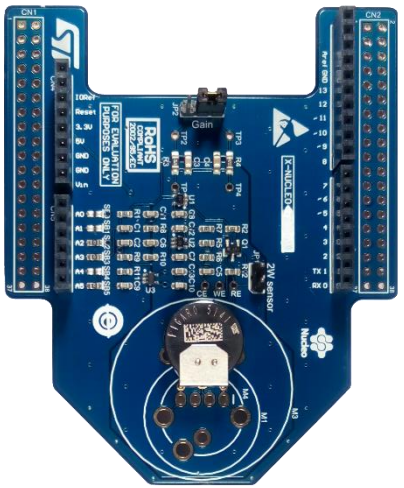
Quick Start Guide

Gas sensing expansion board for electrochemical sensors (P-NUCLEO-IKA02A1)



life.augmented

Version 1.0 (February 1st, 2017)

Overview

1 STM32 Nucleo multifunctional expansion board for gas sensors

2 Documents & Related Resources

3 Setup & Demo Examples

Overview

1 STM32 Nucleo multifunctional expansion board for gas sensors

2 Documents & Related Resources

3 Setup & Demo Examples

Electrochemical gas sensor expansion board

Hardware overview

P-NUCLEO-IKA02A1Hardware description

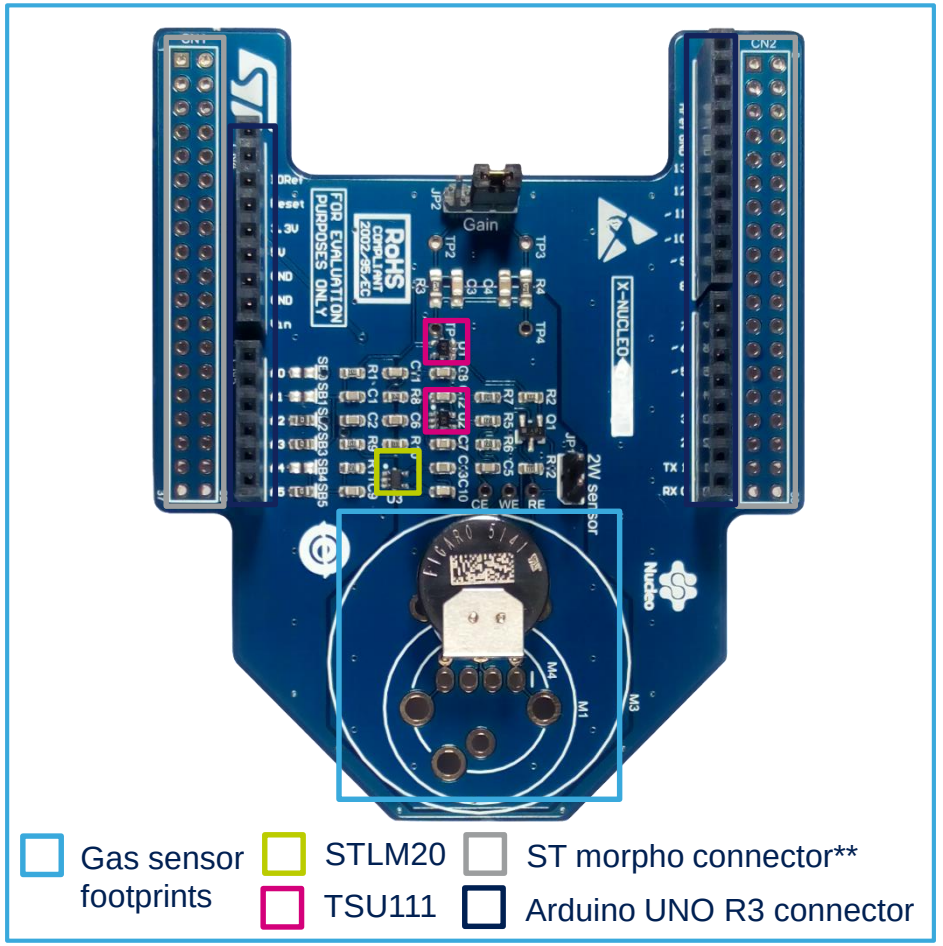
- The P-NUCLEO-IKA02A1 is an electrochemical gas sensor evaluation board.
- It embeds several footprints to host different types of the sensors and different target gas.
- The connectivity assured thanks to Arduino UNO R3 connector and ST morpho connector layout.

