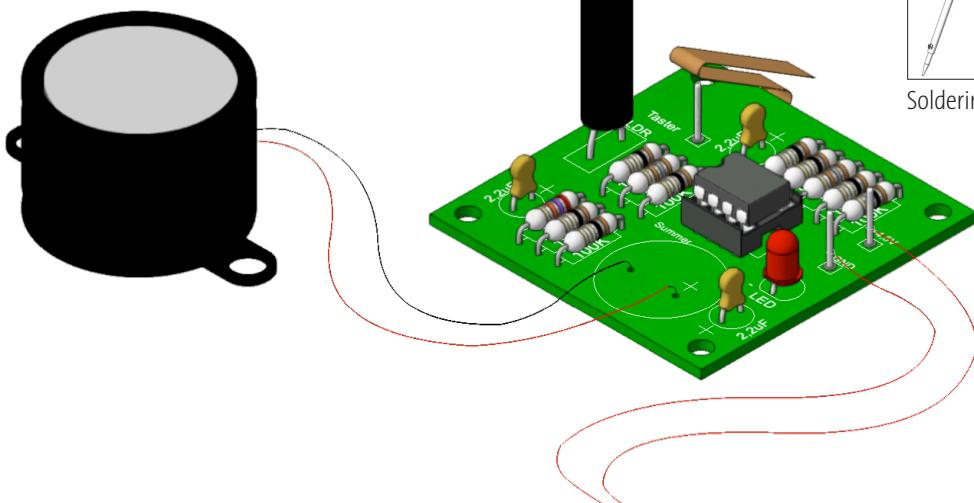
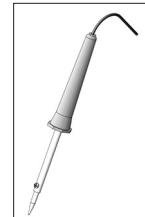


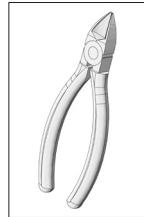
Circuit Board Kit Motion Detector



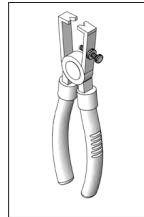
Tools Required:



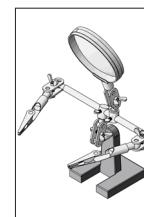
Soldering Iron



Side Cutter



Wire Strippers



Soldering Assistant



Bending Pliers

Please Note!

The OPITEC range of projects is not intended as toys for young children. They are teaching aids for young people learning the skills of Craft, Design and Technology. These projects should only be undertaken and operated with the guidance of a fully qualified adult. The finished projects are not suitable to give to children under 3 years old. Some parts can be swallowed. Danger of suffocation!

Parts List	Quantity	Size (mm):	Description	Part No.
Circuit board for motion detector	1	40x40	Circuit Board	1
Resistor 100 KOhm	8		Resistor	2
Resistor 180 Ohm	2		Resistor	3
Resistor 27 kOhm	1		Resistor	4
Electrolytic capacitor 2,2 uF	3		Elko	5
Solder nail	5		Solder nail	6
LED red	1		LED Diode	7
IC socket 8-pole	1		Socket IC	8
Integrated Circuit (IC)	1		Integrated Circuit (IC)	9
Photoconductive cell	1		Photoconductive cell	10
Bougie tube	1		Cover photoconductive resistor	11
Bronze strip	1		Switch	12
Mini Buzzer	1		Buzzer	13
Electrical Wire Red	1		Battery Connector	14

