

Lesson 17 Photoresistor

Overview

In this lesson, we will learn how to measure the light intensity by photoresistor and make the measurement result displayed in the screen.

Requirement

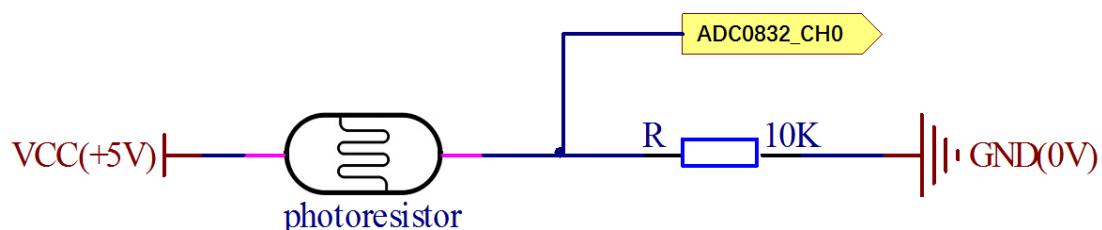
- 1* Raspberry Pi
- 1* ADC0832
- 1* Photoresistor
- 1* 10K Ω Resistor
- 1* Breadboard
- Several Jumper wires

Principle

A photoresistor is a light-controlled variable resistor. The resistance of a photoresistor decreases with the increasing incident light intensity; in other words, it exhibits photoconductivity. A photoresistor can be applied in light-sensitive detector circuits.

A photoresistor is made of a high resistance semiconductor. In the dark, a photoresistor can have a resistance as high as a few megohms ($M \Omega$), while in the light, a photoresistor can have a resistance as low as a few hundred ohms. If incident light on a photoresistor exceeds a certain frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electrons (and their hole partners) conduct electricity, thereby lowering resistance. The resistance range and sensitivity of a photoresistor can substantially differ among dissimilar devices. Moreover, unique photoresistors may react substantially differently to photons within certain wavelength bands.

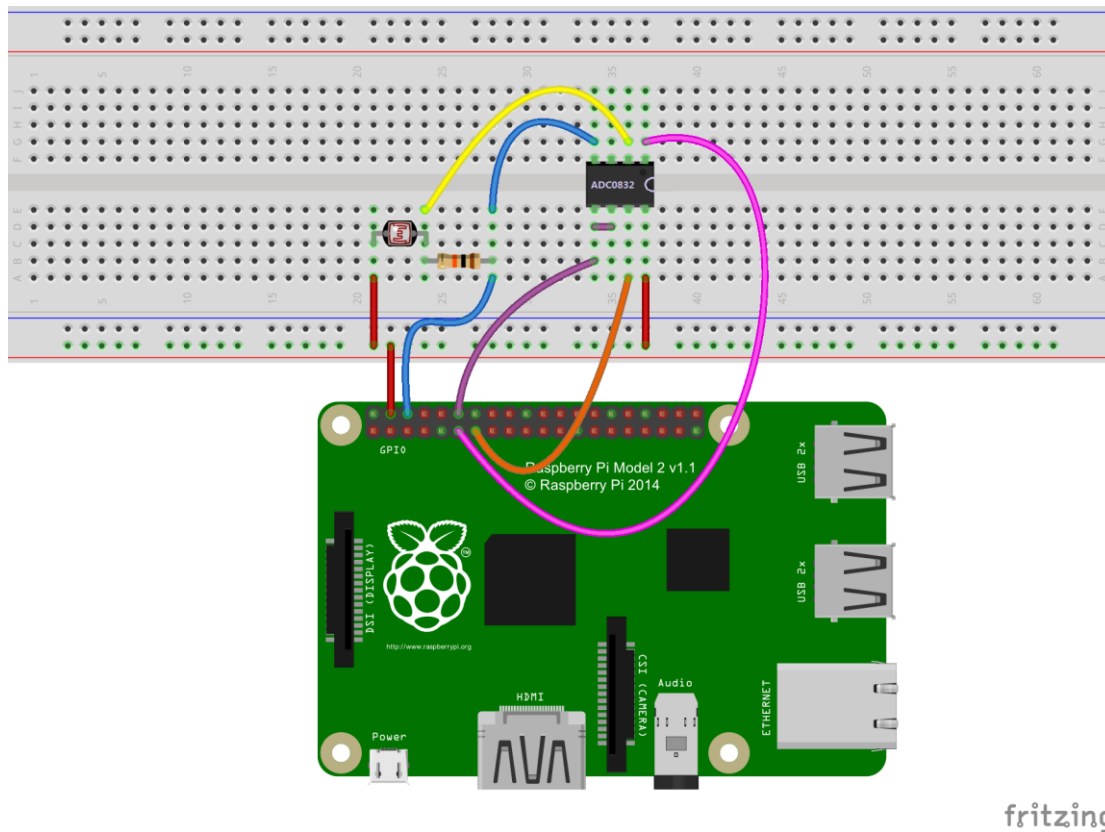
The schematic diagram of this experiment is shown below:



With the increase of the light intensity, the resistance of photoresistor will be decreased. The voltage of GPIO port in the above figure will become high.

