

Using DHT22 Digital Temperature & Humidity Sensor Module with Arduino



The DHT sensors are made of two parts, a capacitive humidity sensor and a thermistor. There is also a very basic chip inside that does some analog to digital conversion and spits out a digital signal with the temperature and humidity. The digital signal is fairly easy to read using any microcontroller.

In this tutorial, the DHT22 sensor will be used alongside with Arduino to take a temperature and humidity reading. This sensor is suitable to use for basic data logging.

Feature / Detail:

- Accuracy = 0.1
- Humidity Range = 0~100% RH
- Temperature Range = -40~80°C
- Humidity Precision = $\pm 2\%$ RH
- Temperature Precision = $\pm 0.5^\circ\text{C}$

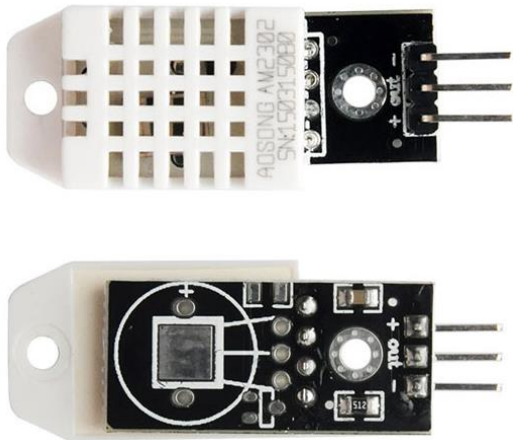
Objective:

The DHT22 sensor will sense the Temperature & Humidity level and the reading values will be displayed at the Serial Monitor tab.

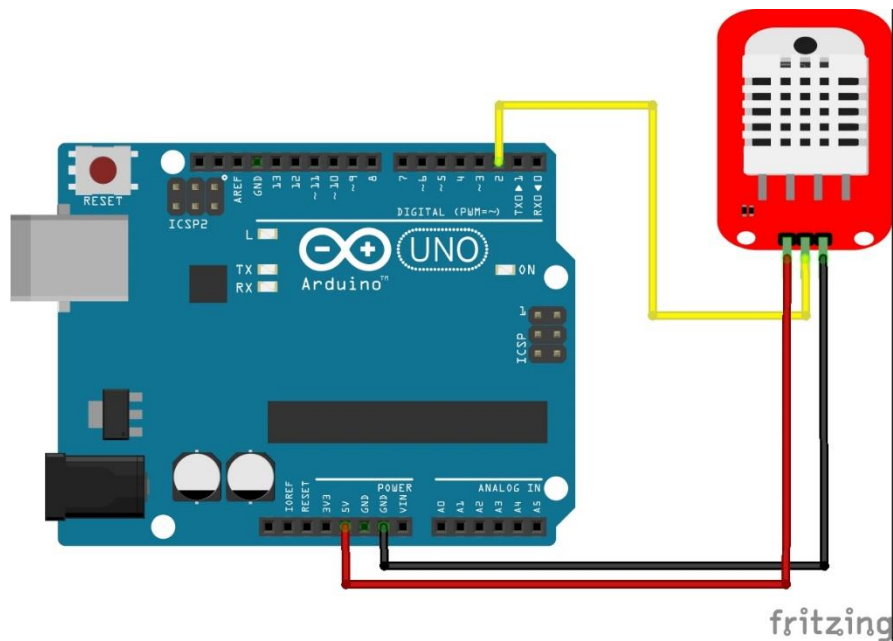
Preparation:

- Arduino Board
- DHT22 Digital Temperature & Humidity Sensor Module
- Jumper Wire

Pin Connection:

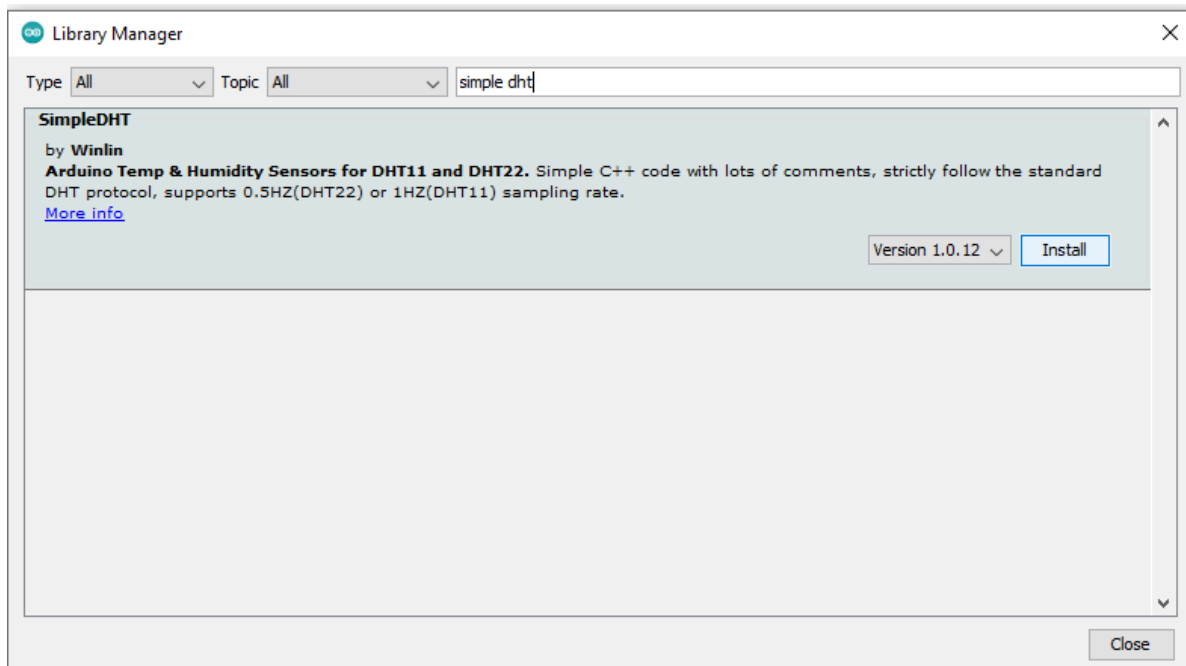
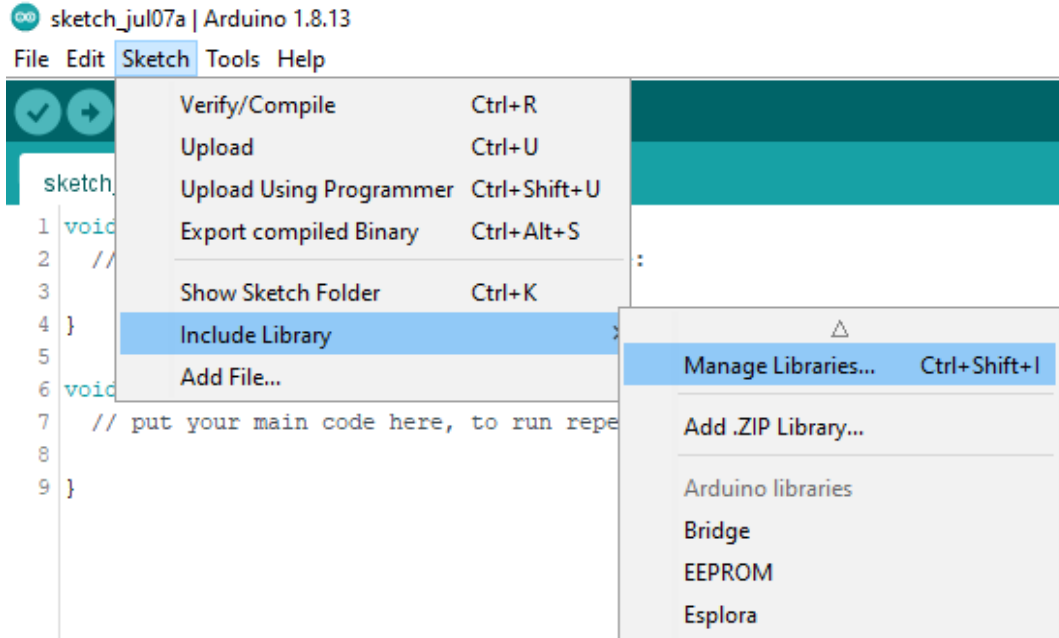


