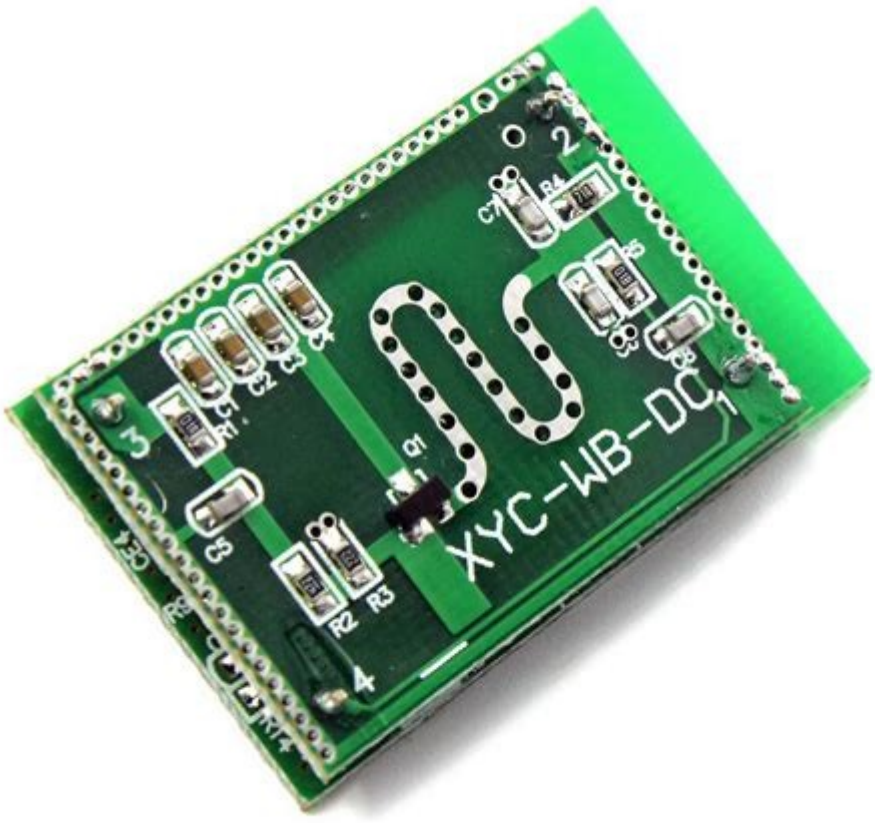
XYC-WB-DC Microwave radar motion sensor module

Description:
Doppler technology (microwave induction) -- active (sensor: human/moving object)

- ***Detection:***
  when someone or an object enters the detection range, the output of the high-frequency induction module, Vout, outputs TTL high. After a preset delay period, the output resets and reverts to TTL low level.
- ***Delay:***
  after the detection mode is started, and there is human or object activity, the module output terminal Vout will continue to output TTL high level. When there is no movement detected because the person or object is no longer in range of the module, the output reverts to low TTL level after a delay periode.
- ***Photosensitive control (optional) :***
  control the output state of the module according to the external light intensity to achieve energy saving effect. This pin can also be used with a resitor bridge to control the output state of the module with an external programming board.

Compared with infrared products, the high-frequency induction module has a longer detection distance, a wide angle (360°), no dead zone, and is not affected by environmental temperature and dust. It uses Doppler radar technology, with auto-sensing capabilities to control other products. Widely used in lighting situations, anti-theft alarm detectors.
Can “see” through concrete and wood. Metal will block the signal.

