

STM32 Nucleo Multifunctional Expansion Board For Gas Sensors User Guide

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Quick Start Guide
Gas sensing expansion board for electrochemical sensors
(P-NUCLEO-IKA02A1)
June 2023



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STM32 Nucleo multifunctional expansion board for gas sensors

Electrochemical gas sensor expansion board Hardware overview



P-NUCLEO-IKA02A1 hardware description

- The P-NUCLEO-IKA02A1 is an electrochemical gas sensor evaluation board.
- It embeds several footprints to host different types of sensors and different target gas.
- The connectivity is ensured thanks to Arduino® UNO R3 connector and ST morpho connector layout.



Key products on board

TSU111

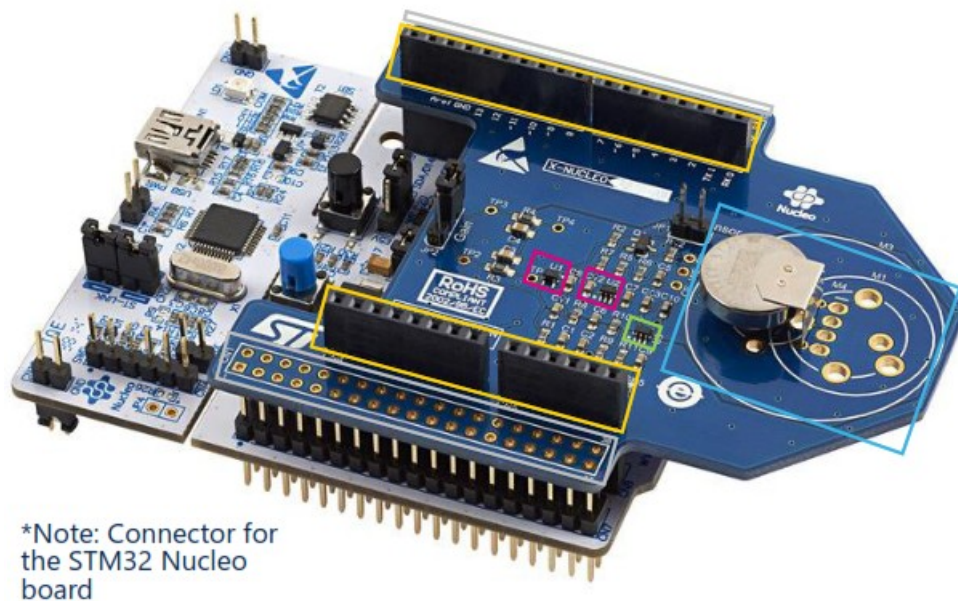
Nanopower (900 nA), high accuracy (150 μ V) 5 V operational amplifier

STLM20

Ultra-low current 2.4 V precision analog temperature sensor

Gas sensor

Four different footprints for various electrochemical gas sensors (PCD 13,5 mm, PCD 17 mm, miniature, TGS5141).



- *Note: Connector for the STM32 Nucleo board
- | | | |
|--|--|--|
|  Gas sensor footprints |  STLM20 |  ST morpho connector** |
| |  TSU111 |  Arduino UNO R3 connector |

[P-NUCLEO-IKA02A1](#)



