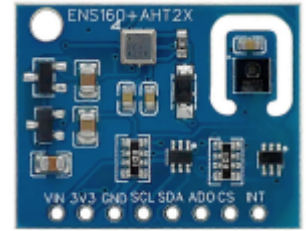


lamaPLC: ENS160 + AHT21 Air Quality Sensor - CO, ECO, TVOC, Temp & Humidity Module

The ENS160 + AHT21 Air Quality Module is a combined environmental sensor board that measures indoor air pollutants (VOCs, eCO₂, AQI) and climate conditions (Temperature, Humidity). It is a popular upgrade for older sensors like the CCS811 due to its integrated sensor fusion and automatic calibration.



- Detection of reducing (VOC) and oxidizing gases (such as NO₂)
- MOX supports up to 4 gas sensors
- Integrated sensor measurement and heater drive control
- Integrated pre-calibrated sensor fusion and automatic correction algorithm

Key Capabilities

- **ENS160 (Air Quality):** Uses Metal-Oxide (MOX) technology to detect reducing and oxidizing gases.
 - **Outputs:** Total Volatile Organic Compounds (TVOC), equivalent CO₂ (eCO₂), and Air Quality Index (AQI).
 - **Target Gases:** Ethanol, toluene, hydrogen, NO₂, and ozone.
- **AHT21 (Climate):** A high-precision digital temperature and humidity sensor.
 - **Temperature:** ±0.3 °C accuracy; range of -40 °C to +120 °C.
 - **Humidity:** ±2 % RH accuracy; range of 0 to 100 % RH.

Technical Specifications

Feature	Specification
Supply Voltage (VIN)	2.0V to 5.5V DC (Breakout boards often regulate to 3.3V)
Interface	I ² C (Standard) or SPI (ENS160 only)
I2C Addresses	ENS160: 0x53 (default) or 0x52 ; AHT21: 0x38
Warm-up Time	< 1 minute for immediate use; up to 1 An hour for full accuracy
Power Use	1.2 to 46 mW depending on operating mode

Pinout

Pin Name	Type	Description
VIN / VCC	Power	Power supply input. Usually supports 3.3V to 5V due to onboard regulators.
GND	Power	Ground connection.
SCL	I ² C	Serial Clock line for both ENS160 and AHT21.
SDA	I ² C	Serial Data line for both ENS160 and AHT21.
ADDR / ADO	Control	(Optional) I ² C address selection for ENS160. Connect to GND for 0x52 or VCC for 0x53.
INT	Output	(Optional) Interrupt pin; can signal when new data is ready.

Example Arduino code

To use the ENS160 + AHT21 module with Arduino, you'll typically need two libraries from the Arduino Library Manager: Adafruit ENS160 and Adafruit AHTX0.

Install Required Libraries

Open the Arduino IDE and install the following:

- Adafruit ENS160 Library
- Adafruit AHTX0 Library (works for both AHT20 and AHT21)
- Adafruit Unified Sensor (dependency for many Adafruit libraries)

This code initializes both sensors via I²C and prints climate and air quality data to the Serial Monitor every two seconds.

```
#include <Wire.h>
#include <Adafruit_ENS160.h>
#include <Adafruit_AHTX0.h>

Adafruit_ENS160 ens160;
Adafruit_AHTX0 aht;

void setup() {
  Serial.begin(115200);
  while (!Serial) delay(10); // Wait for Serial Monitor

  Serial.println("ENS160 + AHT21 Test");

  // Initialize AHT21 (Address 0x38)
  if (!aht.begin()) {
    Serial.println("Could not find AHT21 sensor!");
    while (1) delay(10);
  }
  Serial.println("AHT21 initialized.");

  // Initialize ENS160 (Address 0x53 or 0x52)
  // Most combo boards default to 0x53
  if (!ens160.begin(0x53)) {
    Serial.println("Could not find ENS160 sensor!");
    while (1) delay(10);
  }

  // Set operating mode: Standard (detecting)
  ens160.setMode(ENS160_OPMODE_STD);
  Serial.println("ENS160 initialized.");
}

void loop() {
  // 1. Read Climate Data from AHT21
```

```

sensors_event_t humidity, temp;
aht.getEvent(&humidity, &temp);

// 2. Feed Temperature/Humidity to ENS160 for better accuracy
ens160.setTempRH(temp.temperature, humidity.relative_humidity);

// 3. Read Air Quality Data from ENS160
if (ens160.available()) {
  Serial.print("Temp: "); Serial.print(temp.temperature); Serial.println("
C");
  Serial.print("Humidity: "); Serial.print(humidity.relative_humidity);
Serial.println(" %");

  Serial.print("AQI: "); Serial.println(ens160.getAQI());
  Serial.print("TVOC: "); Serial.print(ens160.getTVOC()); Serial.println("
ppb");
  Serial.print("eCO2: "); Serial.print(ens160.getECO2()); Serial.println("
ppm");
  Serial.println("-----");
}

delay(2000);
}

```

Usage Tips

- Baud Rate: Set your Serial Monitor to 115200 to match the code above.
- Warm-up: The ENS160 requires about 1 hour to achieve full accuracy, though it will start providing initial readings within 1 minute.
- Address Conflict: If the ENS160 is not found, try changing `ens160.begin(0x53)` to `ens160.begin(0x52)`.
- Library Alternatives: If the Adafruit library doesn't work for your specific breakout, the `DFRobot_ENS160` library is a highly compatible alternative.

