

TA0061 Temperature Sensor Module

1. Introduction

A thermistor is a type of resistor whose resistance is dependent on temperature, more so than in standard resistors. The word is a portmanteau of thermal and resistor. Thermistors are widely used as inrush current limiter, temperature sensors (NTC type typically), self-resetting overcurrent protectors, and self-regulating heating elements.

The XC4538 Module's feature as below:

Feature	Value
Model No.	NTC-MF52 3950
Temperature Range	-55°C~+125°C
Accuracy	+/- 0.5°C
Pull-up resistor	10KΩ

And Pinout as below:

Pin	Content
"S"	Singal pin
"_"	Gnd
"+"	Vcc(reference voltage:5V DC)

2. Temperature convert Formula

Here we use Steinhart–Hart equation to calculate the corresponding temperature. The equation is

$$\frac{1}{T} = A + B \ln(R) + C[\ln(R)]^3,$$

where:

T is the temperature (in Kelvins)

R is the resistance at T (in ohms)

A , B , and C are the Steinhart–Hart coefficients which vary depending on the type and model of thermistor and the temperature range of interest. (The most general form of the applied equation contains a $[\ln(R)]^2$ term, but this is frequently neglected because it is typically much smaller than the other coefficients).

Note: For this module, the recommended coefficients of A,B,Care

A equals 0.001129148;

B equals 0.000234125;

C equals 0.0000000876741;

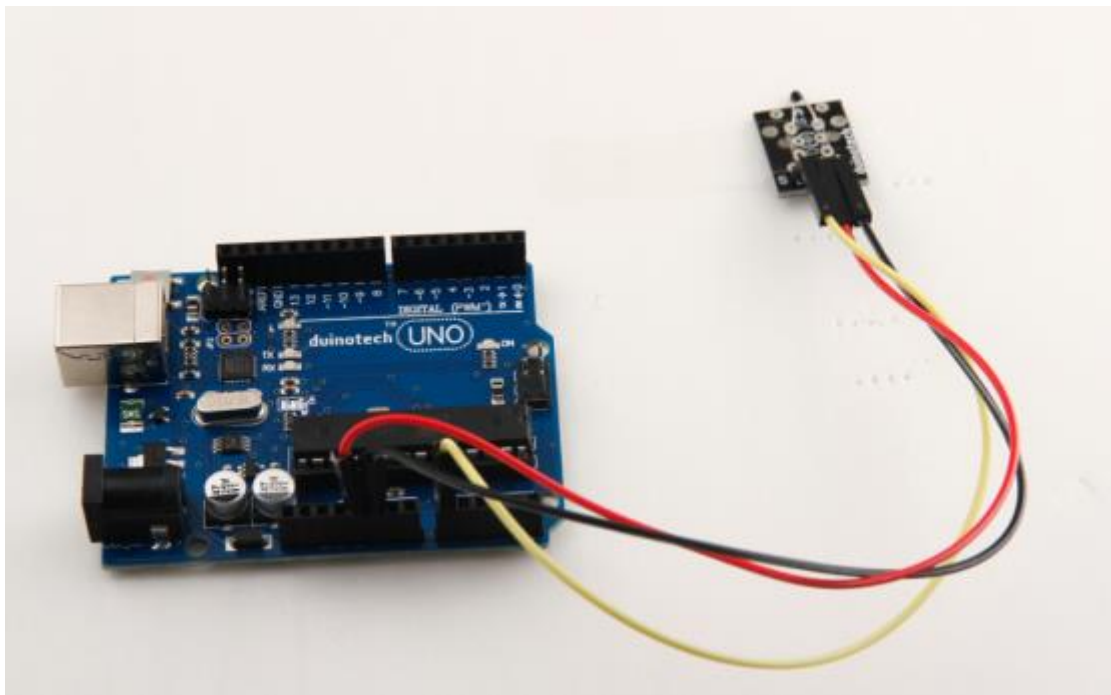
More, the same item products has a little bit different A,B,C coefficients , which depends your environmental temperature. If the recommended coefficients are not accurate enough, you'd better amend the A,B,C coefficients by Thermistor Calculator tool.

