QUICK REFERENCE · TK120

SHT31 Temperature and Humidity

Both numbers, calibrated at the factory, over two shared wires at 0x44.

VCC goes to your board's logic supply

The pull-ups on SDA and SCL end at VCC, so the bus rests at whatever VCC is. **5V on an Uno, 3V3 on an ESP32, ESP32-S3 or Pico.** 5V on VCC beside a 3.3 V board puts 5 V on two of its pins. The sensor itself runs from 2.15 V, so 3V3 costs nothing.

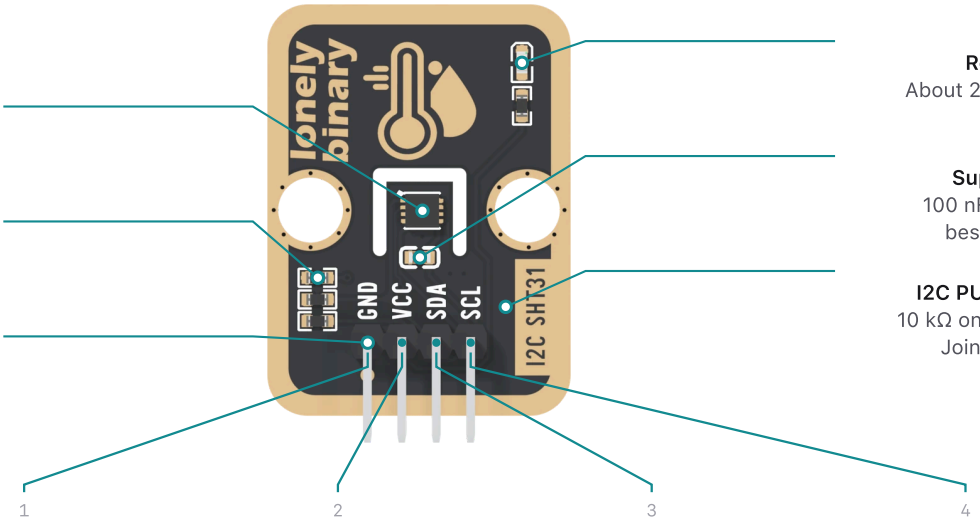
Pins, and which to wire

Sensor side up, header at the bottom. All four pins are wired. The red light only says VCC arrived: the sensor answering at 0x44 is the sign it works.

SHT31 at 0x44
On a tongue: the slot keeps board heat off it.

ADDR jumper, on the back
Open: 0x44. Bridged: 0x45. No third address.

GND is the square pad
Then VCC, SDA, SCL. The back prints them mirrored.



Red power light
About 275 µA at 3.3 V, always on.

Supply capacitor
100 nF, VCC to GND, beside the sensor.

I2C PULL-UP jumper
10 kΩ on SDA and SCL. Joined as shipped.

Front	GND	VCC	SDA	SCL
Back	GND	VCC	SDA	SCL
I2C	GND	VCC	SDA	SCL

Two library calls are two measurements

readTemperature() then readHumidity() measures twice, 20 ms each, from two moments: the library keeps nothing. **readBoth()** takes one measurement and returns both numbers, and its false is the failed checksum.

Three numbers to read it by

Temperature

±0.2 °C typical

From 0 to 90 °C. It prints hundredths; about one decimal of them is real.

Humidity

±2 %RH typical

Happiest at 20 to 80 %RH; above that the reading drifts and recovers.

Current

1.7 µA at a reading a second

600 µA for the 12.5 ms it measures. The power light draws about 275 µA.

The sensor is accurate enough that where you put it matters more than which sensor you bought: a degree high is the board, the breadboard or the microcontroller warming the air round it. Keep it on long wires, away from warm parts.

Typical values from Sensirion's SHT3x-DIS datasheet, version 7; the average current is its own worked example, and the light's is Ohm's law on the 5.1 kΩ with a red LED's usual 1.9 V. Not measured on a bench.

The first reading, every two seconds

Arduino IDE · Board: your board, e.g. ESP32S3 Dev Module · USB CDC On Boot: Enabled (S3 only) · Library: Adafruit SHT31 Library, with Adafruit BusIO

```
#include <Adafruit_SHT31.h>

#define SHT31_ADDR 0x44   // 0x45: ADDR bridged

Adafruit_SHT31 sht;

void setup() {
  Serial.begin(115200);
  while (!Serial) delay(10);   // native USB
  // begin() starts Wire on the default pins.
  if (!sht.begin(SHT31_ADDR)) {
    Serial.println("no SHT31: check GND, SDA, SCL");
    while (true) delay(100);
  }
  Serial.println("SHT31 found");
}

void loop() {
  float celsius, humidity;
  // One measurement, both numbers.
  if (sht.readBoth(&celsius, &humidity)) {
    Serial.print(celsius);
    Serial.print(" C  ");
    Serial.print(humidity);
    Serial.println(" %");
  } else {
    Serial.println("read failed");  // bad checksum
  }
  delay(2000);
}
```

```
SHT31 found
22.59 C 48.29 %
22.61 C 48.27 %
```

Serial Monitor at 115200, a line every two seconds. Breathe on the board and the humidity climbs within a few seconds.

Wiring

	FRONT	UNO	ESP32	S3	PICO
1	**GND**	GND	GND	GND	GND
2	**VCC**	5V	3V3	3V3	3V3
3	**SDA**	A4	GPIO 21	GPIO 8	GP4
4	**SCL**	A5	GPIO 22	GPIO 9	GP5

Hole 1 is the square pad. VCC is the board's logic supply, never 5V beside a 3.3 V board. The SDA and SCL pins are each board's defaults, so begin() needs no pin numbers.

Two on one bus, and the jumpers

Bridge the **ADDR** pads on the back of the second board and it answers at 0x45; begin it with `sht2.begin(0x45)`. Leave both boards' **I2C PULL-UP** jumpers joined: two 10 kΩ in parallel make 5 kΩ, and the lines rise faster. A third SHT31 needs a second bus. In MicroPython, write `b"\x24\x00"` to 0x44, wait 20 ms and read six bytes: temperature, its CRC, humidity, its CRC.

When it does not work

No SHT31 at 0x44

Count from the square pad: GND, VCC, SDA, SCL. SDA and SCL swapped is the usual fault.

read failed, again and again

A checksum failed on the wires. Shorter jumpers, off the breadboard, 100 kHz.

Two boards, one shows up

Both are at 0x44. Bridge ADDR on one of them to move it to 0x45.

The light is on, nothing answers

The light only proves VCC and GND. Check GND at your board, then SDA and SCL.

A degree or two high

The sensor reads the air round it. Move it off the breadboard, away from warm parts.

Humidity offset after damp days

Long spells above 80 %RH shift it. It recovers on its own in normal air.

Specifications

Sensor	Sensirion SHT31-DIS, DFN-8	**Address**	0x44; 0x45 with ADDR bridged
Temperature	-40 to 125 °C, ±0.2 °C typical	**Humidity**	0 to 100 %RH, ±2 %RH typical
Measuring	12.5 ms typical, 15 ms max	**Supply**	2.15 to 5.5 V: your logic supply
Pull-ups	10 kΩ to VCC, cut jumper	**Board**	22.4 × 30.4 mm, header fitted