

Title: *Light Detector*

I. Summary

Light Detectors are used to simply detect light. Within this circuit, whenever you place your finger on top of the light dependent resistor in a room that contains light, the LED will turn off. On the other hand, if you turn the room light off and apply light onto the circuit, the LDR will detect light which will allow the LED to become lite.

II. Objective

This project will give individuals the opportunity to setup a Light Detector on a breadboard using a NAND Gate.

III. Industry

Light sensors are using all over the world. Light sensors can be used in robots to allow them to detect the current ambient light level, to determine how dark or bright an environment is. Also, the Robotics Institute at Pittsburgh's Carnegie Mellon University, created and sent a robot to the arctic and desert region of the Earth that uses sunlight to remain charged. The way this robot can see light to remain charged is due to the use of phototransistors (A). Phototransistors are light sensors that allow a circuit to function once light hits it. Also, a few material scientists from the University of California Los Angeles Samueli School of Engineering created designed a robot that is powered and can be steered by the use of light. The named the device the OsciBot due to the tail being about to move by oscillating. The speed of the OsciBot can be controlled by how much light is being used. Above it all, a spot on

the tail will become heated up whenever a light from a laser, for example, hits a spot on the tail. By that being said, due to the spot on the tail being heated up, it will cause the robot to eject some of the water and become smaller in volume and move the tail in the direction of the source of light (B).

IV. Methodology

a. Parts

- i.** Breadboard
- ii.** Power Supply
- iii.** Digital Multimeter
- iv.** Wires
- v.** 7400 IC
- vi.** 330 Ω Resistor
- vii.** 6.8k Ω Resistor
- viii.** Light-emitting diode
- ix.** Light Dependent Resistor

b. Procedure

- i.** Place a wire into the voltage terminal and ground terminal.
- ii.** Connect the power supply with the digital multimeter to set the power supply to 9 volts.
- iii.** Connect the breadboard with ground and the 9 volts.
- iv.** Place the 7400 IC onto the breadboard.
- v.** Connect pin 14 to the voltage and pin 7 to the ground of the 7400 IC.

- vi. The cathode part of the LDR is connect with pin 1 of the 7400 IC and the anode part is connect to the ground.
- vii. The 6.8k resistor it connected to the voltage source and with pin 2 of the 7400 IC.
- viii. The 330 resistor is connected with pin 3 and the anode pin of the LED.
- ix. The cathode pin of the LED is connected to the ground.

V. References and Photos

- a. <https://learn.parallax.com/tutorials/robot/scribbler-robot/navigating-sensors/following-visible-light>
- b. <https://phys.org/news/2019-09-soft-bodied-robot-power.html>
- c. <https://www.youtube.com/watch?v=-JrocsbN49o>



