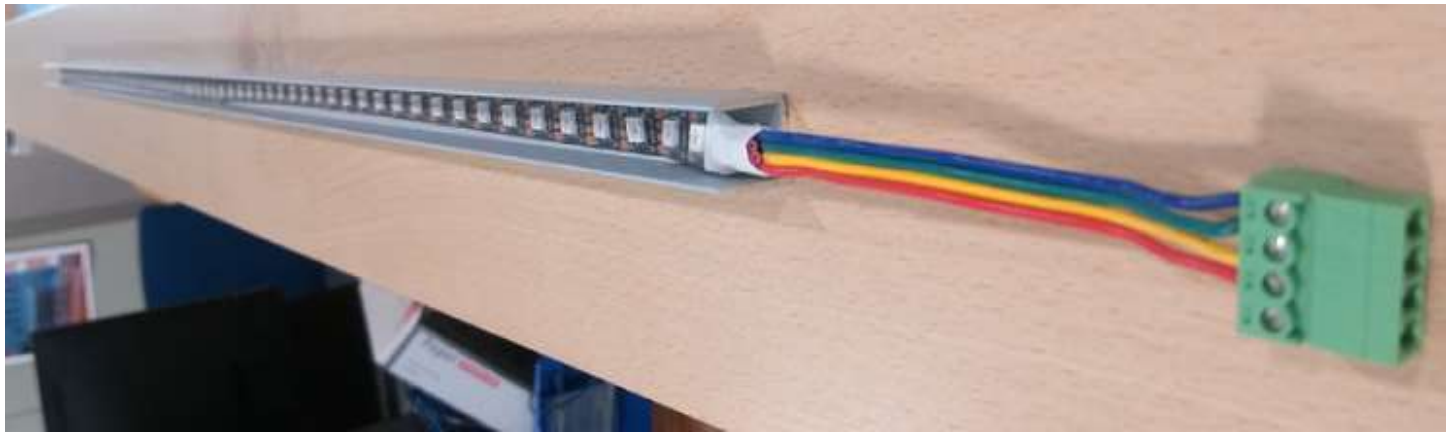


Diverse leds 1

Nixie buisjes leds uren minuten en seconden

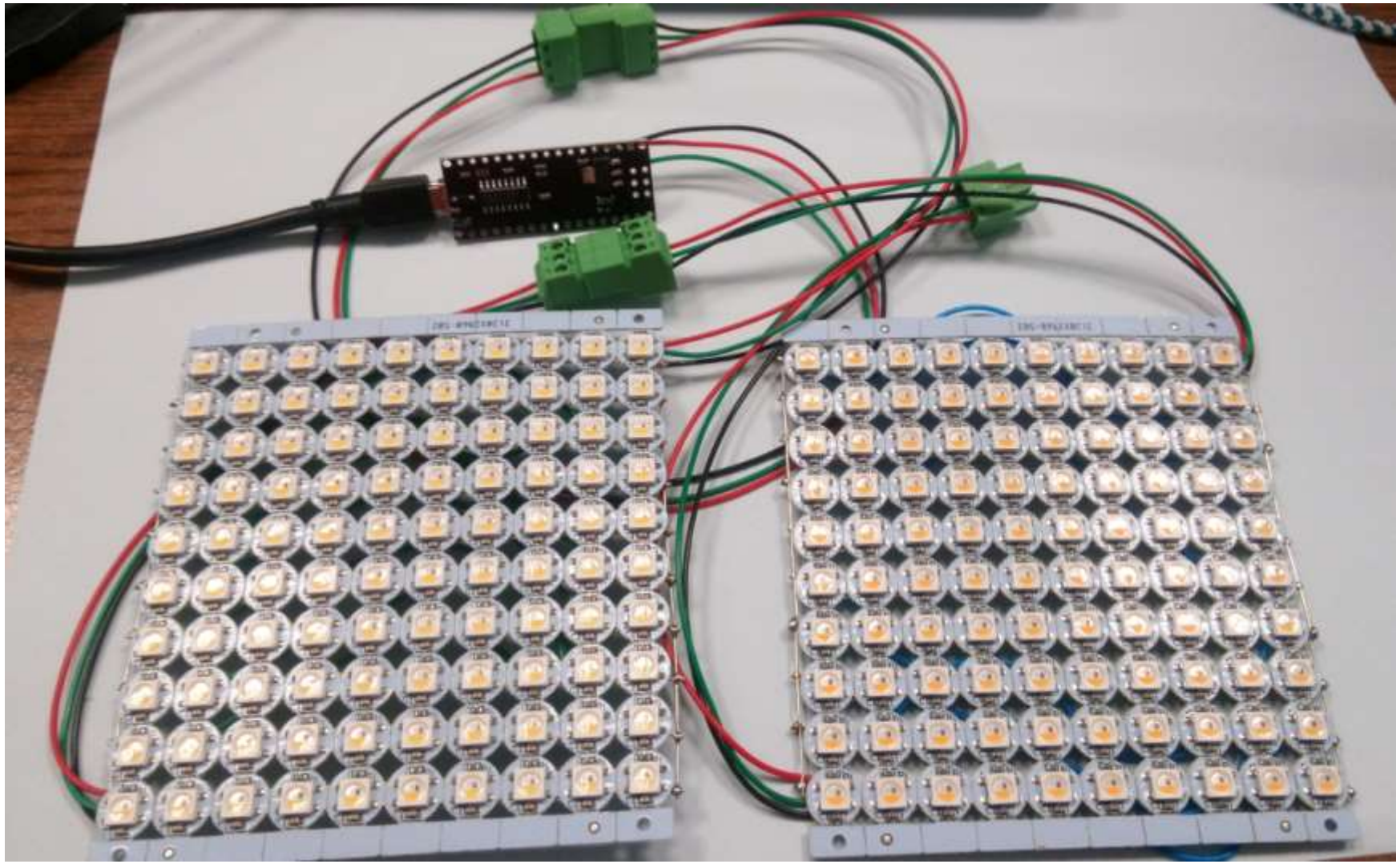
Diverse leds 2

APA 102 klok + data



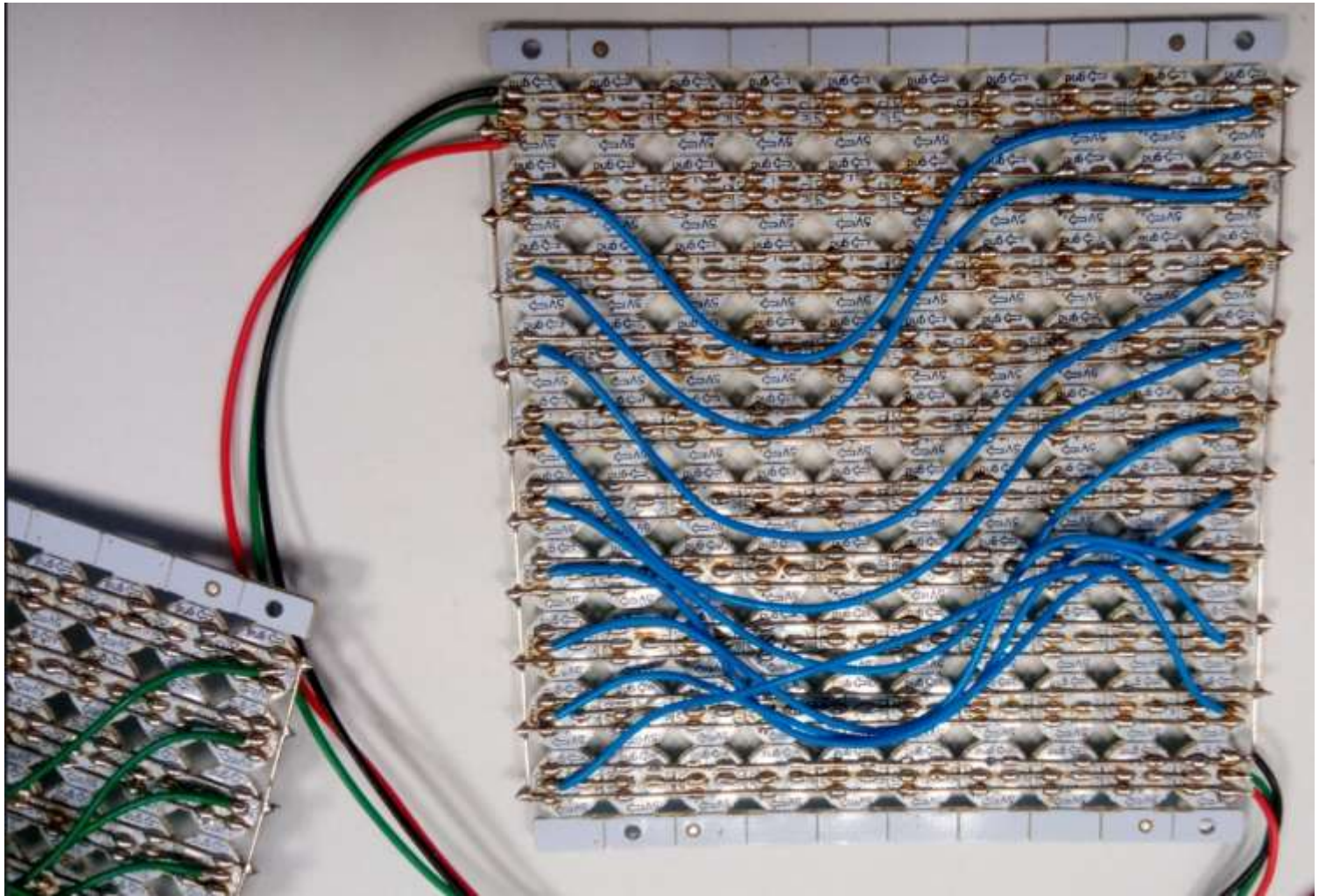
Diverse leds 3

Eerste led ervaring



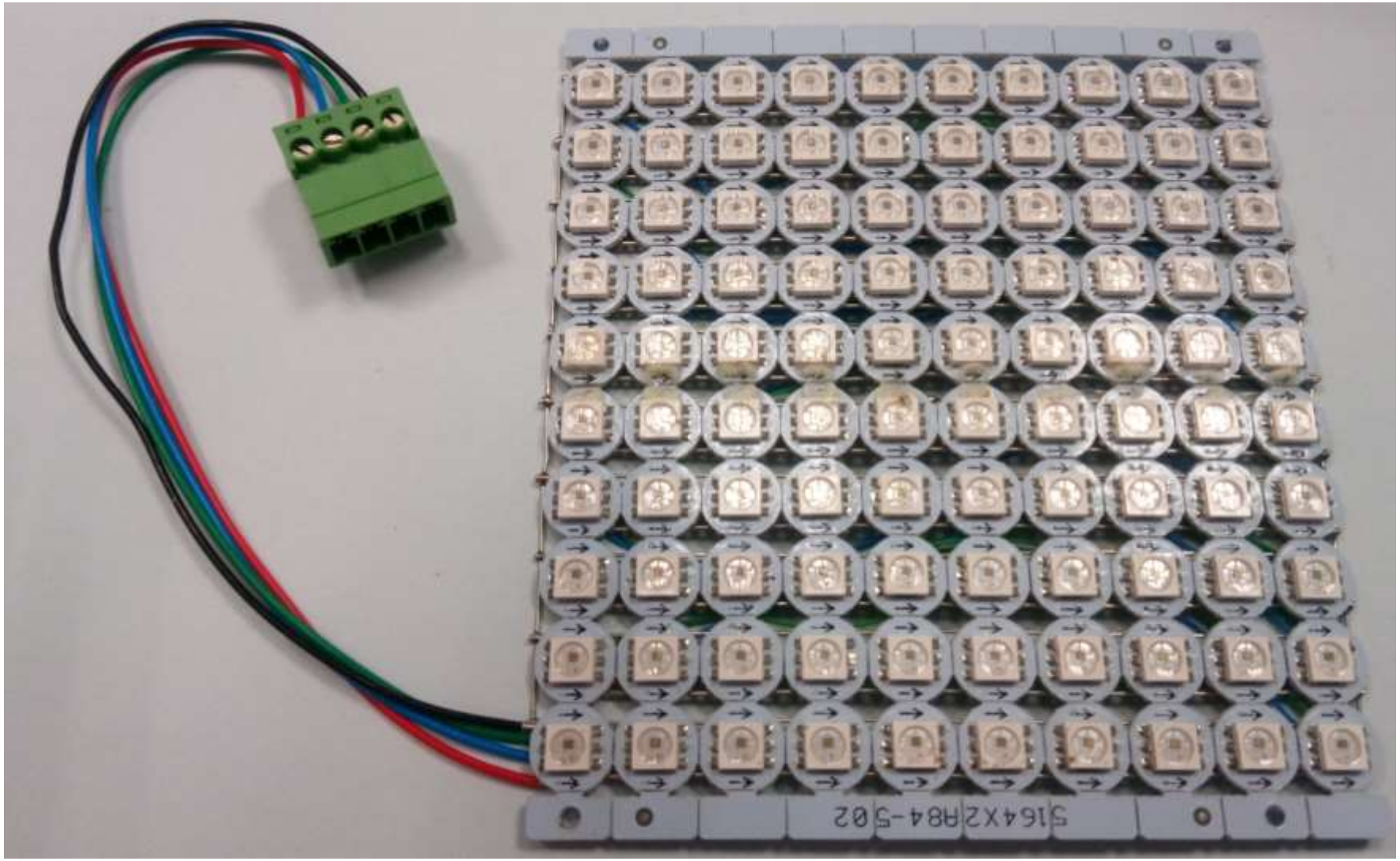
Diverse leds 3b

Eerste led ervaring



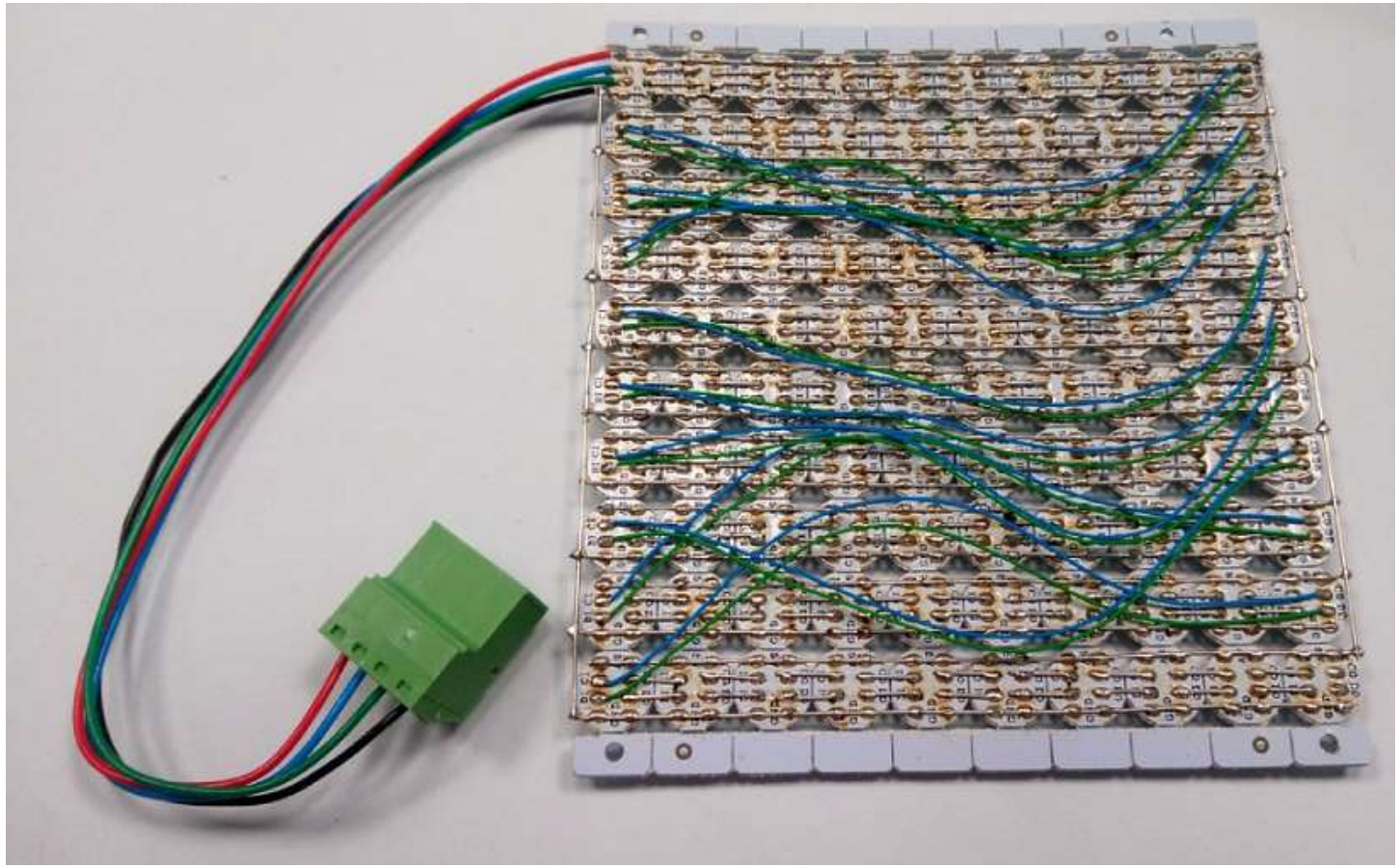
Diverse leds 4