Procedures

1. Build the circuit



2. Program

C user:

2.1 Edit and save the code with vim or nano.

(Code path: /home/Adeept_Ultimate_Starter_Kit_C_Code_for_RPi/17_photoresistor/photoresistor.c)

2.2 Compile the program

```
$ gcc photoresistor.c -o photoresistor -lwiringPi
```

2.3 Run the program

```
$ sudo ./photoresistor
```

Python user:

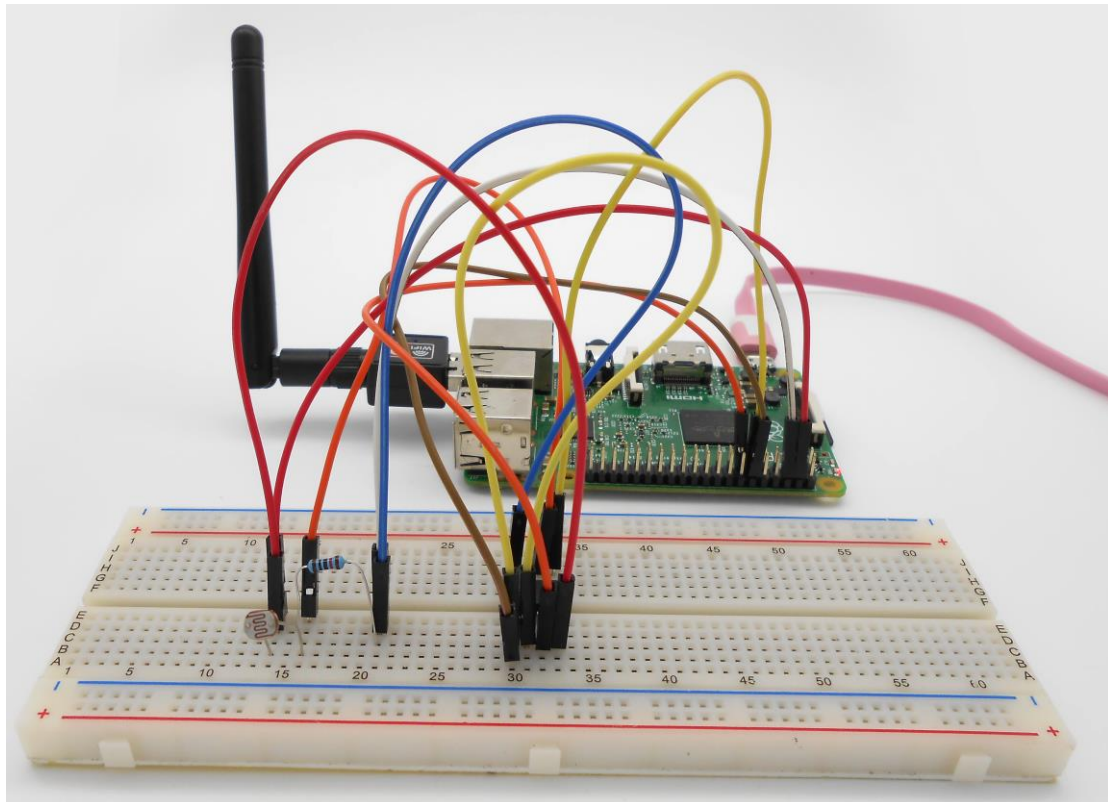
2.1 Edit and save the code with vim or nano.

(Code path: /home/Adeept_Ultimate_Starter_Kit_Python_Code_for_RPi/17_photoresistor.py)

2.2 Run the program

```
$ sudo python 17_photoresistor.py
```

Now, when you try to block the light towards the photoresistor, you will find that the value displayed in the screen will be reduced. Otherwise, when you use a powerful light to irradiate the photoresistor, the value displayed will be increased.



Summary

By learning this lesson, we have learned how to detect surrounding light intensity with the photoresistor. You can play your own wisdom, and make more originality based on this experiment and the former experiment.