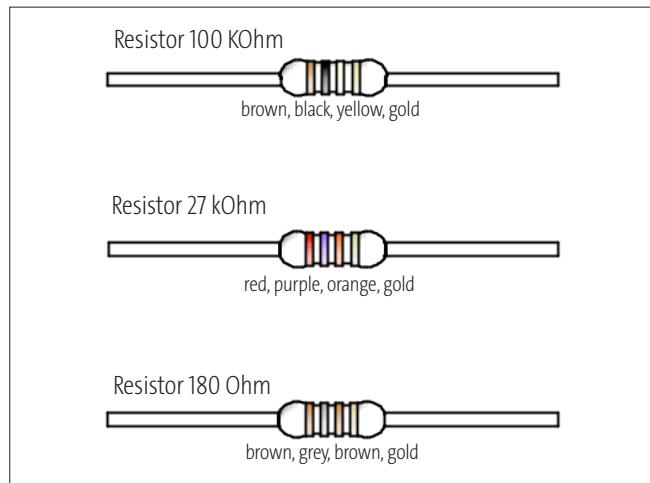
Instruction 110187

Circuit Board Kit Motion Detector

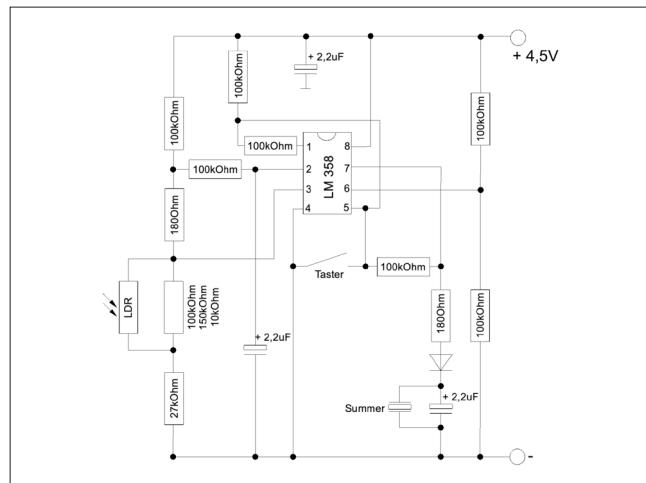
International colour code for exact determination of the individual resistance:

colour ring	1. ring	2. ring	3rd ring (multiplier)	4. ring (tolerance)
black	0	0	1	Colour:
brown	1	1	10	brown 1%
red	2	2	100	red 2%
orange	3	3	1000	gold 5%
yellow	4	4	10000	silver 10%
green	5	5	100000	without 20%
blue	6	6		
purple	7	7	1000000	
grey	8	8		
white	9	9	0,1	
gold	-	-	0,01	
silver	-	-		

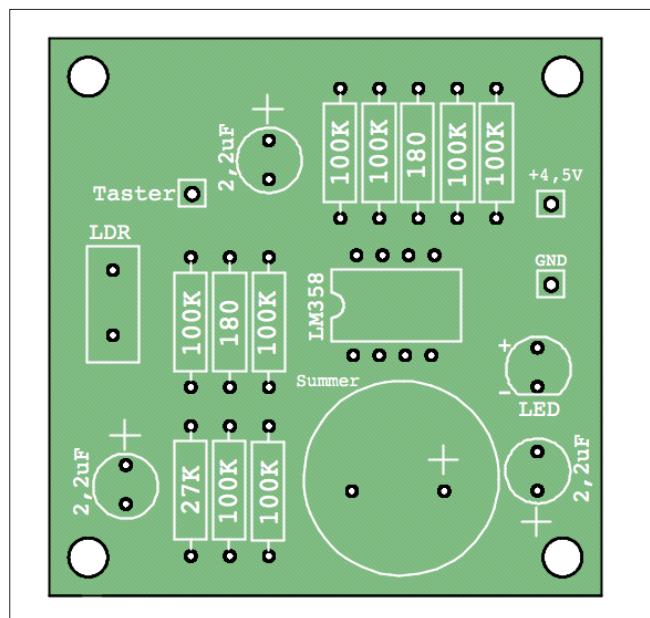
Kit included resistors:



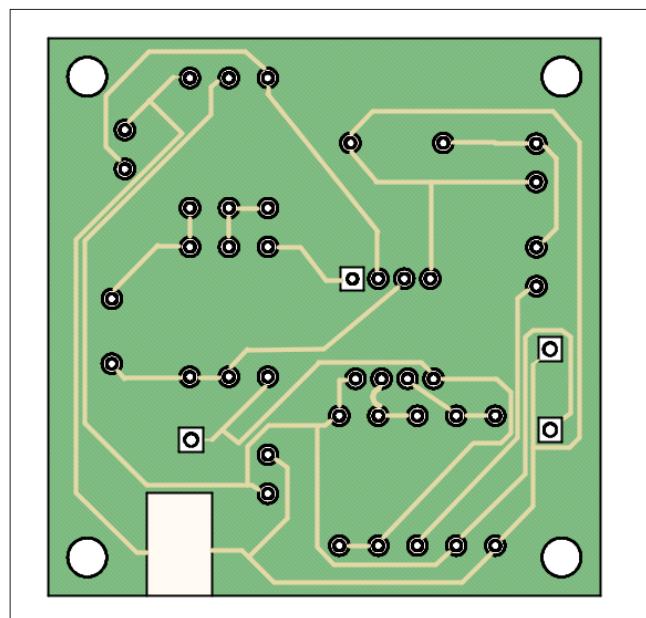
Circuit diagram:



top view (assembly plan)



