

RGB Controller



K8088

Control incandescent bulbs, LEDs,
 common anode led strips, etc ...

Specifications

- 256 intensity levels/ch.
- voltage output : same as input voltage
- current limit possible (on-board resistor needed)
- LED PWM freq. : 82Hz
- power supply : 10 - 15Vdc / 9A max.
- dimensions : approx 80x70x23mm

Ideal for use with flexible LED light strips, ex. RGB Led. (ordernr. LDB1-HS3027AC)

Features:

- suited for both incandescent bulbs and LEDs
- up-down level adjust for each output
- hard transition effects : running light, Strobo, Colour loops, etc...
- smooth fade effects : colour change, flame effect, random colours, slow off etc...
- wide-range effect speed adjust
- Hi power MOSFET outputs
- memory for last selected effect & speed
- easy up/down effect select
- suited for common anode RGB strips

Specifications:

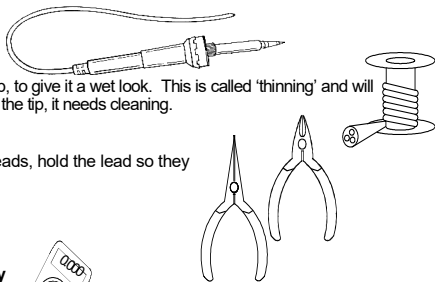
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1. Assembly (Skipping this can lead to troubles !)

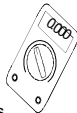
Ok, so we have your attention. These hints will help you to make this project successful. Read them carefully.

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

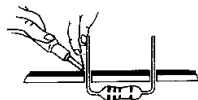
**1.2 Assembly Hints :**

- ⇒ 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.
- ⇒ 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

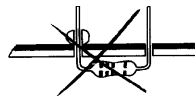
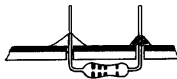
* Typographical inaccuracies excluded. Always look for possible last minute manual updates, indicated as 'NOTE' on a separate leaflet.

1.3 Soldering Hints :

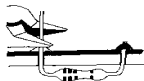
1- Mount the component against the PCB surface and carefully solder the leads



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

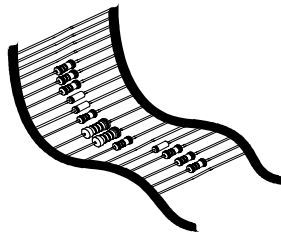


3- Trim excess leads as close as possible to the solder joint



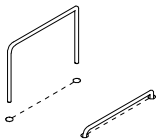
REMOVE THEM FROM THE TAPE ONE AT A TIME !

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

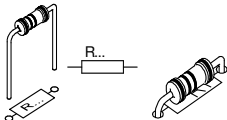


1. Jumper wire

J



2. Resistors

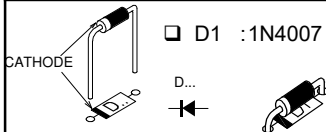


- R1 : 330 (3 - 3 - 1 - B)
- R2 : 330 (3 - 3 - 1 - B)
- R3 : 330 (3 - 3 - 1 - B)

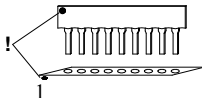
R4,R5 & R6 : see page 9 &10

- R7 : 180 (1 - 8 - 1 - B)
- R8 : 390 (3 - 9 - 1 - B)
- R9 : 1K (1 - 0 - 2 - B)
- R10 : 47K (4 - 7 - 3 - B)

3. Diode. Watch the polarity!

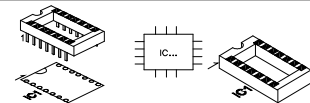


4. Resistor array



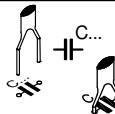
RA1 : 10K (103)

5. IC socket. Watch the position of the notch!



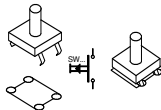
IC1 : 14p

6. Capacitors.



- C1 : 100nF (104)
- C2 : 100nF (104)
- C3 : 100nF (104)
- C4 : 15pF (15)
- C5 : 15pF (15)

7. Push buttons

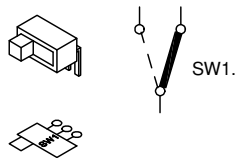


SW2

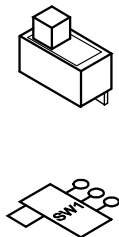
- : Blue up
- SW3 : Green up
- SW4 : Red up
- SW5 : Red down
- SW6 : Green down

8. Switches

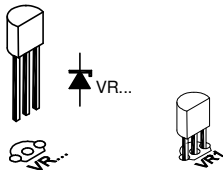
- SW1 : ON / OFF



- SW8 : RGB / effect -mode

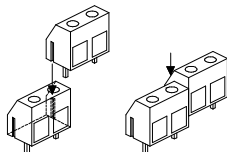


9. Voltage regulator



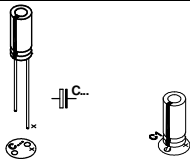
- VR1 : UA78L05

10. Terminal blocks



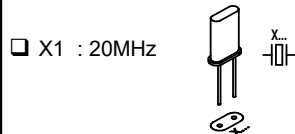
- SK1 : 2p "12Vdc"
- SK2 : 2p "Red"
- SK3 : 2p "Green"
- SK4 : 2p "Blue"

