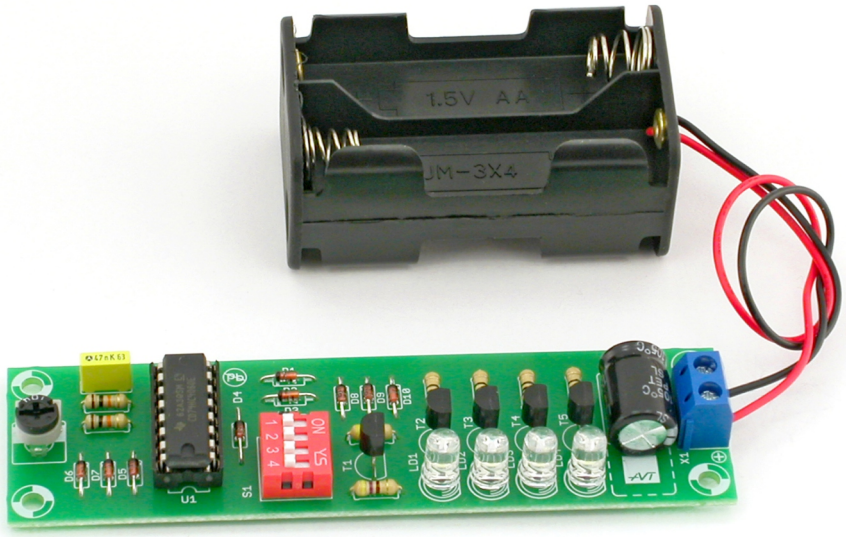
KITS EDUCATIONAL ELECTRONIC

AVT 747
Disco strobe lamp



The generated effect of strong flashes of white light is realized by super-bright LEDs, thanks to which the module can be powered by battery. The strobe lamp is easy to assemble and does not require any additional commissioning activities.

Specifications

- source of light – white, super bright LEDs
- the light effect is selected by a switch
- adjustable frequency of light flashes
- low power consumption
- supply voltage: 4-6V DC (4×AA battery)

Functional description

The schematic diagram of the strobe lamp is shown in Figure 1. The LD1-LD4 diodes are powered by current sources with transistors T2-T5. The amplitude of the pulses occurring on the basis of T1 transistor is limited to around 2V with diodes D8-D10. During operation, the sum of voltage drops on diodes D8 and D9 is similar to the sum of voltage UBE of transistor T1 and each of transistors T2- T5. As a result, at the time of the presence of a T1-based pulse, on each of the resistors R5-R8 there is a voltage of about 0.6V. This voltage is practically independent of the supply voltage, which means, that the current of the LEDs during the lighting does not depend on the supply voltage and it is approximately 0.6V/R5.

For the given resistances R5...R8 the current of each diode is approximately 60mA. Four ultra-bright LEDs working with such a high current give a very strong flash of light, comparable to the flash of a typical stroboscope with a xenon lamp.

Usually white and blue LEDs have a conduction voltage greater than 3V, and at such a high current it can be higher than 3.5V. The resistors R5-R8 have a drop of 0.5- 0.6V, and the saturation voltage of transistors T2-T5 can be smaller than 0.1V. As a result, the lamp achieves the set parameters at the supply voltage of 4.5V. To reduce saturation voltage and UBE voltage, BC338 transistors with maximum collector current of 1A were used.

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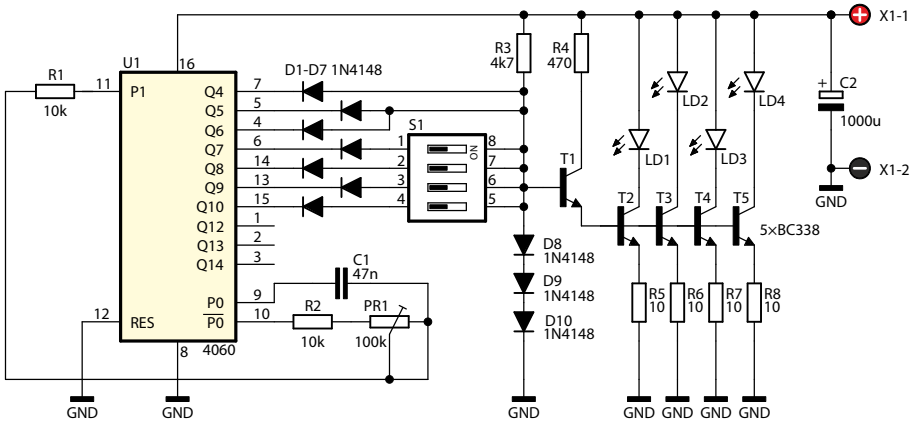

Figure 1. Schematic diagram

Assembly and test

The assembly diagram of the strobe lamp is shown in Figure 2. The assembly is typical and should not cause problems. It starts with soldering resistors and it ends with soldering electrolytic capacitors, LED diodes, U1 socket, connectors and switch. The lamp works immediately after turning on the power. The frequency of strobe light flashes can be set using the PR1 potentiometer, and the light effect is controlled by the S1 switch. It is worth to check all 16 settings.