Arduino	DHT22
5v	+
GND	-
Data 2	Out



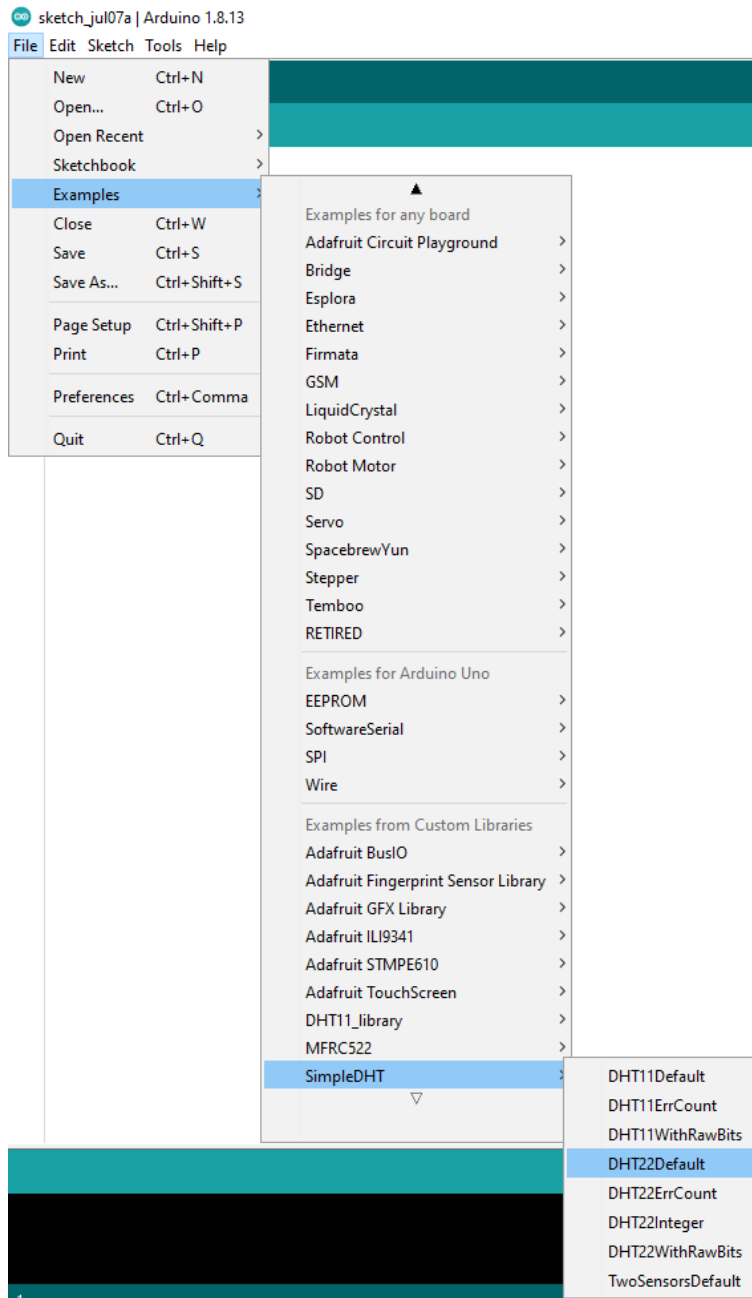
Installing Library:

1. Download & install 'SimpleDHT' library from Arduino Library Manager based on picture below.

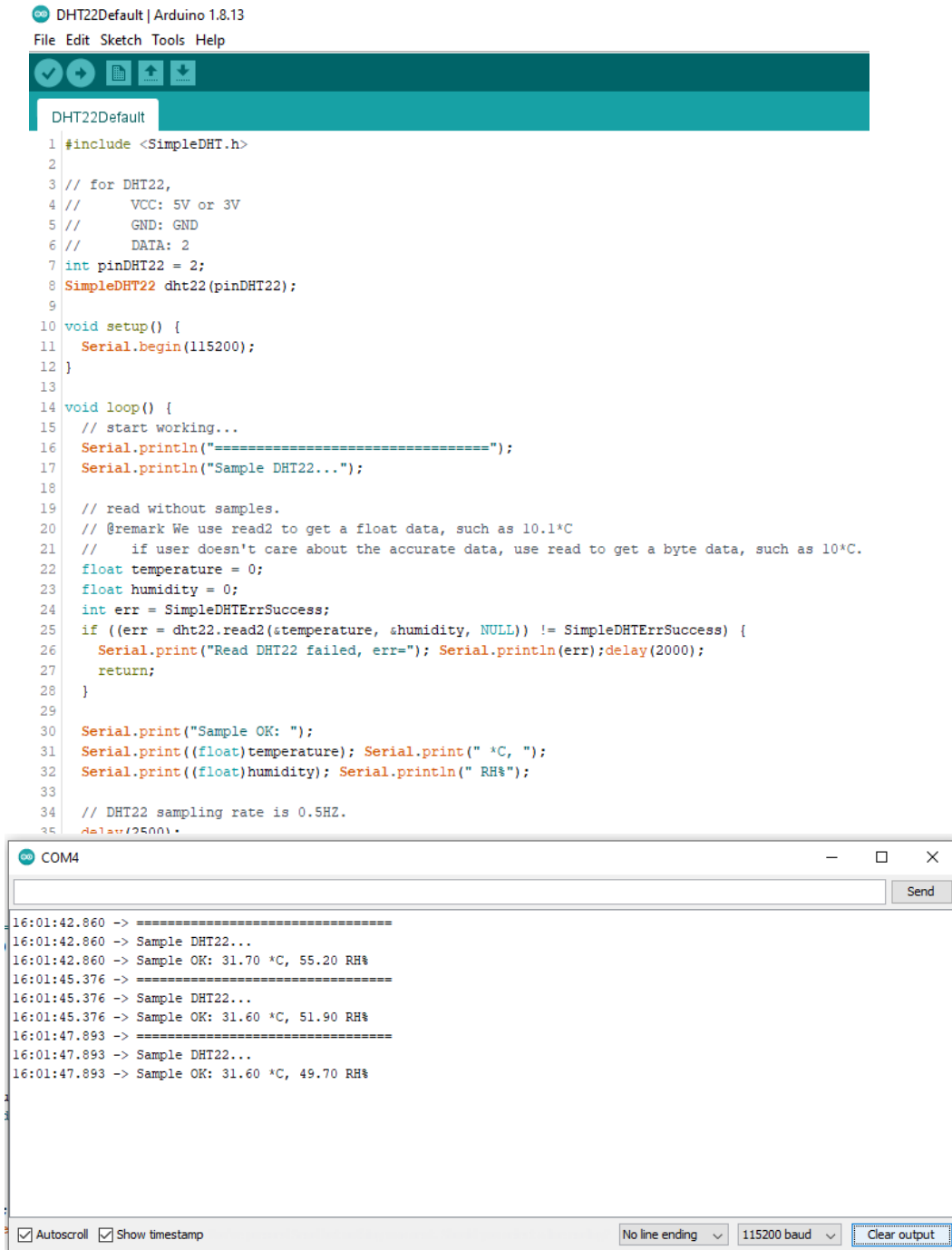


Uploading Sketch / Program:

1. Open DHT22Default sketch as picture below.



2. Upload the sketch & Open the Serial Monitor tab to obtain current temperature & humidity data .



The image shows the Arduino IDE interface with a sketch named 'DHT22Default' and a serial monitor window open. The sketch code is as follows:

```
1 #include <SimpleDHT.h>
2
3 // for DHT22,
4 //   VCC: 5V or 3V
5 //   GND: GND
6 //   DATA: 2
7 int pinDHT22 = 2;
8 SimpleDHT22 dht22(pinDHT22);
9
10 void setup() {
11   Serial.begin(115200);
12 }
13
14 void loop() {
15   // start working...
16   Serial.println("=====");
17   Serial.println("Sample DHT22...");
18
19   // read without samples.
20   // @remark We use read2 to get a float data, such as 10.1°C
21   //   if user doesn't care about the accurate data, use read to get a byte data, such as 10°C.
22   float temperature = 0;
23   float humidity = 0;
24   int err = SimpleDHTErrSuccess;
25   if ((err = dht22.read2(&temperature, &humidity, NULL)) != SimpleDHTErrSuccess) {
26     Serial.print("Read DHT22 failed, err="); Serial.println(err); delay(2000);
27     return;
28   }
29
30   Serial.print("Sample OK: ");
31   Serial.print((float)temperature); Serial.print(" °C, ");
32   Serial.print((float)humidity); Serial.println(" RH%");
33
34   // DHT22 sampling rate is 0.5HZ.
35   delay(2500);
```

The serial monitor window shows the following output:

```
16:01:42.860 -> =====
16:01:42.860 -> Sample DHT22...
16:01:42.860 -> Sample OK: 31.70 °C, 55.20 RH%
16:01:45.376 -> =====
16:01:45.376 -> Sample DHT22...
16:01:45.376 -> Sample OK: 31.60 °C, 51.90 RH%
16:01:47.893 -> =====
16:01:47.893 -> Sample DHT22...
16:01:47.893 -> Sample OK: 31.60 °C, 49.70 RH%
```

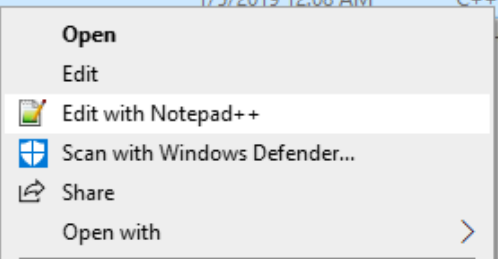
The serial monitor settings are: COM4, No line ending, 115200 baud, and Clear output button.

Fixing Error Receiving Data:

Some DHT22 module might not report data correctly (example = error) due to library incompatibility. This problem occurs because there are many types of different OEM chips used on same breakout board. To fix this issue user need to change the main Library.

1. Close Arduino IDE. Navigate to 'C:\Users\Admin\Documents\Arduino\libraries\SimpleDHT' to edit SimpleDHT.cpp.
2. Open / Edit the SimpleDHT.cpp with any text editor ([Notepad++](#) is recommended).

Name	Date modified	Type	Size
examples	1/5/2019 12:08 AM	File folder	
keywords.txt	1/5/2019 12:08 AM	Text Document	1 KB
library.properties	1/5/2019 12:08 AM	PROPERTIES File	1 KB
LICENSE	1/5/2019 12:08 AM	File	2 KB
README.md	1/5/2019 12:08 AM	MD File	3 KB
SimpleDHT.cpp	1/5/2019 12:08 AM	C++ Source	11 KB
SimpleDHT.h		C++ Header	7 KB