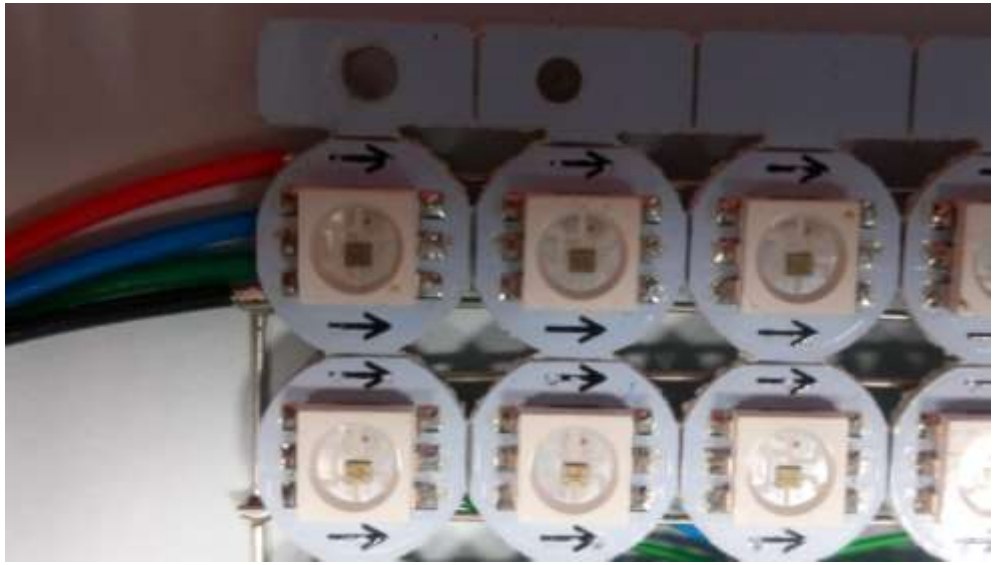
APA 102 Data + Klok



Diverse leds 4b

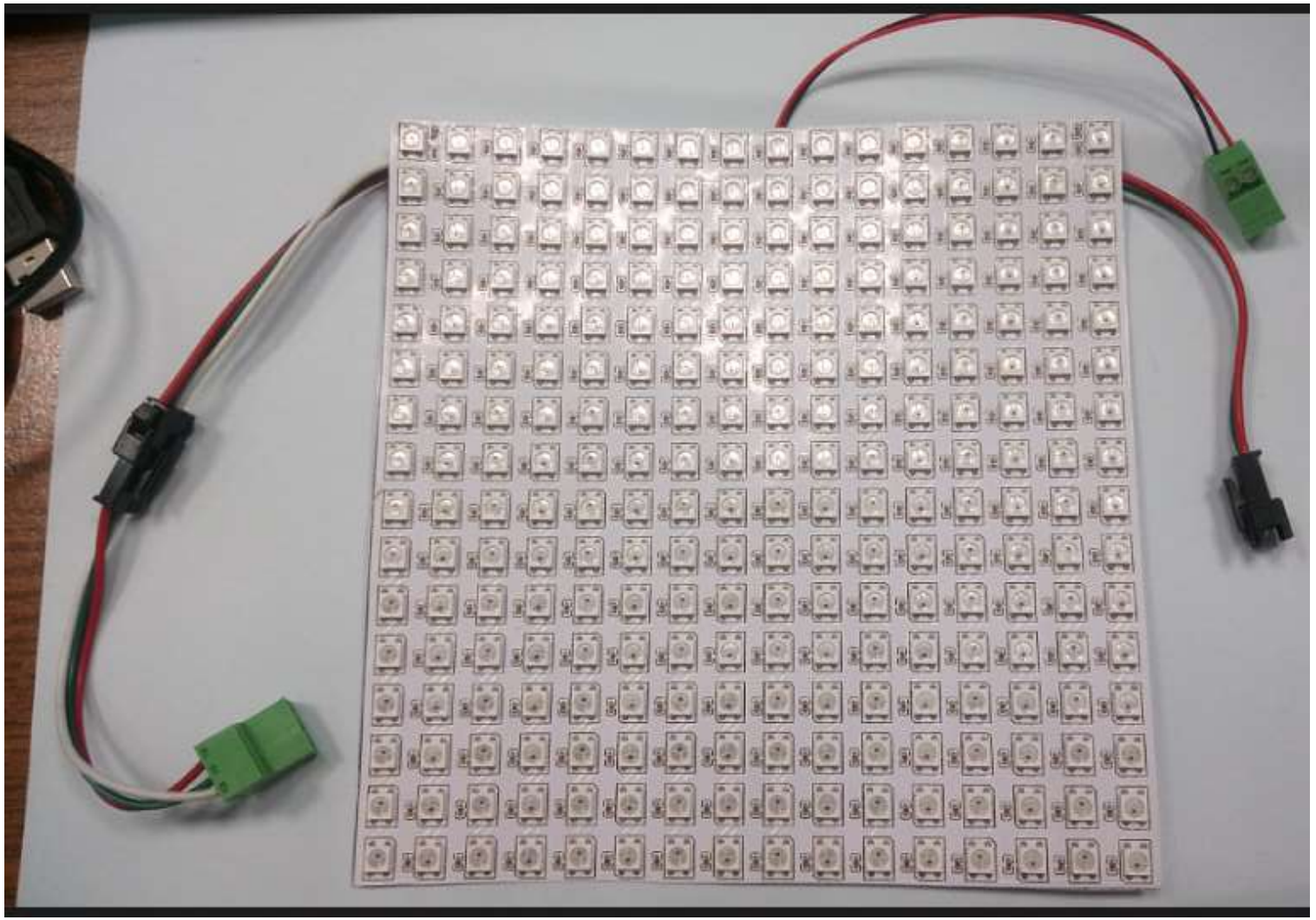
APA 102 Data + Klok





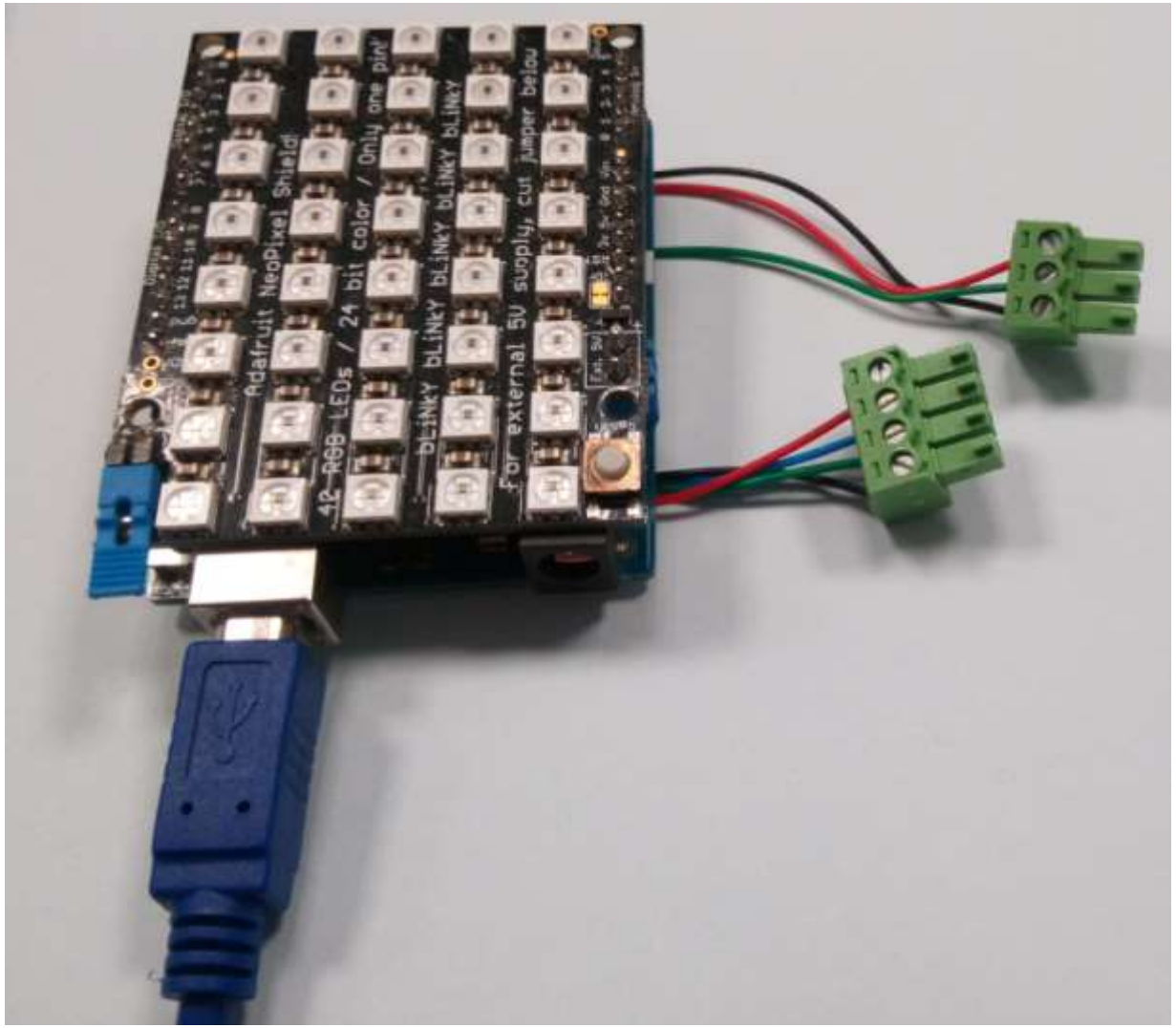
Diverse leds 5

16 x 16 op flex print



Diverse leds 6

Arduino add on neopixel 5 x 8



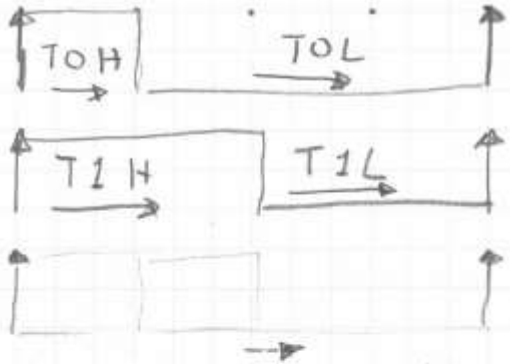
LED Timing 1

800 kHz

LED Timings

T0H = 0,3 µs ± 150ns
T0L = 0,9 µs "
T1H = 0,6 µs "
T1L = 0,6 µs "