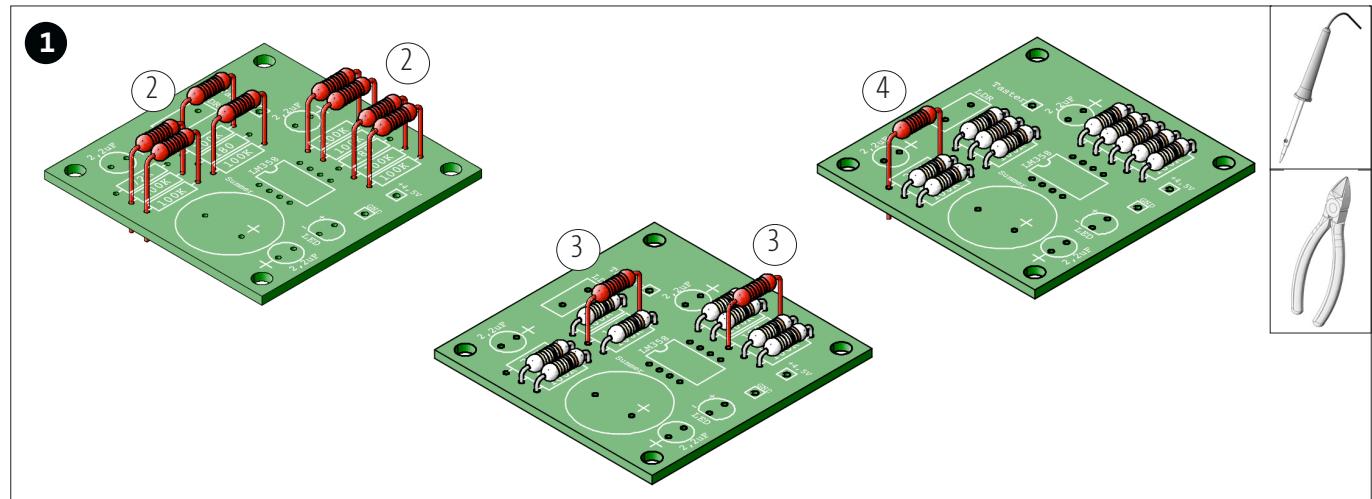
bottom view (layout)



Instruction 110187

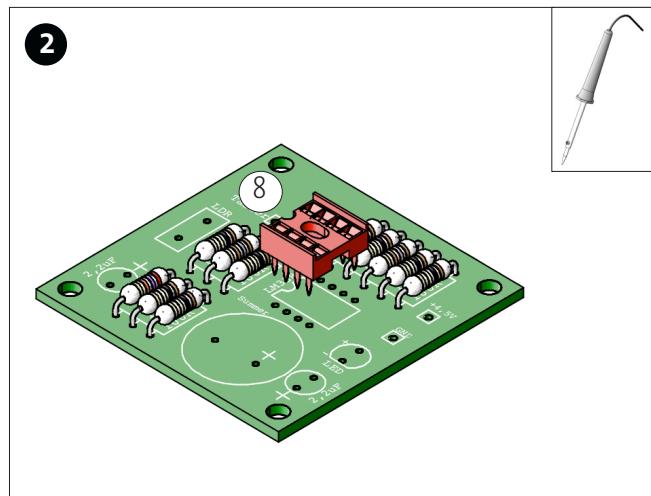
Circuit Board Kit Motion Detector

Soldering of the individual components:

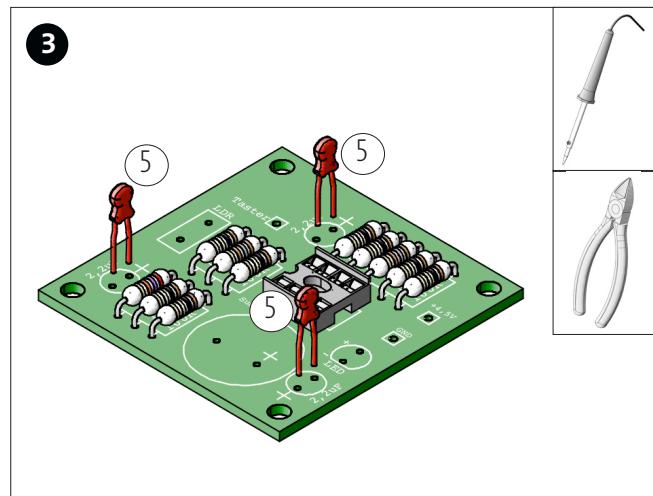


Solder the 8 resistors (2, 100 kOhm), the 2 resistors (2, 180 ohms) as well as the resistor (4, 27kOhm) as shown. Kick off protruding legs after soldering.

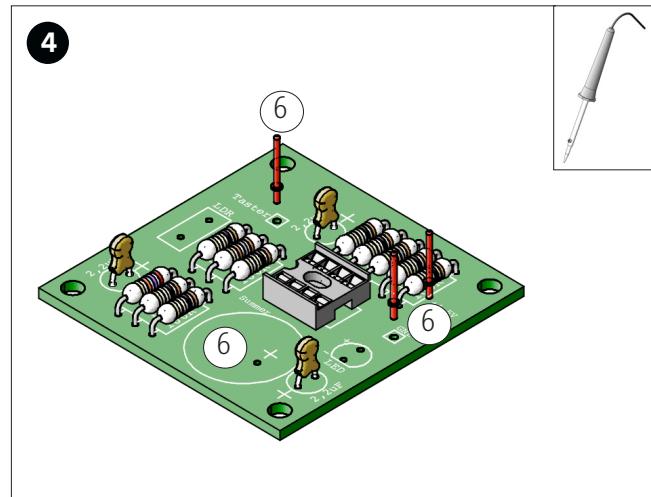
Note: The resistors are on the board!



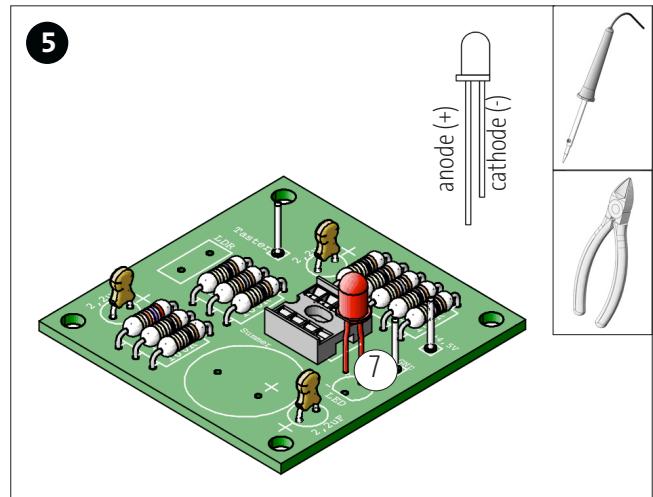
Solder in the IC socket (8). 1 Note: Note 2 Mounting direction!



Solder in the electrolytic capacitors (5) at the provided slots and shorten the protruding legs.



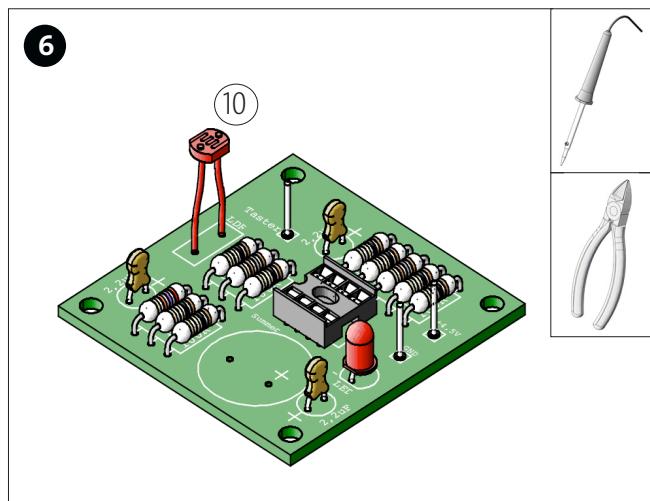
Solder three soldering nails (6) to the intended slots.



