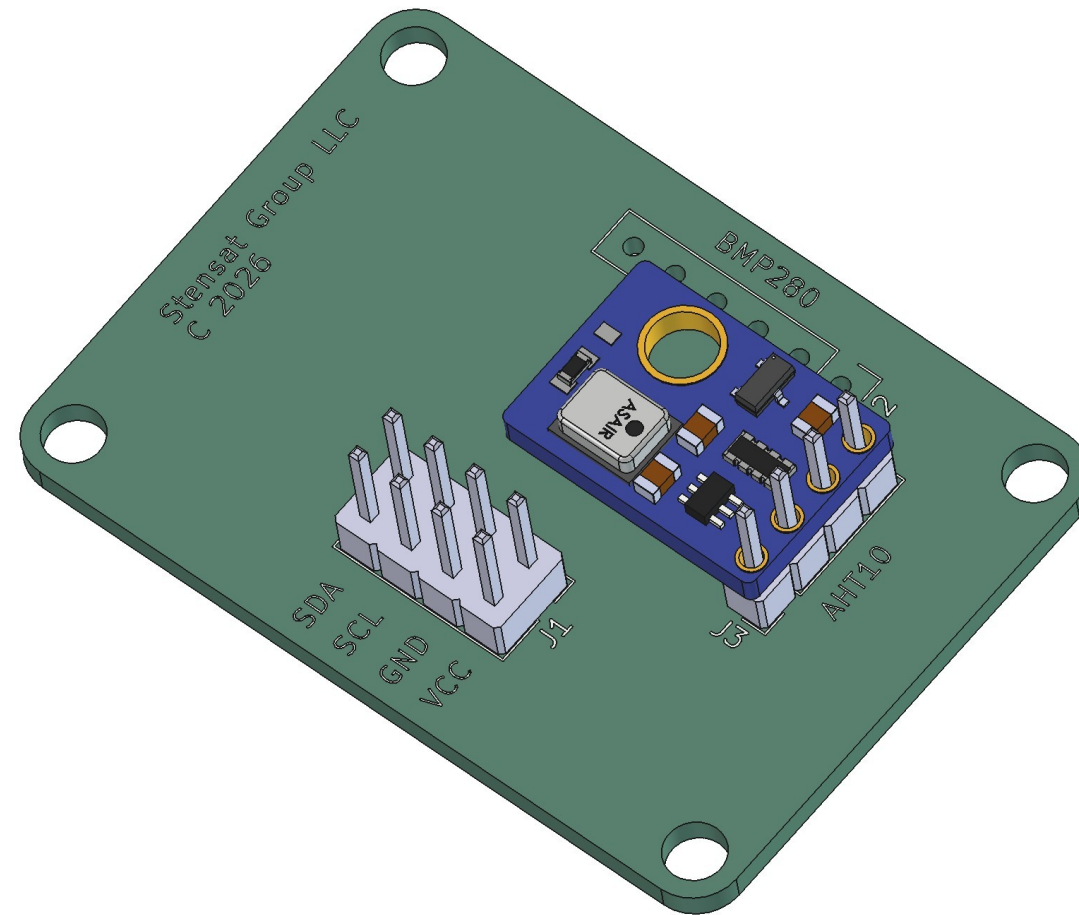


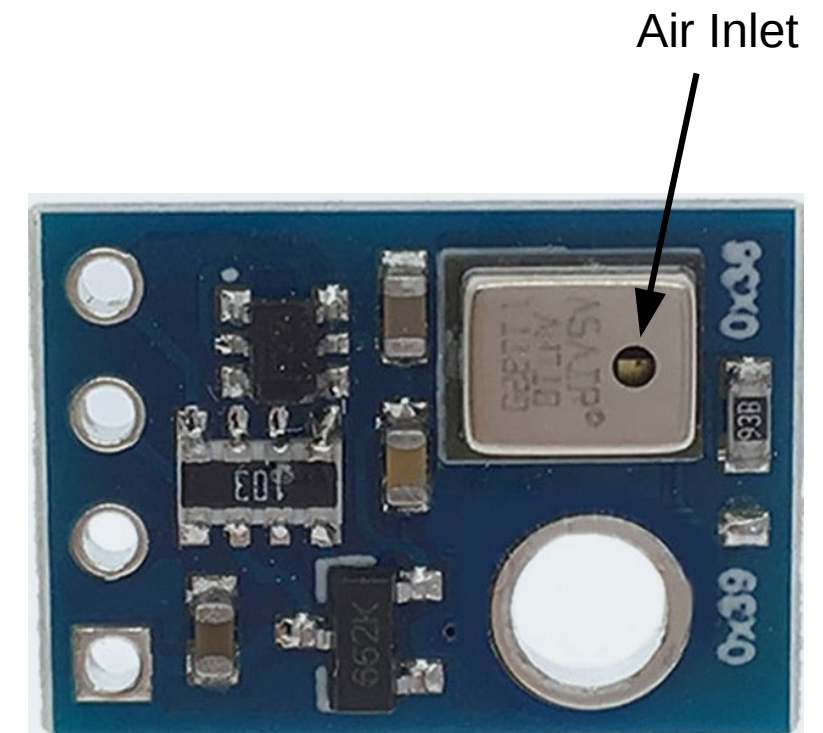
# Humidity Sensor

---



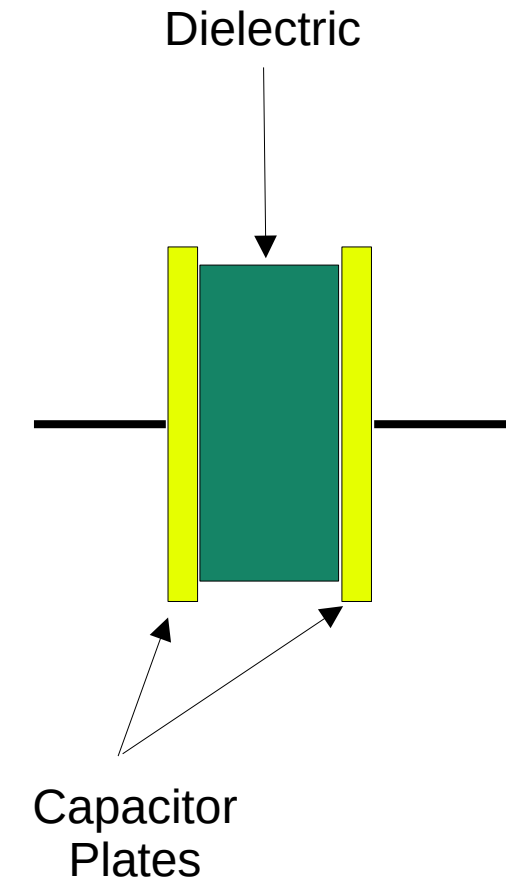
# Humidity Sensor

- This is the humidity sensor board. The green board is the sensor carrier that is designed to support the sensor.
- The blue circuit board is the humidity sensor circuit.
- The small silver rectangle is the sensor itself. Notice the small hole. This hole allows air to enter so it can measure the relative humidity.