The lamp can be supplied with voltage from 3.5V, but the optimal results are obtained with a supply voltage of 4.5-6V. The lamp can be powered from the power supply, but the low power consumption allows supply form battery, which increases the practical use of the stroboscope lamp. A set of four AA alkaline batteries is sufficient for several dozen hours of stroboscope operation.

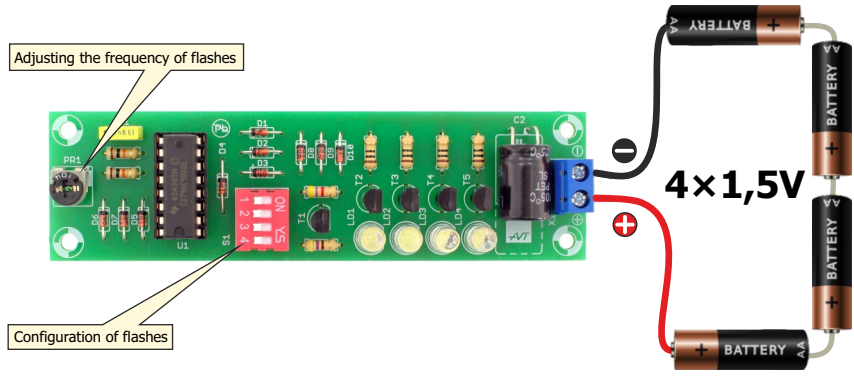

Figure 2.

Start off by soldering the printed circuit elements in order from smallest to largest. The unit assembled flawlessly, using the supplied components will operate immediately after switching on the power supply.

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Component list

Resistors:

R1, R2:.....10kΩ (black-red-orange-gold)
R3: .....4,7kΩ (yellow-violet-red,-gold)
R4: .....470Ω (Yellow-violet-brown-gold)
R5-R8: .....10Ω (brown-black-black-gold)
PR1:.....trimmer potentiometer 100kΩ

Capacitors:

C1: .....47nF (also marked as 473)
C2: .....1000uF !

Semiconductors:

D1-D10:.....1N4148 !
T1-T5:.....BC337 or BC338 !
LD1-LD4: .....LED diode white
U1:.....74HC4060 IC with 16-pin IC socket !

Others:

S1:.....DIP Switch
X1: .....2-pin terminal block connector
Battery holder 4×AA (R6) (red wire ⊕ ; black wire ⊖)

While assembling the components marked with an exclamation mark attention should be paid to their polarity. Symbols of the components on the PCB as well as photos of assembled sets may come in useful. To access high-resolution images, download the PDF file.

http://bit.ly/2toPzuq

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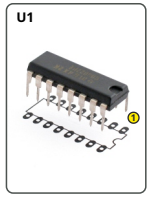
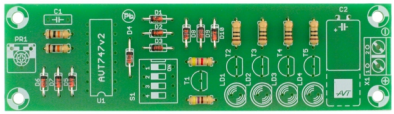


Warning! The module should not be powered by a voltage higher than 6V!

Assembly in 4 steps

1 Solder resistors R1-R8 and diodes D1-D10



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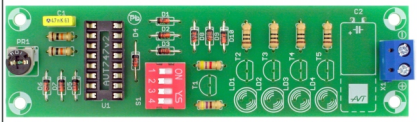
2 Solder IS socket, DIP Switch, capacitior C1, trimmer potentiometer and connector X1



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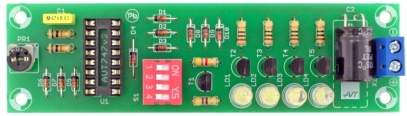
3 Solder transistors T1-T5 and LED diodes



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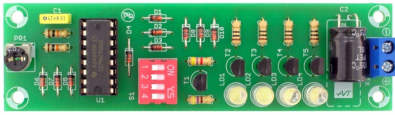
4 Insert chip in to socket and screw the battery holder (red wire ⊕ ; black wire ⊖)



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Notes

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• Battery or wall-adaptor are safe devices. They do not require special attention unless main voltage is connected to an output e.g. a relay.
• If the kit is used to switch currents greater than 24V it is necessary to have the installation and performed by a trained professional authorized for such work. The kit may only be used in such application if it was installed in a safe to touch enclosure.
• Never exceed the limits or ratings listed in the 'Specifications' section at the this user guide.
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• The product itself and all parts thereof (including packing material) are not suitable toys for childern! (choking hazard, risk of electric shock, ...)

Failures in modern electronic component are very rare as 95% of non-working kits are due to poor soldering or components placed in the wrong location or orientation so please check your work carefully.

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