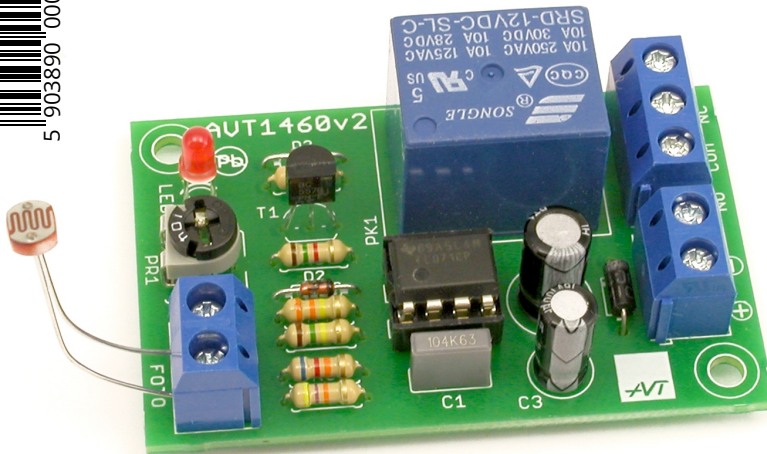
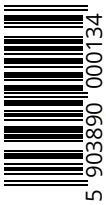




Twilight switch automatically switches on and off the lighting of your home, garden or other place. When it gets dark, the device switches on the output relay. The twilight switch is equipped with circuitry that eliminates the possibility of oscillation if the illumination level is at the operating threshold.

Specifications

- photo resistor as a light sensor
- adjustable sensitivity
- hysteresis eliminates oscillations when the lighting is at the operating threshold
- active status indication with LED
- output relay with contacts 230V AC, 8A
- power supply: 12-15V DC

Functional description

Schematic of the twilight switch is shown in Figure 1. It is based on the TL071 operating amplifier working as a comparator. The TL071 compares the voltage from the potentiometer PR1 to the voltage from a resistive divider made up of a resistor R3 and a photoresistor. The decrease in the intensity of light incident on the photoresistor causes an increase in the voltage on the pin 2 of the operational amplifier U1. If the voltage on the pin 2 will be higher than the voltage on the pin 3, the amplifier output voltage appears, causing conduction of the transistor T1 and switching on the relay RL1.

The PR1 potentiometer allows for adjusting the sensitivity threshold over a wide range. The C3 capacitor eliminates the possibility of oscillation if the illumination level is at the operating threshold. Relay contacts are switched on at dusk and off at dawn. Using the changeover contacts can reverse the operation of the device. The high load capacity of the relay contacts enables the switch to be used in a variety of applications. The switch can be powered by 12V DC from any AC adapter or a battery.



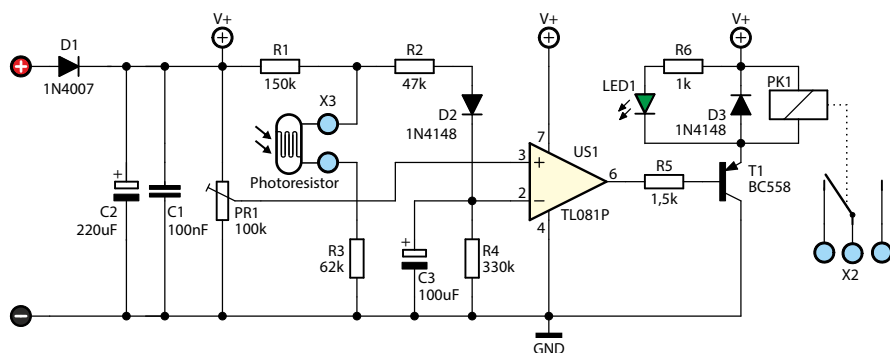


Figure 1. Schematic diagram

Assembly and test

The assembly is typical and should not cause the problems. It runs in standard way starting from the smallest components and ending with the largest ones.

The device assembled from the tested components does not require any adjustment

and operates immediately after the power is turned on. The twilight switch will not only be used for lighting control but also in photography, modeling and other applications. In the active mode twilight switch consumes a current of approximately 100mA.

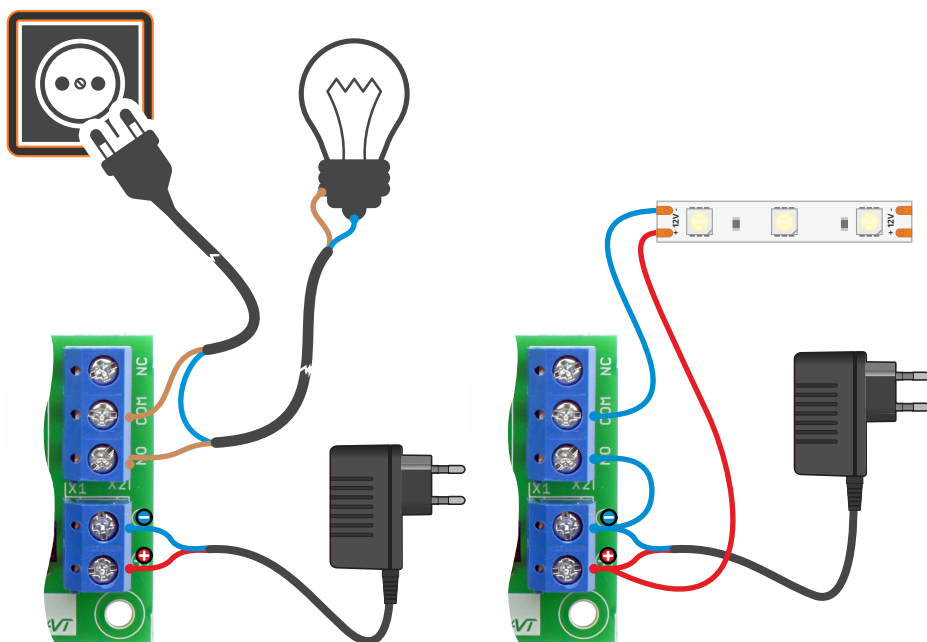


Figure 2. Connection example



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.

