NATIONAL TECHNICAL UNIVERSITY

‘KHARKIV POLYTECHNIC INSTITUTE’

Department of ‘COMPUTER TECHNOLOGY AND PROGRAMMING’

Calculated graphic work:

‘Microprocessor Programming’

Topic: Development of a device for reading data from a DHT22 humidity and temperature sensor on an ATMega328 microcontroller

Performed by:

Senior Student KIT–36

Nadyan G. O.

Reviewed by:

Podorozhnyak A. O.

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1 RELEVANCE AND PURPOSE OF THE DEVELOPMENT

We constantly need to control the temperature around us in order to feel comfortable. It is especially nice when the room thermohygrometer that helps us with this Thermohygrometer - helps to track data on the home microclimate. The device's screen displays information about temperature and humidity. Monitoring and proper regulation of the temperature regime is very important, especially where there are children. It can be used to measure the air temperature in apartments, kindergartens, schools, libraries, and archives.

The relevance of the development is explained by the price of this device and its characteristics.

2 TECHNICAL CHARACTERISTICS

2.1 Setting the task for device development

Develop a software product with the following functions::

- Temperature measurement
- Air humidity measurement

2.2 Description of device operation

- Determine the current humidity and temperature;
- Determine air humidity

2.3 Description and justification of technical and software tools

2.3.1 Hardware used during writing and debugging:

1. HP Notebook 15-ay085ur laptop;
   1.1. Processor: Intel Core i5-6200U CPU @ 2.30 GHz. 2.80 GHz;
   1.2. RAM: 8,00 Гб;
2. Arduino Uno controller;
   2.1. ATmega328 microcontroller;
   2.2. ating memory capacity – 2 KB.
3. DHT22 sensor;
4. Breadboard;
5. 10 kOhm resistor;

2.3.2 Software used during writing and debugging:

- Windows 10 operating system (64-bit);;
- Arduino IDE integrated development environment;
- Proteus 8.4 simulation environment

3 DEVICE DESIGN

The connection diagram for all components is shown in Fig. 1.

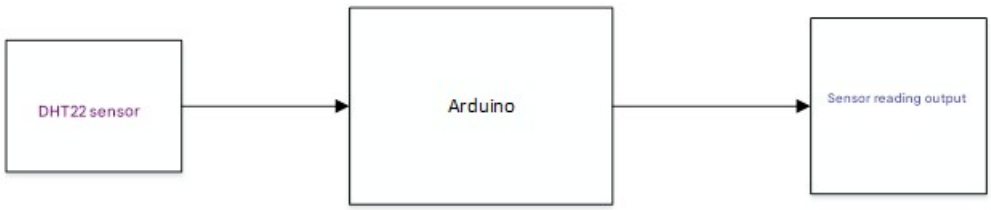

Figure 1 – Block diagram of the device

The device operation algorithm is shown in Figure 2.

Figure 2 – Device operation algorithm

Fig. 3 shows the connection diagram in Proteus 8.5. An LED was used to simulate the operation of the sensor motor.