I2C topics on lamaPLC

Page	Date	Tags
• lamaPLC Communication: 1-Wire	2025/05/31 21:56	1-wire , communication , bus , microlan , i2c , uart , usart , ds18b20
• lamaPLC Communication: I²C	2025/09/23 19:25	i2c , i c , smbus , philips , bus , communication , arduino
• LamaPLC: AHT10 Modul	2026/03/21 19:20	communication , i2c , temperature , humidity , sensor , aht , aht 10 , modul
• LamaPLC: AHT20 / BMP280 Modul	2026/02/15 20:33	bmp280 , aht20 , adafruit , temperature , humidity , pressure , sensor , arduino , code , i2c

- [LamaPLC: APDS - Avago ALS and proximity detection sensors with I²C communication](#) 2026/02/14 22:24

avago, apds-9900, apds-9930, apds-9960, als, proximity, detection, gesture recognition, gesture, i2c, communication, sensor, arduino, code
- [lamaPLC: AS5600 Magnetic Induction Angle Measurement Sensor Module](#) 2026/03/28 22:07

communication, i2c, as5600, as-5600, magnetic, induction, angle, sensor
- [LamaPLC: BMP/BME Bosch Temperature/Humidity/Pressure sensors with I²C communication](#) 2026/02/15 20:40

bme280, bme680, bmp180, bmp280, hw-611, hw611, bosch, temperature, humidity, pressure, sensor, arduino, i2c, communication, cjmcu
- [LamaPLC: CJMCU-219/INA-219 breakout board/IC with I²C communication](#) 2026/02/14 23:37

cjmcu-219, ina-219, ina219, breakout board, i2c, communication, sensor, voltage, current, arduino, code, cjmcu
- [LamaPLC: CJMCU-3216 / AP-3216 integrated digital ambient light and proximity sensor module/IC with I²C communication](#) 2026/02/14 22:40

cjmcu-3216, cjmcu, ap-3216, ap3216, ambient light, proximity, sensor, arduino, code, i2c, communication
- [lamaPLC: CJMCU-811 CCS811 Gas Sensor \(VOCs TVOC CO2\)](#) 2026/03/21 22:25

cjmcu-811, ccs811, gas, sensor, vocs, tvoc, eco2, co2, arduino, air quality metal oxide, mox, i2c
- [LamaPLC: D6T Omron Non-Contact Thermal Sensors with I²C communication](#) 2026/02/14 18:19

d6t, d6t-32l, d6t-44l, d6t-8l, d6t-1a, omron, non-contact, thermal, sensor, i2c, arduino, code
- [LamaPLC: DPS Infineon Temperature/Pressure sensors with I2C communication](#) 2026/02/14 18:11

dps310, infineon, temperature, pressure, sensor, arduino, i2c, communication, code
- [lamaPLC: Energy, power, current, and voltage](#) 2025/05/31 21:32

i2c, i c, communication, arduino, energy, power, current, sensor, ina226
- [LamaPLC: ENS ScioSense Multi-gas sensors with I²C communication](#) 2026/02/14 19:29

ens160, sciosense, gas-quality, i2c, communication, sensor, arduino, code, eco2, tvoc, aqi, indoor air quality, iaq, co2, voc
- [lamaPLC: ESP32 / ESP8266](#) 2025/11/21 23:07

esp8266, esp32, esp32-c2, esp32-c3, esp32-c5, esp32-c6, esp32-c61, esp32-h2, esp32-s2, esp32-s3, esp32-p4, espressif systems, communication, ethernet, ip, wi-fi, thread, zigbee, matter, homekit, bluetooth, mqtt, adc, spi, uart, i2c, i2s, rmt, pwm, usb, usb otg, twai
- [LamaPLC: Gas sensors](#) 2023/07/01 15:29

gas, sensor, i2c, onewire, communication, mq-3, mq-4, mq-5, mq-6, mq-7, mq-8, mq-9, mq-135, gm-102b, gm-302b, gm-502b, gm-702b, alcohol, ch4, natural gas, smoke, lng, co, co2, lpg, h2, iso-butane, nox, nh3, benzene, town gas, formaldehyde, propane, humidity, temperature, voc, grv gas sens v2
- [lamaPLC: GY-511 6DOF sensor module](#) 2026/03/22 00:26

stmicroelectronics, lsm303dlhc, i2c, lsm303, sensor, gy-511, 6dof, pololu, module, arduino