LBT = 1,25 µs = 800Hz BIT TYD Inc CLK



LED BIT = 0

LED BIT = 1

LED BIT TYD = X µs

400 kHz

T0H = 0,6 µs ± 150 ns
T0L = 1,8 µs "
T1H = 1,2 µs "
T1L = 1,2 µs "

LBT = 2,5 µs = 400Hz

LED YFG23-F5 ∅ 5mm
YFG23-F8 ∅ 8mm

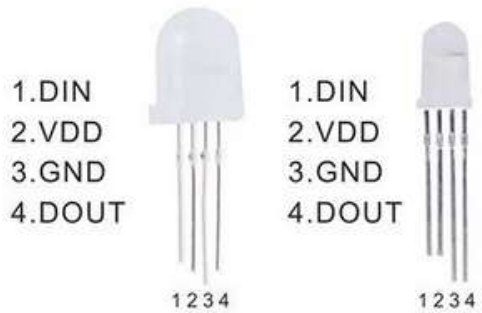
T0H = 0,3µs ± 150 ns
T0L = 0,6µs "
T1H = 0,6µs "
T1L = 0,3µs "

LED Timing 2

Feature

- Power supply: DC4.5V-6V
- Integrate RGB LEDs withControl IC at same body
- Support 256 dimming level for each color
- Intemal frequency up to 800K Hz
- Single wire signal transmission (clock and Data)
- To be controlled by extemal MCU to achieve target imge
- Available on ϕ5mm, ϕ8mm
- No extermal component required

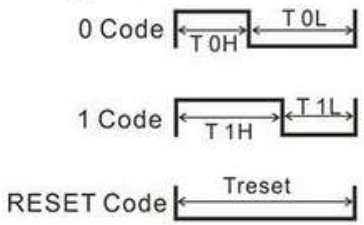
Package Type



Package selection

PART No.	Package
YF923-F8	ϕ8mm
YF923-F5	ϕ5mm

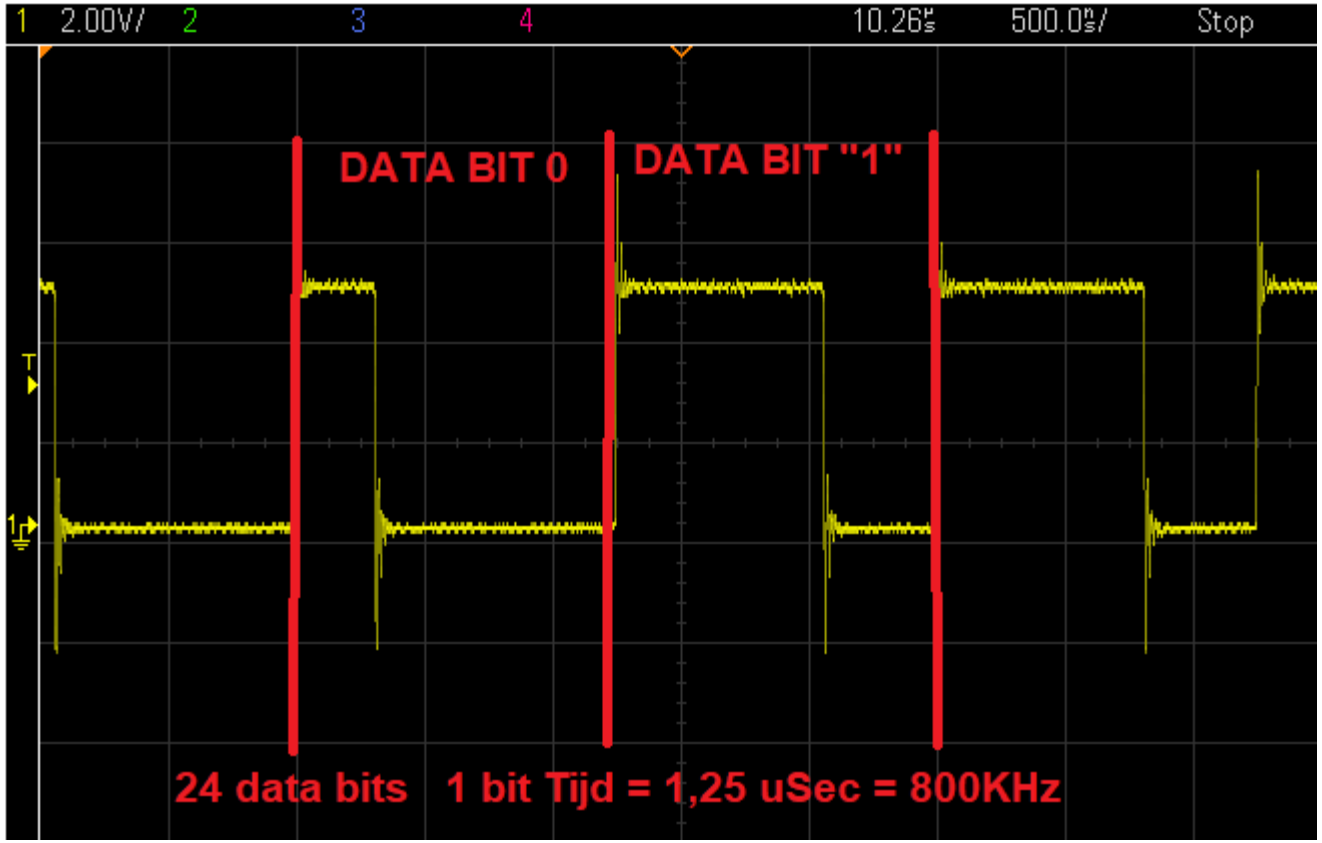
Timing waveform



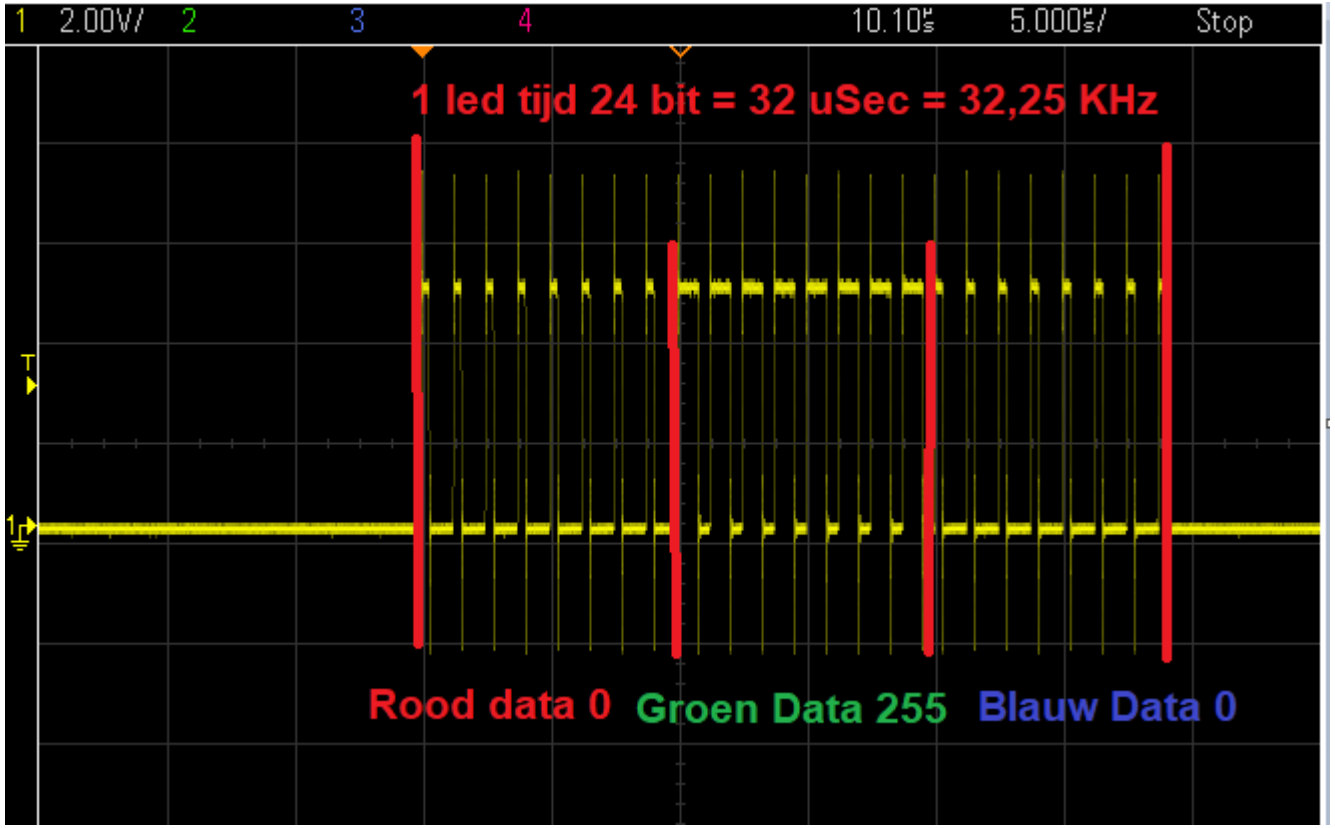
Name	Description	Typically	Allowable error
T0H	0 code,high level time	0.3 μs	±150ns
T1H	1 code,high level time	0.6 μs	±150ns
T0L	0 code,low level time	0.6 μs	±150ns
T1L	1 code,low level time	0.3 μs	±150ns
RES	RESET code	50 μs	