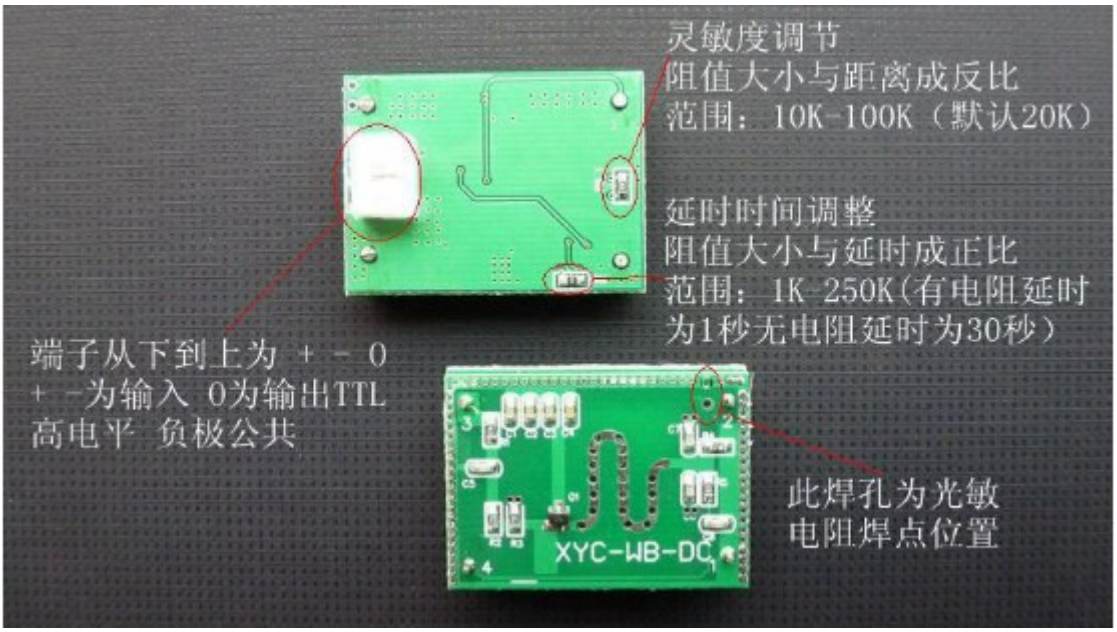


Features:

1. Microwave sensors using planar antenna and receiving echo.
2. The switch is an active sensor.
3. The sensor emit a high-frequency electromagnetic waves and receives their echo.
4. The sensor detect changes within echo.
5. The sensor detect tiny movement in detect range.
6. Send signal to MCU and execute instructions.
7. Signals are likely to be detected through the door, glass and thin walls.
8. Best result if person or object is moving towards the sensor.
9. This product is a strong anti-jamming capability, almost without wind, heat and other environmental factors foreign interference

Parameter:

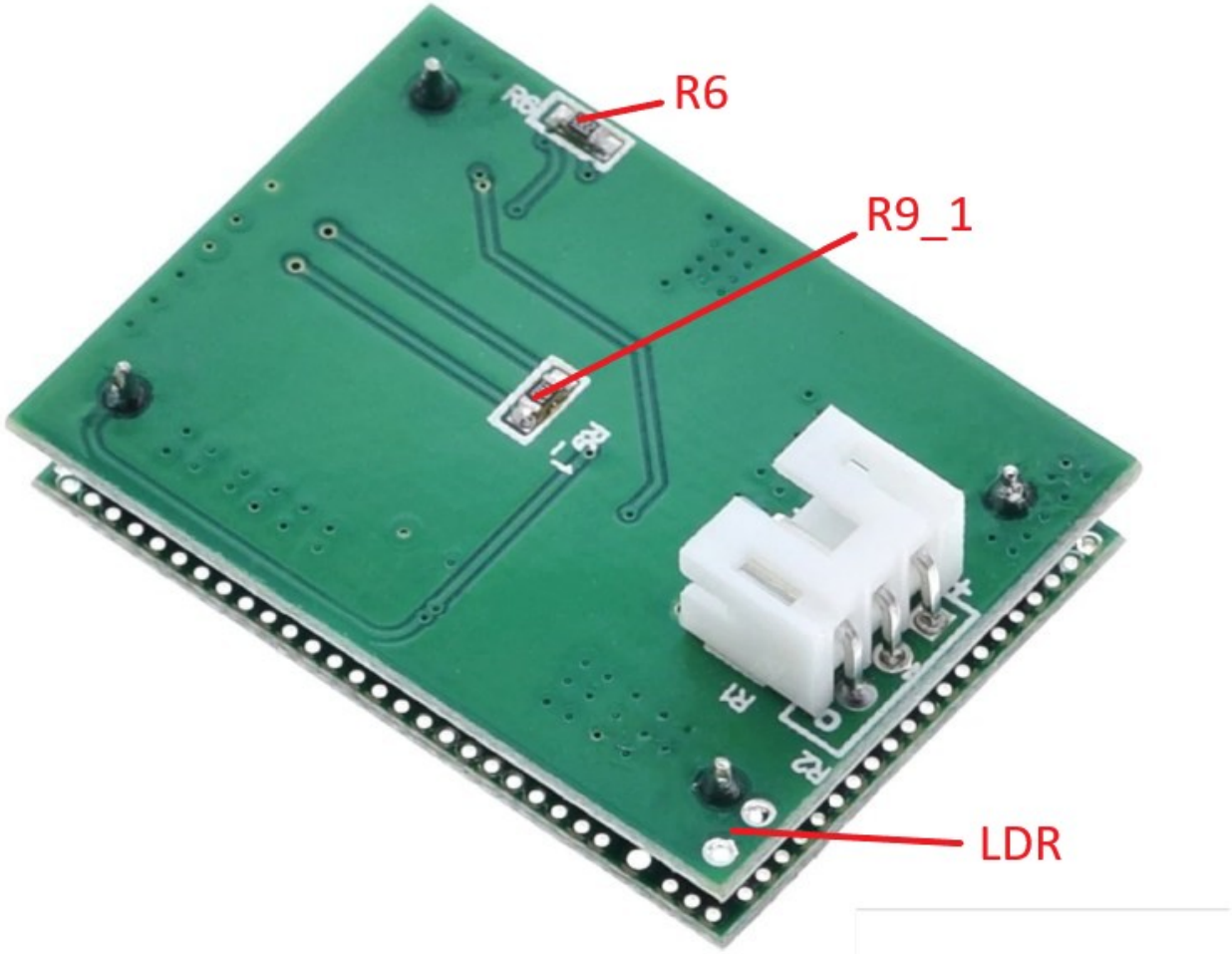
1. Working voltage: 3.3-20VDC;
2. Standby quiescent current: <3mA;
3. Transmit power: <2mW;
4. The working environment temperature: -20°~+80°;
5. Trigger: Repeat Trigger (default);
6. The output signal: TTL level; high → 3.3V / Low → 0V;
7. Detection angle: 360°(spherical) no dead spots;
8. Detection range: 6-9 meters (when ordering optional). The default setting is 8 meters.
9. The working delay: 1 second to hundreds of seconds, the default setting is 30seconds.



