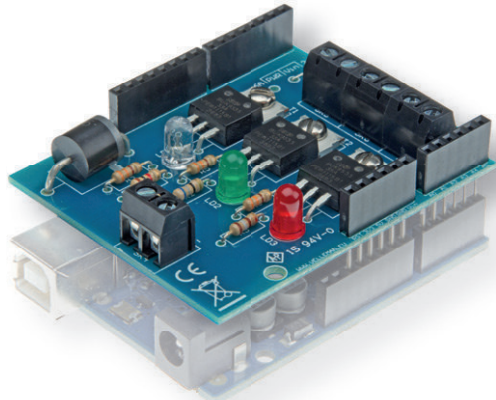
KA01

ILLUSTRATED ASSEMBLY MANUAL HKA01IP'1

RGB Shield for Arduino®

velleman® projects



Control 3 dimmer channels (1 x RGB or 3 single channels) with Arduino UNO™.

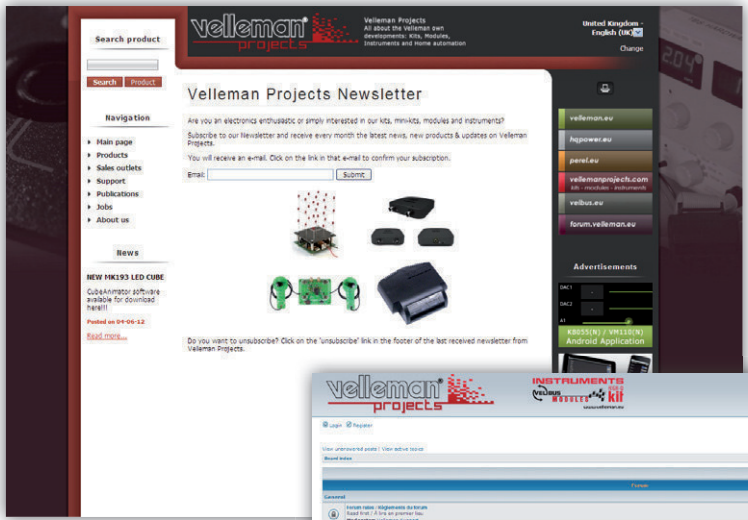
Features

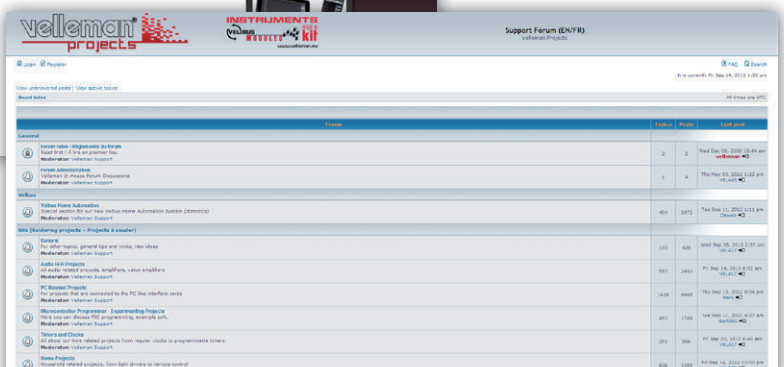
- For use with Arduino Due™, Arduino Uno™, Arduino Mega™
- RGB indicator leds
- Screw terminals for led strip connection.
- With cascade connectors for other shields
- Selectable power supply: external power or power from Arduino Uno™ board

Specifications

- Max. current: 2A/channel
- Max. input voltage: 50VDC
- Dimensions: 68 x 53mm / 2.67 x 2.08"

Made for ARDUINO





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9890 Gavere
(België)

assembly hints

1. Assembly (Skipping this can lead to troubles !)

Ok, so we have your attention. These hints will help you to make this project successful. Read them carefully.

1.1 Make sure you have the right tools:

- A good quality soldering iron (25-40W) with a small tip.
- Wipe it often on a wet sponge or cloth, to keep it clean; then apply solder to the tip, to give it a wet look. This is called 'thinning' and will protect the tip, and enables you to make good connections. When solder rolls off the tip, it needs cleaning.
- Thin raisin-core solder. Do not use any flux or grease.
- A diagonal cutter to trim excess wires. To avoid injury when cutting excess leads, hold the lead so they cannot fly towards the eyes.
- Needle nose pliers, for bending leads, or to hold components in place.
- Small blade and Phillips screwdrivers. A basic range is fine.