Application Note

Enkele voorbeelden 1

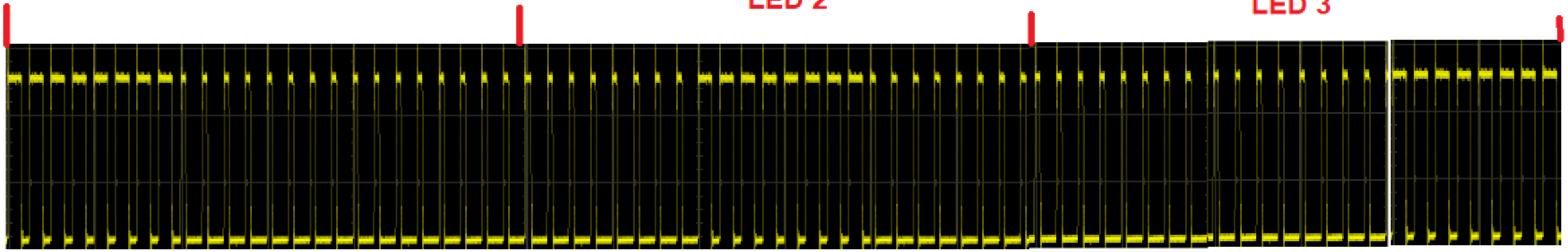


Enkele voorbeelden 2



Enkele voorbeelden 3

Tijd 3 Leds 96uSec = ongeveer 10 KHz



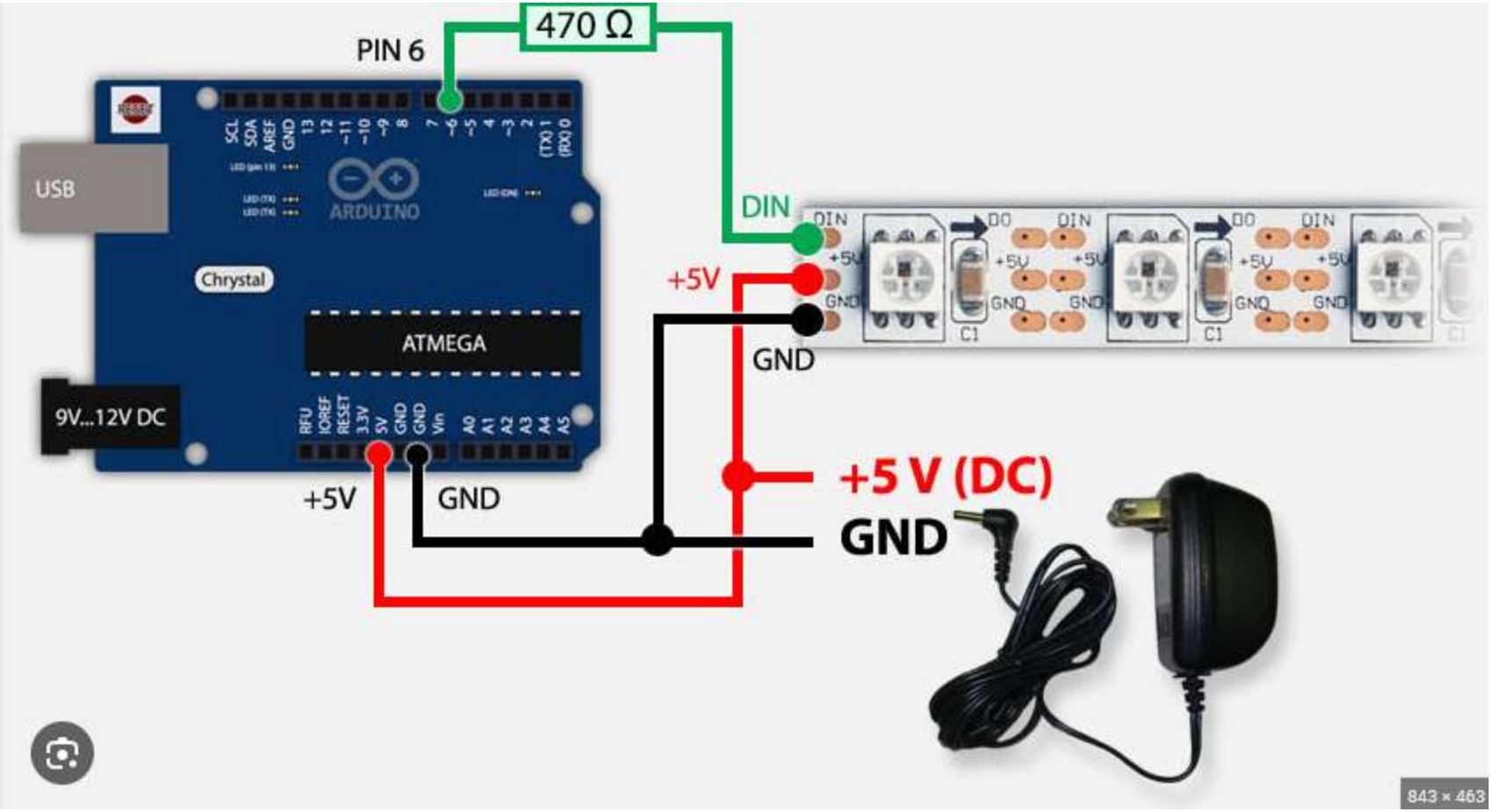
Rood = 255 Groen =0 Blauw = 0

Rood = 0 Groen = 255 Blauw = 0

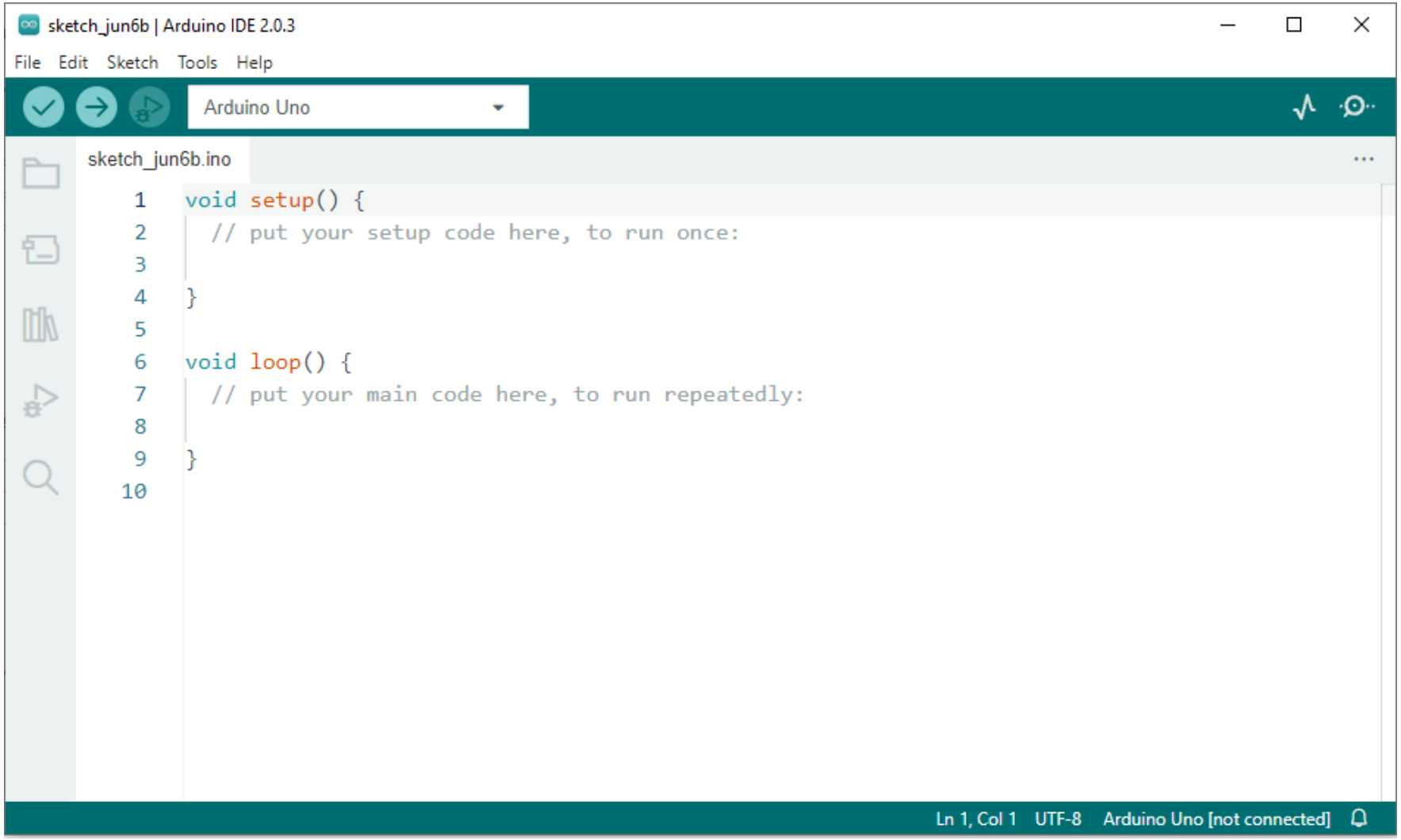
Rood = 0 Groen = 0 Blauw = 255

note 1000 leds refrech tijd is 32 mSec = 31 Hz

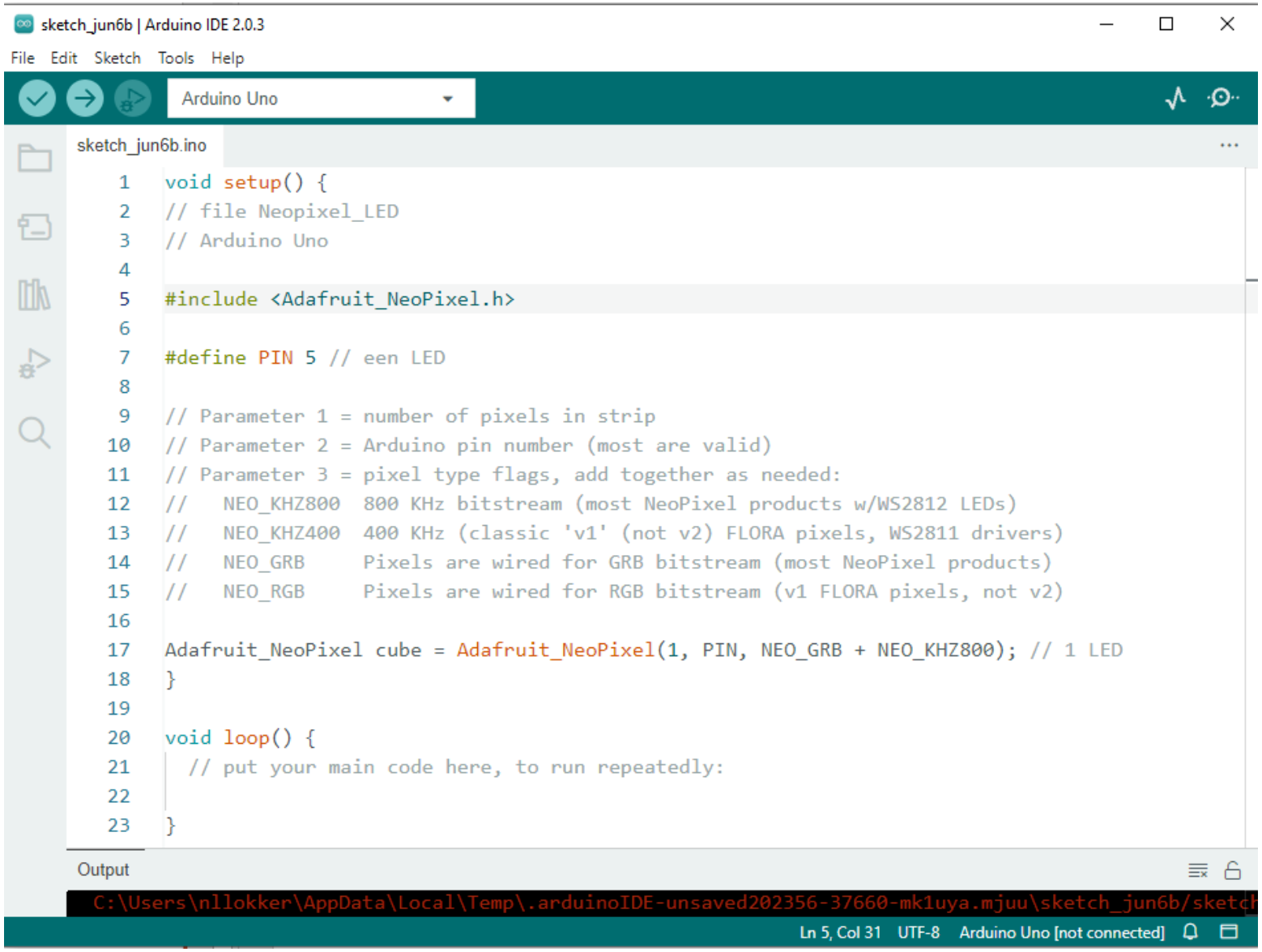
Enkele voorbeelden 4



