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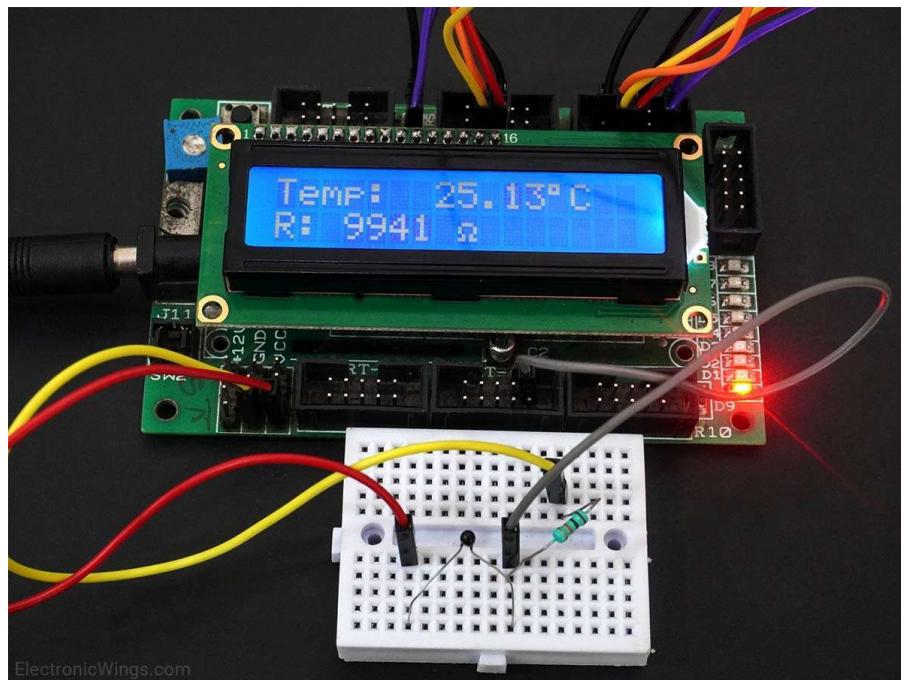
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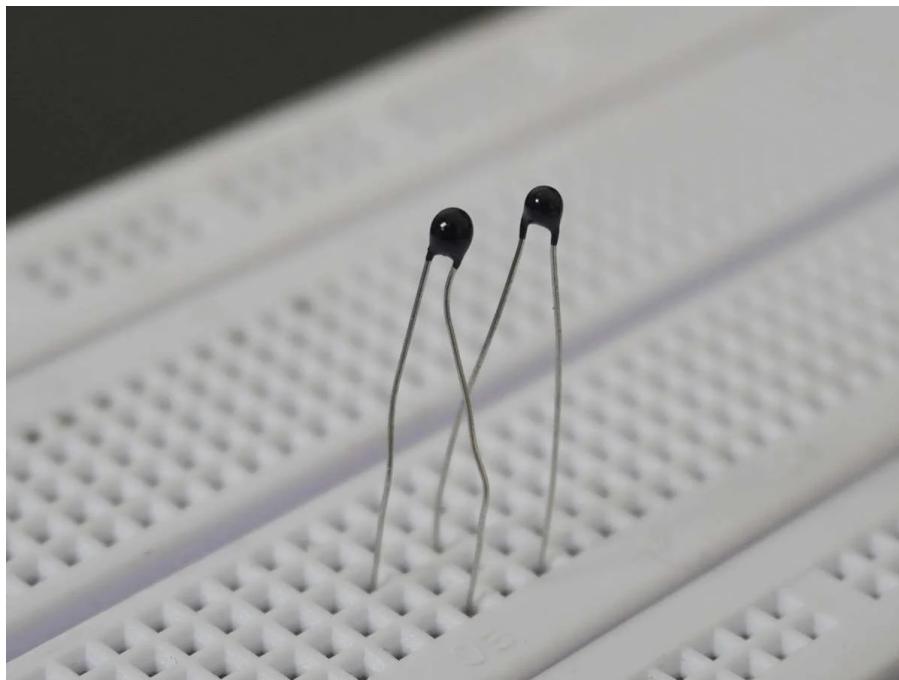
BorisDmitrenko

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Thermistor Interfacing with AVR ATmega16/ATmega32



Overview of Thermistor



A thermistor is a variable resistance element, whose resistance changes with a change in temperature.



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The resistance decreases with an increase in temperature for NTC (Negative Temperature Coefficient) type thermistors.

They can be used as current limiters, temperature sensors, overcurrent protectors, etc.

The change in resistance value is a measure of the temperature.

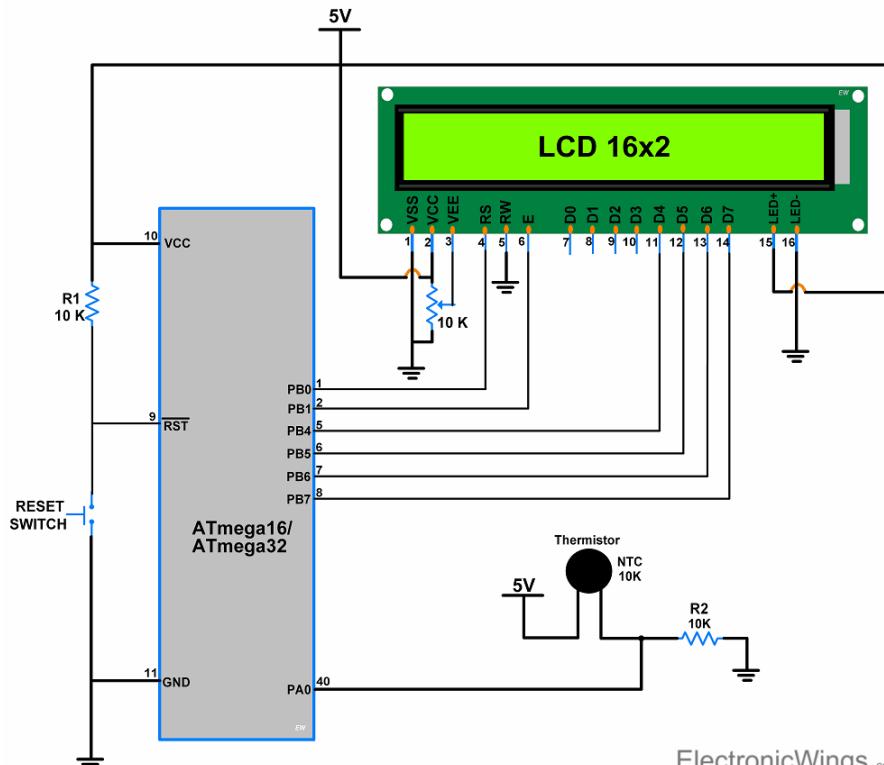
By using the thermistor in series with a fixed resistance forming a simple voltage divider network, we can find out the temperature by the change in voltage of the voltage divider network due to a change in temperature. (Temperature change leads to change in resistance which leads to change in voltage.)

For more information about the thermistor and how to use it, refer to the topic **NTC Thermistor** (<http://electronicwings.com/sensors-modules/ntc-thermistor>) in the sensors and modules section.

For information about ADC in ATmega16 and how to use it, refer to the topic **ADC in AVR ATmega16/ATmega32** (<http://electronicwings.com/avr-atmega/atmega1632-adc>) in the ATmega inside section.

Connection Diagram of NTC Thermistor with ATmega16/32

- In the below circuit diagram, we used an NTC type 10K thermistor.



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Interfacing Thermistor With AVR ATmega16/ATmega32



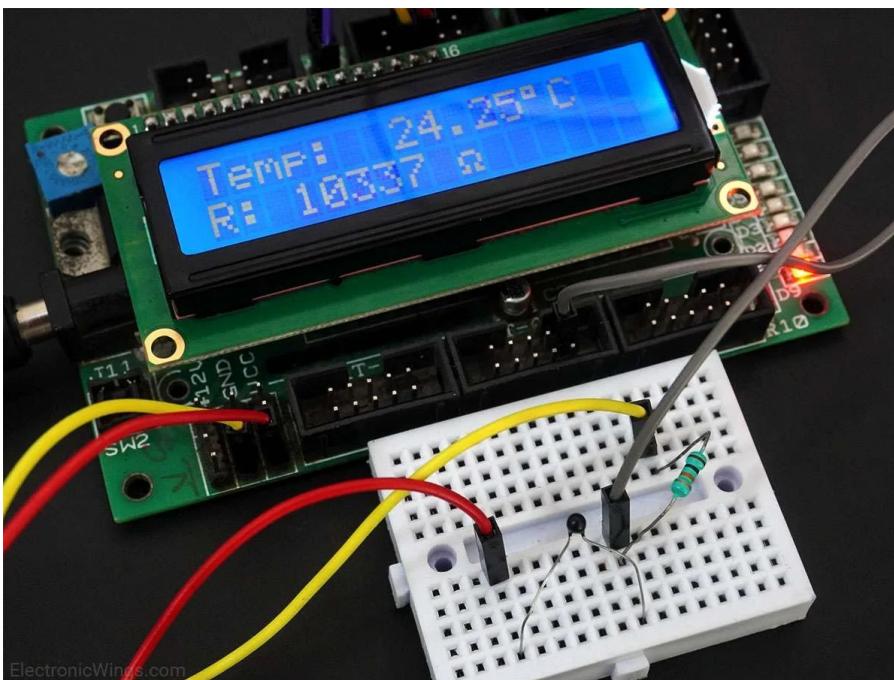
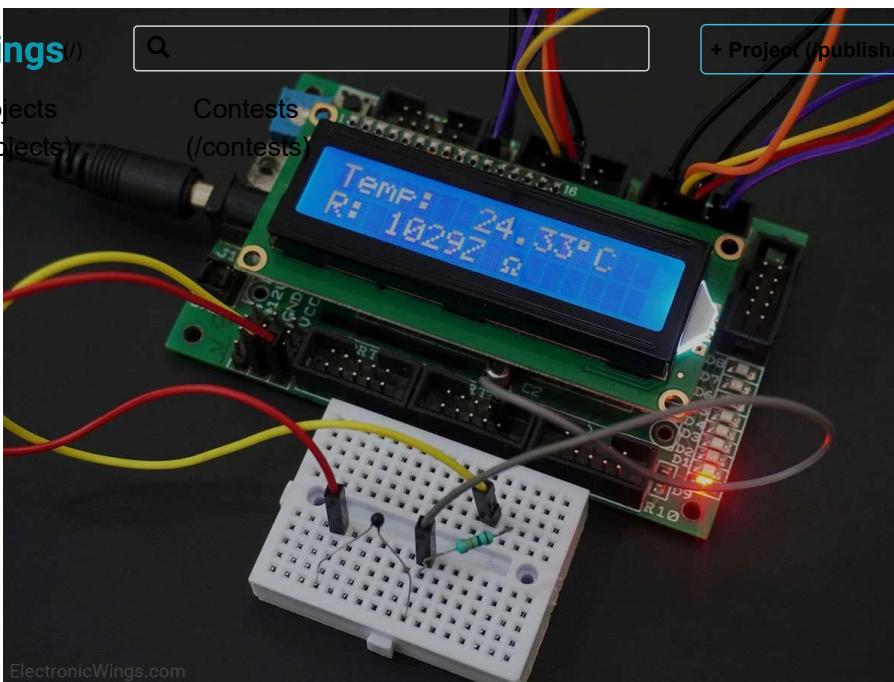
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NTC Thermistor Code for ATmega16/32



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```

Contests          /* Vref: Avcc, ADC channel: 0 */
ADMUX = 0X40;
((contests))
ADCSRA |= (1<<ADSC); /* start conversion */
while ((ADCSRA &(1<<ADIF))==0); /* monitor end of conversion int
ADCSRA |=(1<<ADIF); /* set the ADIF bit of ADCSRA register */
return(ADCW); /* return the ADCW */

}

double getTemp()
{
    val = adc(); /* store adc value on val register */
    R=((10230000/val) - 10000);/* calculate the resistance */
    Thermister = log(R); /* calculate natural log of resistance */
    /* Steinhart-Hart Thermistor Equation: */
    /* Temperature in Kelvin = 1 / (A + B[ln(R)] + C[ln(R)]^3) */
    /* where A = 0.001129148, B = 0.000234125 and C = 8.76741*10^-8 */
    Thermister = 1 / (0.001129148 + (0.000234125 * Thermister));
    Thermister = Thermister - 273.15; /* convert kelvin to °C */

    return Thermister;
}

```

Video of Temperature Measurement using NTC Thermistor with ATmega16/32



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ATmega 16
ATmega 16

X 1

(https://www.mouser.in/ProductDetail/Microchip-Technology-Atmel/ATMEGA16L-8PU?qs=%2Fha2pyFaduiGCJtTvs2wv8fVZbVAalLu7Iq%2FgITS0tALAx6fMenLvg%3D%3D&utm_source=electronicswings&utm_medium=display&utm_campaign=mouser-componentslisting&utm_content=0x0)

Datasheet (</components/atmega-16/1/datasheet>)

Atmega32
Atmega32

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Datasheet (</components/atmega32/1/datasheet>)



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Thermistor

Thermistor is a type of resistor whose resistan...

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ATmega16 Thermister Project File

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ATmega16 Thermister Interfacing Simulation

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Thermistor Resistance vs Temperature Chart

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Calibrate Steinhart-Hart Coefficients for
Thermistors

Comments



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StanislawSieniuc

(/users/StanislawSieniuc/profile)
2021-01-31 21:55:04

:

I warmly welcome.

Sorry for my language but I am writing with a translator.

Design proven, works beautifully. I only have one problem, I am using a NTC 1kom thermistor. It is known that there will be wrong readings. I don't know the manufacturer of the thermistor.

A, B and C are coefficients derived from experimental measurement. How to get them for a 1k thermistor.

I mean these values:

Thermister = 1 / (0.001129148 + (0.000234125 * Thermister) + (0.0000000876741

How to calculate them. I am asking for tips.

Best regards.

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