



Datasheet - Programming & Sensors

VOC Monitoring System with LCD Display



The programming interfaces for the NUCLEO-L476RG, micro:bit, and Arduino boards are very similar. Here we present a program designed for micro:bit. It displays the measured elements on the LCD screen.

Editor used: vittascience.com/l476;
vittascience.com/arduino or vittascience.com/microbit

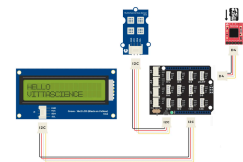


Assembly connection with an Arduino

The MICS6814 multi-channel sensor is connected to an I2C port on the shield.

The display is connected to an I2C port.

The Openlog module for logging data to an SD card is connected to a digital port (D2 to D8).

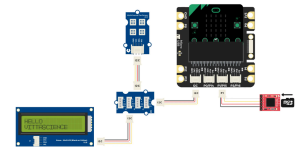


Assembly connection with a micro:bit

The MICS6814 multi-channel sensor is connected to an I2C port on the shield.

The display is connected to an I2C port.

The Openlog module for logging data to an SD card is connected to a digital port P0.



Code

```
from microbit import *
from lcd_i2c import LCD1602
from gas_gmxxx import GAS_GMXXX

lcd = LCD1602()
multichannel_v2 = GAS_GMXXX(0x08)

while True:
    lcd.setCursor(0, 0)
    lcd.writeTxt('Mesure VOC')
    lcd.setCursor(0, 1)
    lcd.writeTxt(str(multichannel_v2.calcVol(multichannel_v2.measure_VOC())))
```



Documentation: Glossary of pollutants

Pollutants	Effects on the environment (climatic and local)	Health effects	Maximum values recommended by WHO
Fine particles PM10 / PM2.5	<p>Diffusing or absorbing effect, increasing the greenhouse effect</p> <p>Damage to buildings and monuments: formation of a black layer, dirt</p>	<p>The finer the particle, the more harmful it is to the body:</p> <p>PM10: retained in the nose and deep respiratory tract</p> <p>PM2.5: penetrates deeply, crosses the lung barrier and enters the bloodstream</p>	<p>For PM2.5:</p> <p>10 µg/m³ annual average</p> <p>25 µg/m³ average over 24 hours</p> <p>For PM10:</p> <p>20 µg/m³ annual average</p> <p>50 µg/m³ average over 24 hours</p>
Nitrogen dioxide (NO₂)	<p>Contributes to acid rain, affecting plants and soils</p> <p>Responsible for the formation of nitrate aerosols and their accumulation in the soil</p>	<p>High concentrations can be toxic and cause severe inflammation of the respiratory tract.</p>	<p>40 µg/m³ annual average</p> <p>200 µg/m³ hourly average</p>
Carbon monoxide (CO)	<p>Participates in the mechanism of ozone formation</p> <p>Transformation into CO₂, contributing to the greenhouse effect</p>	<p>High-level poisoning: if indoor pollution, risk of poisoning</p> <p>Affects the central nervous system and sensory organs by binding to blood hemoglobin instead of oxygen</p>	<p>10 mg.m⁻³ on average over 8 hours</p> <p>30 mg.m⁻³ on average over 1 hour</p>
Volatile organic compounds (VOCs)	<p>Precursor to ozone formation</p>	<p>Different health effects depending on the specific compound</p>	<p>Varies depending on the compound</p>
Ozone (O₃)	<p>Contributes to the greenhouse effect</p> <p>Disrupts photosynthesis, leading to lower crop yields</p> <p>Oxidation of materials</p>	<p>Gas that irritates the respiratory tract. At excessively high concentrations, it can cause breathing problems, asthma, decreased lung function, and the onset of respiratory diseases.</p>	<p>100 µg/m³ average over 8 hours</p>