Total solder points: 113
Difficulty level: *beginner* 1 ☐ 2 ☑ 3 ☐ 4 ☐ 5 ☐ *advanced*

velleman® HIGH-Q kit

DUAL FUNCTION STROBE

K5203

Create fantastic light effects for disco, photographs, signalisation, ...

Specifications:

☑ Create fantastic light effects for disco, photographs, signalisation..
☑ Two operating modes:
- Flashes on power down.
- For use in combination with light computer K5201, running lights K5200, K8032 or other light effect generator.
- Continuous flashing with adjustable speed.

☑ Simple two-wire connection.
☑ High power flash tube.
☑ Power on LED.
☑ Reflector included.

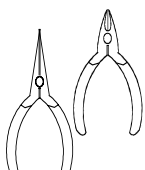
Features:

- Power supply : 230VAC / 50 Hz
- Power consumption : 20W max. / 3W standby
- Max flash rate : 20 flashes/s
- Dimensions (W x L x H): 70 x 120 x 50 mm

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

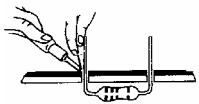
1.2 Assembly Hints :

⇒ 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

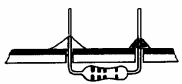
* Typographical inaccuracies excluded. Always look for possible last minute manual updates, indicated as 'NOTE' on a separate leaflet.

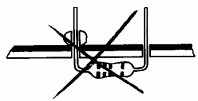
1.3 Soldering Hints :

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

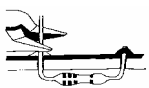


2- Make sure the solder joints are cone-shaped and shiny



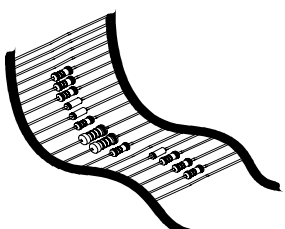


3- Trim excess leads as close as possible to the solder joint



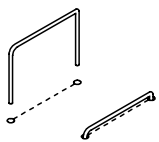
REMOVE THEM FROM THE TAPE ONE AT A TIME !

AXIAL COMPONENTS ARE TAPED IN THE CORRECT MOUNTING SEQUENCE !



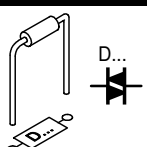
You will find the colour code for the resistances and the LEDs in the HALG (general manual) and on our website: http://www.velleman.be/common/service.aspx

1. Jumpers



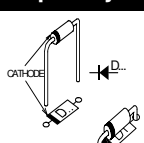
- ❑ J1
- ❑ J2

2. DIAC



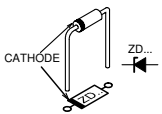
- ❑ D1 : D0200YR

3. Diodes. Watch the polarity !



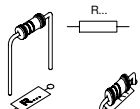
- ❑ D2 : **1N4148**
- ❑ D3 : 1N4007
- ❑ D4 : 1N4007
- ❑ D5 : 1N4007
- ❑ D6 : 1N4007
- ❑ D7 : 1N4007
- ❑ D8 : 1N4007

4. Zener diodes. Watch the polarity !



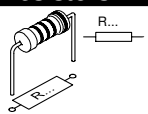
- ❑ ZD1 : 15V
- ❑ ZD2 : 2V4

5. Resistors



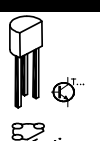
- ❑ R1 : 15K (1 - 5 - 3 - B)
- ❑ R2 : 10K (1 - 0 - 3 - B)
- ❑ R3 : 4K7 (4 - 7 - 2 - B)
- ❑ R4 : 100K (1 - 0 - 4 - B)
- ❑ R5 : 100K (1 - 0 - 4 - B)
- ❑ R6 : 100K (1 - 0 - 4 - B)
- ❑ R7 : 100K (1 - 0 - 4 - B)
- ❑ R8 : 100K (1 - 0 - 4 - B)
- ❑ R9 : 100K (1 - 0 - 4 - B)
- ❑ R10: 100K (1 - 0 - 4 - B)
- ❑ R11: 100K (1 - 0 - 4 - B)