Key products on board

TSU111
Nanopower (900 nA), high accuracy (150 uV) 5V operational amplifier

STLM20
Ultra-low current 2.4 V precision analog temperature sensor

Gas sensor
4 different footprints for various electrochemical gas sensors (PCD 13,5mm, PCD 17mm, miniature, TGS5141)



Latest info available at www.st.com
P-NUCLEO-IKA02A1

** Connector for the STM32 Nucleo Board

life.augmented

Electrochemical gas sensor expansion board

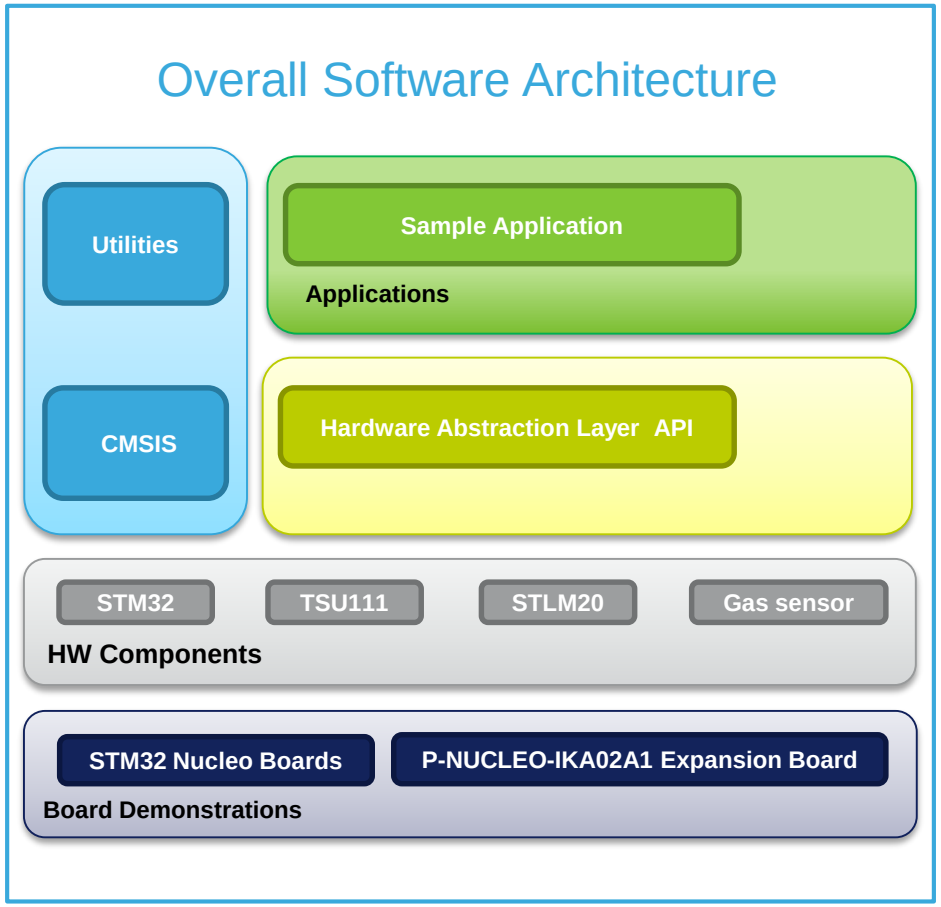
Software overview

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, NUCLEO-L053R8.

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.



