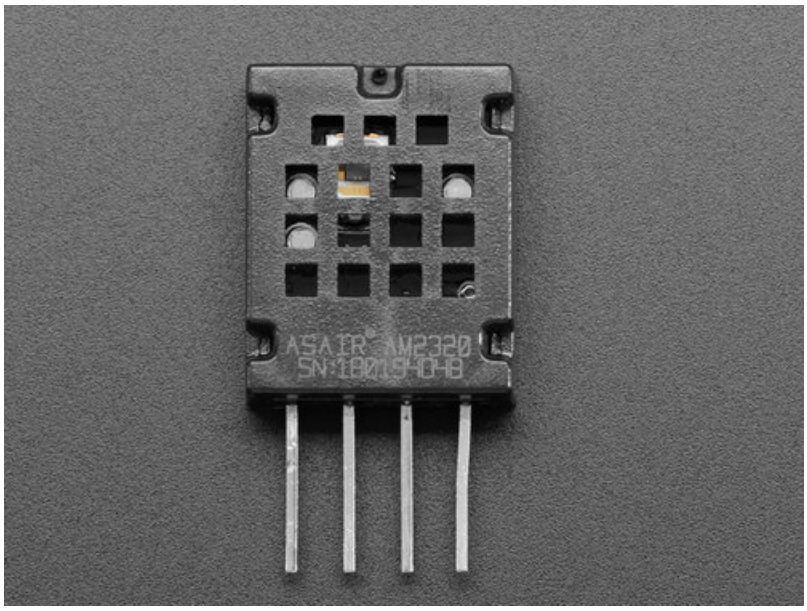
adafruit learning system

Adafruit AM2320 Sensor

Created by lady ada



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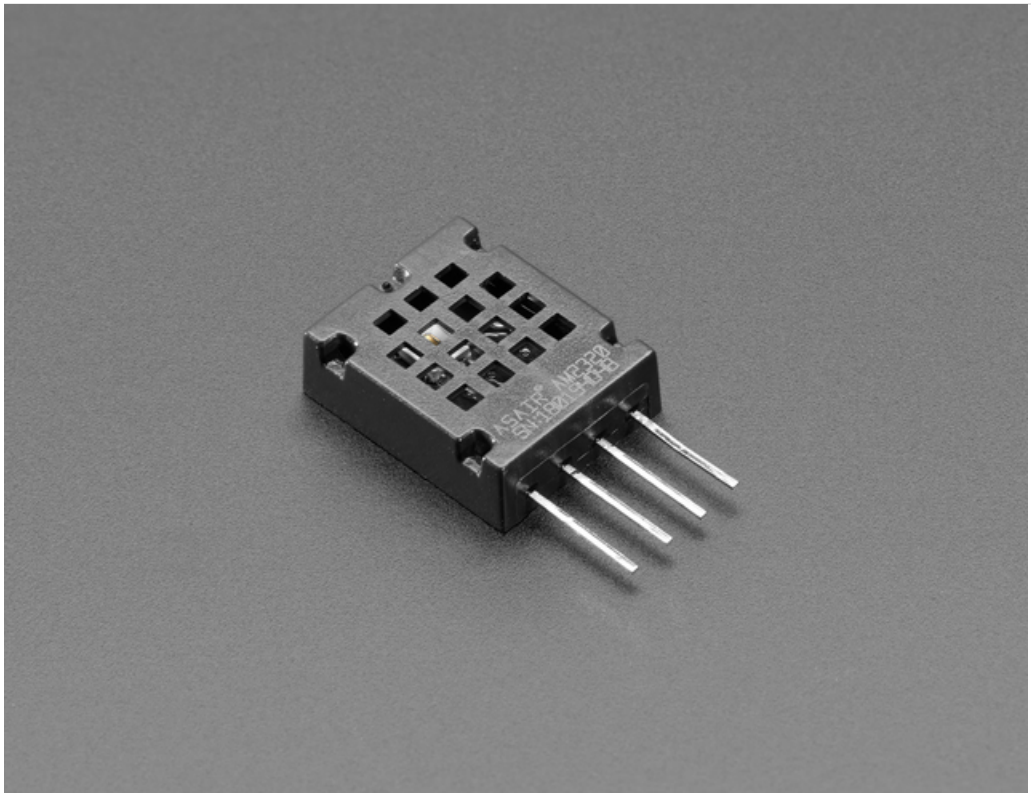
Guide Contents

