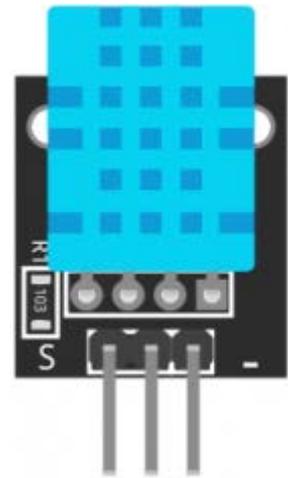


Temperature and Humidity Sensor Module

This temperature and humidity sensor module provides a digital serial interface to measure humidity and temperature.

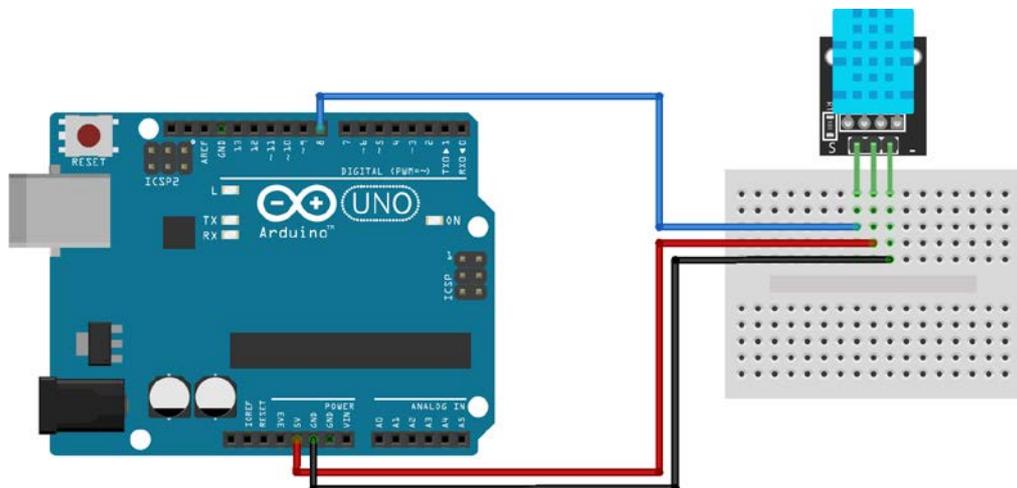
The module consists of a DHT11 digital humidity and temperature sensor and a 1 kΩ resistor. The DHT11 uses an internal thermistor and a capacitive humidity sensor to determine environment conditions, an internal chip is responsible for converting readings to a serial digital signal.



Operating Voltage	3.3V to 5.5V
Humidity range	20% to 90% RH
Humidity accuracy	±5% RH
Humidity resolution	1% RH
Temperature range	0°C to 50°C [32°F to 122°F]
Temperature accuracy	±2°C
Temperature resolution	1°C
Signal transmission range	20m

Pinout and Connection to Arduino

Connect the Power line (middle) and ground (-) to +5 and GND respectively. Connect signal (S) to pin 8 on the Arduino.



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Arduino Example Sketch

The following sketch uses pin 8 on the Arduino to serially send and receive data from the sensor. Serial communication is achieved by sending specific high/low signals to the sensor and waiting for a response. Temperature and humidity data is read bit by bit and returned as an array of bytes.

```

int DHpin = 8; // input/output pin
byte dat[5];
byte read_data()
{
  byte data;
  for(int i = 0; i < 8; i++)
  {
    if(digitalRead(DHpin) == LOW)
    {
      while(digitalRead(DHpin) == LOW); // wait 50us;
      delayMicroseconds(30); // Duration of high level determine whether data is 0 or 1
      if(digitalRead(DHpin) == HIGH)
        data |= (1<<(7 - i)); //High in the former, Low in the post;
      while(digitalRead(DHpin) == HIGH); //Data '1', waiting for next bit
    }
  }
  return data;
}

void start_test()
{
  digitalWrite(DHpin, LOW); //Pull down the bus to send the start signal;
  delay(30); //The delay is greater than 18 ms so that DHT 11 can detect the start signal;
  digitalWrite(DHpin, HIGH);
  delayMicroseconds(40); //Wait for DHT11 to respond;
  pinMode(DHpin, INPUT);
  while(digitalRead(DHpin) == HIGH);
  delayMicroseconds(80); //The DHT11 responds by pulling the bus low for 80us;
  if(digitalRead(DHpin) == LOW);
  delayMicroseconds(80); //DHT11 pulled up after the bus 80us to start sending data;
  for(int i = 0; i < 4; i++) //Receiving data, check bits are not considered;
    dat[i] = read_data();
  pinMode(DHpin, OUTPUT);
  digitalWrite(DHpin, HIGH); //After release of bus, wait for host to start next signal
}

void setup()
{
  Serial.begin(9600);
  pinMode(DHpin, OUTPUT);
}

void loop()
{
  start_test();
  Serial.print("Current humidity = ");
  Serial.print(dat[0], DEC); //Displays the integer bits of humidity;
  Serial.print('.');
  Serial.print(dat[1], DEC); //Displays the decimal places of the humidity;
  Serial.println('%');
  Serial.print("Current temperature = ");
  Serial.print(dat[2], DEC); //Displays the integer bits of temperature;
  Serial.print('.');
  Serial.print(dat[3], DEC); //Displays the decimal places of the temperature;
  Serial.println('C');
  delay(700);
}

```