Software overview

X-CUBE-IKA02A1 software description

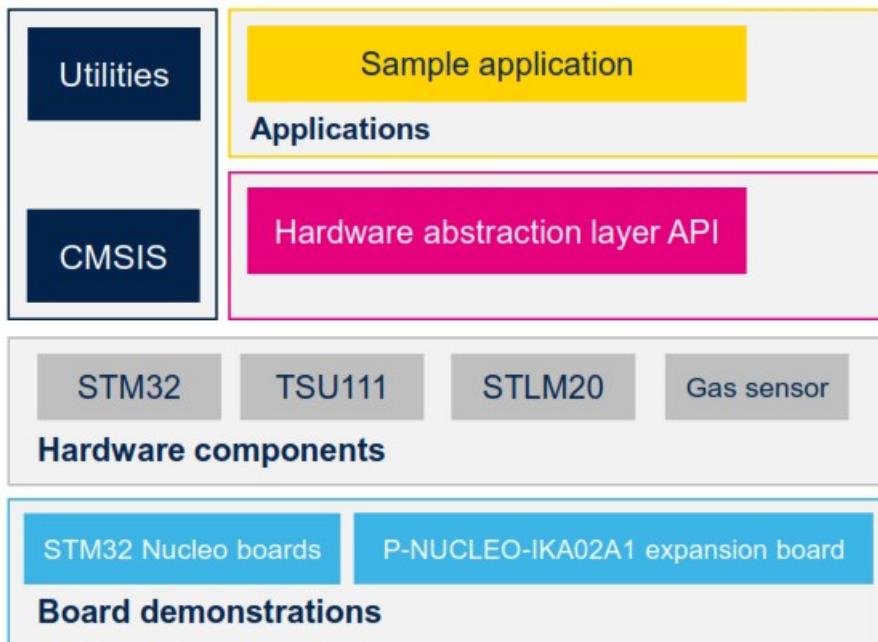
- The X-CUBE-IKA02A1 software package is an expansion for STM32Cube, associated with the P-NUCLEO-IKA02A1 expansion board.
- It is compatible with NUCLEO-F401RE, NUCLEOL053R8.



Key features

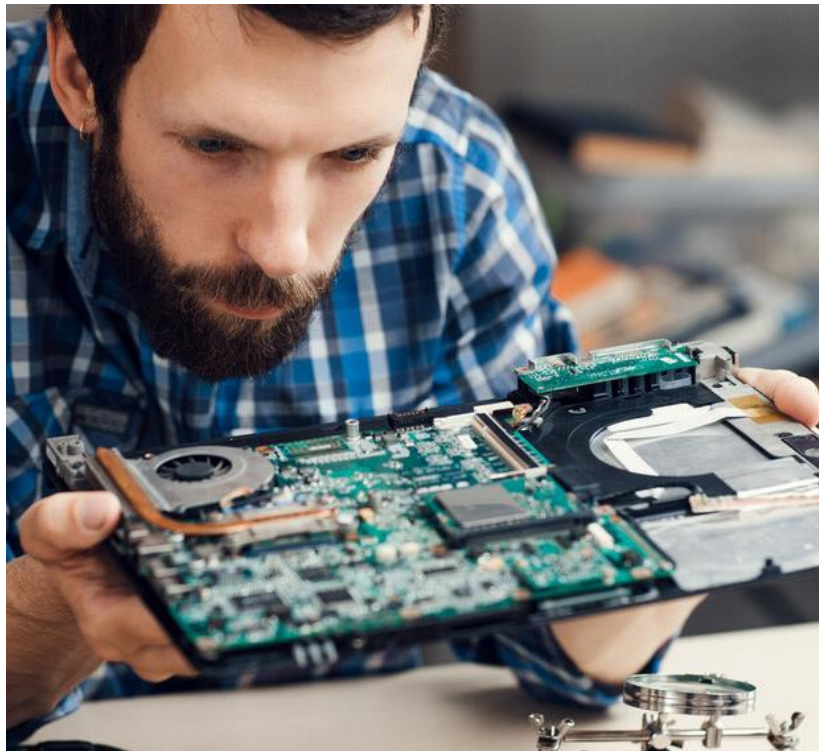
- Complete middleware to build applications using electrochemical gas sensors with signal conditioning done by TSU111.
- Library uses STLM20 temperature sensor for compensation over temperature range.
- Easy portability across different MCU families, thanks to STM32Cube.
- Low-power optimization (suitable for the STM32L0 MCU family).
- Free, user-friendly license terms.



