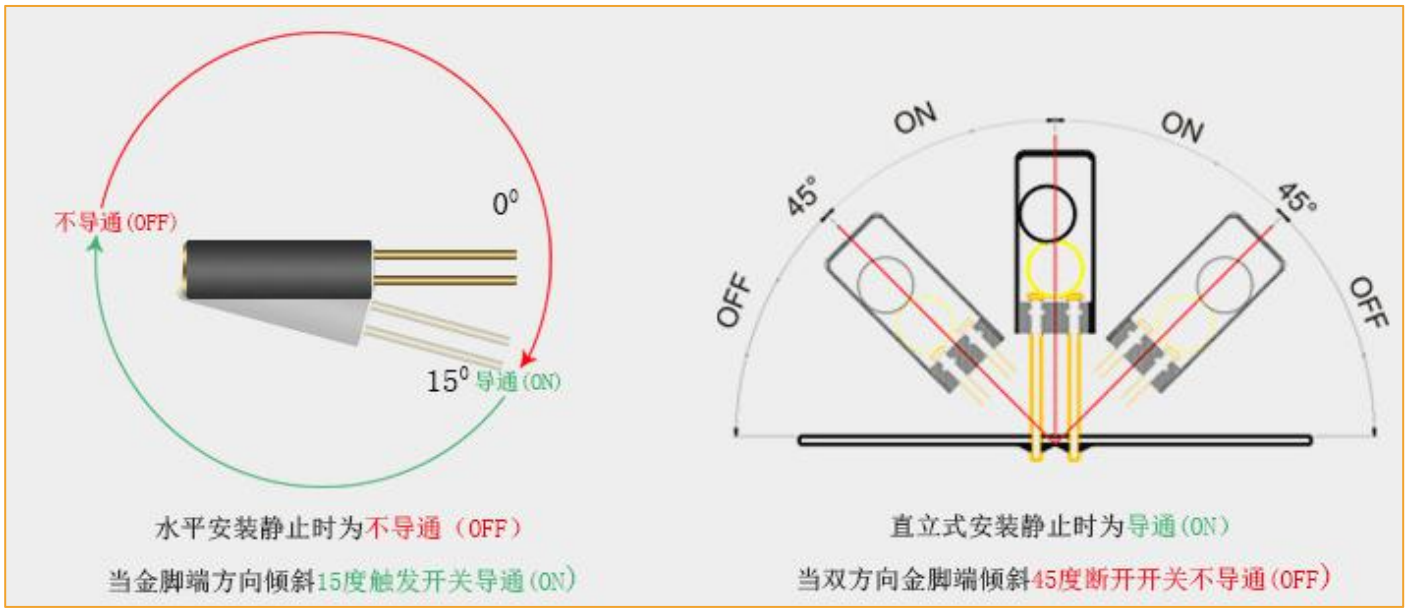
Introduction to Tilt switch

Ball switch, also known as ball switch, steel ball switch, is actually a vibration switch.It has a different name, but it works the same way.The ball contacts or does not contact the pin to control the connection or disconnection of the circuit.Simply put, just like turning a light on or off, if the switch touches the inner metal plate, the light will go on, and when the switch leaves, the light will go off.Contact with metal terminals or changing the path of light with beads on a switch will produce a conduction effect.

Ball switches are widely used, such as tire pressure monitoring system (TPMS), pedal light, digital photo frame rotation, flip camera, anti-theft system and so on.The common ball switches on the market are sw-200d, sw-300da, sw-520d and so on.The switch used in this experiment is sw-520d, which is OFF in the static state.When it is subjected to the right vibration of external touch, or moves at the right speed to generate the right centrifugal force, the needle is instantly ON, changing electrical characteristics.When the external force vanishes, the electrical characteristics return to the closed state

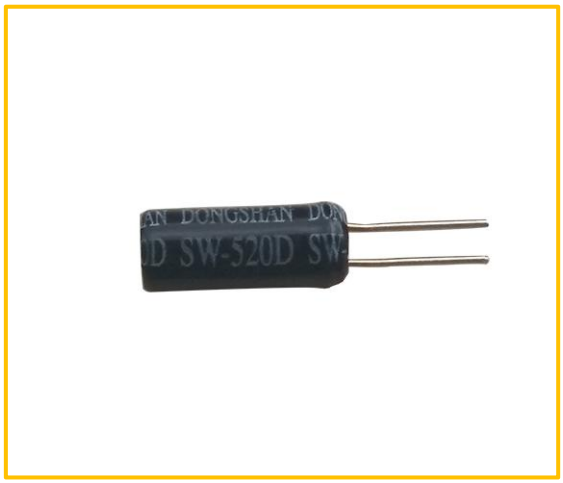


Ball switch parameters

1. Non-directional, it can be triggered from any Angle
2. Fully sealed package, waterproof and dustproof.
3. Suitable for small current circuit trigger.
4. Double pin, more stable contact.