For some projects, a basic multi-meter is required, or might be handy

1.2 Assembly Hints :

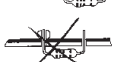
- Make sure the skill level matches your experience, to avoid disappointments.
- Follow the instructions carefully. Read and understand the entire step before you perform each operation.
- Perform the assembly in the correct order as stated in this manual
- Position all parts on the PCB (Printed Circuit Board) as shown on the drawings.
- Values on the circuit diagram are subject to changes, the values in this assembly guide are correct*
- Use the check-boxes to mark your progress.
- Please read the included information on safety and customer service

* Typographical inaccuracies excluded. Always look for possible last minute manual updates, indicated as 'NOTE' on a separate leaflet.

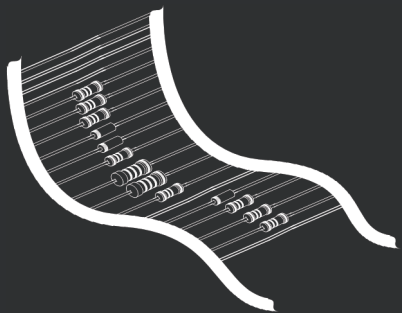
1.3 Soldering Hints :

1. Mount the component against the PCB surface and carefully solder the leads

2. Make sure the solder joints are cone-shaped and shiny

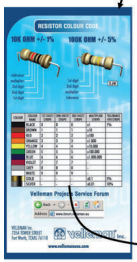


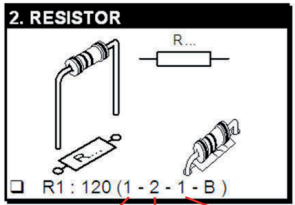
3. Trim excess leads as close as possible to the solder joint



REMOVE THEM FROM THE TAPE ONE AT A TIME !

Included in this kit



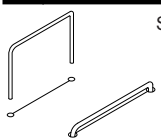


COLOUR	COLOUR NAME	1ST DIGIT/ STRIPE	2ND DIGIT/ STRIPE	3RD DIGIT/ STRIPE	MULTIPLIER STRIPE	TOLE 4TH
	BLACK	0	0	0	x1	1%
	BROWN	1	1	1	x10	
	RED	2	2	2	x100	
	ORANGE	3	3	3	x1.000	
	YELLOW	4	4	4	x10.000	
	GREEN	5	5	5	x100.000	
	BLUE	6	6	6	x1.000.000	

DO NOT BLINDLY FOLLOW THE ORDER OF THE COMPONENTS ONTO THE TAPE. ALWAYS CHECK THEIR VALUE ON THE PARTS LIST!

I CONSTRUCTION

1 Jumper



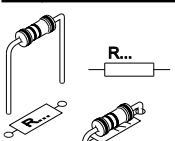
Select power source

- ❑ Vin: power from Arduino®

  OR

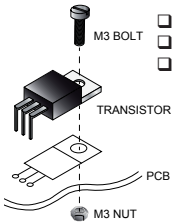
- ❑ PWR: Power from external supply

2 Resistors



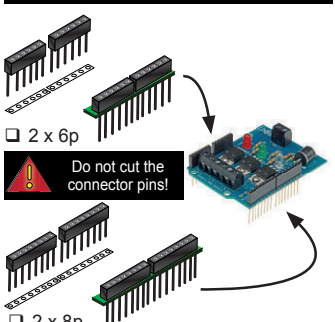
- ❑ R1: 1K (1 - 0 - 2 - B)
- ❑ R2: 68 (6 - 8 - 0 - B)
- ❑ R3: 180 (1 - 8 - 1 - B)
- ❑ R4: 330 (3 - 3 - 1 - B)
- ❑ R5: 330 (3 - 3 - 1 - B)
- ❑ R6: 330 (3 - 3 - 1 - B)

3 Transistors



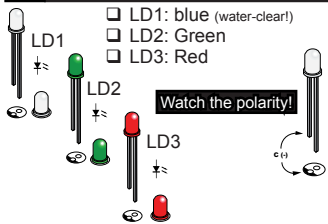
- ❑ T1: BUK9535-55
- ❑ T2: BUK9535-55
- ❑ T3: BUK9535-55