Overall software architecture



[X-CUBE-IKA02A1](#) 

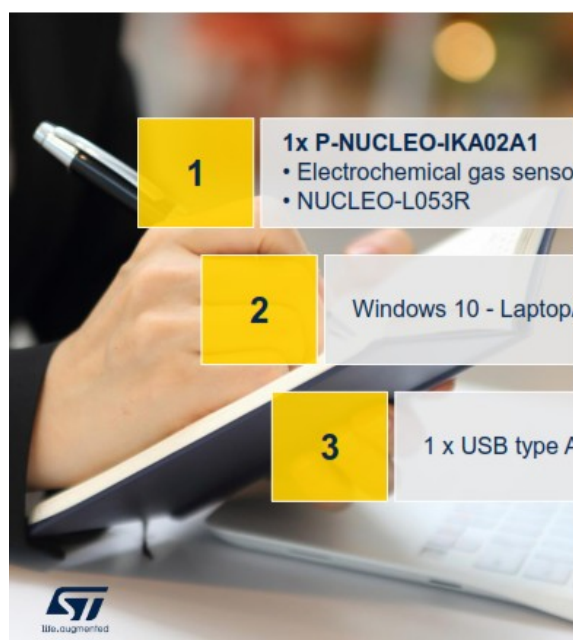
Documents & related resources





<p>All documents are available in the design resources tab of the multifunctional expansion board webpage.</p>	<p>Design resources Technical documentation</p>
<p>P-NUCLEO-IKA02A1</p> <ul style="list-style-type: none"> • Product specifications • User manual 	<p> Product specifications</p> <p>DB2668: Multifunctional expansion board based on operati UM1955: Getting started with the multifunctional expansior</p>
<p>X-CUBE-IKA02A1</p> <ul style="list-style-type: none"> • User manual • Software setup file 	<p> User manual</p> <p>UM2230: Getting started with the XCUBE-IKA02A1 multifu</p>

Setup & demo examples

Hardware prerequisites

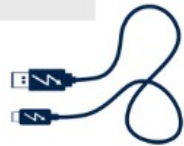


- 1x P-NUCLEO-IKA02A1
 - Electrochemical gas sensor expansion board
 - NUCLEO-L053R
- Windows 10 - Laptop/PC
- 1 x USB type A to mini-B USB cable