5. Sensitive, sealed, 12V 0.1ma, turn-on time 0.1ms, open circuit impedance 10M, temperature tolerance 105.

6. Diameter 4.5mm, length 11mm.



Experimental objective

Understand the working principle of sw-520d vibration sensor, and how to use Arduino to control sw-520d vibration sensor to realize anti-theft alarm function.

Experimental principle

Using the working characteristics of the ball switch, when the circuit board is in the static state, the ball switch is in the on state, when an external force touches the circuit board and causes it to vibrate, the ball switch is disconnected, then trigger the alarm, LED light, buzzer ring; When the ball switch returns to the on state, the LED goes out and the buzzer does not ring.

The component list

- Keywish Arduino Uno R3 motherboard *1
- USB cable *1
- Sw-520d vibration sensor * 1
- Bread plate
- LED*1
- jump lines
- active buzzer *1
- 10kΩ resistance

Wiring

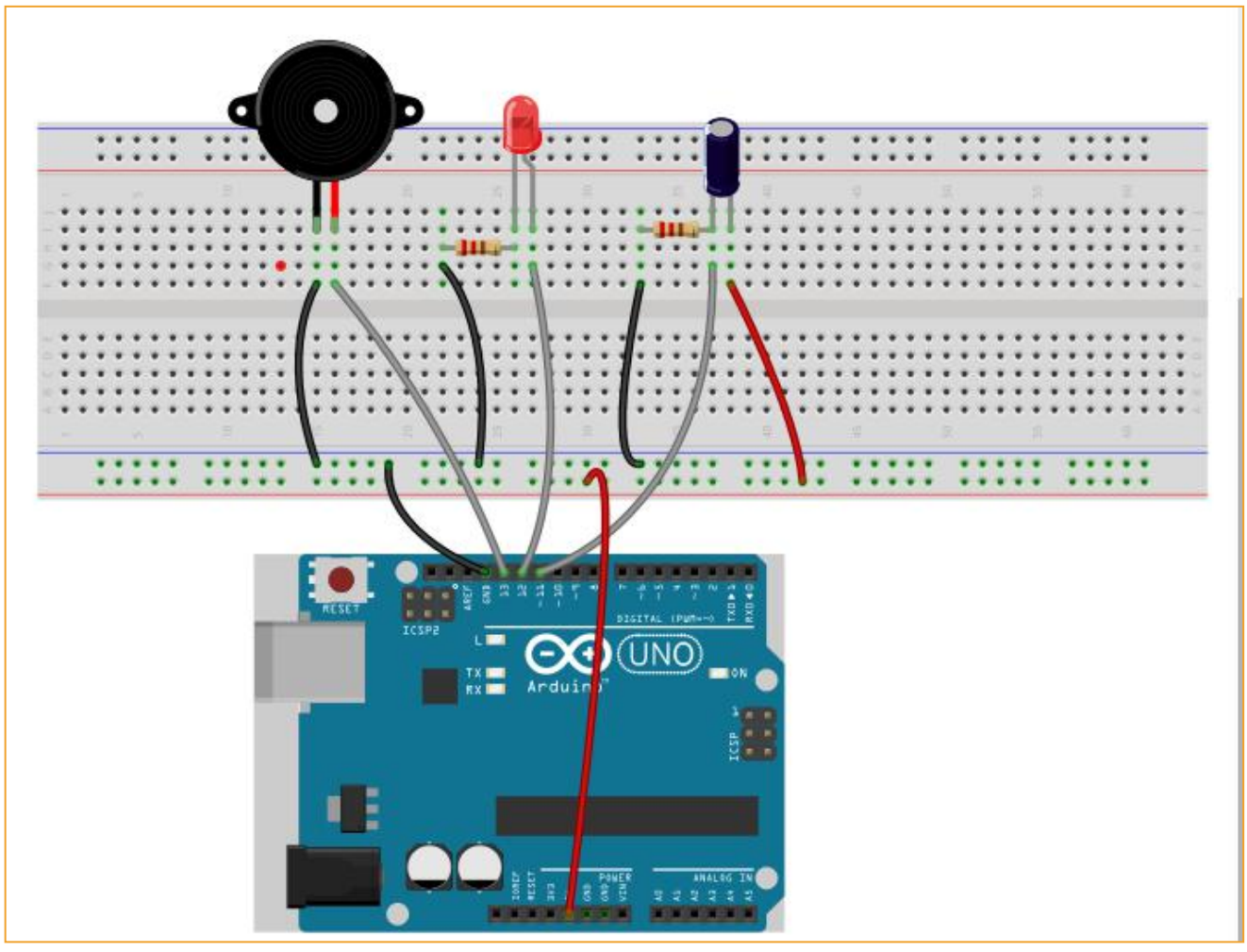