11. Electrolytic Capacitor. Watch the polarity !



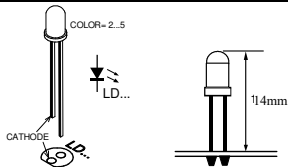
- C6 : 100 μ F / 25V

12. Crystal



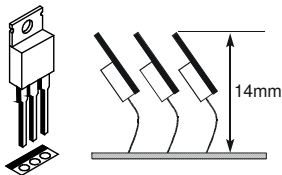
- X1 : 20MHz

12. LEDs. Watch the polarity!



- LD1 : 3mm Red "R"
- LD2 : 3mm Green "G"
- LD3 : 3mm Blue "B"

13. Transistors

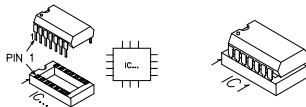


- TR1 : BUK9535-55
- TR2 : BUK9535-55
- TR3 : BUK9535-55

IMPORTANT

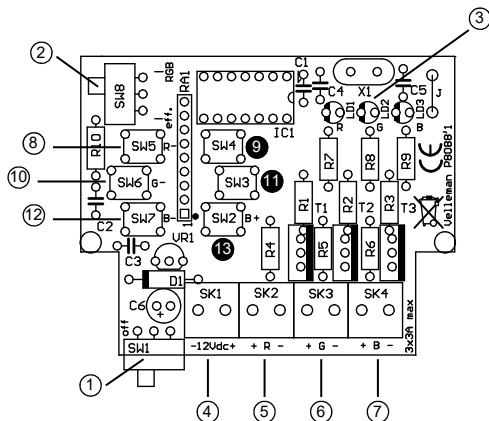
Apply an extra layer of solder on all copper PCB tracks.

14. IC



- IC1 : VK8088
(programmed PIC16F630-I/P)

Description



- 1) On/off switch
- 2) Mode switch. Select between 'RGB'- and 'Effect'-mode
 'RGB'-mode: Red, Green and Blue output levels can be individually adjusted by means of the up/down buttons
 'Effect'-mode: Allows to choose between 11 built-in effects
- 3) Output indicator leds.
- 4) Power supply connector.
- 5) RED output (3A DC max.)
- 6) GREEN output (3A DC max.)
- 7) BLUE output (3A DC max.)
- 8) RED-level down / 'previous effect'-button
- 9) RED-level up / 'next effect'-button
- 10) GREEN-level down / 'reduce effect speed'-button
- 11) GREEN-level up / 'increase effect speed'-button
- 12) BLUE-level down / 'previous colour'-button
- 13) BLUE-level up / 'next colour'-button

Connection

Incandescent lightbulb or halogen lightbulb:

connect the lightbulb to the output R, G or B.

Place a wire jumper for R4, R5 and R6.



☞ Polarity is not important. 3A /channel max (36W@12V).

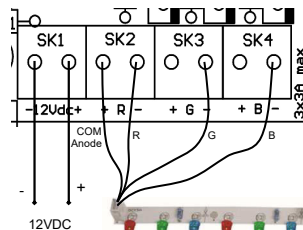
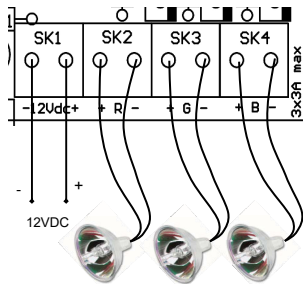
LED-strip with common anode (+) :

Connect the common anode to the (+) of the 12VDC power supply.
Connect the cathode (-) of each colour to the (-) of R, G or B on the K8088.

Place a wire jumper for R4, R5 and R6.

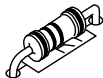


☞ Max. current consumption is 3A/channel.



LED:

☞ LEDs require a series resistor (R4, R5 or R6)



Determine led voltage drop (Check manufacturer datasheet).

Rule of thumb: red: 1.7V, green: 2V, blue: 3..4V).

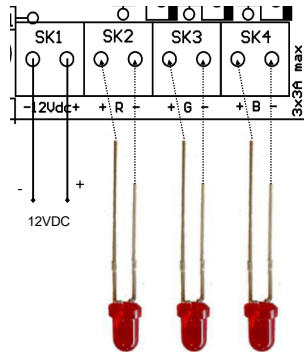
Next, check required LED current.

Example:

Red LED, 1.7V drop, required current: 20mA

Resistor calculation: $(12V - 1.7V) / 0.020 = 515 \text{ ohm}$ (choose nearest value, e.g. 560 ohm)

Resistor power rating calculation: $(12V - 1.7V) \times (12V - 1.7V) / 560 = 0.19W$ (choose a 0.25W resistor)



Use

RGB-mode (mode switch into position 'RGB')

This mode allows you to compose a desired colour by adjusting the level of each channel.