P-NUCLEO-IKA02A1

**NUCLEO-F401RE
NUCLEO-L053R8
NUCLEO-L476RG**



Software prerequisites



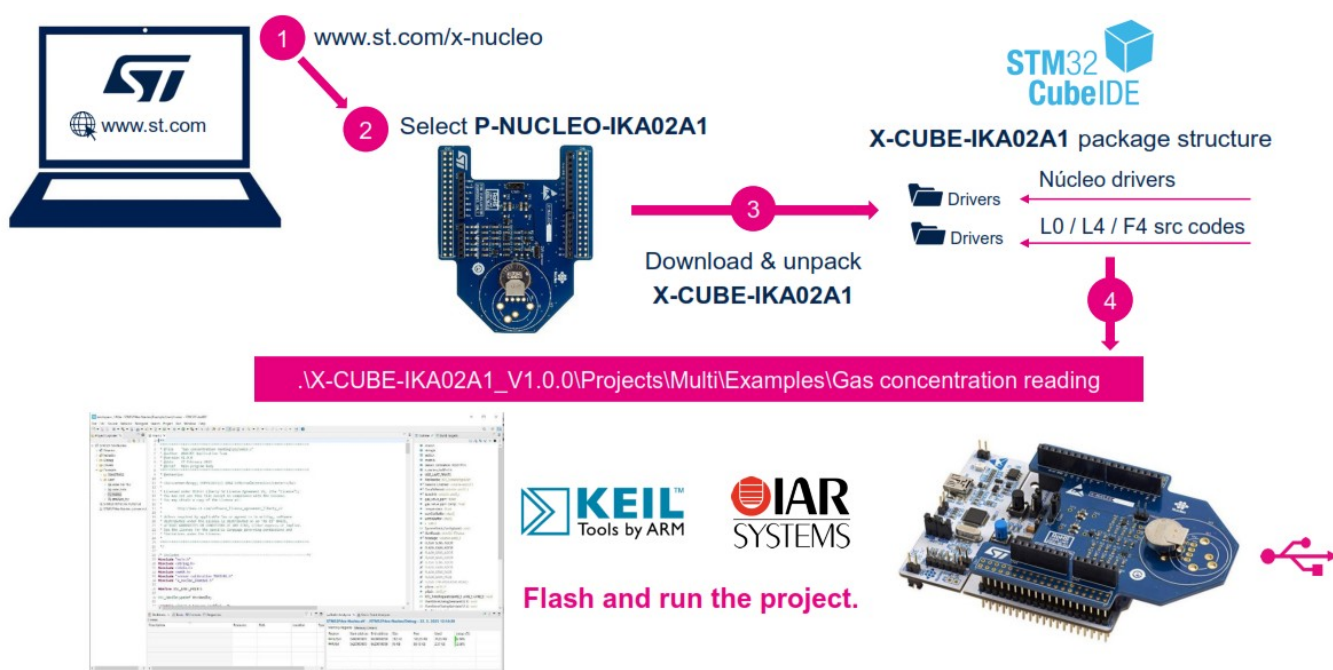
STSW-LINK009: ST-LINK/V2-1 USB driver

X-CUBE-IKA02A1

- Copy the .zip file content into a folder on your PC.
- The package contains source code examples (Keil®, IAR, system workbench) based on NUCLEO-F401RE, NUCLEOL053R8 or NUCLEO-L4.

X-CUBE-IKA02A1

Start coding in just a few minutes



www.st.com/x-nucleo

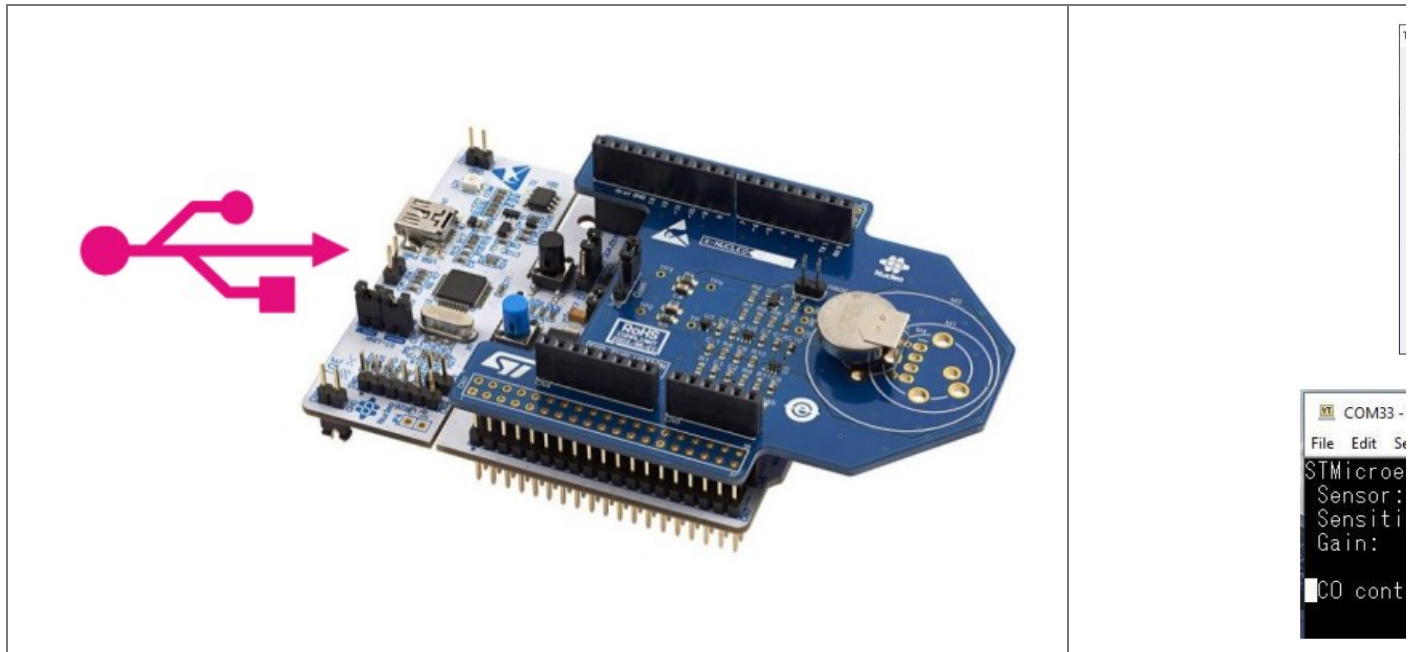
X-CUBE-IKA02A1 quick example (1/2)