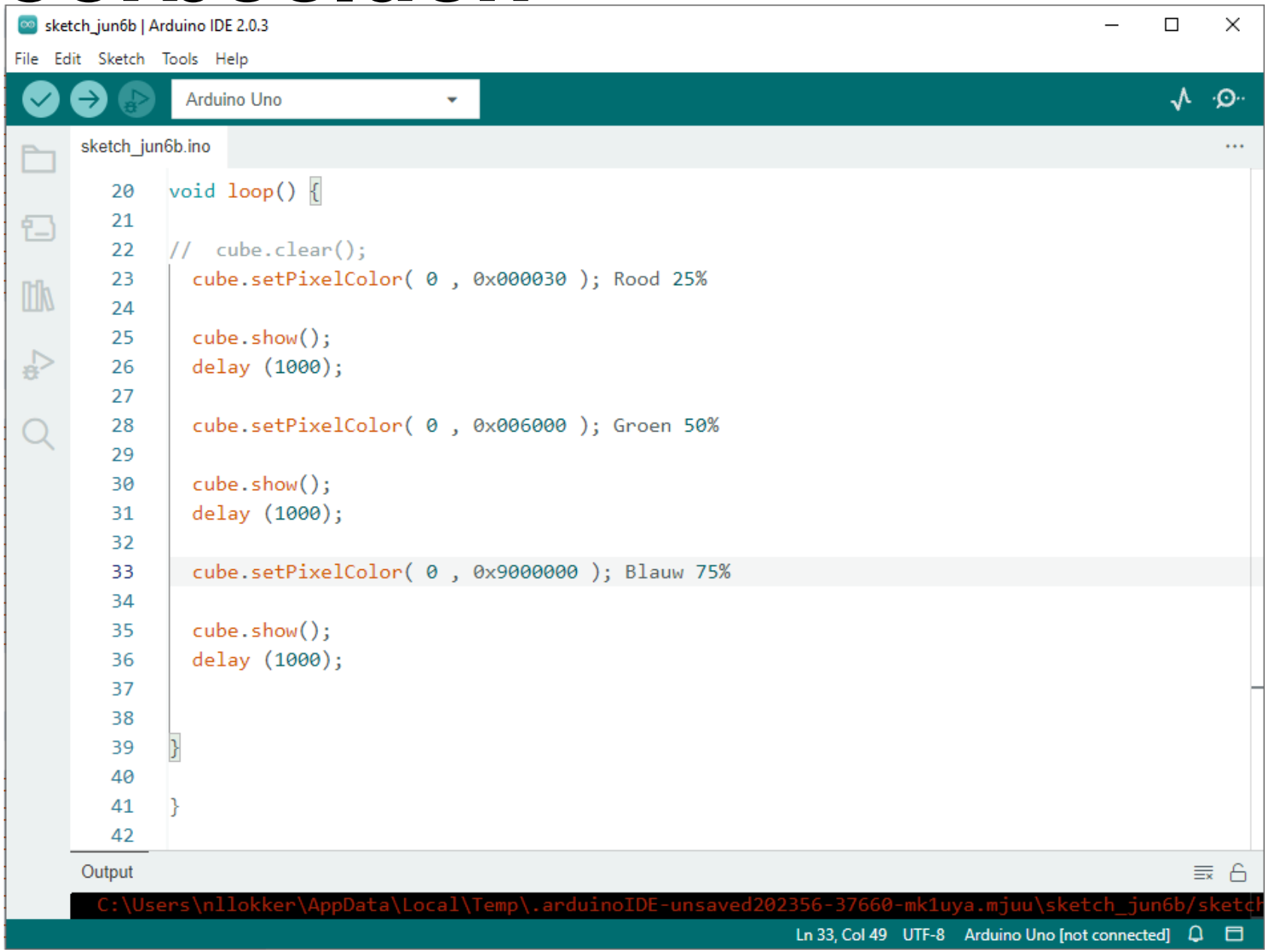
Enkele voorbeelden



Enkele voorbeelden



Enkele voorbeelden



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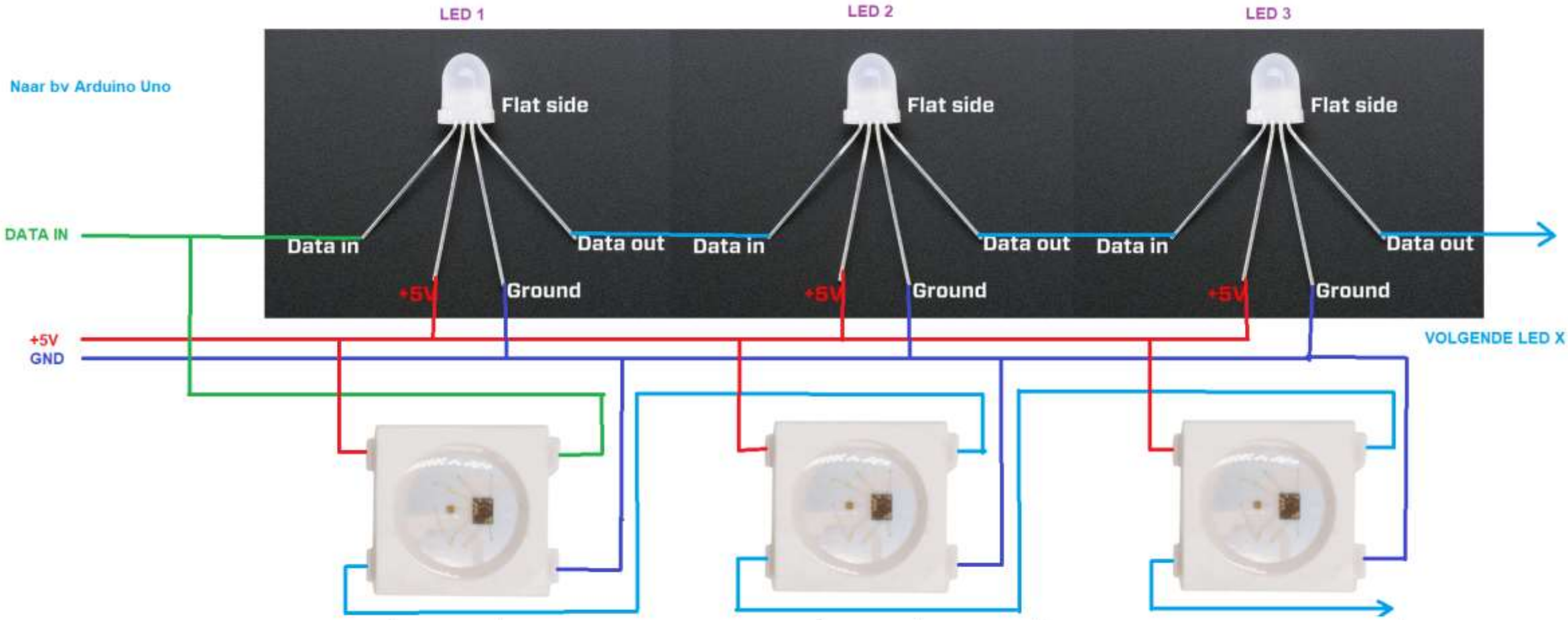
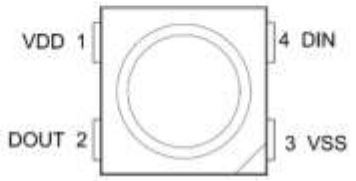
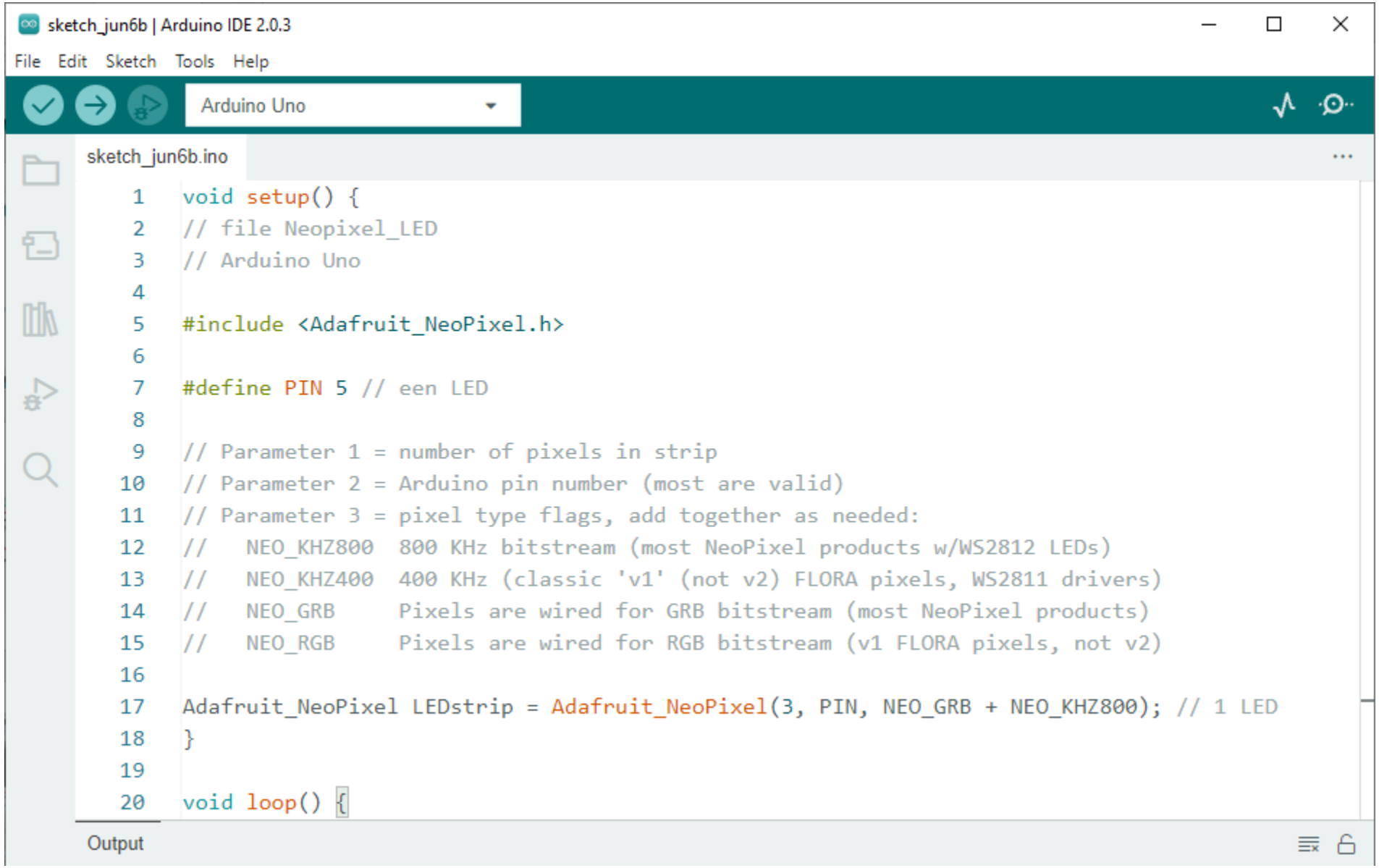




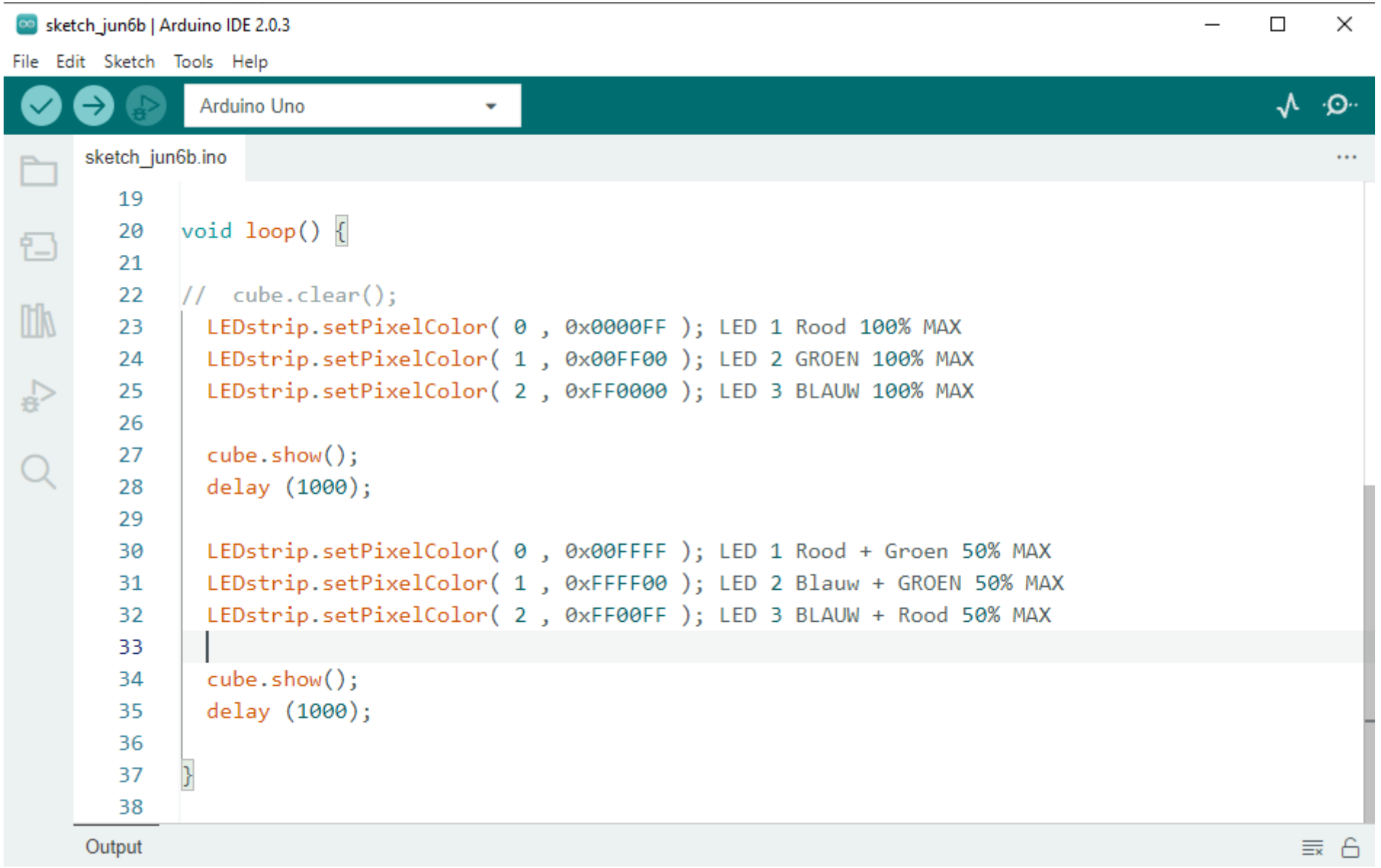
5. PIN configuration

NO.	Symbol	Function description
1	VDD	Power supply LED
2	DOUT	Control data signal output
3	VSS	Ground
4	DIN	Control data signal input