- 8) RED-level down
- 9) RED-level up
- 10) GREEN-level down
- 11) GREEN-level up
- 12) BLUE-level down
- 13) BLUE-level up

Memory: Once you have composed a colour, you can store it in memory by flipping the mode switch to 'eff'. Next time, when you turn on the controller with the slide switch set to 'RGB', it will revert to the colour you've composed.

Effect-mode (mode switch SW8 in position 'eff')

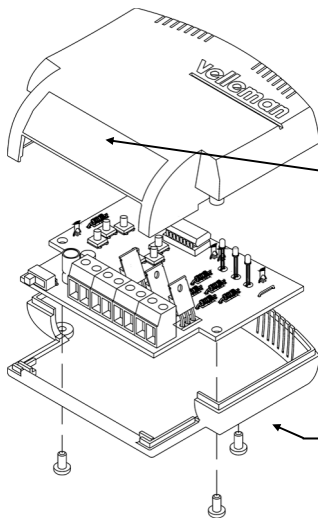
This mode allows you to select one of the 11 available effects, using the buttons (8) and (9)

<u>Effect #</u>		<u>Description</u>
1	Static colours	Select a static colour by means of buttons (12) and (13). Colours: Red - Green - Red/Green - Blue - Red/Blue - Green/Blue - Red/Green/Blue
2	Sequenced colours	Same as above, but automatically sequenced
3	Sequenced primary colours	Red - Green - Blue sequencer
4	Colour fade	Fade Red-Green-Blue-Red
5	Flame effect	3 independent flame simulations
6	Strobo	3 outputs blink with 50% duty cycle
7	Random colours	Random colours, hard transitions between colours
8	Random colours	Random colours, soft transitions between colours
9	Random flashes	Random colours, fade 0 -> 100% -> 0
10	Nightlight	All channels 100%, next, slow off all channels, finally Blue remains at 10%
11	Traffic light	Green, Blue, Red, Green sequence. Use Blue output for yellow light

Effects 2 to 11 feature adjustable speed. Press (11) to increase speed, press (10) to decrease speed

Memory: Once you have selected an effect and the desired speed, you can store it in memory by flipping the mode switch to 'RGB'. Next time, when you turn on the controller with the slide switch set to 'eff', it will revert to the effect you've selected

Mounting order overview



Mount the PCB onto the lower part of the housing, see figure.

Place the front and rear sticker on the housing.

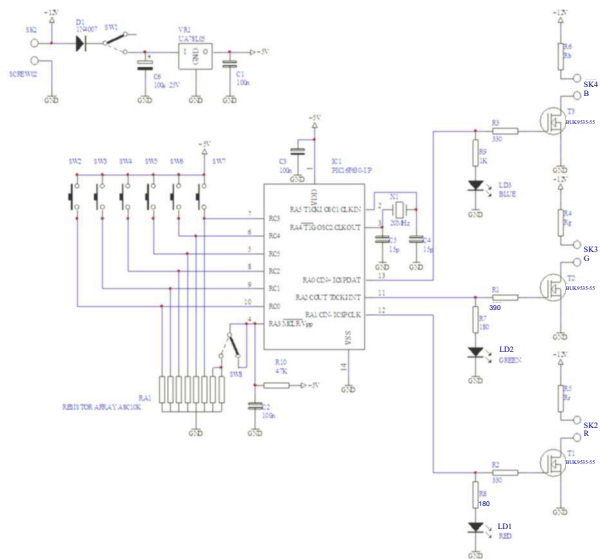
RGB controller		Velleman	
Power		Outputs	
Off	On	3A/ch max.	com. anode
- 12VDC +	+ R -	+ G -	+ B -

- Indoor use only !
- Disconnect power before opening
- Maximum ambient temp. : 35°C

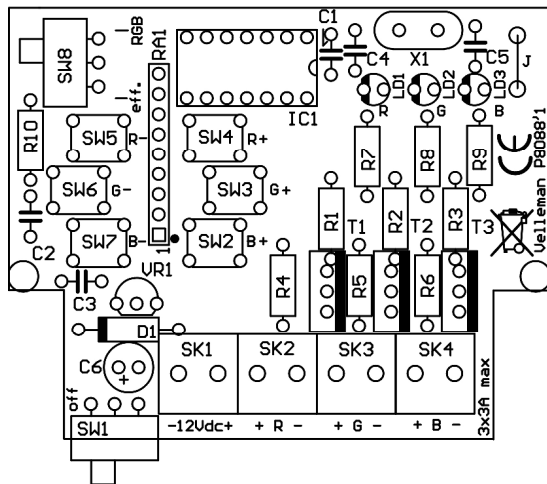
See manual for safety and operating instructions

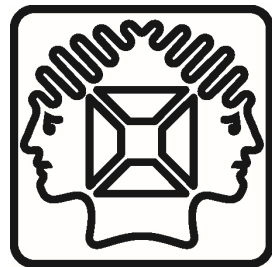
Designed In Europe

Schematic diagram.



PCB





VELLEMAN NV
Legen Heirweg 33, B-9890 GAVERE
Belgium (Europe)