Overview



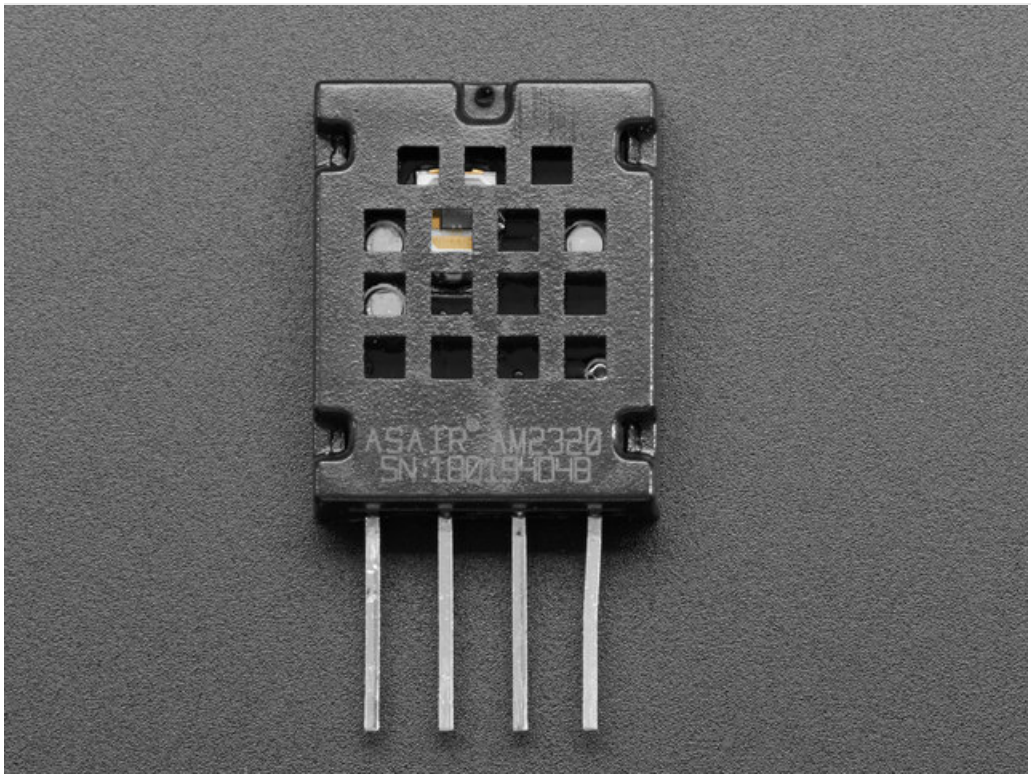
This little sensor looks an *awful lot* like the popular DHT11/DHT22 temperature and humidity sensors, but unlike classic DHT sensors, it has an I2C interface! That's right, you do not need to use a bit-bang timing-specific protocol to talk to the AM2320, it uses plain-old-I2C. Whew, that makes things a little easier, doesn't it?

But! We'll let you know, this sensor is not well documented like our other, fancier I2C temperature & humidity sensors. The datasheet mentions it has 3% humidity accuracy and 0.5C temperature accuracy, but we're not very trusting of the specifications. So, while this sensor does seem to work, it's not recommended for anything where you care about any sort of guaranteed accuracy. Temperature is probably correct to 2-3 degrees Celsius. Humidity is probably within 5-10%.

That said, for maker and IoT projects? You can't beat the simplicity and price! And we've got ready-to-go working Arduino and CircuitPython code to use it.

Each order comes with one AM2320, a low-cost temperature and humidity sensor. You just provide any microcontroller that can run our Arduino or CircuitPython library, and two I2C pull-up resistors (not included).

