DHT22 library for Arduino

1.0.1

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Contents

Chapter 1

DHT22 - AM2303 temperature and humidity sensor library for Arduino

This is a calibrated AM2303 digital temperature and relative humidity sensor on a DHT22 breakout PCB.

Library features

- Read 16-bit temperature (synchronous blocking)
- Read 16-bit relative humidity (synchronous blocking)

AM2303 sensor specifications

- Voltage: 3.3 .. 5V
- Ultra-low power:
  - Typical 15uA dormancy
  - Typical 500uA measuring
- Single wire digital serial interface
- Calibrated digital signal
- Outstanding long term stability
- No additional electronic components needed
- Humidity:
  - Range: 0 .. 99.9 RH (Relative Humidity)
  - Resolution: 0.1 RH
  - Accuracy: +/-2 RH (at 25 degree Celsius)
- Temperature:
  - Range: -40 .. +125 degree Celsius
  - Resolution: 0.1 degree Celsius
  - Accuracy: +/- 0.4 degree Celsius
- Minimum read interval: 2000 ms
- ∼31ms to synchronous read humidity, temperature and parity data from sensor (5 Bytes)

Hardware

Pull-up resistor DAT pin

- Connect an external `3k3..10k` pull-up resistor between the `DAT` and `VCC` pins only when:
  - Using a AM2302 sensor without a DT22 breakout PCB **and** the MCU IO pin has no built-in or external pull-up resistor.
- The DHT22 breakout PCB contains a `3k3` pull-up resistor between `DAT` and `VCC`.
- Please refer to the MCU datasheet or board schematic for more information about IO pin pull-up resistors.

External capacitor

- Tip: Connect a `100nF` capacitor between the sensor pins `VCC` and `GND` when read errors occurs. This may stabilize the power supply.

Connection DHT22 - Arduino

DHT22	Arduino UNO / Nano / Pro Mini / Leonardo / Mega2560
GND	GND
VCC	5V (or 3.3V)
DAT	2 (DIGITAL pin)

Connection DHT22 - ESP8266

Some ESP8266 boards uses Arduino pin 2 -> GPIO4 which is D4 text on the board. Make sure you're using the right pin.

DHT22	ESP8266 / WeMos D1 R2 / ESP12E / NodeMCU
GND	GND
VCC	3.3V
DAT	D4

Connection DHT22 - WeMos LOLIN32

WeMos LOLIN32 requires an additional 100nF capacitor over the GND - VCC pins to prevent parity errors.

Use pin 0 to prevent flash problems.

DHT22	WeMos Lolin32
GND	GND
VCC	3.3V
DAT	0

Other MCU's may work, but are not tested.

Examples

- Examples | Erriez DH22 | Example

Usage

Initialization

```
{c++}
#include <DHT22.h>

// Connect DTH22 DAT pin to Arduino board

// Arduino DIGITAL pin
#define DHT22_PIN      2
// Some ESP8266 boards uses D2 instead of 2
// #define DHT22_PIN   D2
// LOLIN32 uses another pin
// #define DHT22_PIN   0

DHT22 sensor = DHT22(DHT22_PIN);

void setup()
{
    // Initialize serial port
    Serial.begin(115200);
    Serial.println(F("DHT22 temperature and humidity sensor example\n"));

    // Initialize sensor
    sensor.begin();
}
```

Read temperature and humidity

```
{c++}
void loop()
{
    // Check minimum interval of 2000 ms between sensor reads
    if (sensor.available()) {
        // Read temperature from sensor
        int16_t temperature = sensor.readTemperature();

        // Read humidity from sensor
        int16_t humidity = sensor.readHumidity();

        if (temperature == ~0) {
            // Print error (Check hardware connection)
            Serial.print(F("Temperature: Error"));
        } else {
            // Print temperature
            Serial.print(F("Temperature: "));
            Serial.print(temperature / 10);
            Serial.print(F("."));
            Serial.print(temperature % 10);
            Serial.println(F(" *C"));
        }

        if (humidity == ~0) {
            // Print error (Check hardware connection)
            Serial.print(F("Humidity: Error"));
        } else {
            // Print humidity
            Serial.print(F("Humidity: "));
            Serial.print(humidity / 10);
            Serial.print(F("."));
            Serial.print(humidity % 10);
            Serial.println(F(" %"));
        }

        Serial.println();
      }
}
```

Serial output

```
DHT22 temperature and humidity sensor example

Temperature: 17.7 *C
Humidity: 41.0 %

Temperature: 17.8 *C
Humidity: 41.1 %

...
```

Documentation

- Doxygen online HTML
- Doxygen PDF
- AM2303 datasheet
- DHT22 datasheet

Library dependencies

- None

Library installation

Please refer to the Wiki page.

