DHT22

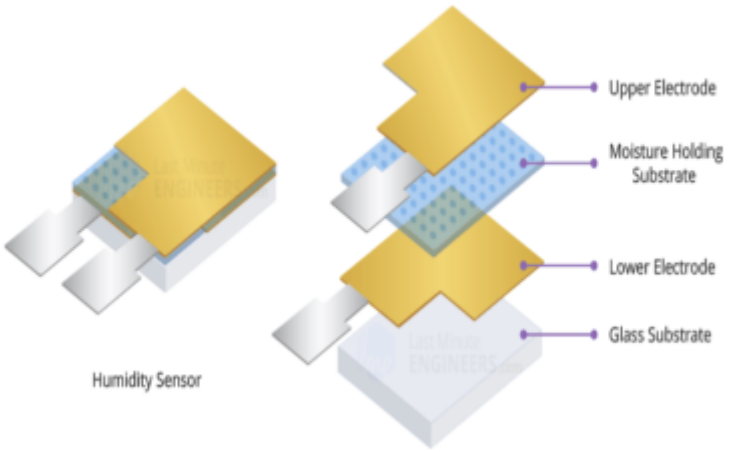


Figure # DHT22 sensing components. Source: https://create.arduino.cc/projecthub/MinukaThesathYapa/dht11-dht22-sensors-temperature-using-arduino-b7a8d6//

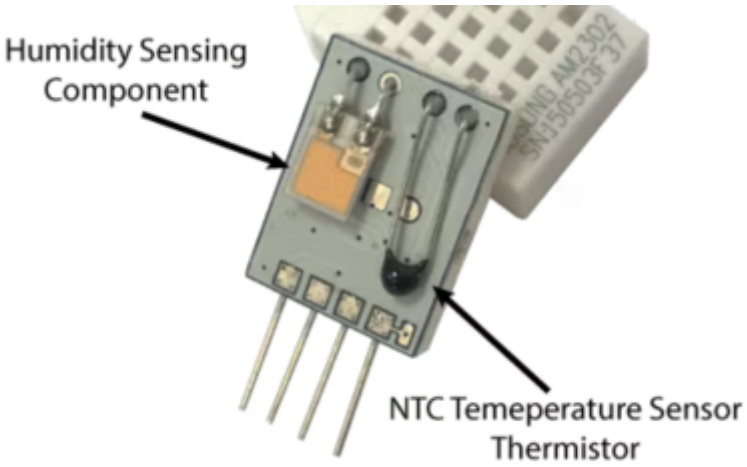


Figure # DHT22 Humidity sensing component. Source: https://howtomechatronics.com

Specifications

Table 2 **Table describing DHT-22 Specifications**	
Description	**Value**
Operating Voltage	3.5 to 5.5V
Data Protocol	Serial Transmission
Operating Temperature	-40 to 80 C
Temperature Accuracy	±0.5°C
Humidity Range	0 to 100 %
Humidity Accuracy	±1%
Sampling Rate	0.5 Hz - Once every 2 sec
Humidity Accuracy	±1%
Output Signal	Digital Signal via 1 wire bus

Table 2 Source: https://cdn-shop.adafruit.com/datasheets/Digital+humidity+and+temperature+sensor+AM2302.pdf

Schematics

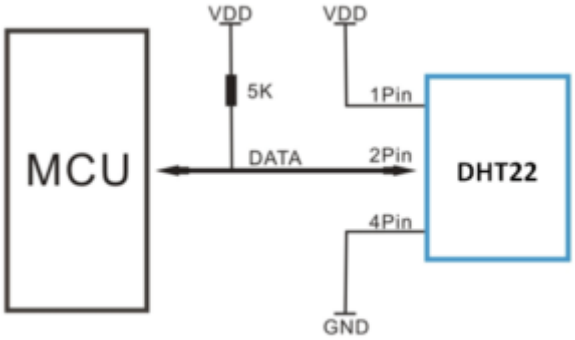


Figure # DHT22 Schematics. Source: https://components101.com/sensors/dht22-pinout-specs-datasheet//

Data

Example of how data transmission and the binary system provides information on both Temperature and Humidity.

ESP-32 receives 40 bits from the sensor as follows:

16 bits for	RHumidity	0000 0010 1000 1100
+		
16 bits for	Temperature	0000 0001 0101 1111
=		
8 bits	Check-sum	1110 1110[1)]

——

The conversion from the humidity data is:

Binary system	**>**	**Decimal System**
0000 0010 1000 1100	**>**	652

$$RH = \frac{\mathrm{652}}{\mathrm{10}} = \mathrm{65.2\;\%}$$

The conversion from the Temperatures data is:

Binary system	**>**	**Decimal System**
0000 0001 0101 1111	>	351

1. $$T = \frac{\mathrm{351}}{\mathrm{10}} = \mathrm{35.1°C}$$

If the highest bit of temperature is 1 as in: **_1_**000 0000 0110 0101, this means that the temperature is negative, therefore T = -10.1 °C[2)].

1)

https://cdn-shop.adafruit.com/datasheets/Digital+humidity+and+temperature+sensor+AM2302.pdf
2)

https://www.researchgate.net/publication/312403569_How_to_Use_the_DHT22_Sensor_for_Measuring_Temperature_and_Humidity_with_the_Arduino_Board

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