3 Example

This is a simple code for the NTC thermistor module, Wire as below:

"S" pin----- A0;
"+" pin-----5V;
"-" pin-----Gnd;

The physical picture is

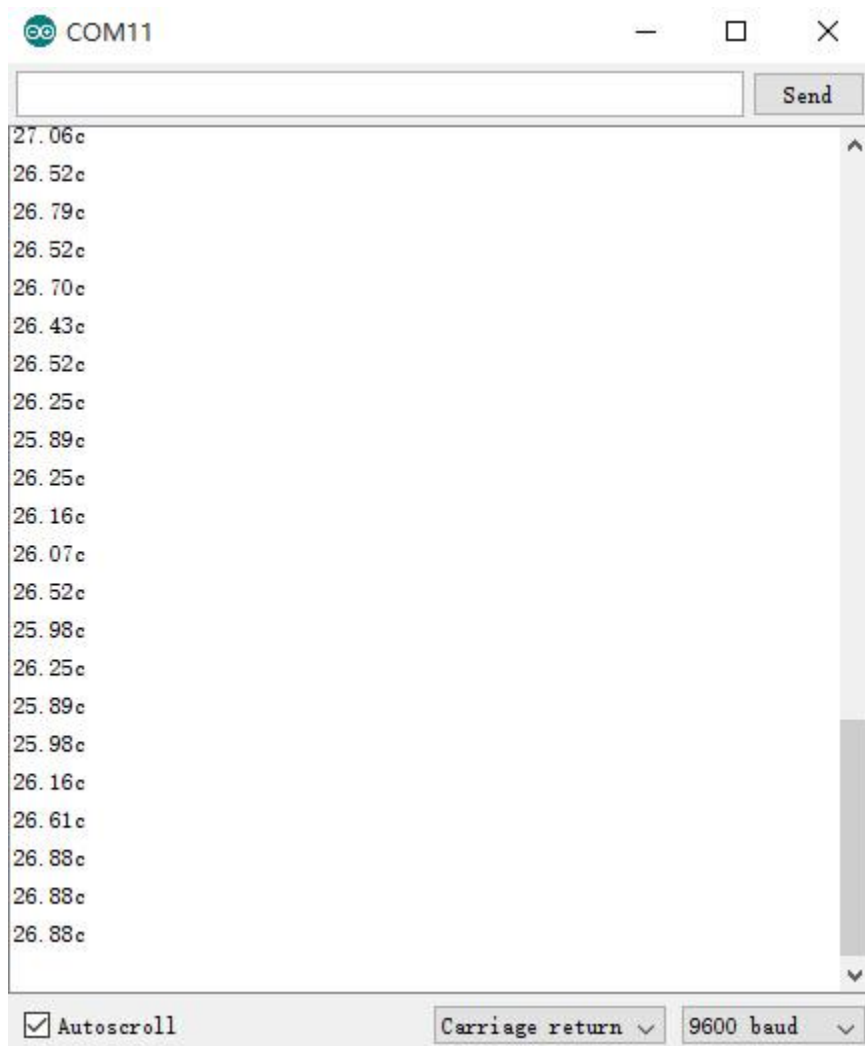


Example code :

```
#include <math.h>
double Thermister(int RawADC){
double Temp;
Temp = log(((1024000/RawADC) - 10000));
Temp = 1 / (0.001129148 + (0.000234125 + (0.0000000876741 * Temp * Temp ))* Temp );
Temp = Temp - 273.15;
return Temp;
}
void setup() {
```

```
Serial.begin(9600);  
}  
void loop()  
{ Serial.print(Thermister(analogRead(0)));  
  Serial.println("c");  
  delay(1000); }
```

The final show is



End