1. R6 Sensitivity adjustment:
   The sensitivity adjustment resistance is inversely proportional to the size of the distance range: 10K- 100K (default 12K which is about 7 meters)
2. R9_1 Delay time adjustment:
   The delay time of the delay is proportional to the size of the resistance adjustment range: 1K- 250K (default 2K2 which is about 0,6 seconds)
3. Photo sensitivity:
   control the output state of the module according to the external light intensity

To improve the stability of this module in use with a MCU consider to place an electrolytic capacitor of 470 µF parallel to the GND and Vcc pins as well as a 10ohm resistor in series with the positive supply voltage.

To have more flexibility with this module it is possible to modify the board and have a 9 pin header connector. If you're not familiar with electronics, please do not make any modifications to this board. Proceed as follows to create the 9 pin header for more fun:
connect two wires to the LDR port
remove R6 and connect two wires to the R6 delay pads
remove R9_1 and connect two wires to the R9_1 sensitivity pads
remove the 3 pin connector and connect three wires to the connector pads.
This way you will have a 9 pin header with a lot more possibilities to play with.



Going to the test:
Next you will find a small sketch for and Arduino to test your module.

```
/*     Tester for XYC-WB-DC Microwave radar motion sensor module

   A simple sketch to tests a microwave radar motion detector.
   On detection of motion of a human or an object, the LED on the Arduino board
   ( pin 13) will turn on at the detection of motion.

   Connections:
   5V of the Arduino to Vin of the module
   GND of the Arduino to the GND pin of the module
   The output of the WYC-WB-DC module connected to pin 2
   Internal LED of the Arduino board, or a LED connected to pin 13 and ground

   Description:
   The module uses Doppler technology. Once the "field" is disturbed by a moving
   human or object, the logic TTL output will go HIGH. As long as it detects
   movement the sensor outputs HIGH. When there is no more detection of movement,
   the sensor output resets and reverts to TTL LOW after the preset delay.

   Metal will block the radar signal.
*/


#define sensorPin 2                     // pin to output signal of sensor board
#define ledPin 13                       // pin to which LED is connected

bool sensorState = 0;                   // read the sensor output status
bool prevSensorState = 0;               // remember last sensor output state

int motionCount = 0;                    // count the number of sensor positives


void sensorISR(){                               // ISR = Interrupt Service Routine
 sensorState = digitalRead( sensorPin);         // read the sensor output pin

 if( sensorState != prevSensorState){
  if ( sensorState == HIGH){
    motionCount++;                      // add 1 to the motion counter
    digitalWrite( ledPin, HIGH);        // turn LED on
    Serial.print(F( "Motion:\t"));      // print to serial monitor
    Serial.println( motionCount);
  } else {
    digitalWrite( ledPin, LOW);         // turn LED off
  }
  prevSensorState = sensorState;        // remember last sensor state
 }
}
```

```
void setup() {
  Serial.begin( 115200);
  Serial.println( "Test sketch for the XYC-WB-DC module");

  pinMode( ledPin, OUTPUT);                 // set the LED pin as output
  pinMode( sensorPin, INPUT);               // set pin as input

// interrupt routine for sensor output change
  attachInterrupt( digitalPinToInterrupt( sensorPin), sensorOutput, CHANGE);
}


void loop() {
  // Nothing here, do other important and interesting stuff.
}
```