Other Arduino Libraries and Sketches from Erriez

- Erriez Libraries and Sketches

Chapter 2

Class Index

2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 3

File Index

3.1 File List

Here is a list of all documented files with brief descriptions:

Chapter 4

Class Documentation

4.1 DHT22 Class Reference

DHT22 sensor class.

`#include <DHT22.h>`

Public Member Functions

- DHT22 (uint8_t pin)
  Constructor DHT22 sensor.
- void begin ()
  Initialize sensor.
- bool available ()
  Check if new temperature or humidity read is allowed.
- int16_t readTemperature ()
  Read temperature from sensor.
- int16_t readHumidity ()
  Read humidity from sensor.

4.1.1 Detailed Description

DHT22 sensor class.

Definition at line 59 of file DHT22.h.

4.1.2 Constructor & Destructor Documentation

4.1.2.1 DHT22()

```
DHT22::DHT22 (
            uint8_t pin )  [explicit]
```

Constructor DHT22 sensor.

Parameters

pin	Data pin sensor.

Definition at line 38 of file DHT22.cpp.

4.1.3 Member Function Documentation

4.1.3.1 available()

```
bool DHT22::available ( )
```

Check if new temperature or humidity read is allowed.

The application should call this function and check if a new temperature and humidity can be read to prevent too fast sensor reads.

Return values

true	Available, interval between sensor reads >= 2000 ms.
false	Not available, interval between sensor reads too short.

Definition at line 87 of file DHT22.cpp.

4.1.3.2 begin()

```
void DHT22::begin ( )
```

Initialize sensor.

Call this function from setup().

- Connect an external 3k3..10k pull-up resistor between the DAT and VCC pins only when:
  - using a AM2302 sensor without a DT22 breakout PCB
    AND
  - the MCU IO pin has no built-in or external pull-up resistor.
- The DHT22 breakout PCB contains a 3k3 pull-up resistor between DAT and VCC.
- Please refer to the MCU datasheet or board schematic for more information about IO pin pull-up resistors.

Definition at line 68 of file DHT22.cpp.

4.1.3.3 readHumidity()

```
int16_t DHT22::readHumidity ( )
```

Read humidity from sensor.

Return values

Humidity	Signed humidity with last digit after the point.
∼0	An error occurred.

Definition at line 130 of file DHT22.cpp.

4.1.3.4 readTemperature()

```
int16_t DHT22::readTemperature ( )
```

Read temperature from sensor.

Returns the actual temperature, or a cached temperature when read interval is too short.

Return values

Temperature	Signed temperature with last digit after the point.
∼0	An error occurred.

Definition at line 107 of file DHT22.cpp.

The documentation for this class was generated from the following files:

- DHT22.h
- DHT22.cpp

Chapter 5

File Documentation

5.1 DHT22.cpp File Reference

DHT22 (AM2303) Humidity and Temperature sensor example for Arduino.

```
#include "DHT22.h"
```

5.1.1 Detailed Description

DHT22 (AM2303) Humidity and Temperature sensor example for Arduino.

Source: https://github.com/Erriez/ErriezDHT22

5.2 DHT22.h File Reference

DHT22 (AM2303) Humidity and Temperature sensor example for Arduino.

```
#include <Arduino.h>
```

Classes

- class DHT22

  DHT22 sensor class.

Macros

- #define DHT22_MIN_READ_INTERVAL 2000

  Enable debug prints to Serial.
- #define DHT22_NUM_DATA_BITS (5 ∗ 8)
- #define DEBUG_PRINTLN(...) {}

  Debug print configuration.

5.2.1 Detailed Description

DHT22 (AM2303) Humidity and Temperature sensor example for Arduino.

Source: https://github.com/Erriez/ErriezDHT22

5.2.2 Macro Definition Documentation

5.2.2.1 DHT22_MIN_READ_INTERVAL

```
#define DHT22_MIN_READ_INTERVAL 2000
```

Enable debug prints to Serial.

Minimum interval between sensor reads in milli seconds

Definition at line 41 of file DHT22.h.

5.2.2.2 DHT22_NUM_DATA_BITS

```
#define DHT22_NUM_DATA_BITS (5 * 8)
```

Number of data bits is 5 Bytes $*$ 8 bits: 1 Byte: Humidity high 1 Byte: Humidity low 1 Byte: Temperature high 1 Byte: Temperature low 1 Byte: Parity

Definition at line 49 of file DHT22.h.

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