Latest info available at www.st.com
X-CUBE-IKA02A1

life.augmented

Overview

1 STM32 Nucleo multifunctional expansion board for gas sensors

2 Documents & Related Resources

3 Setup & Demo Examples

Documents & Related Resources

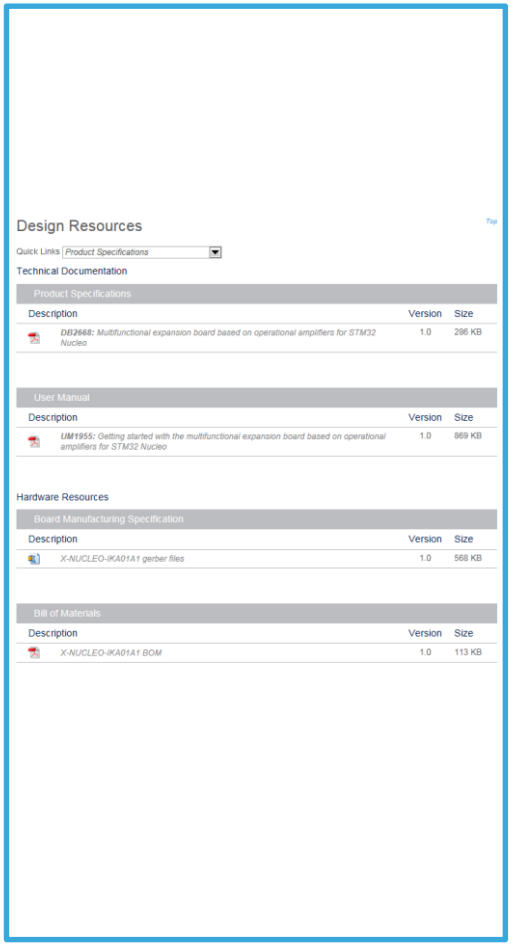
All documents are available in the Design Resources tab of the multifunctional expansion board webpage

P-NUCLEO-IKA02A1 : Product webpage (Link)

- **Gerber files, BOM, Schematic**
- **data brief**
- **user manual**

X-CUBE-IKA02A1: Product webpage (Link)

- **data brief**
- **user manual**
- **Software Setup File**



Overview

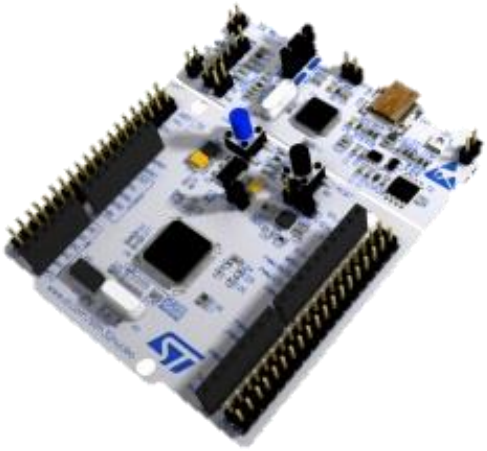
1 STM32 Nucleo multifunctional expansion board for gas sensors

2 Documents & Related Resources

3 Setup & Demo Examples

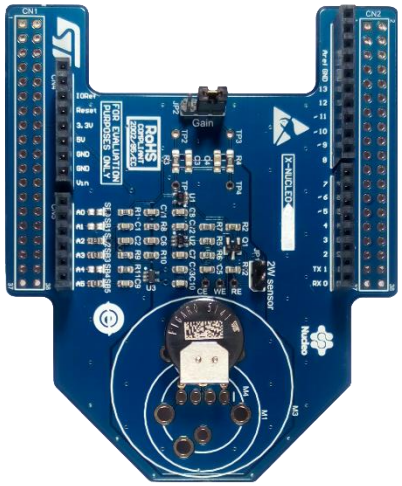
Hardware prerequisites

- 1x **P-NUCLEO-IKA02A1**
  - Electrochemical gas sensor expansion board
  - NUCLEO-L053R8
- Windows 8/7 - Laptop/PC
- 1 x USB type A to mini-B USB cable



NUCLEO-F401RE
NUCLEO-L053R8
NUCLEO-L476RG

Mini USB Cable



P-NUCLEO-IKA02A1

Software prerequisites

- **STSW-LINK008:** ST-LINK/V2-1 USB driver
- **STSW-LINK007:** ST-LINK/V2-1 firmware upgrade
- **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, NUCLEO-L053R8 or NUCLEO-L476RG**