Pinouts

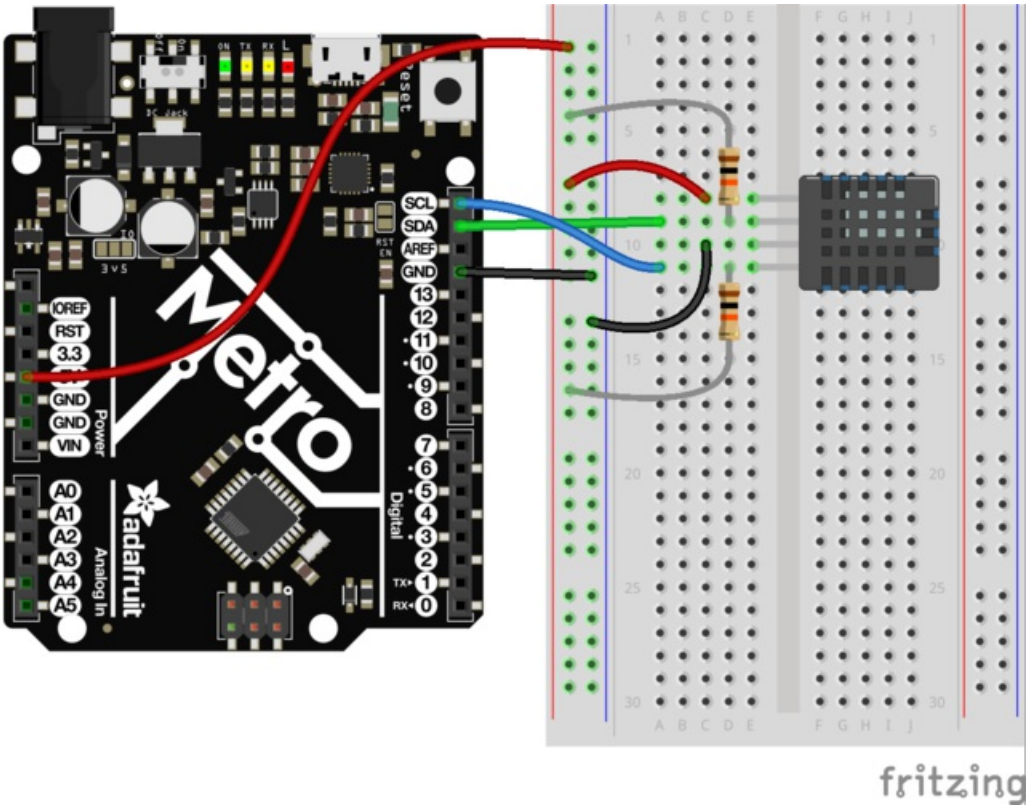


Starting from the **left** the pins are

1. **VDD** - this is power in, can be 3-5VDC
2. **SDA** - I2C data in/out, requires a pullup of 2-10K to **VDD**
3. **GND** - this is signal/power ground
4. **SCL** - I2C clock in, requires a pullup of 2-10K to **VDD**

Arduino Usage

You can easily wire this breakout to any microcontroller, we'll be using an Arduino. For another kind of microcontroller, just make sure it has I2C, then port the code - its pretty simple stuff!



https://adafru.it/AMu

https://adafru.it/AMu

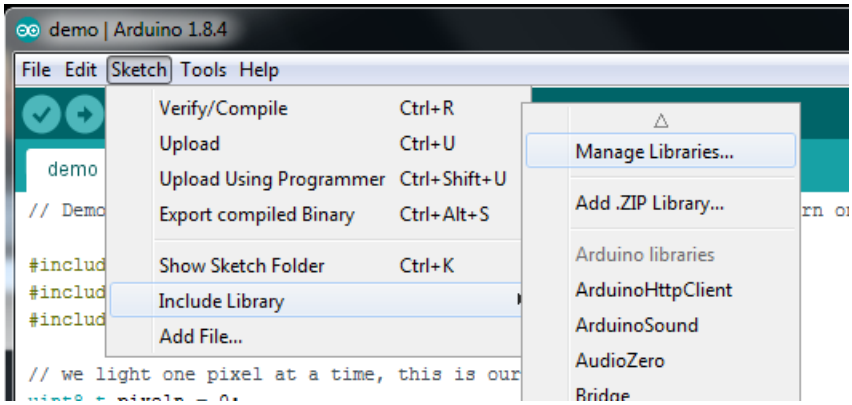
- Connect **Vin** to the power supply, 3-5V is fine. Use the same voltage that the microcontroller logic is based off of. For most Arduinos, that is 5V
- Connect **GND** to common power/data ground
- Connect the **SCL** pin to the I2C clock **SCL** pin on your microcontroller
- Connect the **SDA** pin to the I2C data **SDA** pin on your microcontroller.