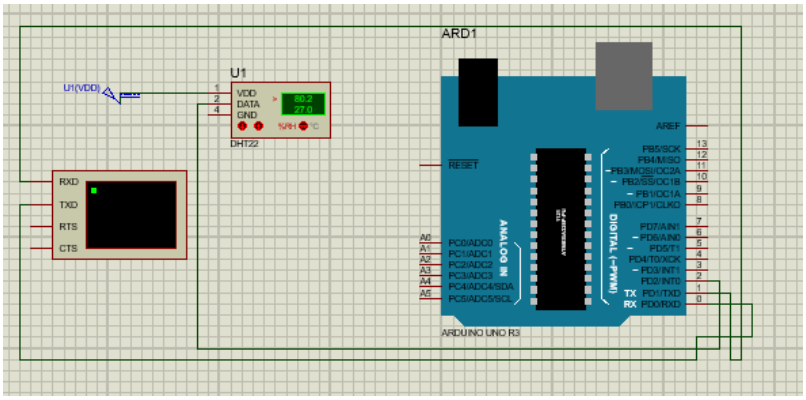

Figure 3 - Connecting components to Arduino

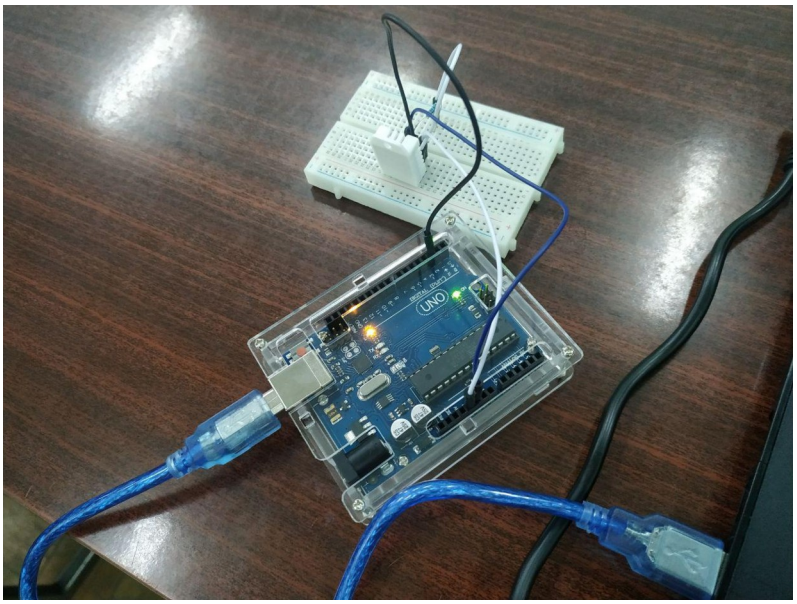

Figure 4 - Actual device

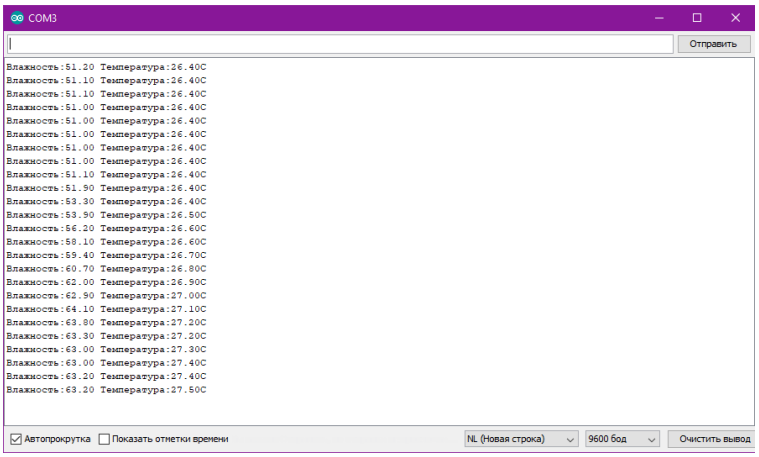

Figure 5 - Temperature and humidity readings (Port Monitor)

4 DEVICE TEST RESULTS

The device was assembled and tested during classes. No errors were found.

Using DHT22 in Arduino projects, you can build elements of smart home systems and smart greenhouses. With these sensors, you can create research complexes for climate measurements and environmental monitoring. The possibilities for using these sensors are virtually endless.

Appendix A
Program code:

```
#include <dht.h>
#define dataPin 8 // Determine the pin number to which the sensor is connected
dht DHT; // Create a DHT object
void setup() {
Serial.begin(9600); Set the data transfer rate in bits per second (baud) for serial data transfer
}
void loop() {
int readData = DHT.read22(dataPin);
float t = DHT.temperature; // Get the temperature value
float h = DHT.humidity; // Get the humidity value
//Output results
Serial.print("Temperature = ");
Serial.print(t);
Serial.print(" *C ");
Serial.print(" Humidity = ");
Serial.print(h);
Serial.println(" % ");
delay(2000);
}
```