



BASICS OF PHOTORESISTOR

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Abstract

In this SOP, the basic operations and functions of the photoresistor are discussed. The ways to code, construct, and adjust photoresistors through Arduino are included.



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1 Principle of Operation of Photoresistor

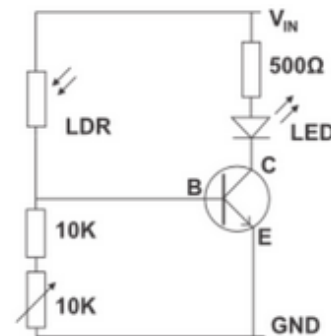
A photoresistor is a type of resistor whose resistance decreases as the intensity of light increases. Photoresistors are also referred to as LDR (Light Dependent Resistor), semiconductor photoresistors, photoconductors, or photocells. Photoresistor changes its resistance only when it is exposed to light.[1]

2 Applications of Photoresistor

2.1 Light Sensor

In the circuit on the right, the LED lights up when the intensity of the light reaching the LDR resistor is sufficient so that the base pin of the PNP transistor can be triggered.

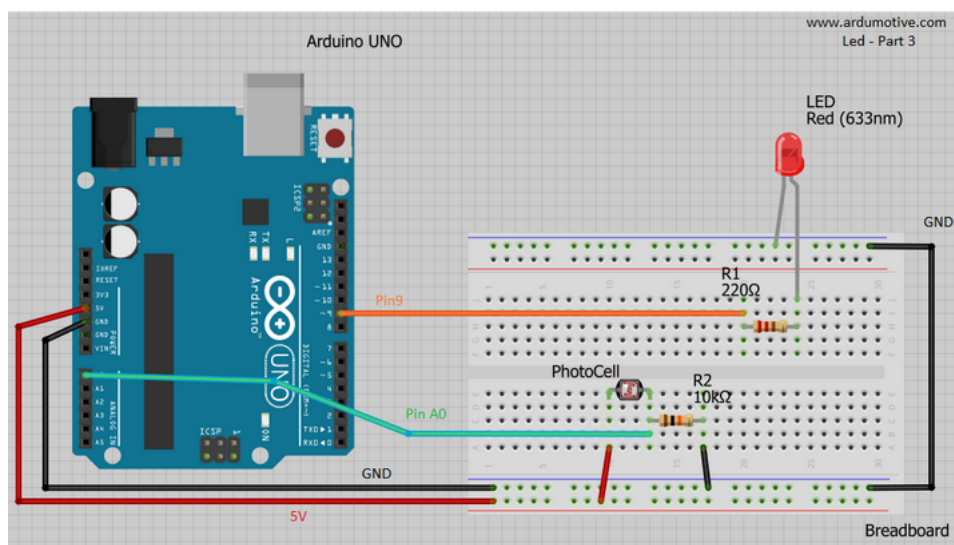
- If the LDR light is below the threshold intensity, the LED will remain in the off-state.
- If the the LDR light is above the threshold intensity, the LED will turn on.



2.2 Audio Compressors

Audio compressors are devices that reduce the audio amplitude when the amplitude of the signal is above a set value. Some compressors use an LDR and a small lamp (LED) connected to the signal source to create changes in signal gain. [2]

3 Photoresistor Using Arduino Code



1. Create a Circuit with ping A0 connecting to the photoresistor, and ping 9 connecting to the LED.
2. Connect the photocell with a 10K ohm resistor and the LED with a 220 ohm resistor.

Then, Run the following code on your Arduino [3]:

```
const int pResistor = A0; // Photoresistor at Arduino analog pin A0
const int ledPin=9;      // Led pin at Arduino pin 9
int value;               //Variables

void setup(){ // Store value from photoresistor (0-1023)
  pinMode(ledPin, OUTPUT); // Set ledPin - 9 pin as an output
  pinMode(pResistor, INPUT);
  // Set pResistor - A0 pin as an input (optional)
}

void loop(){
  value = analogRead(pResistor);
  if (value > 25){ //You can change value "25"
    digitalWrite(ledPin, HIGH); //Turn led off
  }else{
    digitalWrite(ledPin, LOW); //Turn led on
  }
  delay(500); //Small delay
}
```

3.1 How Does the Code Work?

1. Read analog value from the photoresistor.

```
Value = analogRead(pResistor)
```

2. Check if the value is bigger than a value e.g. 25.

```
If(value >25){
```

3. Send a command to turn on the LED if the value is above 25, and remain off if the value doesn't go through that threshold.

```
    digitalWrite(ledPin, HIGH); //Turn led off
  }else{
    digitalWrite(ledPin, LOW); //Turn led on
  }
```

REFERENCES

- [1] Photoresistor- definition, working, types and applications (physics-and-radio-electronics.com). <https://www.physics-and-radio-electronics.com/electronic-devices-and-circuits/passive-components/resistors/photoresistor.html#:~:text=A%20photoresistor%20is%20%20a%20type%20of%20resistor,photoresistor%20increases%20when%20the%20intensity%20of%20light%20increases.>
- [2] Resistor types: Photoresistor.
<https://eepower.com/resistor-guide/resistor-types/photo-resistor/#:~:text=Typical%20Applications%20for%20Photoresistors,lights%20and%20photography%20light%20meters.>
- [3] How to use a photoresistor - arduino tutorial.
<https://www.instructables.com/How-to-use-a-photoresistor-or-photocell-Arduino-Tu/>.