You will also need to add two I2C pullup resistors if your board does not already have them. You can use 2.2K - 10K but we will just use 10K. The resistors go from **VDD** to **SCL** and **SDA** each.

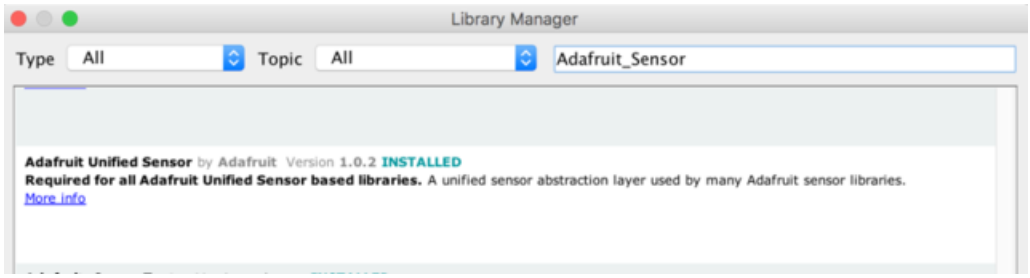
The AM2320 has a default I2C address of **0x5C** and cannot be changed.

Install Adafruit Sensor

Open up the Library Manager in the Arduino IDE...



Search for **Adafruit_Sensor** to locate the Unified Sensor library and **Install** it



Download Adafruit_AM2320

To begin reading sensor data, you will need to download Adafruit_AM2320 from our github repository (https://adafru.it/C3Y). You can do that by visiting the github repo and manually downloading or, easier, just click this button to download the zip

https://adafru.it/AMv

https://adafru.it/AMv

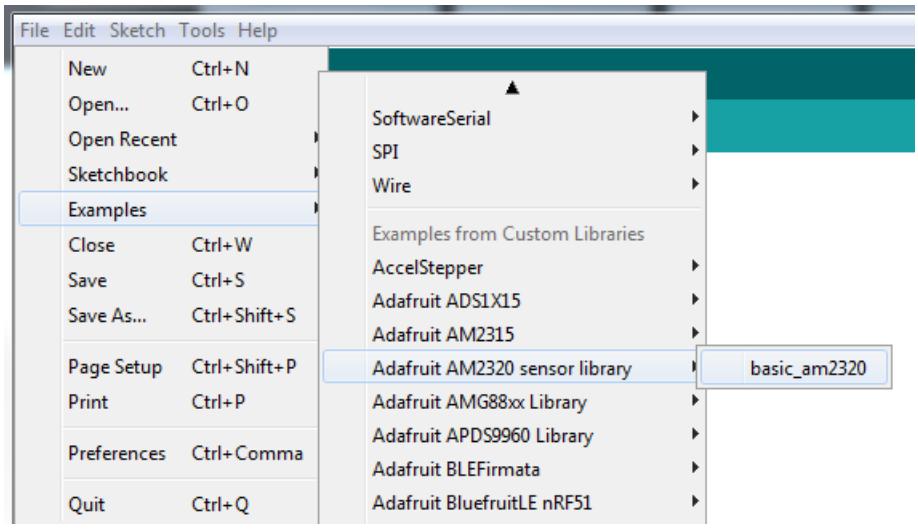
Rename the uncompressed folder **Adafruit_AM2320** and check that the **Adafruit_AM2320** folder contains **Adafruit_AM2320.cpp** and **Adafruit_AM2320.h**

Place the **Adafruit_AM2320** library folder your **arduinosketchfolder/libraries/** folder.
You may need to create the **libraries** subfolder if its your first library. Restart the IDE.