6. 1W Resistors



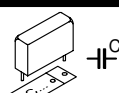
- ❑ R12 : 100K (1 - 0 - 4 - B)
- ❑ R13 : 100K (1 - 0 - 4 - B)
- ❑ R14 : 100K (1 - 0 - 4 - B)
- ❑ R15 : 100K (1 - 0 - 4 - B)

7. Transistor.



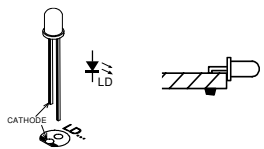
- ❑ T1 : BC337

8. Capacitor.



- ❑ C1 : 100nF / 400V (104 - µ1)

9. LED. Check the polarity!

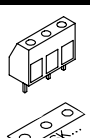


❑ LD1 : 5mm RED

☝ Depending the used housing, mount the LED horizontal or vertical.

10. Screw connector

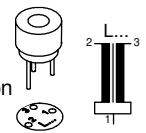
❑ SK1 : 3 P



11. Trigger coil

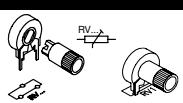
❑ L1 : TC6

☝ Mind the orientation



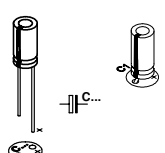
12. Resistor trimmer

❑ RV1 : 1M



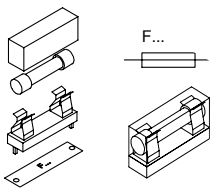
13. Electrolytic Capacitors. Watch the polarity !

❑ C2 : 1µF
❑ C3 : 4,7µF
❑ C4 : 100µF
❑ C5 : 100µF
❑ C6 : 100µF
❑ C7 : 100µF
❑ C8 : 100µF



14. Fuse + Holder

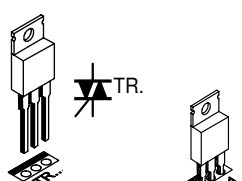
❑ F1 : 250mA slow



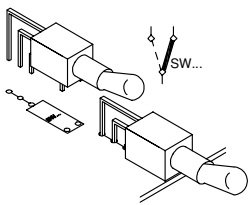
15. Triac.

❑ TR1 : TIC206M or eq.

☝ **MIND THE ORIENTATION !**



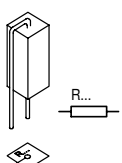
16. Switch.



❑ SW1 : TS8 (ON - ON)

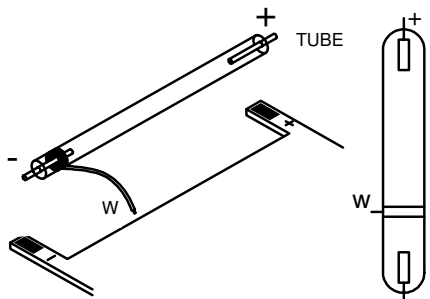
17. 5W resistors.

❑ R16 : 220
❑ R17 : 220
❑ R18 : 220
❑ R19 : 220



18. Strobe tube. Watch the polarity !

Avoid touching the tube. Eventually, it can be cleaned with a dry cloth.
Mind the correct orientation of the tube. Solder the tube in place, parallel to the PCB border, as shown.
Connect the loose wire to point **W**.



CAUTION: under operating condition, voltages up to 6KV can be present at point W.