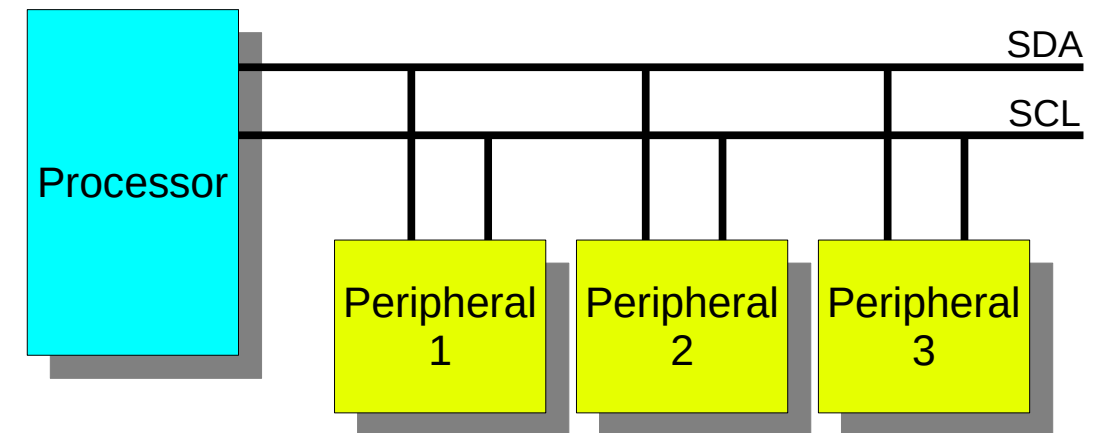


# Humidity Sensor

- The AHT10 relative humidity sensor uses a capacitive humidity sensor. The sensor is comprised of two metal plates making the capacitor and a dielectric material between the two plates. The sensor measures how fast the capacitor discharges. The discharge rate varies by the change in the dielectric material. The dielectric material is sensitive to moisture and changes the capacitance based on the humidity level.