Enkele voorbeelden

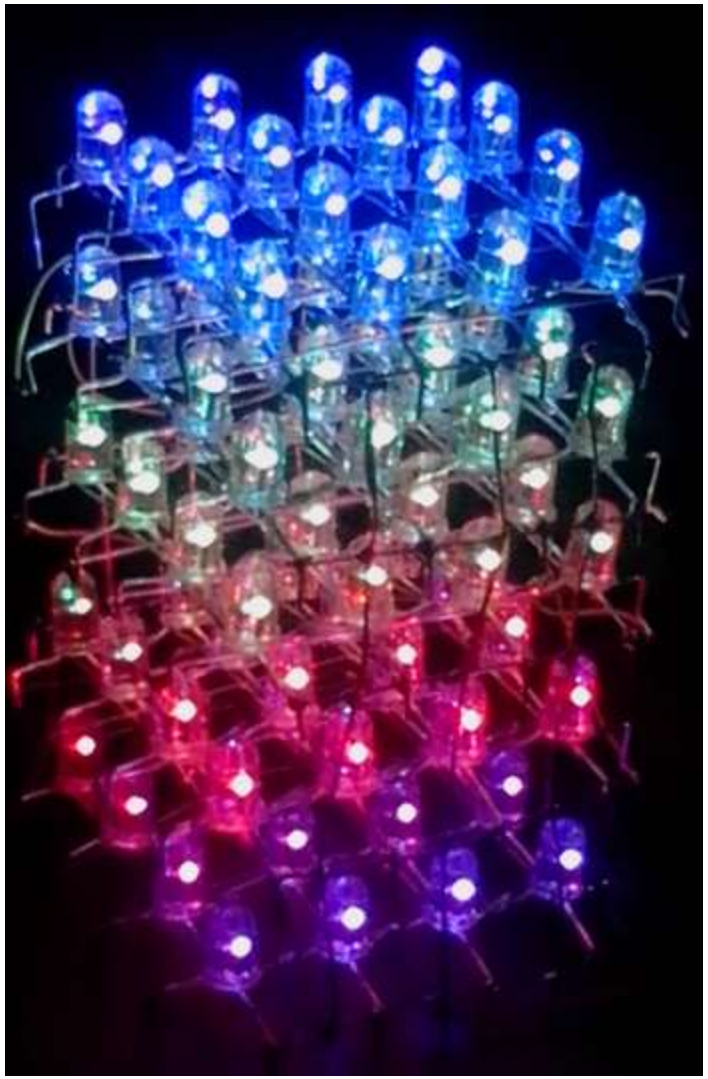


Enkele voorbeelden



Demo 1

Cubus 4 x 4 x 4

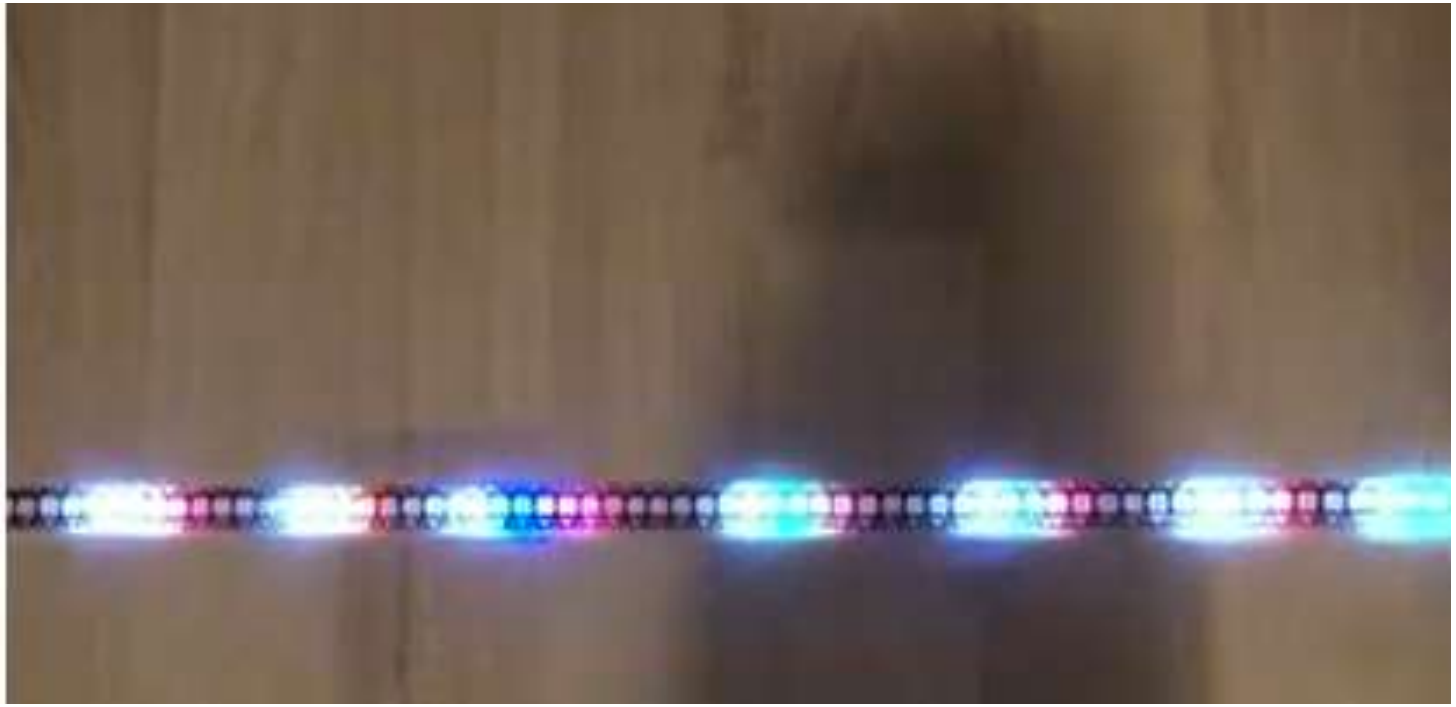


Demo 2

Led Nixie teller

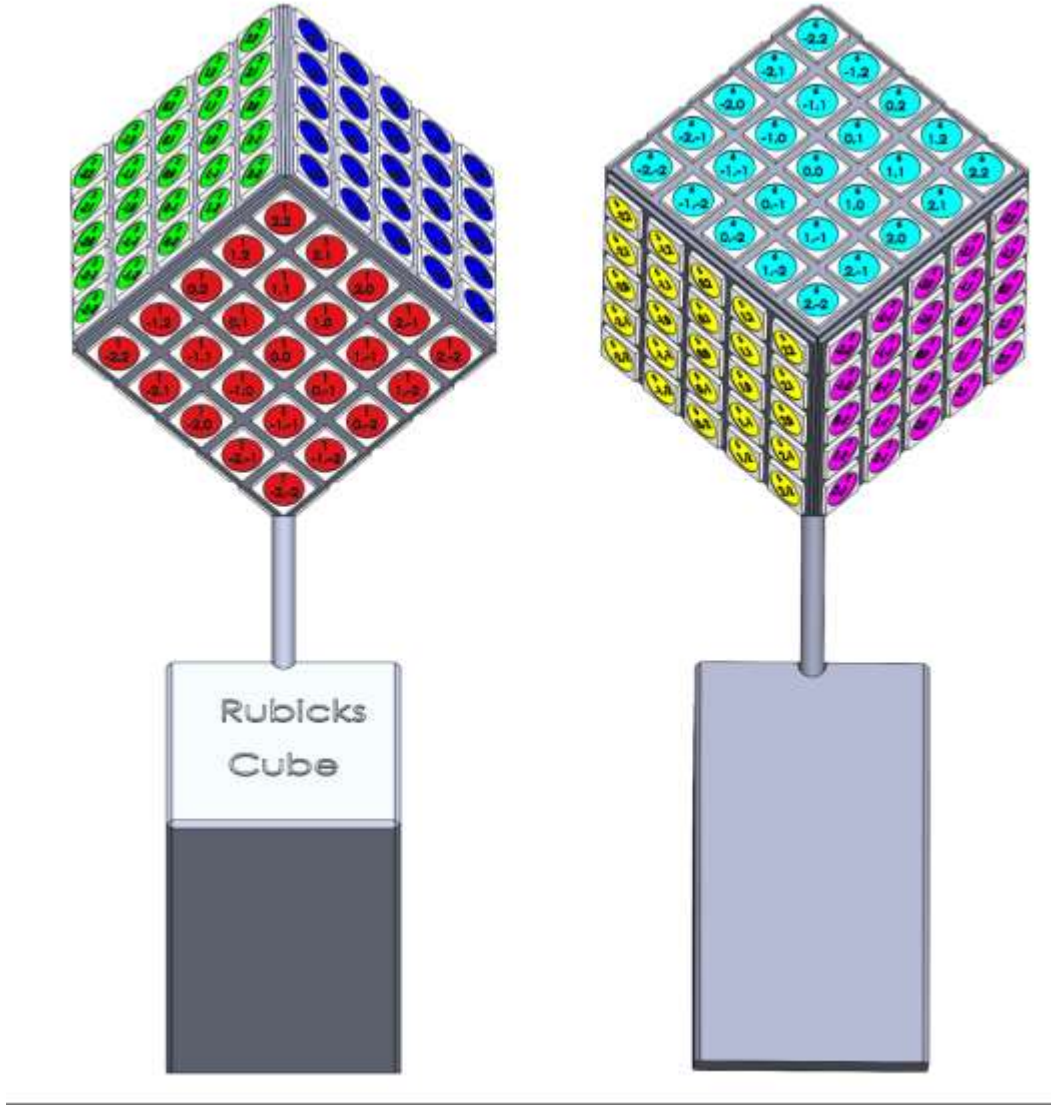
Demo 3 (Rob)

Auto weg met behulp van 1 led string van 500 leds 5 meter lang
-auto's
- Politie auto's
- 2 baans (inhalende auto's
- En heen en terug



Demo 4 (Theo)