• LamaPLC: GY-9250 MPU-9250/6500 9-axis Attitude Sensor Board	2026/02/14 22:45	ak8963, gy-9250, mpu-9250, 9-axis, motion detection, magnetometer, communication, i c, i2c, spi
• LamaPLC: HDC Texas Instruments Temperature/humidity sensors with I²C communication	2026/02/14 22:09	sht21, htu21, si7021, gy-21, gy-213v, hdc1080, gy-213v-hdc1080, cjmcu, cjmcu-1080, texas instruments, temperature, humidity, sensor, i2c, communication, arduino, code
• lamaPLC: HT16K33 display controller	2026/02/14 17:26	i2c, 7-segment display, display, ht16k33, arduino
• LamaPLC: HTU TE Connectivity temperature/humidity sensors with I²C communication	2026/02/14 21:54	htu, htu31d, htu21d, htu20d, sht20, htu20, sht21, htu21, si7021, gy-21, gy-213v, hdc1080, si702, gy-20, sht31, htu31, si7031, gy-31, te connectivity, temperature, humidity, i2c, communication, sensor, arduino, code
• lamaPLC: INA modules with Arduino libraries	2026/03/28 18:02	i2c, i c, communication, arduino, energy, power, current, monitor, sensor, ina219, ina226, ina228, ina237, ina238, ina260, ina3221, ina
• lamaPLC: INA226 - current/voltage/power monitor with I²C communication	2026/02/14 23:58	i2c, i c, communication, arduino, energy, power, current, monitor, sensor, ina226, ina219, ina
• lamaPLC: LCD 1602/2004 with I²C communication	2026/02/14 17:27	communication, i2c, display, lcd, 1602, 2004, hd44780, pcf8574, pcf8574t, pcf8574at, arduino
• LamaPLC: MAX30100/MAX30102 Heart Rate Click Sensor Module	2026/02/14 23:38	max30102, max30100, heart rate click, sensor, communication, i2c, arduino, code
• lamaPLC: MCP23017 / MCP23S17 16-Bit I/O Expander with Serial Interface I²C / SPI	2026/02/14 22:52	communication, i2c, mcp23017, mcp23s17, spi, i o expander, serial, cjmcu-2317, cjmcu
• LamaPLC: Pixart PAJ7620U2 Gesture recognition sensors/module with I²C communication	2026/02/14 22:23	paj7620u2, gy-paj7620, pixart, gesture recognition, i2c, communication, sensor, arduino, code
• LamaPLC: SC16IS750 / SC16IS752: One or two serial (UART) ports from microcontroller via I²C or SPI communication	2026/02/14 22:53	cjmcu-750, cjmcu-752, cjmcu, nxp, sc16is750, sc16is752, uart, serial, i2c, spi, modul, converter, arduino, code
• LamaPLC: SGP Sensirion Gas-sensors with I²C communication	2026/02/15 20:27	sgp30, sgp40, sgp41, sensirion, gas-sensor, i2c, communication, sensor, arduino, code, eco2, voc, tvoc, indoor air quality, iaq, nox, hydrogen
• LamaPLC: SHT Sensirion Temperature/humidity sensor with I²C communication	2026/02/15 20:29	sht20, sht21, sht25, sht30, sht31, sht35, sht40, gy21, temperature, humidity, i2c, communication, sensor, arduino, code
• lamaPLC: Signal level converters	2026/02/14 22:47	pca9306, i2c, voltage, level, converter
• lamaPLC: TCA9548A (HW617); Low-Voltage 8-Channel I²C Switch Module	2026/02/14 22:51	tca9548a, hw617, i2c, switch, communication, expansion board, arduino

- [lamaPLC: TM1637 7-segment display](#) 2026/02/14 17:26 [i2c](#), [7-segment display](#), [display](#), [tm1637](#), [arduino](#)
 - [LamaPLC: TOFnnnC STMicroelectronics Time-of-Flight \(ToF\) sensors with I²C communication](#) 2026/02/14 22:22 [tof050c](#), [vl6180](#), [tof200c](#), [vl53l0x](#), [tof400c](#), [vl53l1x](#), [stmicroelectronics](#), [time-of-flight](#), [tof](#), [i2c](#), [communication](#), [sensor](#), [arduino](#), [code](#)
 - [LamaPLC: VL53Lnn STMicroelectronics time-of-flight \(ToF\) laser-ranging sensors with I²C communication](#) 2026/02/14 22:21 [vl53l0x](#), [vl53l1x](#), [vl53l0 1xv2](#), [gy-530](#), [time-of-flight](#), [tof](#), [laser-ranging](#), [i2c](#), [communication](#), [sensor](#), [arduino](#), [code](#)
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 - [SSH1106/SSD1306 OLED Display with I²C communication](#) 2026/02/14 17:27 [i2c](#), [oled](#), [display](#), [ssd1306](#), [sh1106](#), [ssh1106](#), [arduino](#), [cmos](#)
- [arduino](#), [ENS160](#), [AHT21](#), [Air Quality](#), [sensor](#), [CO](#), [ECO](#), [TVOC](#), [module](#), [AQI](#)

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Last update: **2026/03/21 21:18**