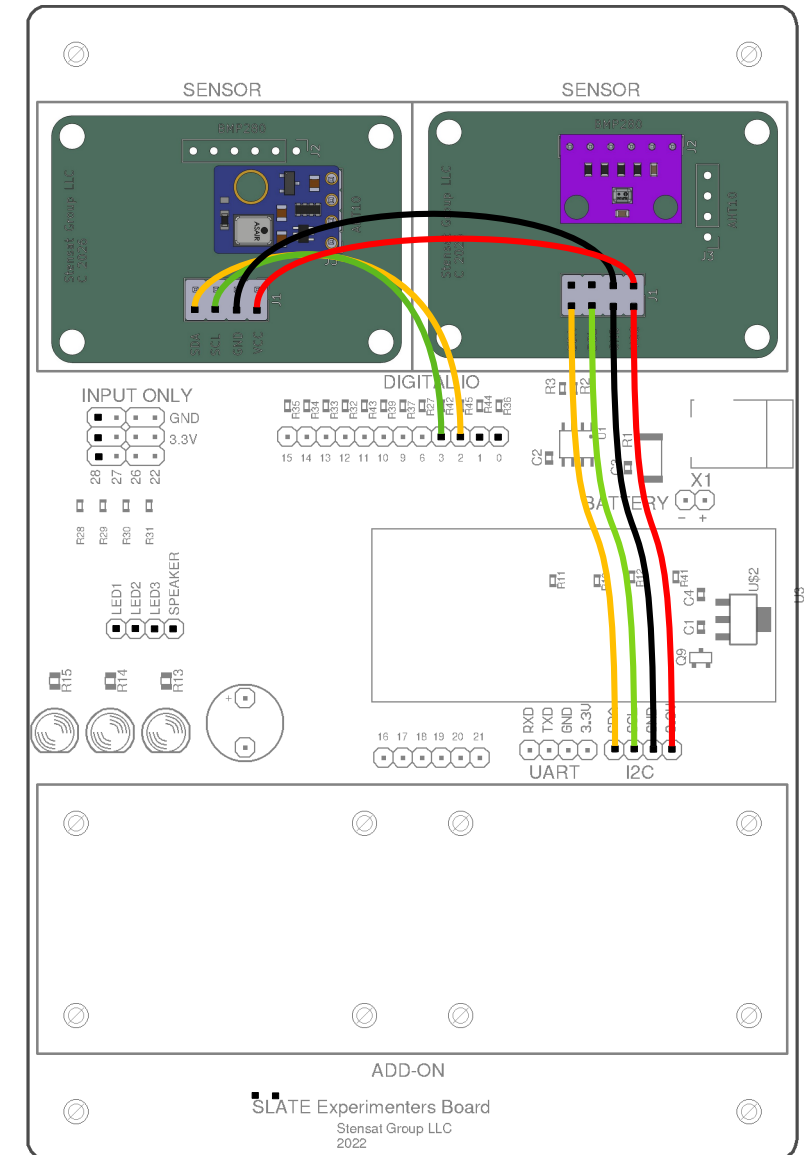


- I2C stands for Inter-Integrated Circuit. It is a serial type interface requiring only two signals, a clock signal and a data signal.
- The I2C bus is typically used to interface with sensors and peripheral devices not needing to communicate at high speeds. The standard data rate is 100 Kilobits per second.
- Multiple devices can be connected to a single I2C bus. The processor is the controller and all the connected devices are peripherals. The processor is also called the master and the peripherals are slaves. Each slave has a unique address.



# Humidity Sensor Issue

- It has been found that the humidity sensor sometimes do not work with other sensors connected on the same I2C interface. The Raspberry PI PICO includes two I2C controllers that can be used on different digital pins.
- Connect the humidity sensor 3.3V and GND to the pressure sensor second set of pins.
- Connect the humidity sensor SDA pin to digital pin 2.
- Connect the humidity sensor SCL pin to digital pin 3.



- From Canvas, download the **ahtx0.py** module.
- Using the File View in Thonny, locate the **ahtx0.py** module.
- Make sure the SLATE board is plugged in and connected to Thonny.
- Find the file **ahtx0.py** and right click on it and select **Upload**.
- The file should now appear in the SLATE file list.

# Humidity Sensor Test Program

- Enter the program to the right. Make sure to use capital letters since it does matter.
- The first line imports the **I2C** bus interface functions and **Pin** functions.
- The second line imports the humidity sensor module functions.
- The third line imports the **time** functions.
- Next, the I2C bus is configured by defining the **SDA** and **SCL** pins and assigned to the object **bus**. The first argument specifies which I2C controller is used.
- Next, the humidity sensor is initialized and assigned to object **hum**.
- In the while loop, the humidity and temperature are captured.
- The pressure function calls look like variables. This is a object oriented feature of python.
- Run the program and see the results.

```
from machine import I2C,Pin
import ahtx0
import time

bus = I2C(1,sda=Pin(2),scl=Pin(3))
hum = ahtx0.AHT10(bus)

while 1:
    print(hum.temperature,hum.relative_humidity)
    time.sleep(.1)
```