Rubix cubes 5 x 5

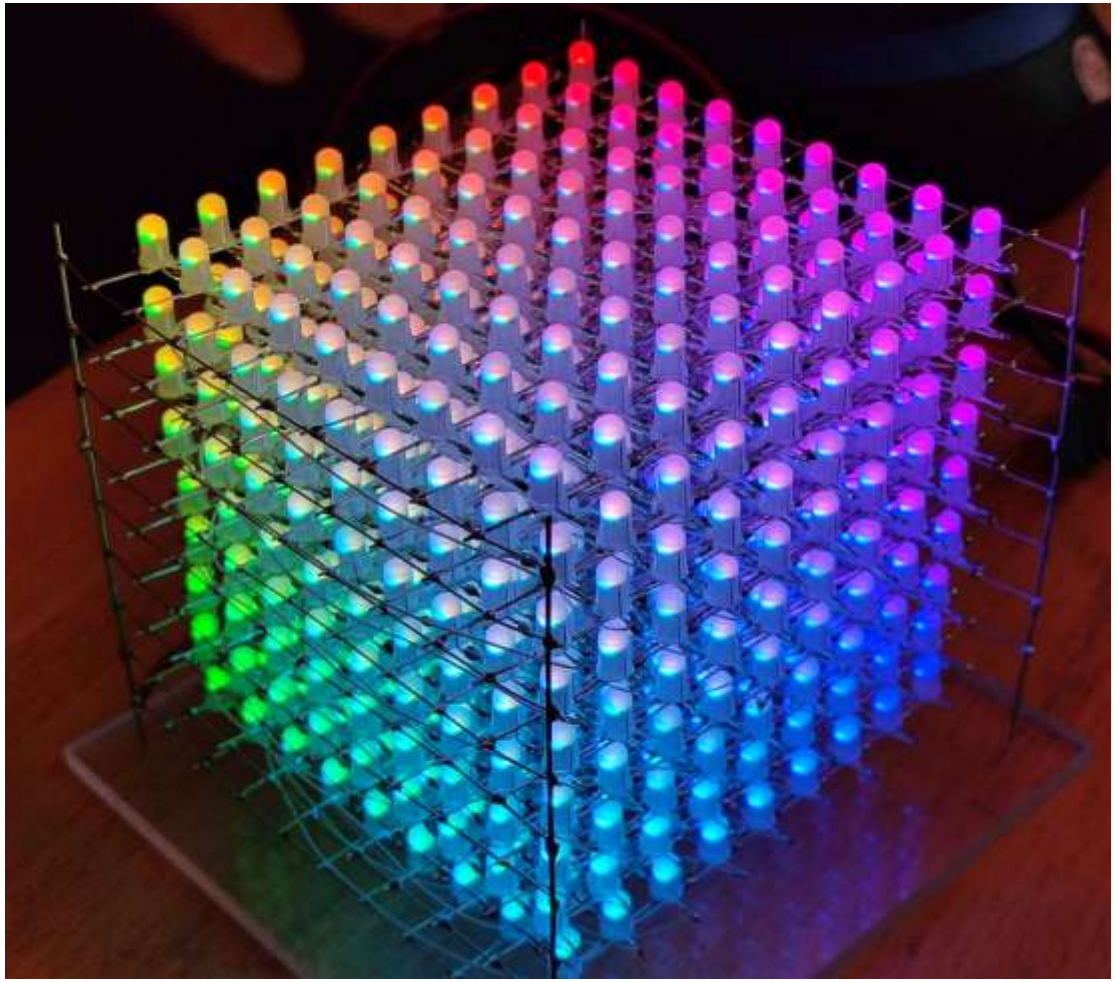


Demo 5

COB FOB FCOB Led strips 12 of 24 Volt

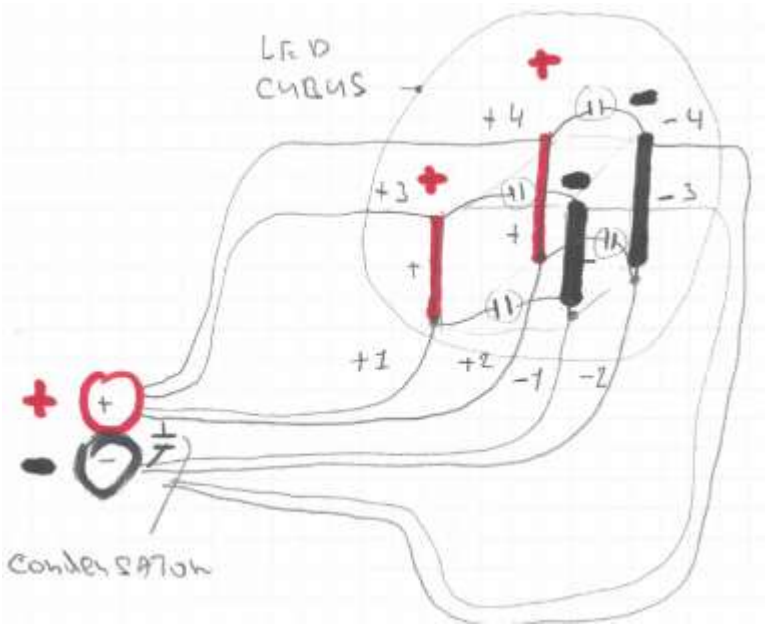
Demo 6 a

3D cubes 9 x 9 x 9 rotaties

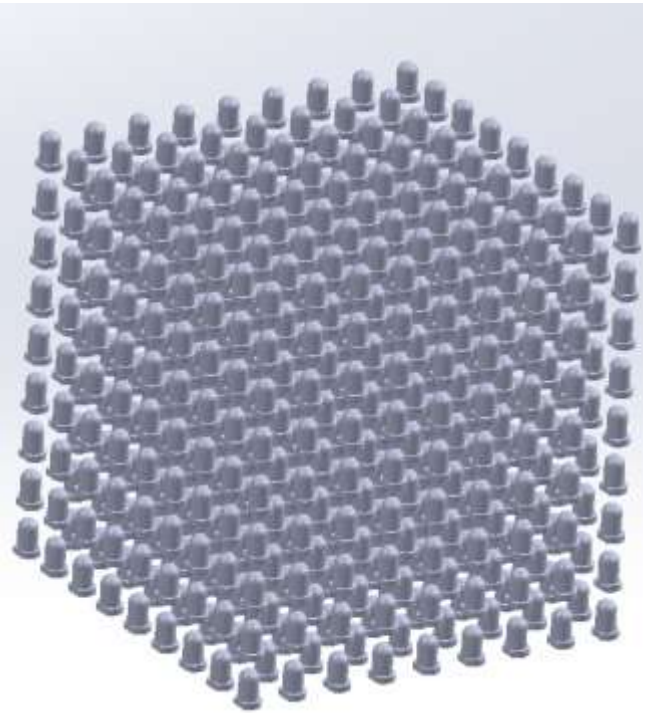


Demo 6 b

3D cubes 9 x 9 x 9

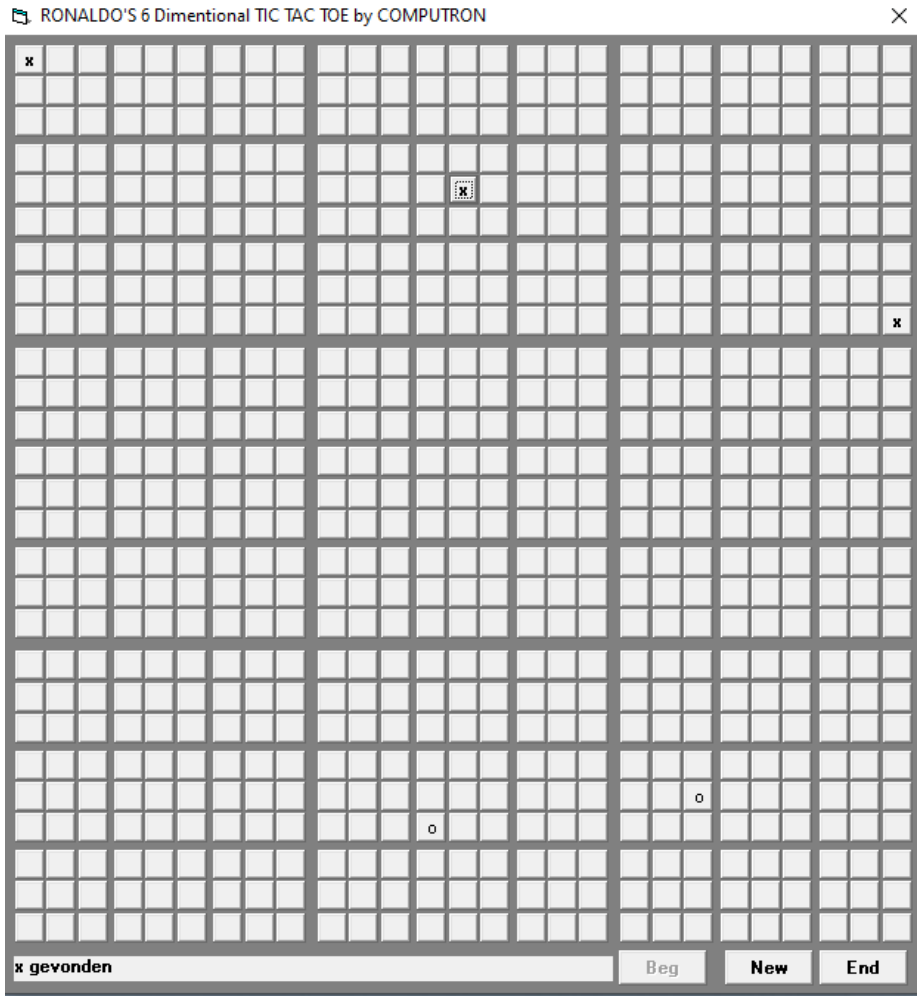


Tic TacToo vieuw

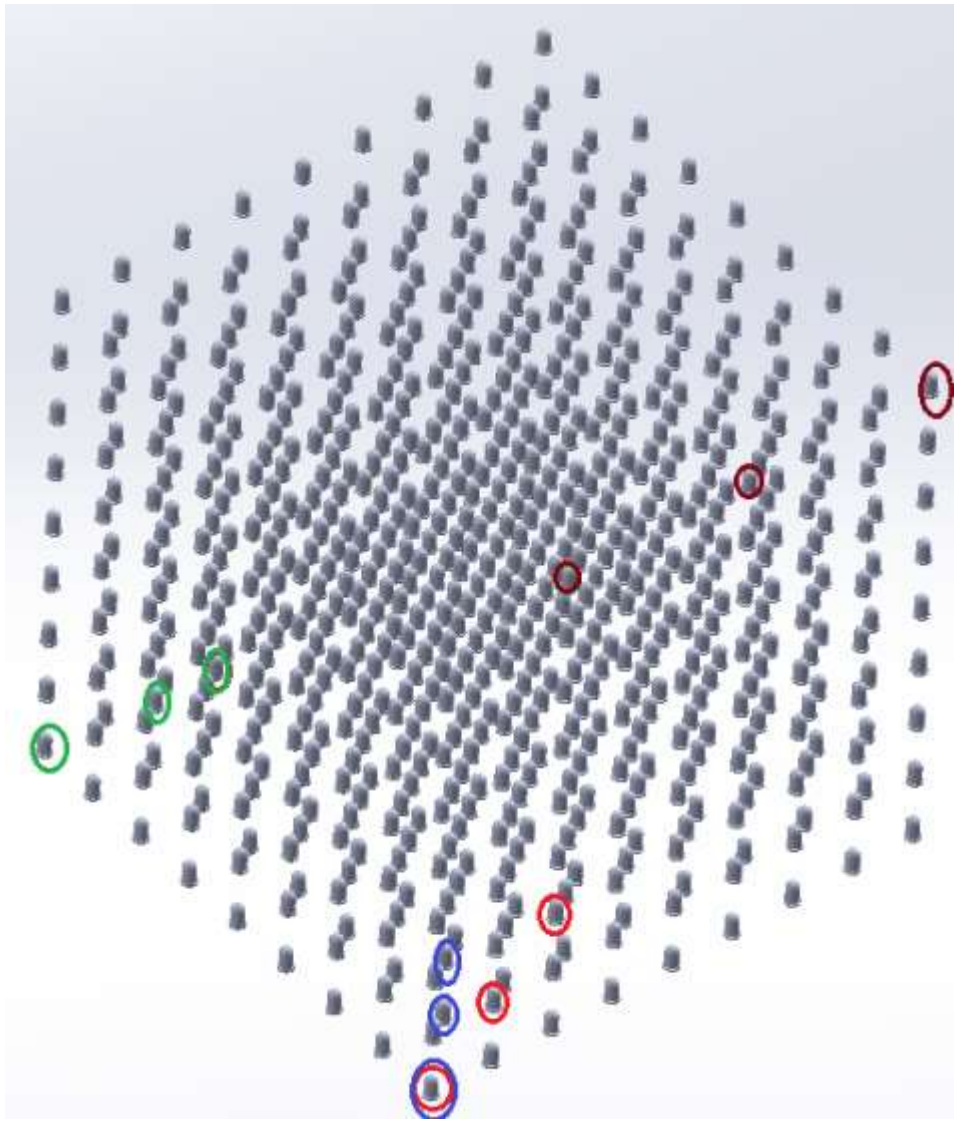


Demo 7 a in ontwikkeling

3D cubes 9 x 9 x 9
Voor 6D tic tac toe



6 Dim Tic Tac Toe in 2 D geprint



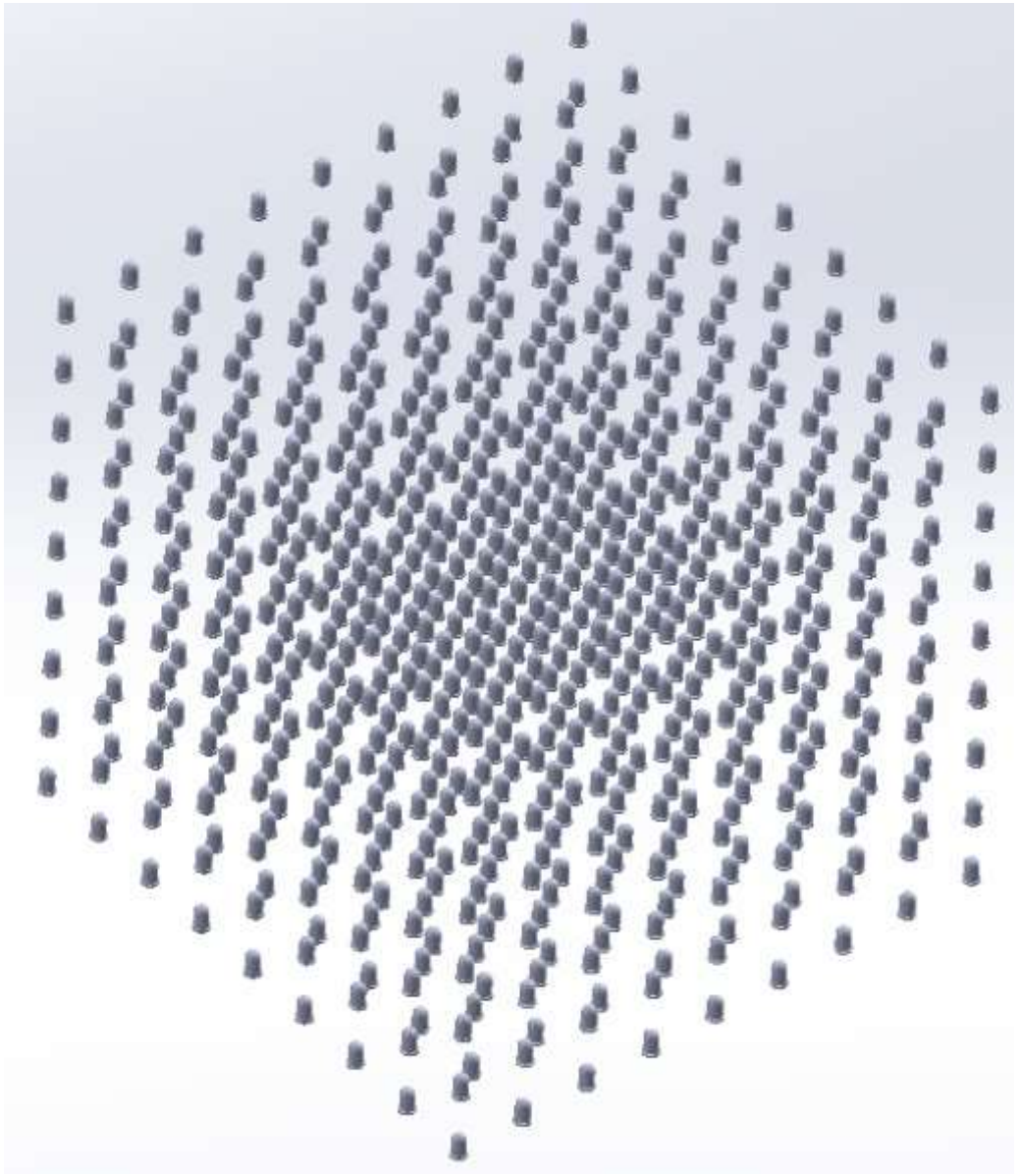
6 Dim Tic Tac Toe in 3 D geprint

Demo 7 in ontwikkeling

3D cubes 9 x 9 x 9

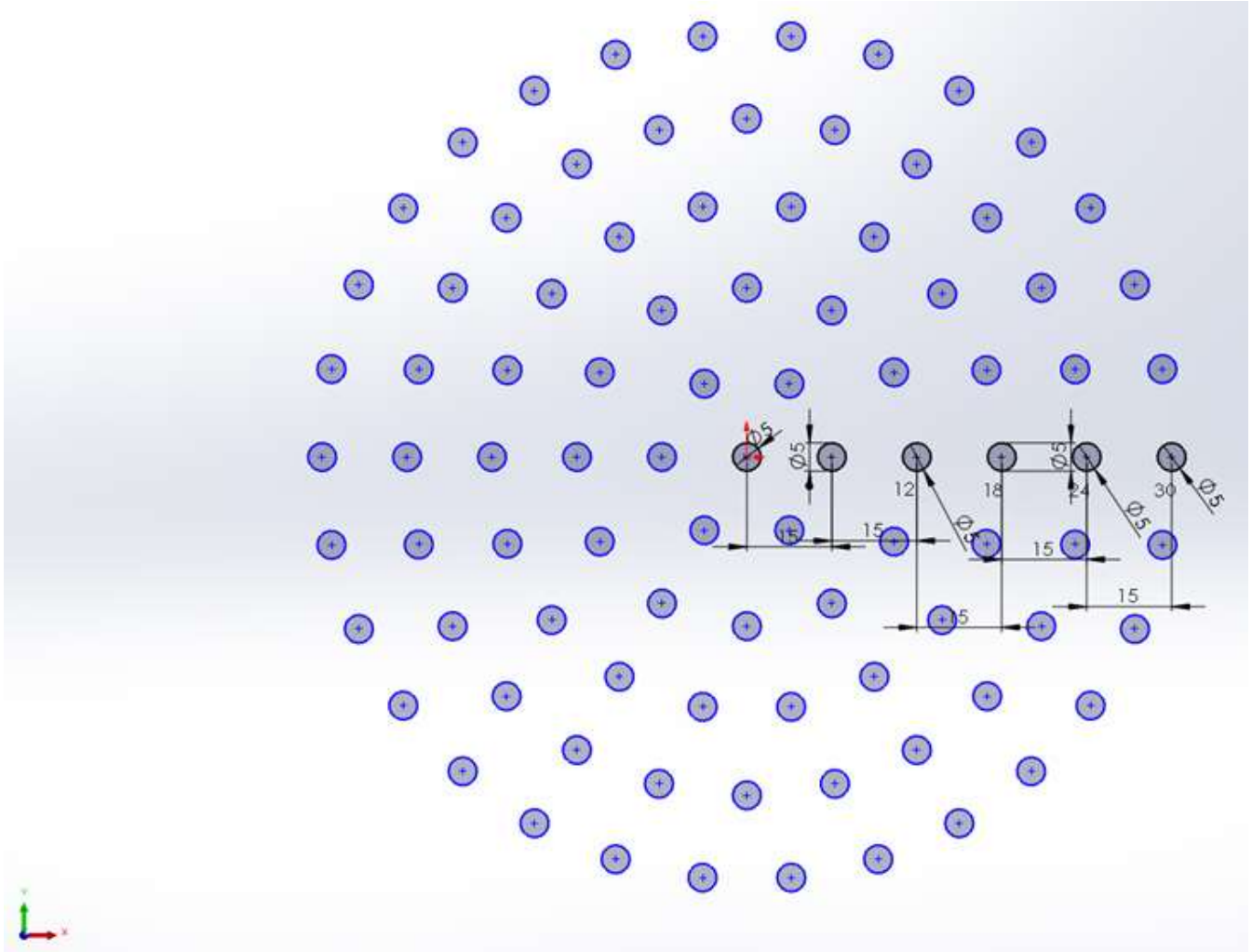
Voor 6D tic tac toe

Mal 3 cm x 3 cm x 3 cm
