

DESIGNING SIMPLE SIGNALIZATION IN A VIRTUAL BREADBOARD ENVIRONMENT

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ABSTRACT

This article discusses ways to protect the building from looting and how to develop them. The characteristics of the photoresistor, the operating parameters of the buzzer were studied, and the security system of the room was designed using the Virtual Breadboard program.

Keywords: Photoresistor, buzzer, Arduino, signalization, led, Virtual Breadboard.

INTRODUCTION

Signalization is a set of symbols, devices, or devices used to attract attention, send a message or command, and transmit a signal in a two-way conversation.[1] Signalizations vary depending on the function: to prevent an emergency, to call, to command, to fire, to search, to warn. In this case, the alarm devices are activated by mechanical, hydraulic, pneumatic, electrical, and radio systems. Electrical transmission of signals is one of the most common methods. It is performed automatically and can divide into visual or acoustic types. Visual signalizations include the illumination of a light bulb illumination a mnemonic crash site and more. A fire extinguisher is often used to prevent an accident. Sirens, bells, and beeps are used as acoustic signals.

The most basic signalization consists of one or more sensors to detect intruders and an intrusion warning device. However, a typical room security alarm uses the following components:[1],[5],[9].

- The home control unit (PCU), alarm control panel (ACP), or simply panel: The “brain” of the system, reads touch records, monitors arm/disarm status, and warns of intrusion. In modern systems, this is usually one or more computer circuit boards housed inside a metal housing along with the power supply.

- **Sensors:** Input detection device. The sensor be can be placed around or inside the protected area. Sensors can detect intruders in a variety of ways, such as by observing the opening of doors and windows or by monitoring motionless, sound, vibration, or other disturbances.[5],[9].

- **Warning devices:** This indicates alarm status. Typically, these are bells, sirens, and flashing lights. Warning devices serve the dual purpose of warning of intrusion and intimidating thieves. These devices can also be used to warn passengers of a fire or smoke situation.

- **Keyboard:** Normally small wall-mounted devices based on a human-machine interface system. In addition to keys, keyboard panels typically include indicator lights, a small multi-character display, or both.

- **Based on the interactions between the components.** This can be a direct connection to the control unit or a wireless connection to local power sources.[9].

In addition to the system itself, security signalizations are often combined with surveillance services. If there is an alarm, the room management department will contact the central monitoring station. Station operators will monitor the signal and take appropriate action. For example: contacting property owners, notifying the police, or sending private security forces. Such signals be can be transmitted via special alarm circuits: telephone lines or the Internet. The development of security alarms, which the sensors used also classified according to their function. Mainly used sensors today: hermetically sealed reed switch, passive infrared detectors, infrared detectors, ultrasonic detectors, microwave detectors, compact-surveillance radars, photoelectric beams, glass-refractive detector, smoke, heat, and carbon monoxide detectors, motion sensors, highway alarms, electromechanical(vibration) sensors, ferrous metal detectors, etc.[3],[5].

Depending on the system, the signal output can be local, remote, or combined. Local signalizations do not include surveillance, but internal or external loudspeakers (e.g., motor bell or electronic siren) and lights (strobe light) are useful for alerting people to evacuate during a fire signalization, may or may not intimidate the amateur thief quickly. However, with the widespread use of signalization systems (especially in cars), false signalizations are very common and many city dwellers ignore signals rather than check, let alone contact the appropriate authorities. In rural areas where no one can hear the fire bell or thief siren, the lights or sounds may not make much difference.

Remote signalization systems are used to connect the control unit to some predefined monitor and are available in a

variety of configurations. Connects to high-level systems through a central station or direct telephone wires, cellular network, radio network (GPRS/GSM), our first response via IP (police/fire/medical). In both signalization systems, two of these options are used simultaneously. Signalization monitoring includes not only sensors but also a communication transmitter. Although direct phone chains are still available from phone companies in some places, they are rare due to their high cost and relatively low cost of the appearance of secondary signals.

