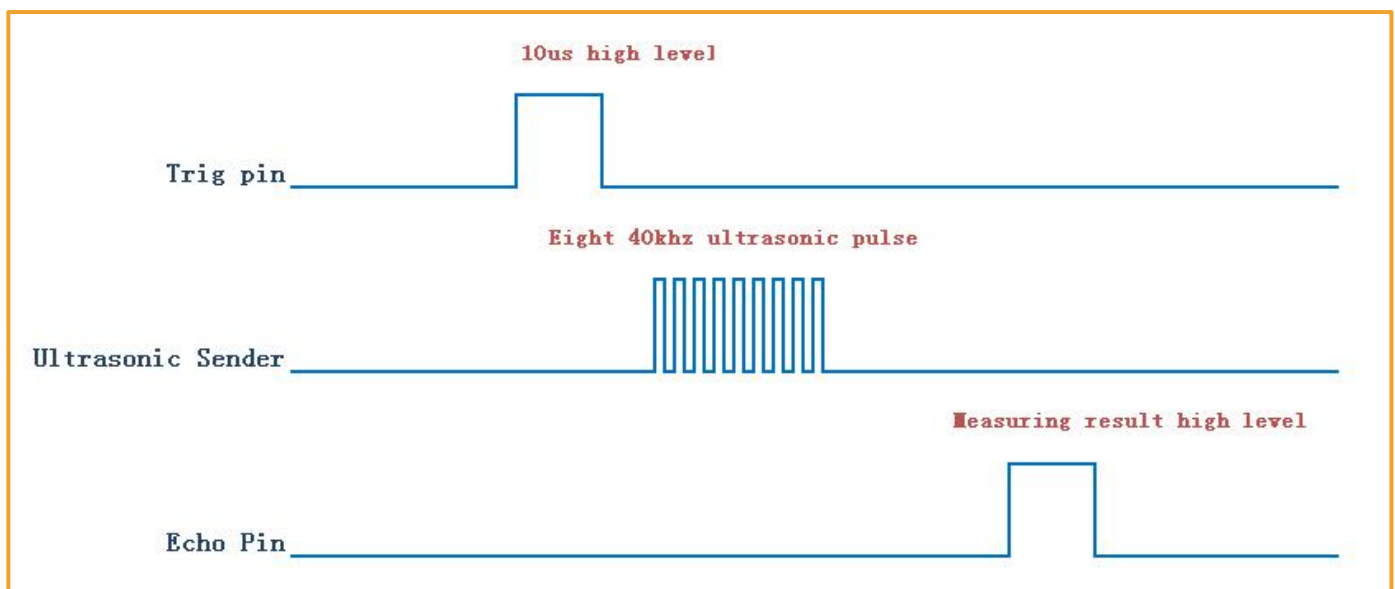


Ultrasonic Experiment

Introduce to Ultrasonic ranging

Ultrasonic transmitter launches ultrasonic to a certain direction and we start timing at the same time. When the ultrasonic in the air runs into obstacles, it will return immediately, ultrasonic receiver receives the reflected wave, then we stop timing. Sound waves in the air are at the rate of 340 m/s, according to the recorded time t , the distance s between launch spot and the obstacles can be calculated, that is: $s = 340m / s * t / 2$. So we can get the distance.

Ultrasonic ranging module has four pins, they are Vcc, Trig, Echo, GND, among the Trig is distance measuring trigger pin, as long as the Trig pin are at least 10 μ s high level, ultrasonic sending module will automatically send eight 40KHZ ultrasonic pulse, and automatically detect whether there is a returned signal. This step will be done automatically by the inside module. If there is any returned signal, the Echo pin will output high level, the duration of the high level is the time of ultrasonic wave from launch to return. At this point, we can use pulseIn () function to obtain the result of distance measuring, and calculate the actual distance.