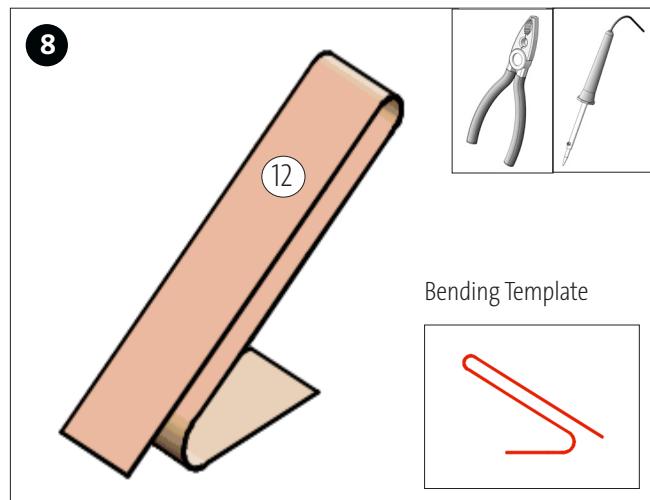
Solder the LED (7) and cut the protruding legs.

Note: Do not confuse 1 anode and cathode!

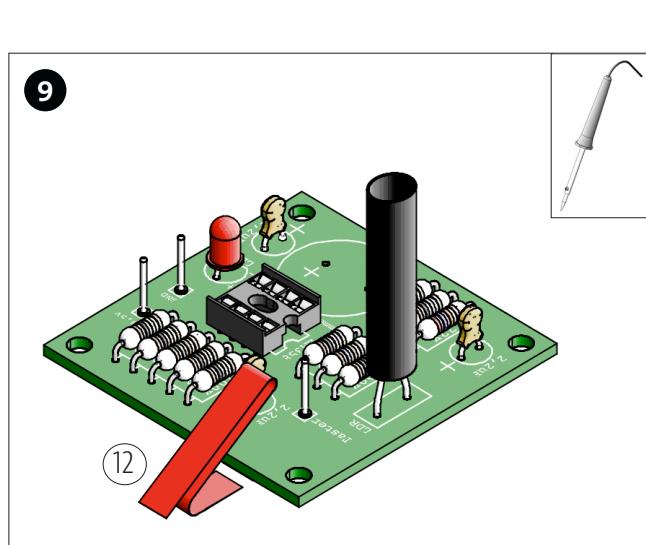
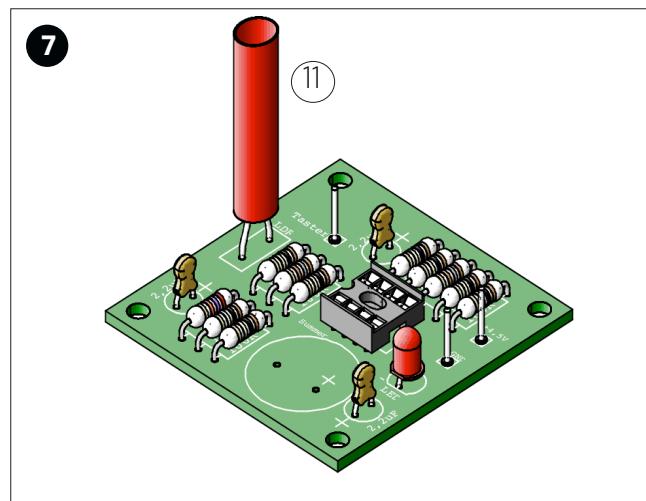
Instruction 110187
Circuit Board Kit Motion Detector



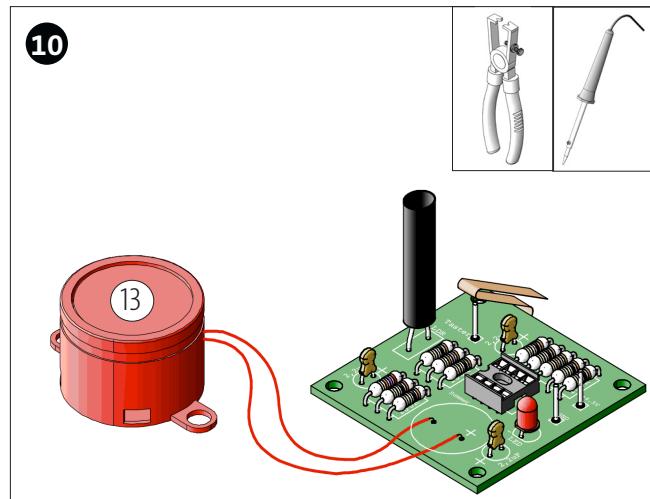
Solder in the photo resistor (10) at the intended slot. Cut off protruding legs.