In the modern signaling market, sensors are nothing an alternative to lasers. Such systems are used-to guard industrial, military, and banking facilities. Laser signaling is not yet widely used in daily life, but it is possible to independently make a fully functional sample or order a ready-made model.

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Create a circuit that works with a simple alarm laser light, which is built to ensure the safety of the room. This type of signalization can be installed at the door of the room where the safes, servers are stored, or at the entrance to the room. This system is programmed so that when someone or something crosses the laser beam, it sends a message to the alarm and the alarm goes off.

You will need:

- Arduino UNO
- Photoresistor
- Buzzer
- Led
- Virtual Breadboard software

The first step is to test the current carrying capacity of the photoresistor by connecting an LED lamp to the photoresistor. This allows you to understand the operating system of the photoresistor.

```
void loop() {  
    int val = analogRead(PIN_PHOTO_SENSOR);  
    Serial.println(val);  
    if (val < 300) {  
        digitalWrite(PIN_LED, LOW);  
    } else {  
        digitalWrite(PIN_LED, HIGH);  
    }  
}
```

By covering the photoresistor can observe the on and off of the LED. Changing the threshold parameter in the code can force the light bulb to turn on / off at different lighting levels.

In the case of the photoresistor level 0, the current does not flow to the LED lamp at all, in the following case, you can see that the LED lamp is not lit (Figure 1).

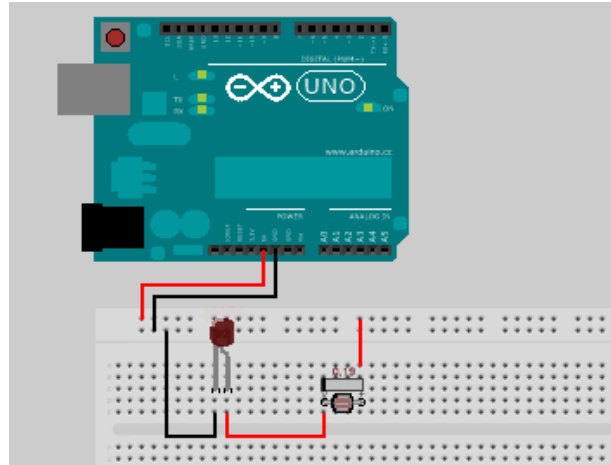


Figure 1. Zero states of the photoresistor

The average level of light emitted by the photoresistor is 2.5 V to the LED lamp, and the LED lamp emits an average amount of light (Figure 2).

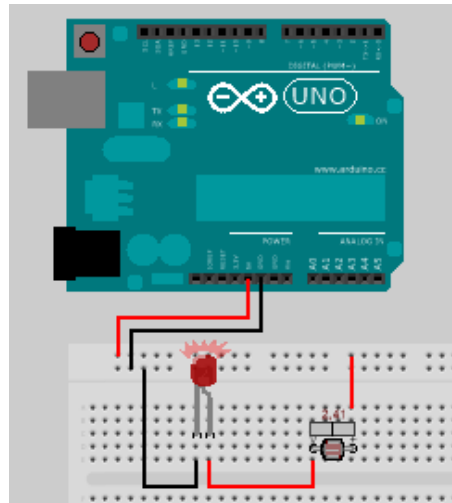


Figure 2. The average state of the photoresistor

At the maximum light output to the photoresistor, the maximum current also flows to the lamp, and the LED lamp emits full light (Figure 3).

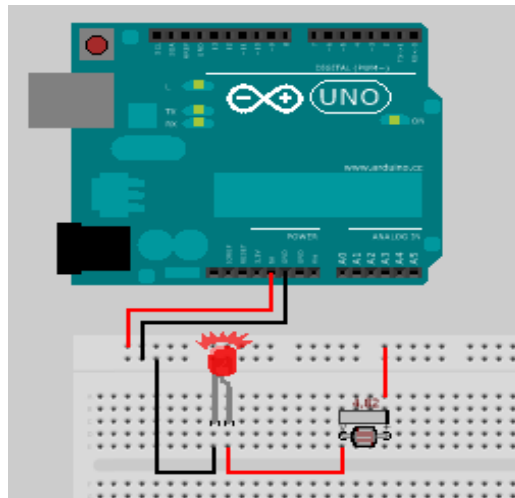


Figure 3. The maximum state of the photoresistor

The next device is to connect the buzzer via the Arduino. The code that records the alarm sound is recorded (Figure 4). Through this, we can program the sound to give an audible message during the signaling process.