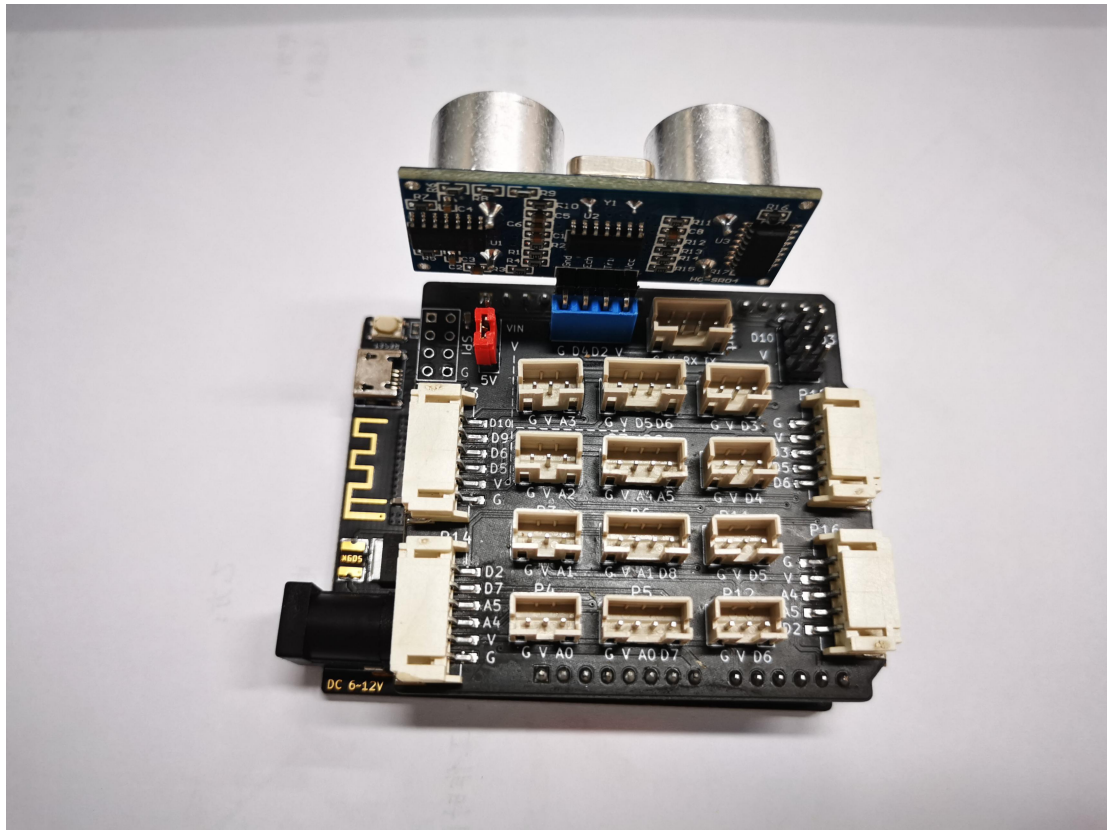
Experiment Purpose

The purpose is to type ultrasonic ranging module distance through a serial port.

Component List

- ◆ Keywish Arduino UNO R3 mainboard
- ◆ Breadboard
- ◆ USB cable
- ◆ Ultrasonic module* 1
- ◆ Several jumper wires