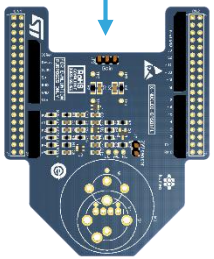
Start coding in just a few minutes

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

life.augmented

www.st.com

1 www.st.com/x-nucleo



2 Select P-NUCLEO-IKA02A1

3 Download & unpack X-CUBE-IKA02A1

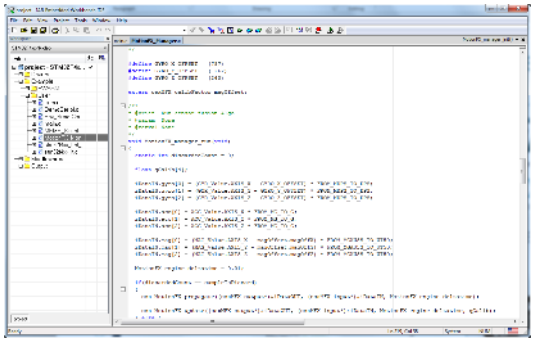
X-CUBE-IKA02A1 package structure

Nucleo drivers

L0 / L4 / F4 src codes

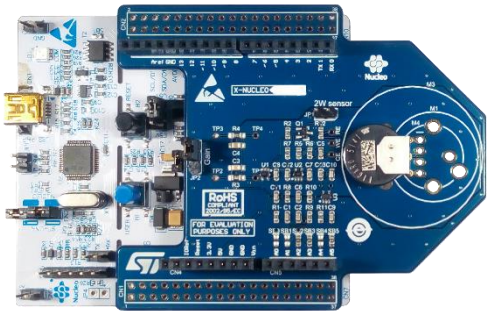
4

.\X-CUBE-IKA02A1_V1.0.0\Projects\Multi\Examples\Gas concentration reading



KEIL Tools by ARM

IAR SYSTEMS

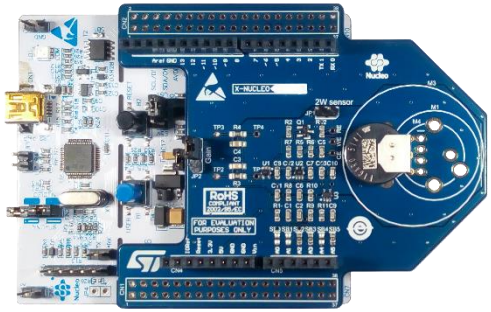


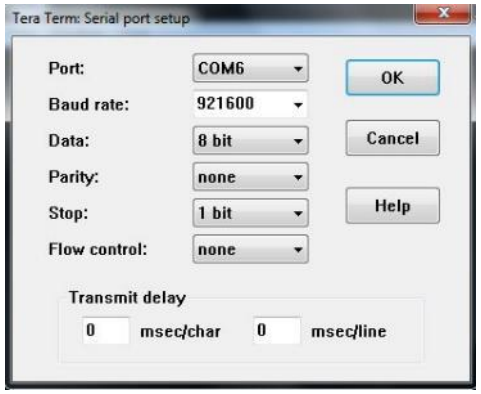
Flash and run the project.

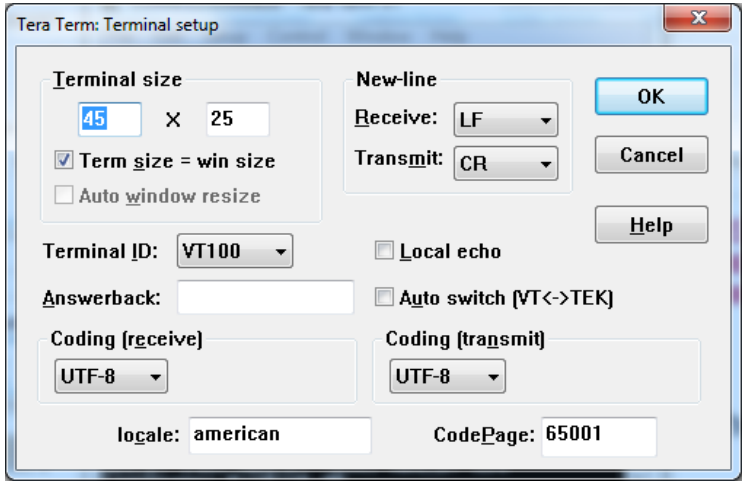
X-CUBE-IKA02A1 quick example 1/2
Using serial line monitor – e.g.TeraTerm