4 Female header



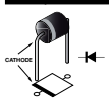
- ❑ 2 x 6p
- ❑ 2 x 8p

5 LED's



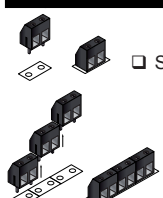
- ❑ LD1: blue (water-clear!)
- ❑ LD2: Green
- ❑ LD3: Red

6 Diode



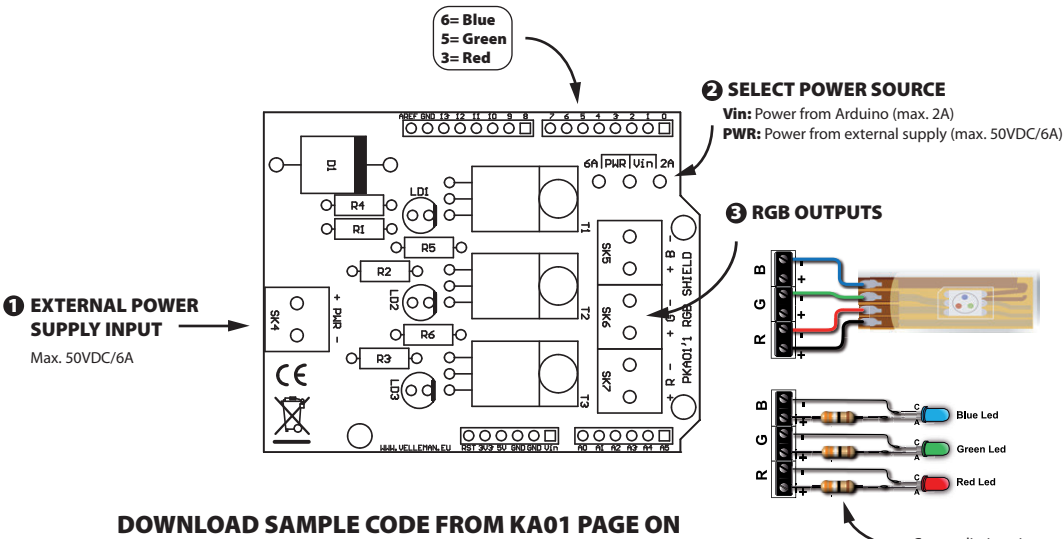
- ❑ D1: 6A6

7 Terminal blocks

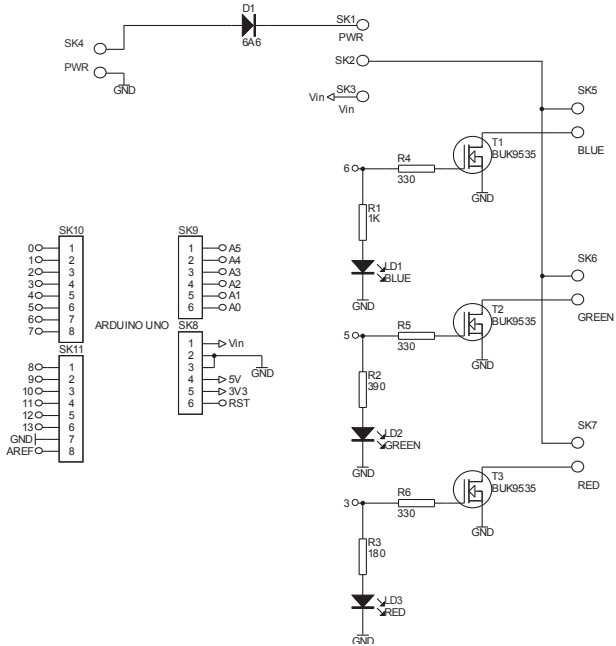


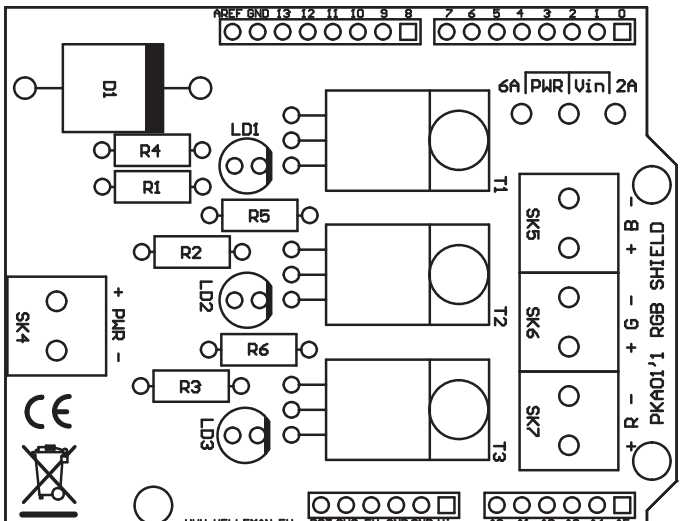
- ❑ SK4: 2p (power)
- ❑ SK5: 2p (Red)
- ❑ SK6: 2p (Green)
- ❑ SK7: 2p (Blue)