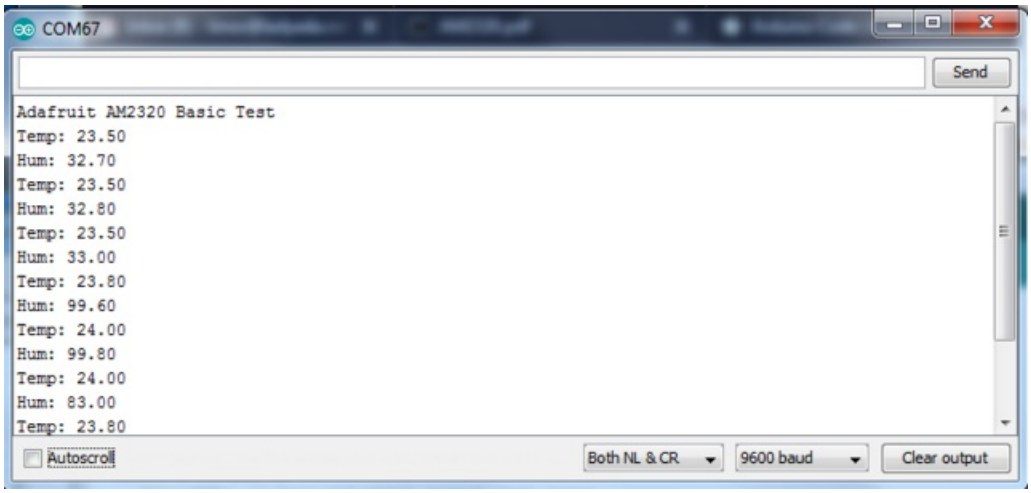
We also have a great tutorial on Arduino library installation at:
http://learn.adafruit.com/adafruit-all-about-arduino-libraries-install-use (https://adafru.it/aYM)

Load Demo

Open up **File->Examples->Adafruit_AM2320->am2320_basictest** and upload to your microcontroller wired up to the sensor



Thats it! Now open up the serial terminal window at 9600 speed to begin the test.