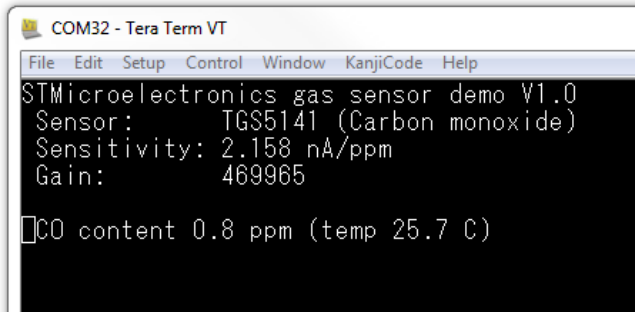
Gas concentration reading example
X-CUBE-IKA02A1 for NUCLEO-F401RE, NUCLEO-L053R8 or NUCLEO-L476RG

- Configure the serial line monitor (speed, LF)
- Press the **BLACK** user button on STM32Nucleo to restart MCU









X-CUBE-IKA02A1 quick example 2/2

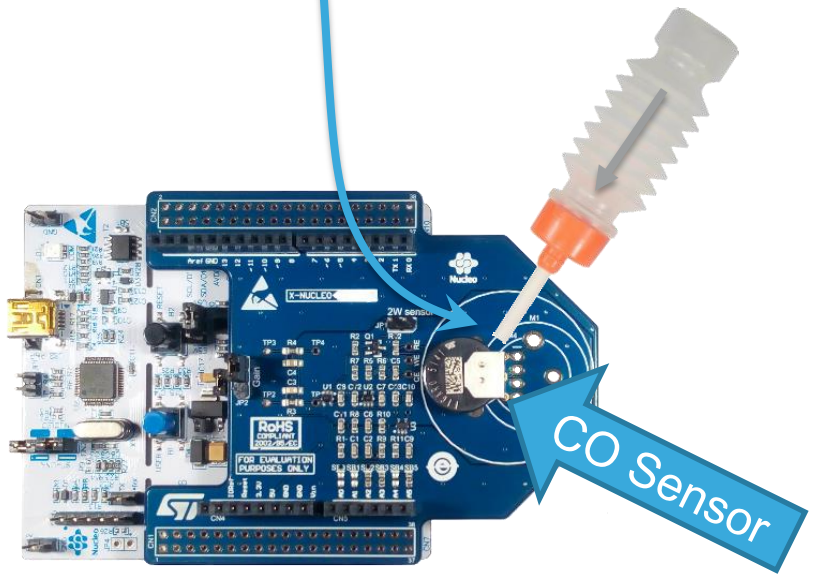
Using serial line monitor – e.g.TeraTerm