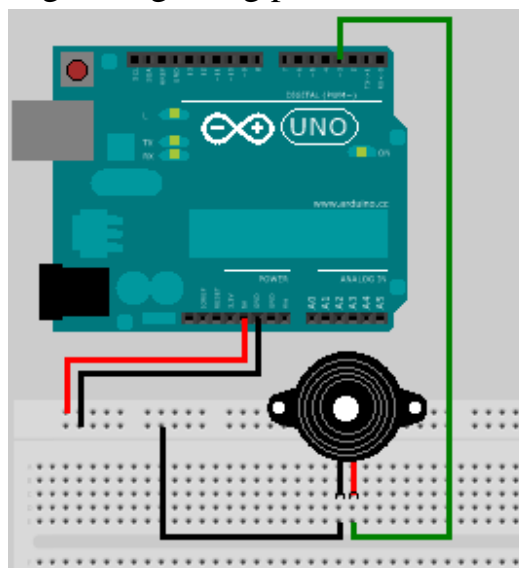


Figure 4. Buzzer's position connected to the Arduino Uno

```
void setup(){  
  pinMode(3,OUTPUT);  
}  
void loop(){  
  analogWrite(3,50);  
  _delay(1000);  
  analogWrite(3,0);  
  _delay(1000);  
}
```

}

A photoresistor buzzer and an LED lamp were used, and now a security system is created by combining them (Figure 5).

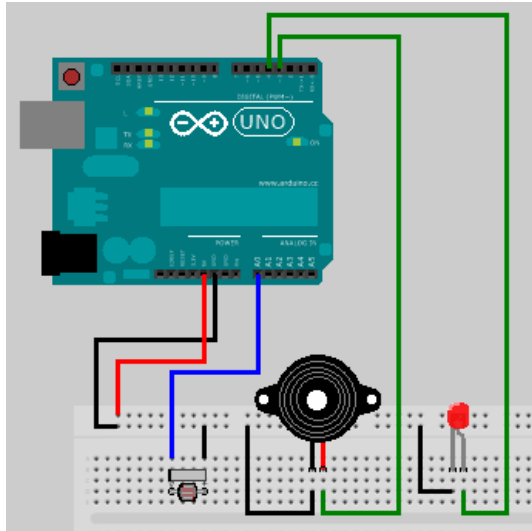


Figure 5. Simple alarm connection diagram in Virtual Breadboard

At first glance, the scheme may seem complicated, but it is not. The alarm is can be assembled on any board, including the Arduino Uno. Instead of LEDs, you can use an LED strip, but at the same time, the power supply for the board will need to be 12 volts, and connect the LED strip not to 5V, but to the Vin Arduino pin. With LEDs, you can use a regular 5-volt phone charger to power the circuit.

```
void setup(){  
  pinMode(A0+0,INPUT);  
  pinMode(3,OUTPUT);  
  pinMode(4,OUTPUT);  
}  
void loop(){  
  if((analogRead(A0+0)) < (50)){  
    analogWrite(3,150);  
    digitalWrite(4,1);  
    _delay(0.5);  
  }  
}
```

CONCLUSION

Signalization: a photoresistor is placed on one side of the entrance to the room, a laser is placed on the photoresistor, and a light beam is formed at the entrance to the

room. When someone or something enters the room, the laser light is cut off, resulting in the light falling on the photoresistor being cut off and the LED lamp with the buzzer starting to work.

A strong and reliable security system for businesses and organizations is built on simple mechanisms. You can make the protection system for home use as you wish or order a ready-made kit from online stores. An important plus - the relatively low energy consumption makes laser signaling autonomous from power supply sources.

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