Component list

Resistors:

- R1:150k Ω (brown-green-yellow-gold)
R2:47k Ω (yellow-red-orange-gold)
R3:62k Ω (blue-red-orange-gold)
R4:330k Ω (orange-orange-yellow-gold)
R5:1,5k Ω (brown-green-red-gold)
R6:1k Ω (brown-black-red-gold)
FR:photoresistor
PR1:trimmer potentiometer 100k Ω

Capacitors:

- C1:100nF (marked as 104)
C2:220 μ F !
C3:100 μ F !

Semiconductors:

- D1:1N4007 or similar !
D2, D3:1N4148 or similar !
D4:LED diode
T1:BC557 (BC558) !
U1:TL081 (TL061, TL071)

Others:

- X1, X3:2-pin terminal block connector
X2:3-pin terminal block connector
PK1:relay

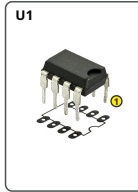
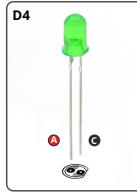
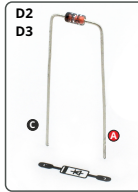
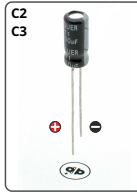


While assembling the components marked with an exclamation mark attention should be paid to their polarity. Symbols of the components on the PCB as well as photos of assembled sets may come in useful. To access high-resolution images, download the PDF file.

<http://bit.ly/2JYmoFM>

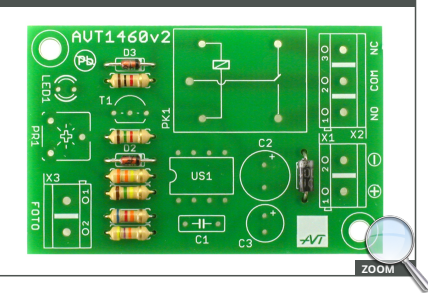


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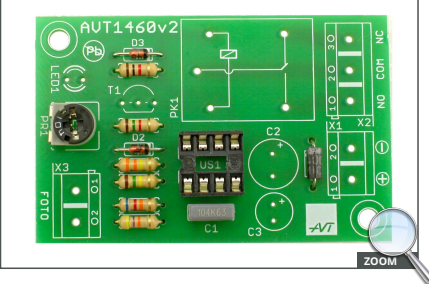


Assembly in 4 steps

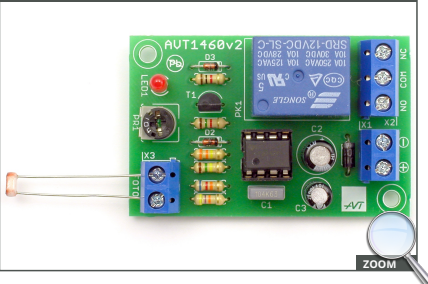
1 Solder resistors R1-R6 and diodes D1-D3



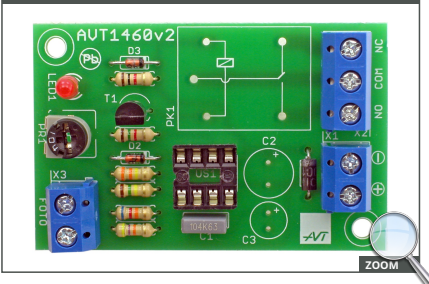
2 Solder IC socket, capacitor C1 and trimmer potentiometer PR1



4 Solder capacitors C2, C3, relay PK1, insert chip into socket, screw the photoresistor to X3



3 Solder transistor T1, LED diode and connectors



AVT 1460

Twilight switch

DIFFICULTY
LEVEL





- 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.
- If the kit is used in schools or educational facilities or similar institutions the operation must be supervised by trained and authorized staff.
- The product itself and all parts thereof (including packing material) are not suitable toys for children! (choking hazard, risk of electric shock, ...)

DIFFICULTY LEVEL



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KITS

Leszczynowa 11 Street,
03-197 Warsaw, Poland
<http://avtkits.com/>



This symbol means do not dispose of your product with your other household waste. Instead, you should protect human health and the environment by handing over your waste equipment to a designated collection point for the recycling of waste electrical and electronic equipment.

AVT SPV reserves the right to make changes without prior notice.

AV1-SPV reserves the right to make changes without prior notice.

Assembly and connection of the device not in accordance with the instructions, unauthorized modification of components and any structural modifications may cause damage to the device and endanger the person using it. In this case, the manufacturer and its authorized representatives shall not be liable for any damages arising directly or indirectly from the use or malfunction of the product.