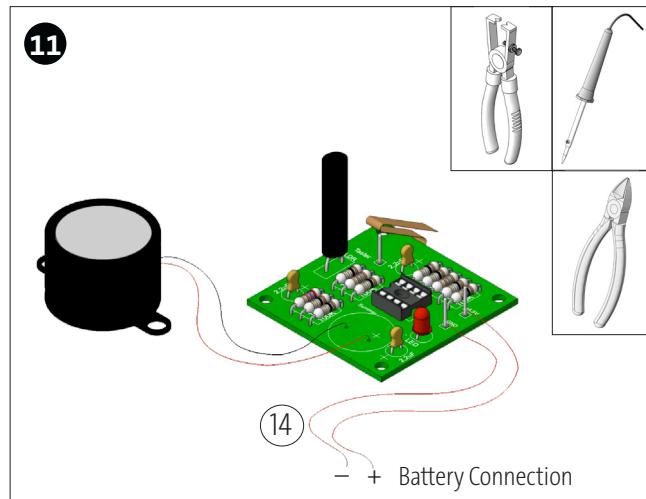
Bend the bronze strip (12) according to the bending template.



Solder the button (12) at the intended position on the underside of the board as shown.

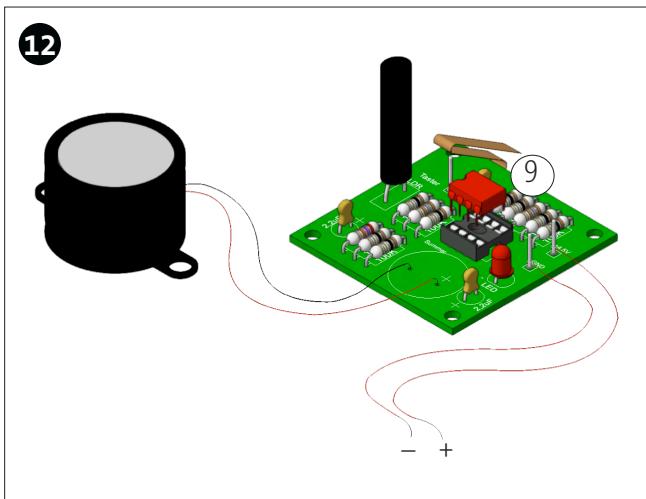


Solder the yellow wire of the buzzer (13) to the + pole and the black cable to the pole as shown.



Cut two sufficiently long pieces from the stranded wire (14) and strip and tin them on both sides. Solder one end of each cable to a solder nail.

Instruction 110187
Circuit Board Kit Motion Detector



Insert the IC (9) into the IC socket before connecting it to the battery.
Note: Pay attention to the insertion direction!

Description of the function:

An operating voltage of 4.5 V must be applied to the motion detector (observe polarity).
A movement in front of the LDR leads to an alarm function.

The heart of the motion detector is a double operation amplifier. One part of the operating room is used for detecting the movement, the other part for maintaining the alarm function.

Both parts work here as switches, ie the output of the OP switches to positive if the voltage at the positive input is higher than at the negative input and to minus when the positive input is at a lower voltage than at the minus input. The voltage divider in which the LDR is located is constructed in such a way that the voltage at the plus input of the OP in idle state is always lower than at the minus input, ie the output = minus.

If the LDR is darkened, the voltage increases at both inputs of the OP, but at the minus input slower, since this input is preceded by a capacitor $2.2 \mu\text{F}$. If the dimming is correspondingly fast, a higher voltage may be present at the positive input for a short time than at the negative input and the output switches to positive for this duration. The second OP stage stores this pulse and supplies the signal generator with the operating voltage of 1.5 V.

By pressing the key you can clear the signal again.

The advantage of this circuit is that slow brightness changes (daily fluctuations) are not perceived.

By changing the parallel resistor ($10 \text{ k}\Omega \dots 150 \text{ k}\Omega$) to the LDR, the circuit can be adapted to the existing lighting conditions.