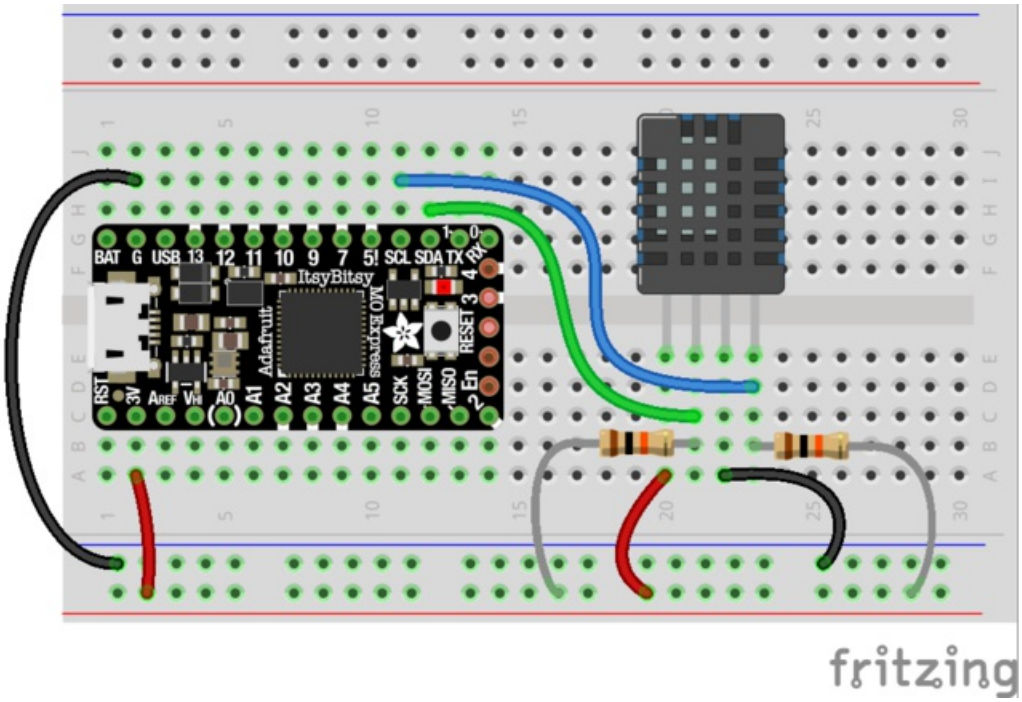


You can try breathing on the sensor to increase the humidity.

CircuitPython Usage

It's easy to use the AM2320 sensor with CircuitPython and the Adafruit CircuitPython AM2320 (https://adafru.it/C3Z) module. This module allows you to easily write Python code that reads the humidity and temperature from the sensor.

First wire up a AM2320 to your board exactly as shown on the previous pages for Arduino using an I2C connection. Here's an example of wiring a ItsyBitsy M0 to the sensor with I2C:



https://adafru.it/AMx

https://adafru.it/AMx

- **Board 3V** to **sensor VIN**
- **Board GND** to **sensor GND**
- **Board SCL** to **sensor SCL**
- **Board SDA** to **sensor SDA**

Next you'll need to install the Adafruit CircuitPython AM2320 (https://adafru.it/C3Z) library on your CircuitPython board.

First make sure you are running the latest version of Adafruit CircuitPython (https://adafru.it/Amd) for your board.

Next you'll need to install the necessary libraries to use the hardware--carefully follow the steps to find and install these libraries from Adafruit's CircuitPython library bundle (https://adafru.it/zdx). Our introduction guide has a great page on how to install the library bundle (https://adafru.it/ABU) for both express and non-express boards.

Remember for non-express boards like the, you'll need to manually install the necessary libraries from the bundle:

- **adafruit_am2320.mpy**
- **adafruit_bus_device**

You can also download the **adafruit_am2320.mpy** from its releases page on Github (https://adafru.it/C3-).

Before continuing make sure your board's lib folder or root filesystem has the **adafruit_am2320.mpy,** and **adafruit_bus_device** files and folders copied over.

Next connect to the board's serial REPL (https://adafru.it/Awz)so you are at the CircuitPython >>> prompt.

Usage

To demonstrate the usage of the sensor we'll initialize it and read the humidity and temperature from the board's Python REPL.

Run the following code to import the necessary modules and initialize the I2C connection with the sensor:

```
import board
import busio
import adafruit_am2320
i2c = busio.I2C(board.SCL, board.SDA)
sensor = adafruit_am2320.AM2320(i2c)
```

Remember if you're using a board that doesn't support hardware I2C (like the ESP8266) you need to use the **bitbangio** module instead:

```
i2c = bitbangio.I2C(board.SCL, board.SDA)
```

Now you're ready to read values from the sensor using any of these properties:

- **relative_humidity** - The relative humidity measured by the sensor, this is a value from 0-100%.
- **temperature** - The temperature measured by the sensor, a value in degrees Celsius.

```
print('Humidity: {0}%'.format(sensor.relative_humidity))
print('Temperature: {0}C'.format(sensor.temperature))
```

That's all there is to using the AM2320 with CircuitPython!

Below is a complete example that measures the sensor readings and prints them every two seconds. Save this as **main.py** on your board and open the REPL to see the output. Remember to change to the **bitbangio** module if necessary for your board!

```
import time
import board
import busio
import adafruit_am2320

# can also use board.SDA and board.SCL for neater looking code!
i2c = busio.I2C(board.D2, board.D0)
am = adafruit_am2320.AM2320(i2c)


while True:
    try:
        print("Temperature: ", am.temperature)
        print("Humidity: ", am.relative_humidity)
    except OSError:
        # These sensors are a bit flakey, its ok if the readings fail
        pass
    except RuntimeError:
        pass
    time.sleep(2)
```

Python Docs

Python Docs (https://adafru.it/C40)