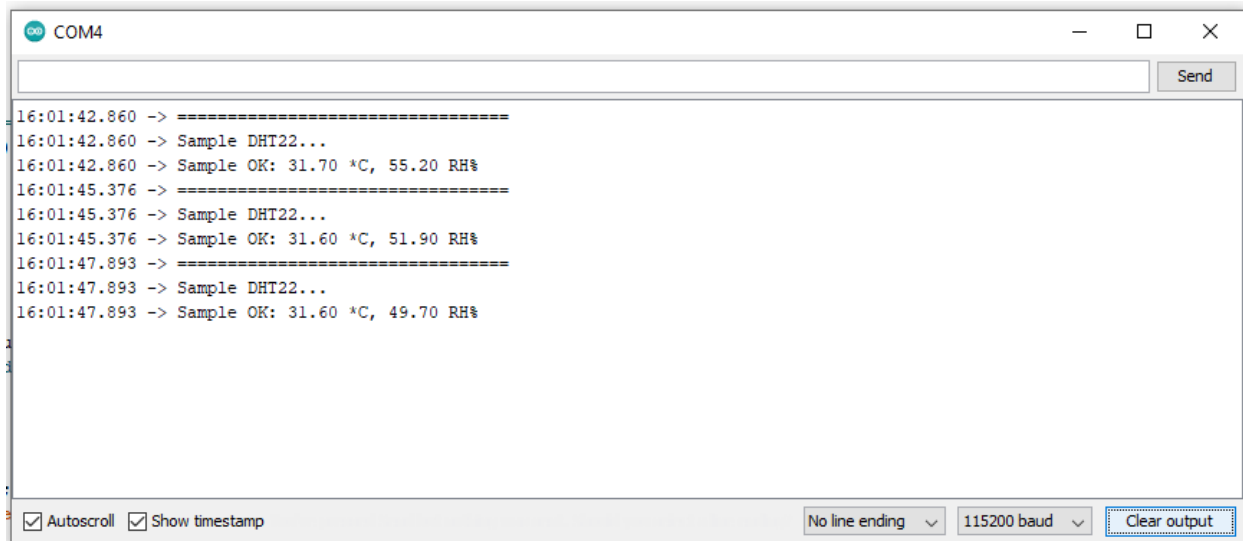
Open
Edit
Edit with Notepad++
Scan with Windows Defender...
Share
Open with >

```
SimpleDHT.cpp x
294
295 int SimpleDHT22::read2(int pin, float* ptemperature, float* phumidity, byte pdata[40]) {
296     setPin(pin);
297     return read2(temperature, humidity, pdata);
298 }
299
300 int SimpleDHT22::sample(byte data[40]) {
301     // empty output data.
302     memset(data, 0, 40);
303
304     // According to protocol: http://akizukidenshi.com/download/ds/aosong/AM2302.pdf
305     // notify DHT11 to start:
306     // 1. T(be), PULL LOW 1ms(0.8-20ms).
307     // 2. T(go), PULL HIGH 30us(20-200us), use 40us.
308     // 3. SET TO INPUT.
309     pinMode(pin, OUTPUT);
310     digitalWrite(pin, LOW);
311     delayMicroseconds(1000);
312     // Pull high and set to input, before wait 40us.
313     // @see https://github.com/winlinvip/SimpleDHT/issues/4
314     // @see https://github.com/winlinvip/SimpleDHT/pull/5
315     digitalWrite(pin, HIGH);
316     pinMode(pin, INPUT);
317     delayMicroseconds(40);
318 }
```

3. Scroll down to line 311, edit `delayMicroseconds(1000);` to `delay(10);` & save.

```
SimpleDHT.cpp x
294
295 int SimpleDHT22::read2(int pin, float* ptemperature, float* phumidity, byte pdata[40]) {
296     setPin(pin);
297     return read2(temperature, phumidity, pdata);
298 }
299
300 int SimpleDHT22::sample(byte data[40]) {
301     // empty output data.
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309     pinMode(pin, OUTPUT);
310     digitalWrite(pin, LOW);
311     delay(10);
312     // Pull high and set to input, before wait 40us.
313     // @see https://github.com/winlinvip/SimpleDHT/issues/4
314     // @see https://github.com/winlinvip/SimpleDHT/pull/5
315     digitalWrite(pin, HIGH);
316     pinMode(pin, INPUT);
317     delayMicroseconds(40);
318 }
```

4. Open Arduino IDE reupload the same sketch / program. Open the serial monitor the result should be fixed.



```
COM4
Send
16:01:42.860 -> =====
16:01:42.860 -> Sample DHT22...
16:01:42.860 -> Sample OK: 31.70 *C, 55.20 RH%
16:01:45.376 -> =====
16:01:45.376 -> Sample DHT22...
16:01:45.376 -> Sample OK: 31.60 *C, 51.90 RH%
16:01:47.893 -> =====
16:01:47.893 -> Sample DHT22...
16:01:47.893 -> Sample OK: 31.60 *C, 49.70 RH%
Autoscroll Show timestamp No line ending 115200 baud Clear output
```