Total 30 x 30 x 30 cm

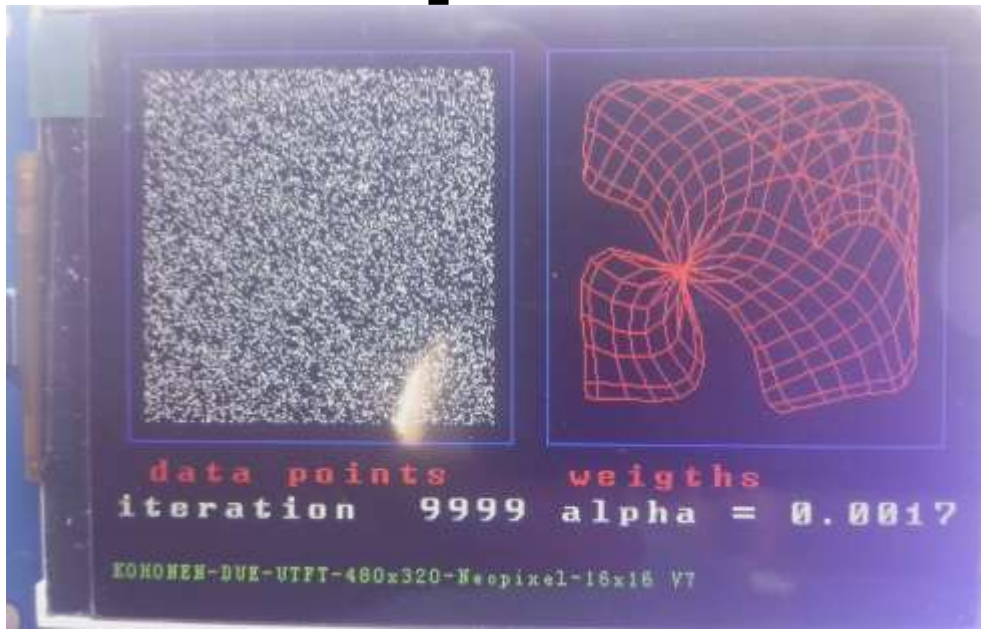


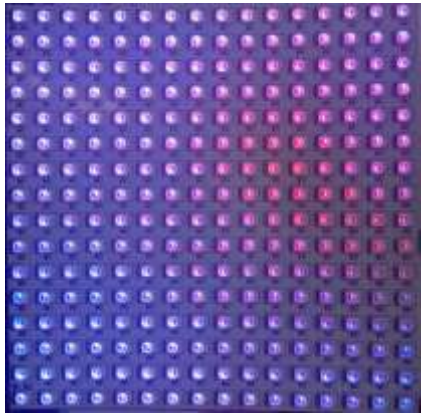
Demo 8 in ontwikkeling

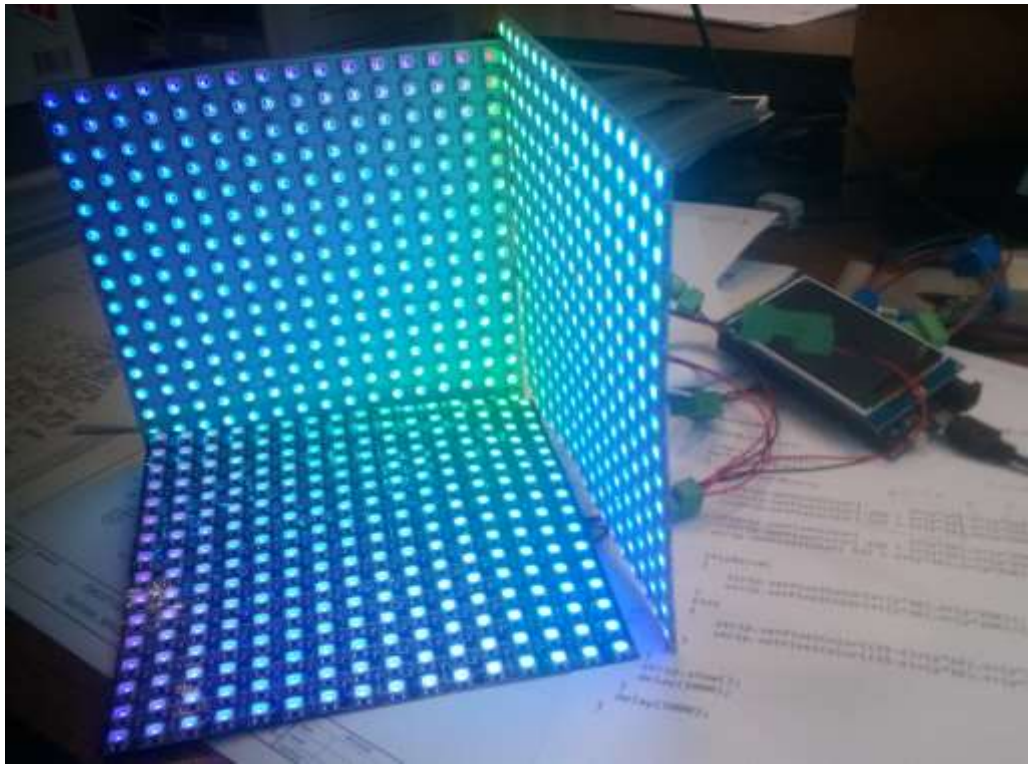
3D Tube 91 x 11 slises = 1001 leds
voor Flowmeter simulation display

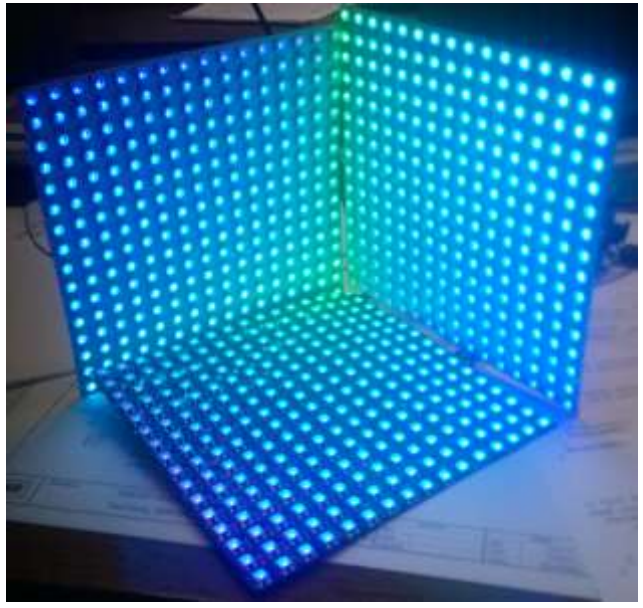


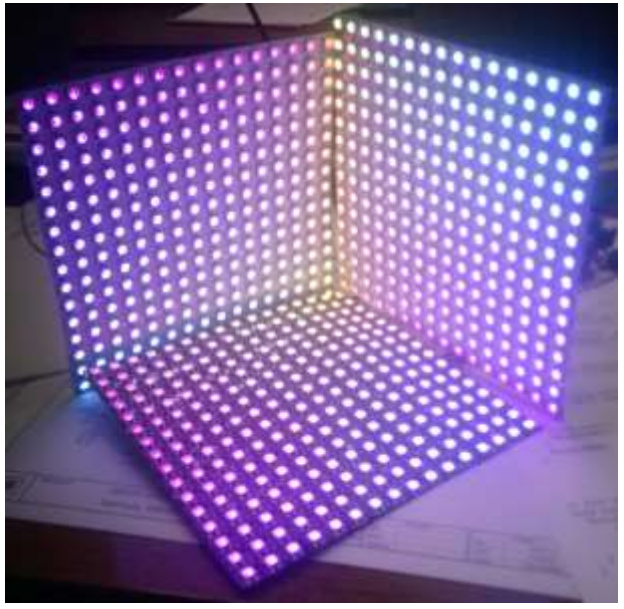
Ontwerp ideen 1 (AI)











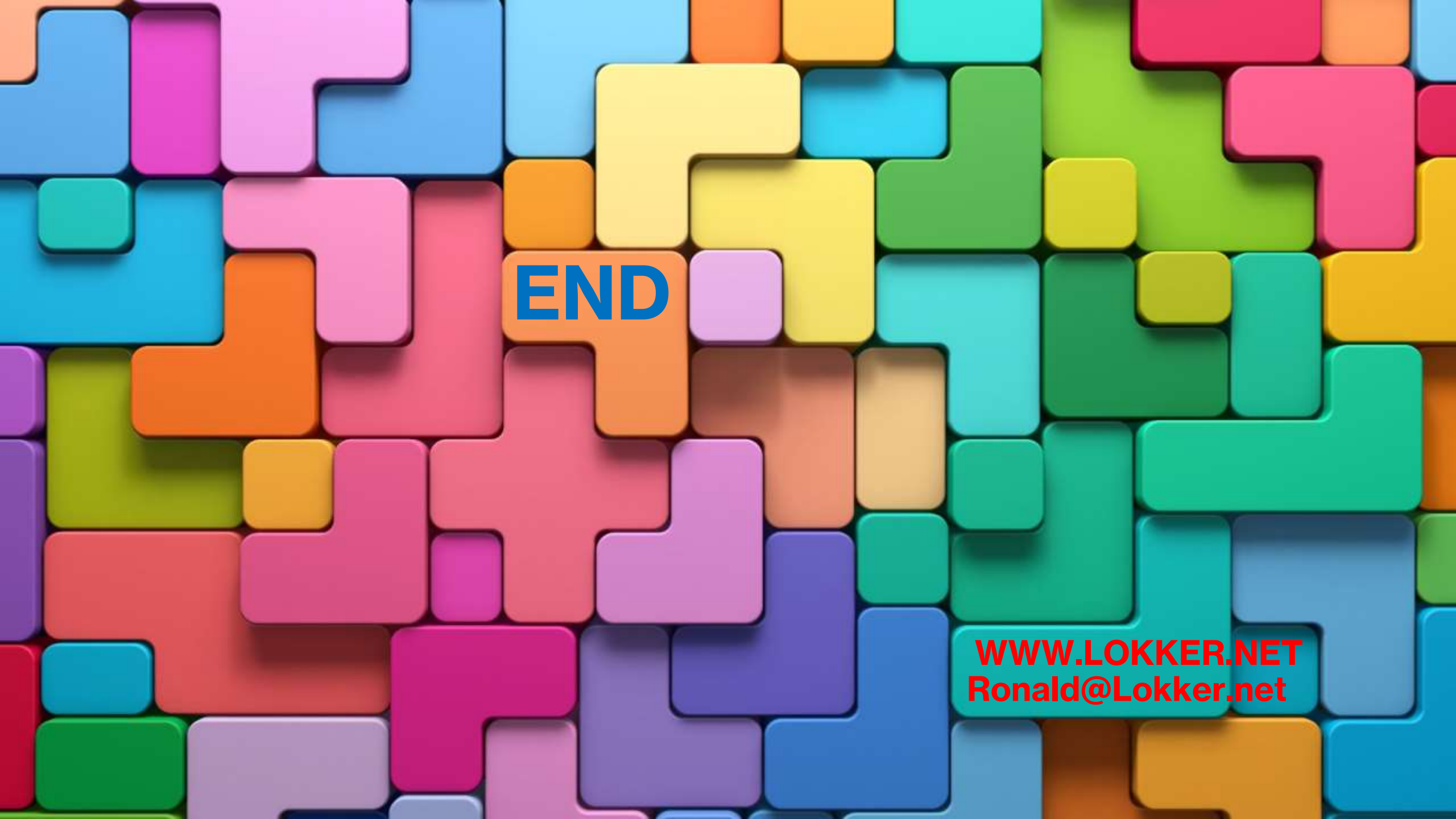
Kohonen
- **Led arry 16 x 16**
- **Uit 3 hoeken**

Ontwerp ideen 2

https://www.youtube.com/watch?v=g7_VKGsEKeA

Led wereld bol

- **Een ronde ledstrip van 128 led's**
- **Rond draaiend in hoeken van 360 / 512 graden**


END
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Ronald@Lokker.net