CO collection

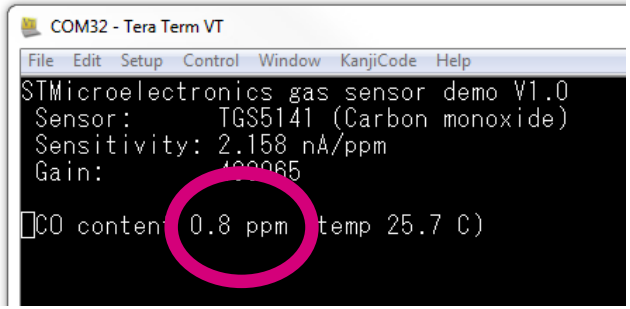
1

CO exposure

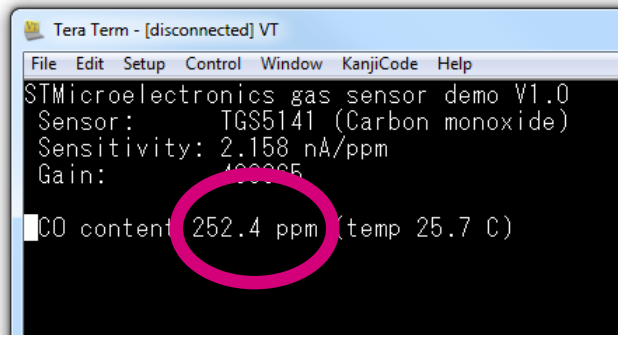
2



NO CO detected

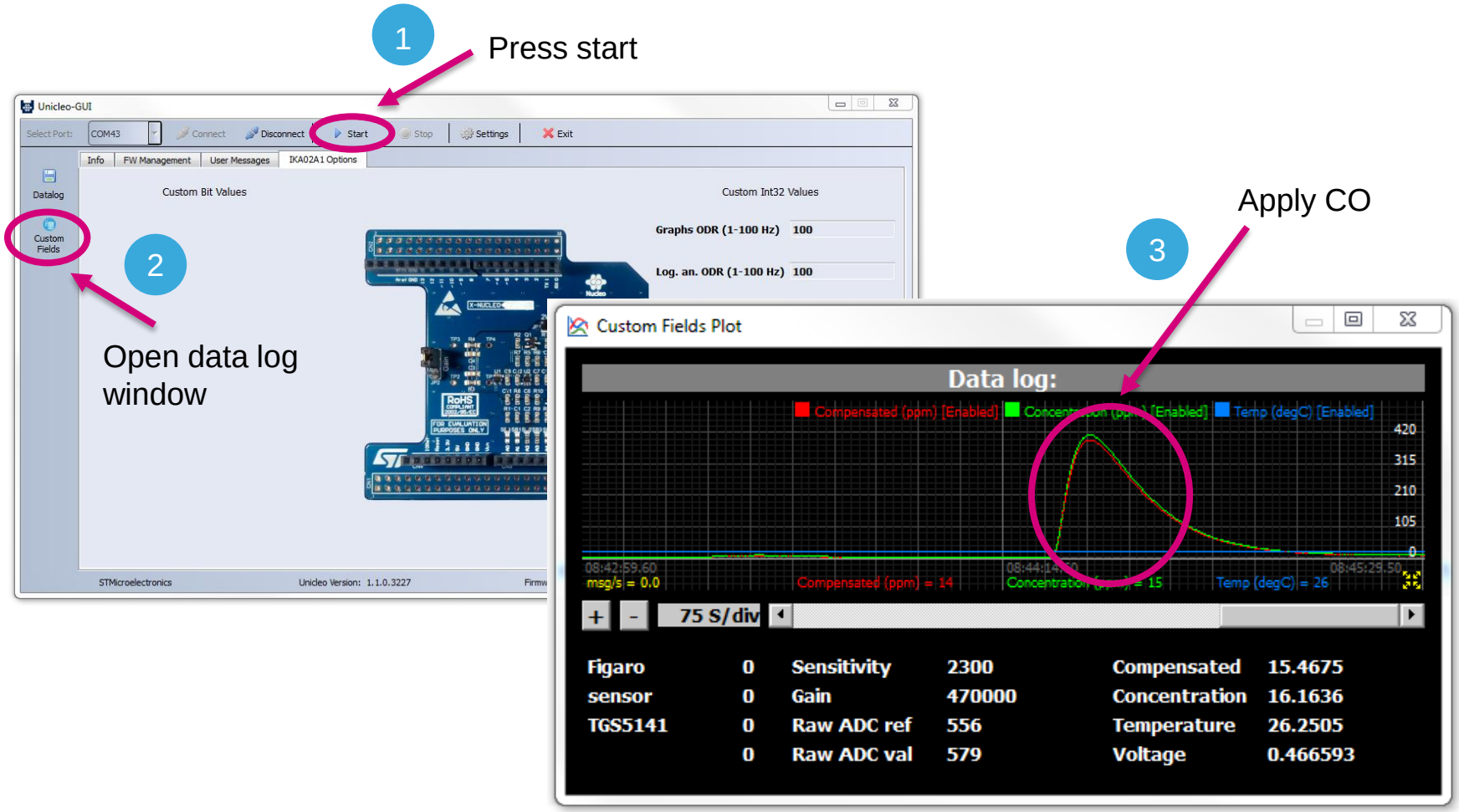