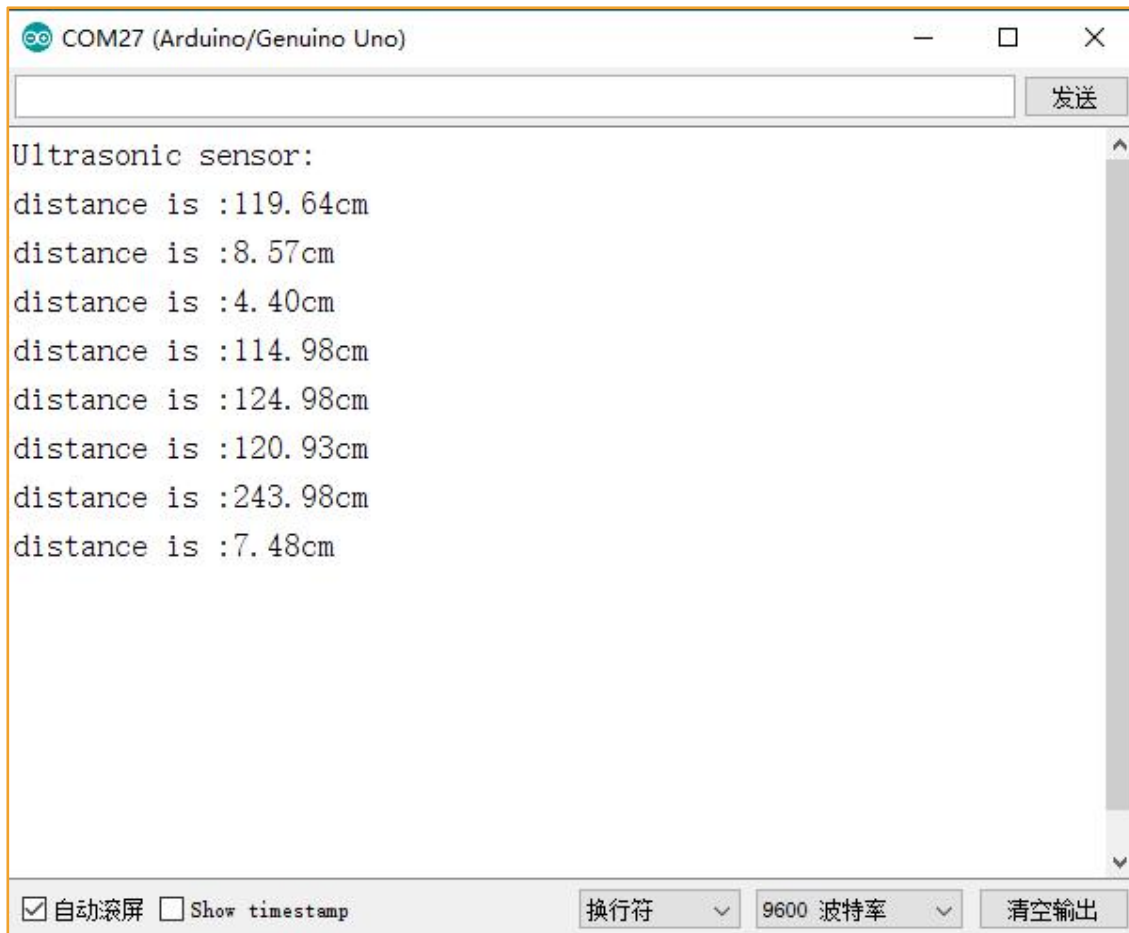
Wiring of Circuit



Arduino Code

```
const int TrigPin = 2; // define TrigPin to pin 2
const int EchoPin = 4; // Define EchoPin to pin 3
float distance;
void setup()
{
    Serial.begin(9600); // Set the serial port baud rate to 9600
    pinMode(TrigPin, OUTPUT); // Set the TrigPin pin to output mode
    pinMode(EchoPin, INPUT); // Set the EchoPin pin to output mode
    Serial.println("Ultrasonic sensor:"); // Print character Ultrasonic sensor:
}
void loop()
{
    digitalWrite(TrigPin, LOW); // Set the TrigPin pin to low level
    delayMicroseconds(2); // Delay 2 microseconds
    digitalWrite(TrigPin, HIGH); // Set the TrigPin pin to high level
    delayMicroseconds(10); // Delay 10 microseconds
    digitalWrite(TrigPin, LOW); // Set the TrigPin pin to low level
    distance = pulseIn(EchoPin, HIGH) / 58.00; // Calculate distance
    Serial.print("distance is :"); // print character distance is:
    Serial.print(distance); // print distance value
    Serial.print("cm"); // print character cm
    Serial.println();
    delay(1000); // Delay 1 second
}
```

Experiment Result



MagicBlock graphical programming program

MagicBlock writes the ultrasonic distance measurement program as shown below



Mixly graphical programming

Mixly compiles the ultrasonic distance measurement program as shown below:

