MEEC/MIEEC

Electronics for Micro-Systems

Lab#1
A Temperature Meter System with 3 Sensors, Relay and GUI

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1 Intoduction

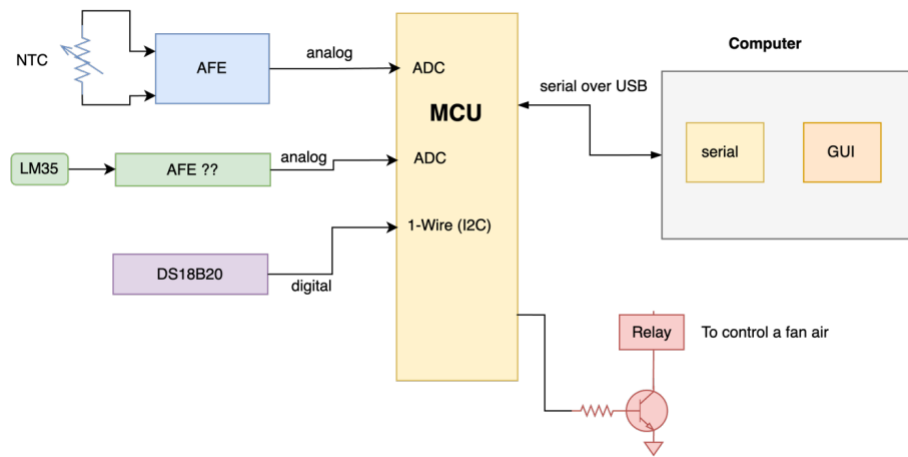explain the requirements and the main objectives of the project

Figure 1: Temperature sensing system with 3 three types of sensors.

2 Temperature Sensors

2.1 NTC - Negative Temperature Coefficient

2.2 LM35 - Precision Centigrade Temperature Sensor

2.3 DS18B20 - Digital Thermometer

3 System Design

3.1 Analog FrontEnd (AFE) NTC

Para usar equacao Steinhart-Hart $\frac{1}{T} = A + B \cdot \ln(R) + C \cdot [\ln(R)]^3$, precisamos de usar 3 pontos para encontrar as constantes A, B e C.

$R(T) = R_{NTC}$ onde T é a temperatura em kelvin e R_{NTC} é o valor da resistencia do thermistor NTC

$$\begin{cases} R(283.15) = 1.998 \cdot 10^4 \ \Omega \\ R(298.15) = 10^4 \ \Omega \\ R(313.15) = 0.5282 \cdot 10^4 \ \Omega \end{cases} \tag{1}$$

$$\begin{cases} A = 1.2 \cdot 10^{-3} \\ B = 2.1 \cdot 10^{-4} \\ C = 1.3 \cdot 10^{-7} \end{cases} \tag{2}$$

4 Simulations

5 Implementation and Experimental Tests

6 Results Analysis

7 Conclusion