II CONNECTION DIAGRAM

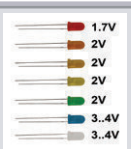


DOWNLOAD SAMPLE CODE FROM KA01 PAGE ON WWW.VELLEMAN.BE

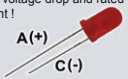

D1
6A6
SK1
PWR
SK4
PWR
GND
SK2
SK3
Vin
Vin
SK5
BLUE
T1
BUK9535
6
R4
330
GND
R1
1K
LD1
BLUE
GND
SK6
GREEN
T2
BUK9535
5
R5
330
GND
R2
390
LD2
GREEN
GND
SK7
RED
T3
BUK9535
3
R6
330
GND
R3
180
LD3
RED
GND
SK10
0
1
2
3
4
5
6
7
8
SK11
8
9
10
11
12
13
GND
AREF
ARDUINO UNO
SK9
A5
A4
A3
A2
A1
A0
SK8
Vin
GND
5V
3V3
RST


AREF GND 13 12 11 10 9 8
7 6 5 4 3 2 1 0
6A PWR Vin 2A
D1
LD1
R4
R1
R5
R2
LD2
R6
R3
LD3
T1
T2
T3
SK5
SK6
SK7
SK4
+ PWR -
+ R - + G - + B -
PKA01'1 RGB SHIELD
WWW.VELLEMAN.EU
RST 3V3 5V GND GND Vin
A0 A1 A2 A3 A4 A5

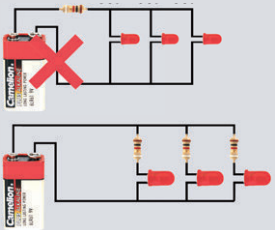
Leds and how to use them



Leds feature a specific voltage drop, depending on type and colour. Check the datasheet for exact voltage drop and rated current !



Never connect leds in parallel



How to Calculate the series resistor:

Example: operate a red led (1.7V) on a 9Vdc source.
Required led current for full brightness: 5mA (this can be found in the datasheet of the led)

$$\frac{\text{Supply voltage (V) - led voltage (V)}}{\text{required current (A)}} = \text{series resistance (ohms)}$$

$$\rightarrow \quad \frac{9V - 1.7V}{0.005A} = 1460 \text{ ohm}$$

closest value : use a 1k5 resistor

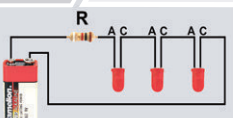
Required resistor power handling=
voltage over resistor x current passed trough resistor

$$\rightarrow \quad (9V - 1.7V) \times 0.005A = 0.036W$$

a standard 1/4W resistor will do the job

LEDs in series:

Example: 3 x red led (1.7V) on 9V battery
Required led current for full brightness: 5mA
(this can be found in the datasheet of the led)



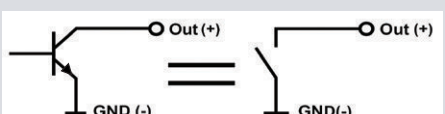
$$\frac{\text{Supply voltage (V) - (number of leds x led voltage (V))}}{\text{required current (A)}} = \text{series resistance (ohms)}$$

$$\rightarrow \quad \frac{9V - (3 \times 1.7V)}{0.005A} = 780 \text{ ohm}$$

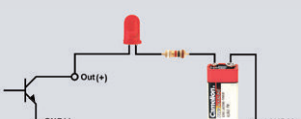
use an 820 ohm resistor

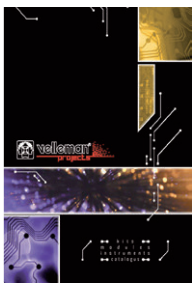
open collector outputs

An open collector output can be compared to a switch which switches to ground when operated



Example: How to switch an LED by means of an open collector output





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