19. Mounting the reflector behind the tube

Solder the reflector on the PCB as shown. Be sure the shiny side faces the flashtube. For improved efficiency, you can bend it in a parabola shape according to the drawing. Use a round tube of about 38mm, to create a smooth circle

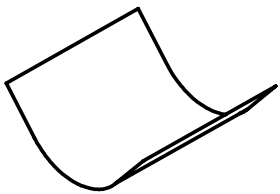


Fig. 1.0

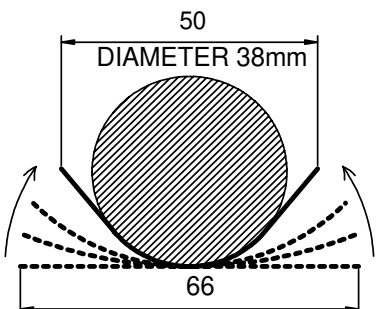


Fig. 2.0

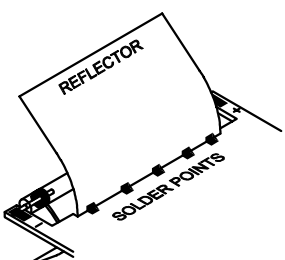


Fig. 3.0

20. Test

WARNING : The circuit is directly connected to the mains and carries a lethal tension ! Make sure that no part of the circuit can be touched during operation.
All capacitors must be fully discharged before touching the circuit.
The flash tube can reach high temperatures during operation, and can cause burns.

Connect the mains to the connector marked AC mains, the LED should light up.
In one mode, selectable with the switch SW1, the unit should flash when the power is disconnected. In the other mode the unit can flash continuously, the flash rate can be adjusted by means of RV1.

21. Building into an enclosure

☝ **It is recommended to mount the unit into an enclosure (due to high voltages).**

Provide sufficient airflow by drilling some 4mm ventilation holes in the cabinet. Use a cable exit grommet for the AC cord. For safety, we recommend you close the flash-tube side of the box with a glass or plexi window. If a metal enclosure is used, be sure to earth all the metal parts and to leave a minimum space of 5mm between the enclosure and any live part. Two fixation holes are already connected to earth on the PCB as are the metal parts like the reflector and the switch.

22. Connection examples

As the circuit requires only two wires, a manual remote control can easily be made by means of a push-button switch (NC contact, 230 V compatible, fig.4.0).

Of course you can use any other control circuit which is able to switch the mains ON and OFF. Use a wire diameter of a least 0.75 mm² for all interconnections and be sure to isolate all live parts.

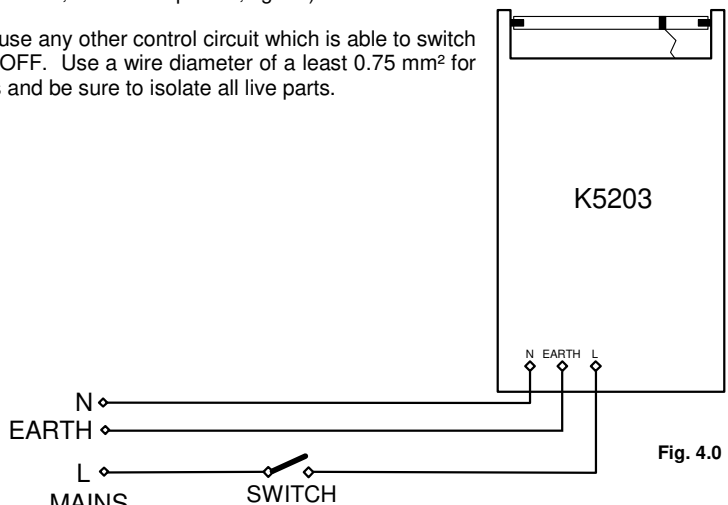


Fig. 4.0

Automatic control with our four channel multifunction runninglight (K5200) :