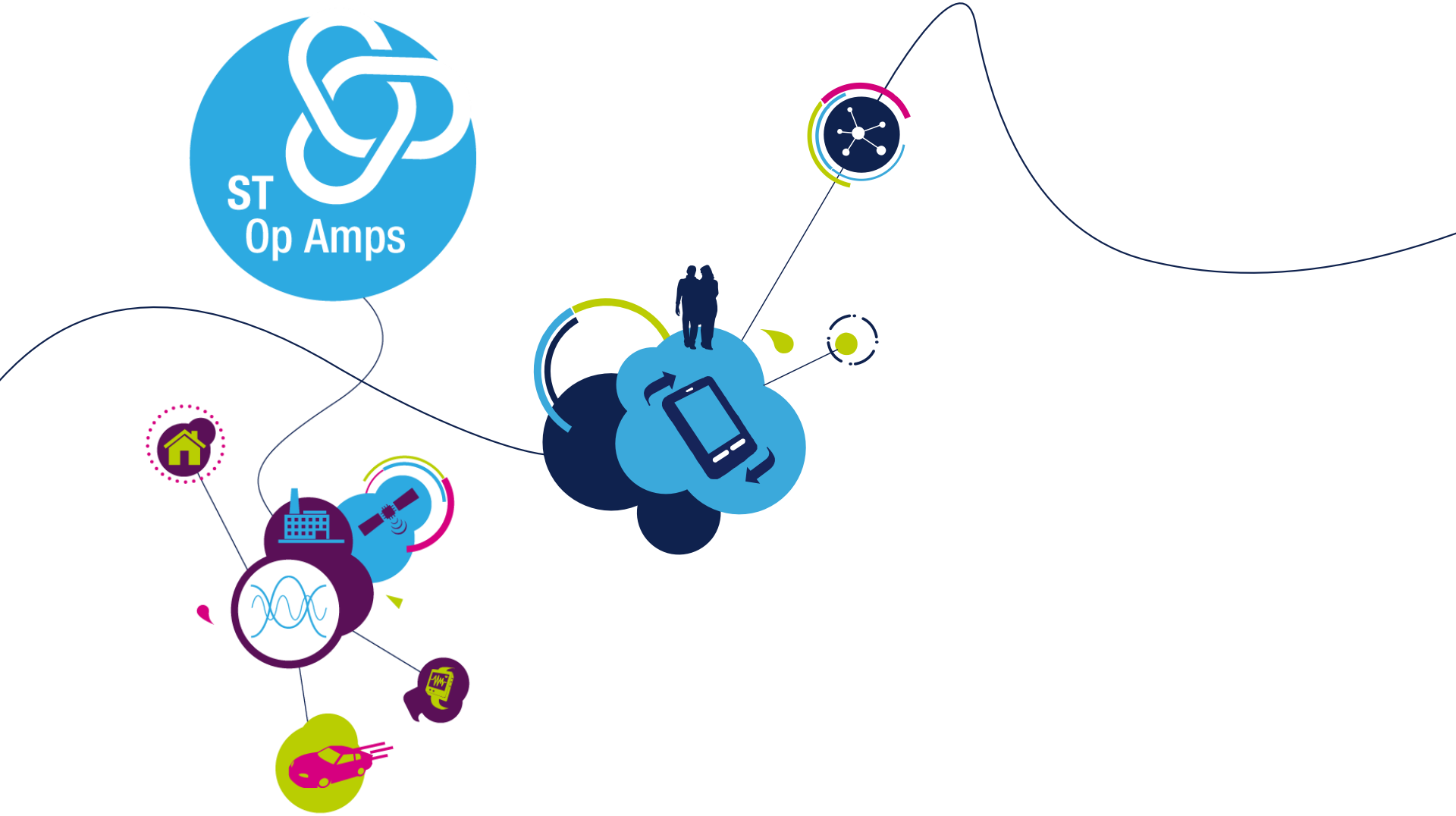
CO detected – ppm value



X-CUBE-IKA02A1 Unicleo GUI example

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





www.st.com/stm32ode

life.augmented