Using serial line monitor – e.g. TeraTerm

Gas concentration reading example

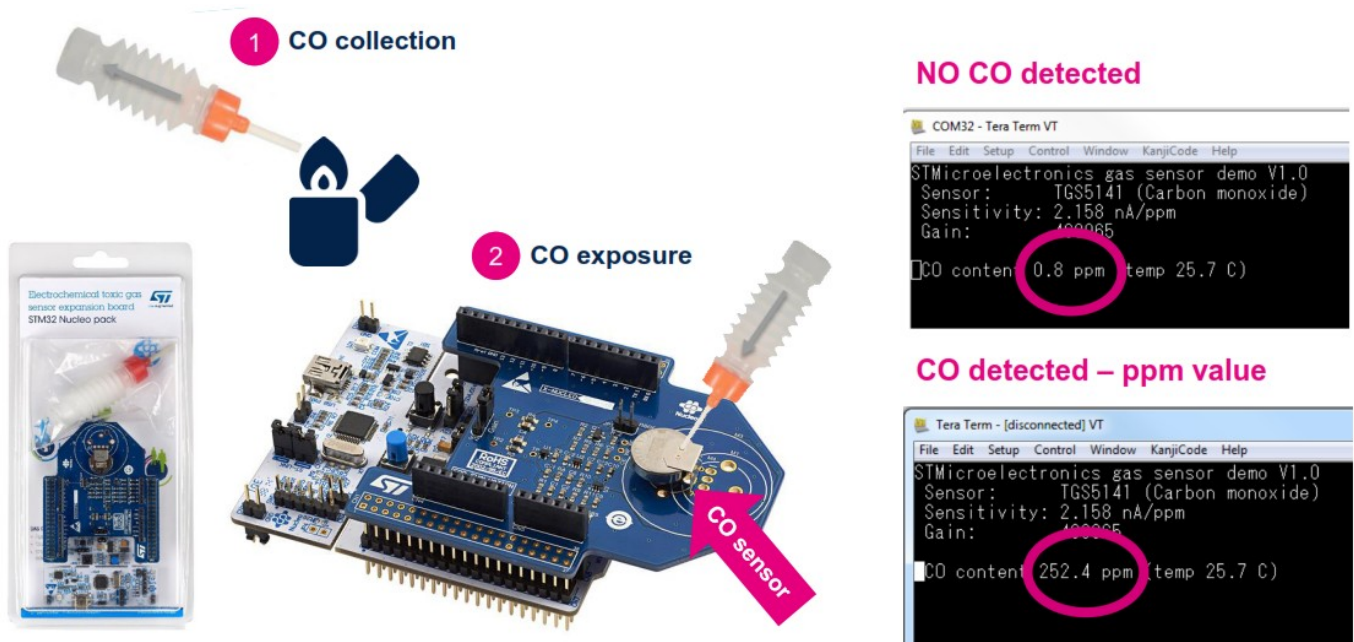
X-CUBE-IKA02A1 for NUCLEO-F401RE, NUCLEO-L053R8 or NUCLEO-L476RG

- Configure the serial line monitor (speed, LF)
- Press the BLACK user button on STM32 Nucleo to restart MCU



X-CUBE-IKA02A1 quick example (2/2)