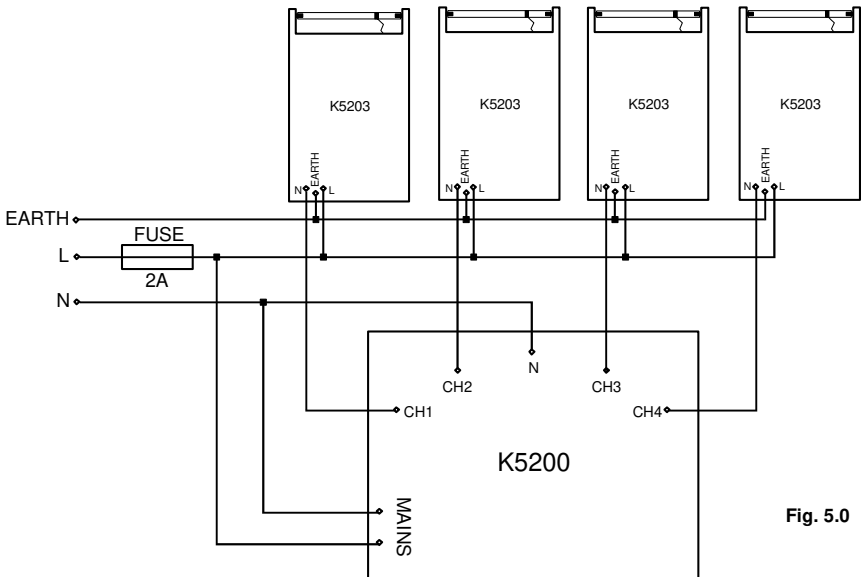


Fig. 5.0

Automatic control with our four channel multifunction runninglight (K8032) :

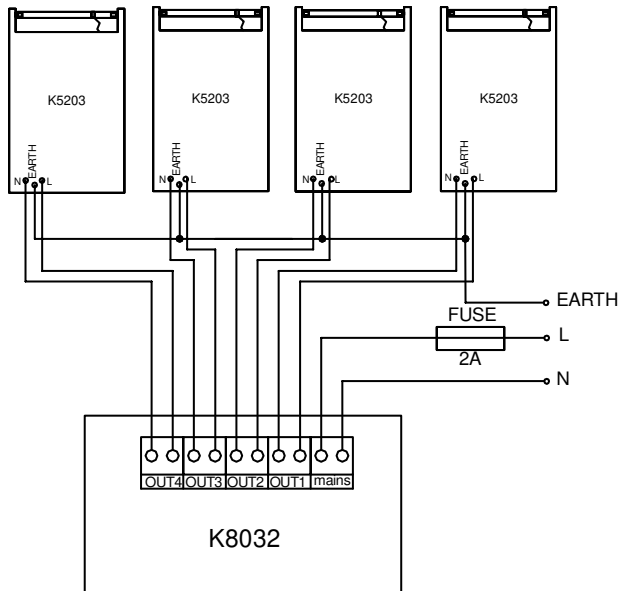


Fig. 6.0

Automatic control with our lightcomputer (K5201) :