Arduino UNO	Active buzzer
13	+

GND	-

Arduino UNO	SW520D
12	1
GND	2

Arduino UNO	10kΩ resistor
5V	1
11	2

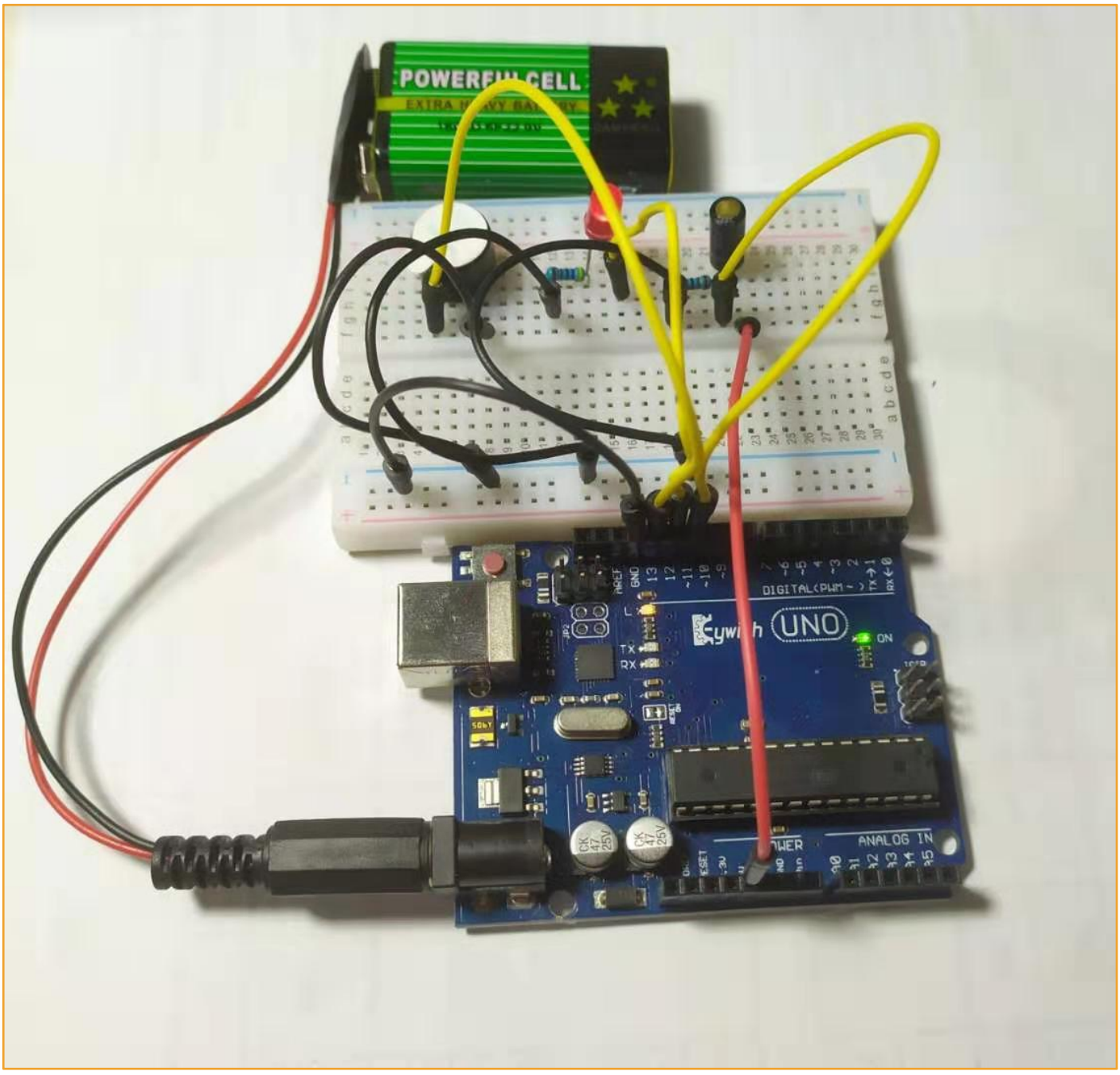
Arduino UNO	LED
12	+
GND	—



Code

```
int Led=12;
int Buzzer_pin=13;
int buttonpin=11;
int val=0;
void setup()
{
  pinMode(Led,OUTPUT);
  pinMode(Buzzer_pin,OUTPUT);
  pinMode(buttonpin,INPUT);
  Serial.begin(9600);
}
void loop()
{
  val=digitalRead(buttonpin);
  Serial.println(val);
  if(val==0)
     {
       digitalWrite(Led,HIGH);
      digitalWrite(Buzzer_pin,HIGH);
      delay(1000);
     }
  else
     {
       digitalWrite(Led,LOW);
       digitalWrite(Buzzer_pin,LOW);
        delay(1000);
     }
}
```

Experiment Result

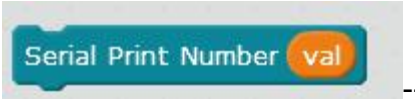


Mlock programming program

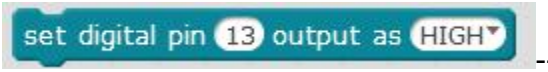
MBlock writes the program as shown in the figure below:

--Set variable read values

--Read the value of the numeric pin



--Serial print variables



--Sets the state of the digital pin output