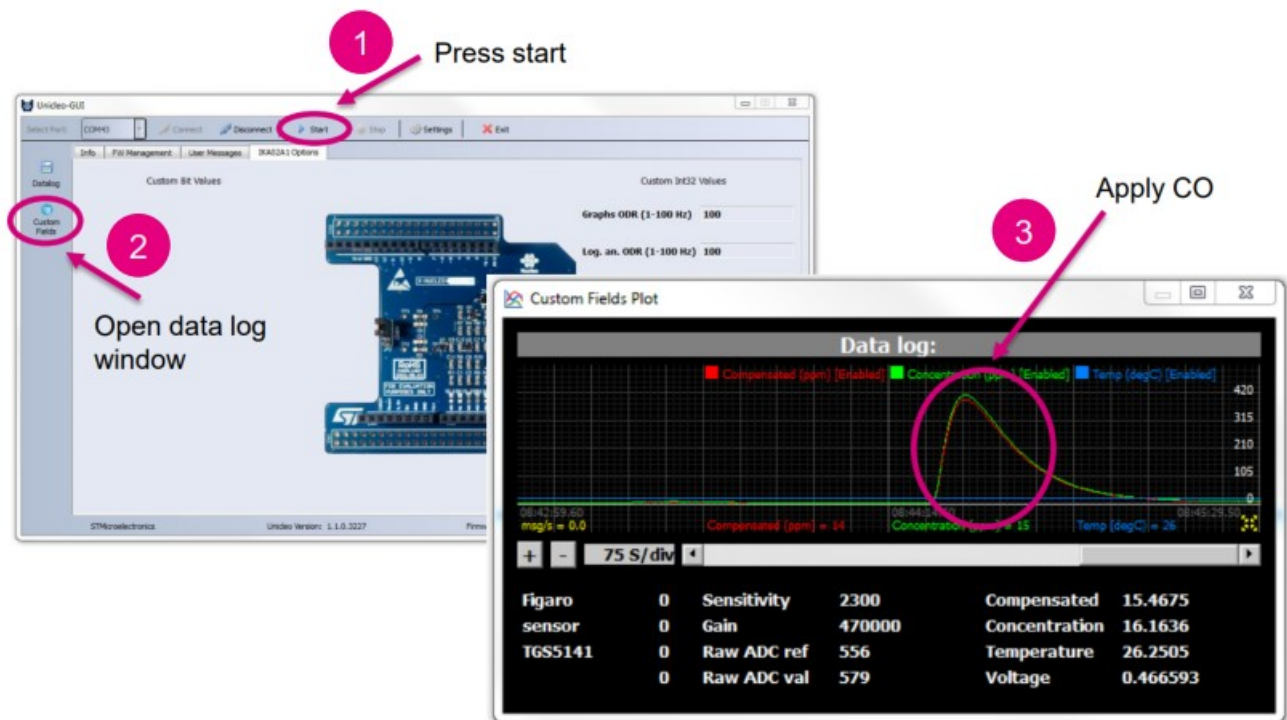
Using serial line monitor – e.g. TeraTerm



Unicleo-GUI example for X-CUBE-IKA02A1

DataLogCustomLite example

X-CUBE-IKA02A1 for NUCLEO-F401RE, NUCLEO-L053R8 or NUCLEO-L476RG



Our Technology starts with you



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Documents / Resources



[ST STM32 Nucleo Multifunctional Expansion Board For Gas Sensors](#) [pdf] User Guide
 STM32 Nucleo Multifunctional Expansion Board For Gas Sensors, STM32, Nucleo Multifunctional Expansion Board For Gas Sensors, Expansion Board For Gas Sensors, Board For Gas Sensors, Gas Sensors, Sensors

References

- [STMicroelectronics: Our technology starts with you](#)
- [Automotive ICs and Products - Analog, Digital and Power - STMicroelectronics](#)
- [STM32 Nucleo expansion boards - STMicroelectronics](#)
- [P-NUCLEO-IKA02A1 - STM32 Nucleo pack: electrochemical toxic gas sensor expansion board with CO sensor - STMicroelectronics](#)
- [P-NUCLEO-IKA02A1 - STM32 Nucleo pack: electrochemical toxic gas sensor expansion board with CO sensor - STMicroelectronics](#)

-  [X-CUBE-IKA02A1 - Electrochemical gas sensor software expansion for STM32Cube - STMicroelectronics](#)
-  [X-CUBE-IKA02A1 - Electrochemical gas sensor software expansion for STM32Cube - STMicroelectronics](#)

[Manuals+](#).