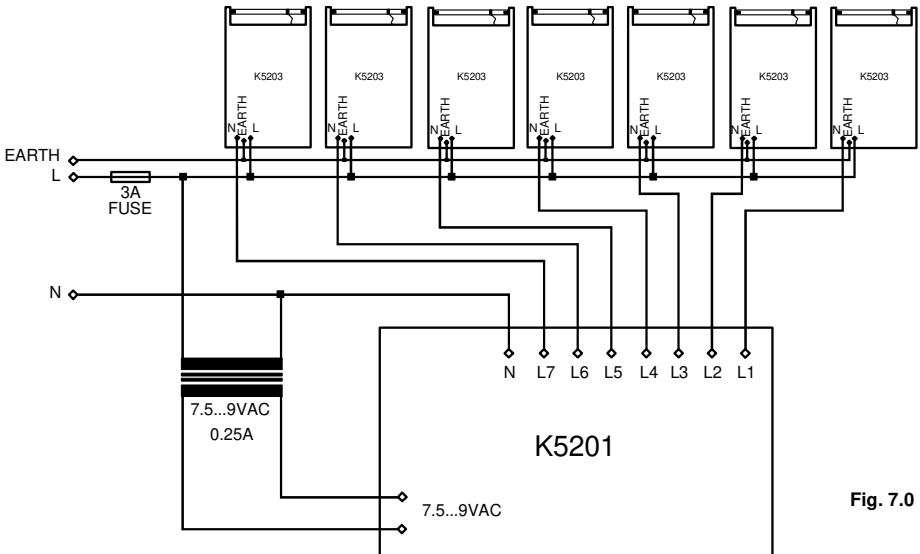
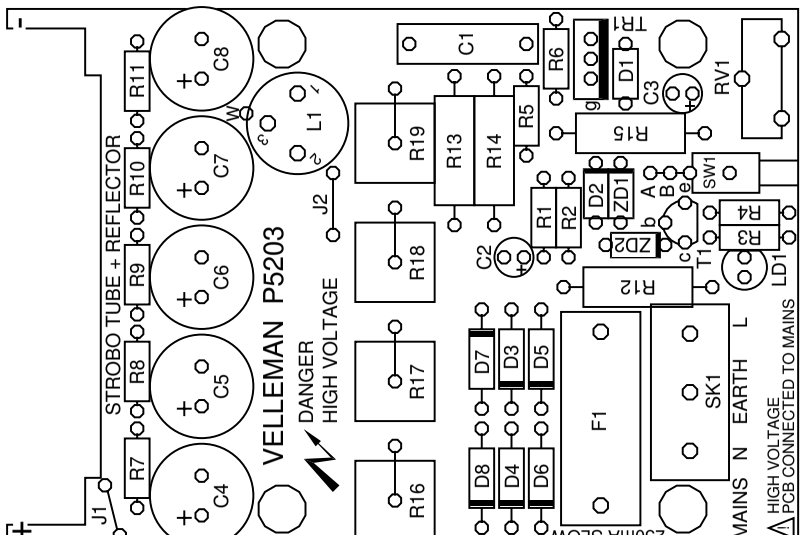
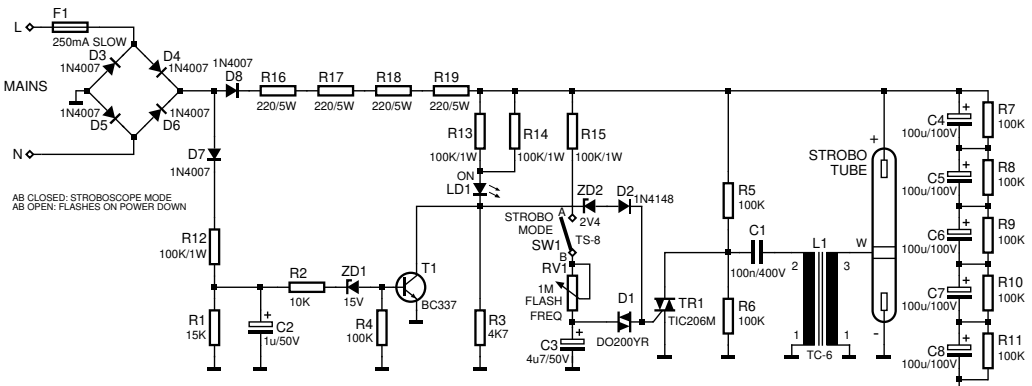


Fig. 7.0

23. PCB layout.



24. Diagram


L
F1
250mA SLOW
MAINS
N
D3
1N4007
D4
1N4007
D5
1N4007
D6
1N4007
D8
1N4007
D7
1N4007
AB CLOSED: STROBOSCOPE MODE
AB OPEN: FLASHES ON POWER DOWN
R16
220/5W
R17
220/5W
R18
220/5W
R19
220/5W
R13
100K/1W
R14
100K/1W
R15
100K/1W
ON
LD1
ZD2
2V4
D2
1N4148
STROBO
MODE
SW1
TS-8
A
B
RV1
1M
FLASH
FREQ
D1
DO200YR
TR1
TIC206M
R5
100K
R6
100K
C1
100n/400V
L1
TC-6
STROBO
TUBE
C4
100u/100V
C5
100u/100V
C6
100u/100V
C7
100u/100V
C8
100u/100V
R7
100K
R8
100K
R9
100K
R10
100K
R11
100K
R12
100K/1W
R1
15K
R2
10K
ZD1
15V
T1
BC337
R4
100K
R3
4K7
C2
1u/50V
C3
4u7/50V

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