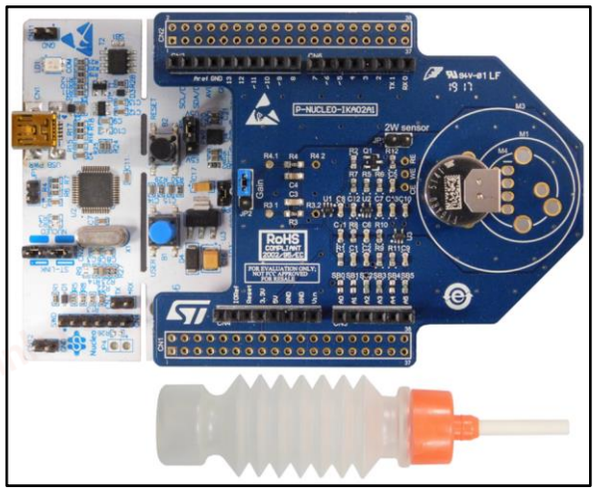
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P-NUCLEO-IKA02A1

STM32 Nucleo pack: electrochemical toxic gas sensor expansion board with CO sensor

Data brief



Features

- STM32 Nucleo gas expansion board
  - compatible with most electrochemical sensors
  - four different footprints for sensors (PCD13,5, PCD17, Mini and TGS5141)
  - two-, three- and four-electrode sensors
  - signal conditioning with TSU111
  - STLM20 temperature sensor
  - changeable gain
- NUCLEO-L053R8
  - Ultra-low-power ARM® Cortex®-M0+ MCU (32 MHz max.) with 64 Kbytes Flash and 8 Kbytes of SRAM
- Carbon monoxide sensor
  - Figaro TGS5141
  - coin-cell sensor
  - expected life time > 10 yrs
  - can pass 5000 ppm EN50291
- Low power design for long battery life
- RoHS compliant

Description

The P-NUCLEO-IKA02A1 evaluation pack provides a reference design for various electrochemical sensors.

The STM32 Nucleo gas expansion board interfaces electrochemical sensors with the MCU on the STM32 Nucleo development board. Two TSU111 operational amplifiers provide signal conditioning; they are ideal for electrochemical sensing thanks to their high precision and low power consumption. The expansion board includes an ultra-low current precision analog temperature sensor STLM20 used for compensation of gas readings.

STM32 Nucleo boards provide an affordable and flexible way for users to experiment with new ideas and build prototypes with any STM32 microcontroller line. The NUCLEO-L053R8 is designed for low power applications.

The design and componentry are optimised for battery operation and maximum battery life time.

For further information contact your local STMicroelectronics sales office

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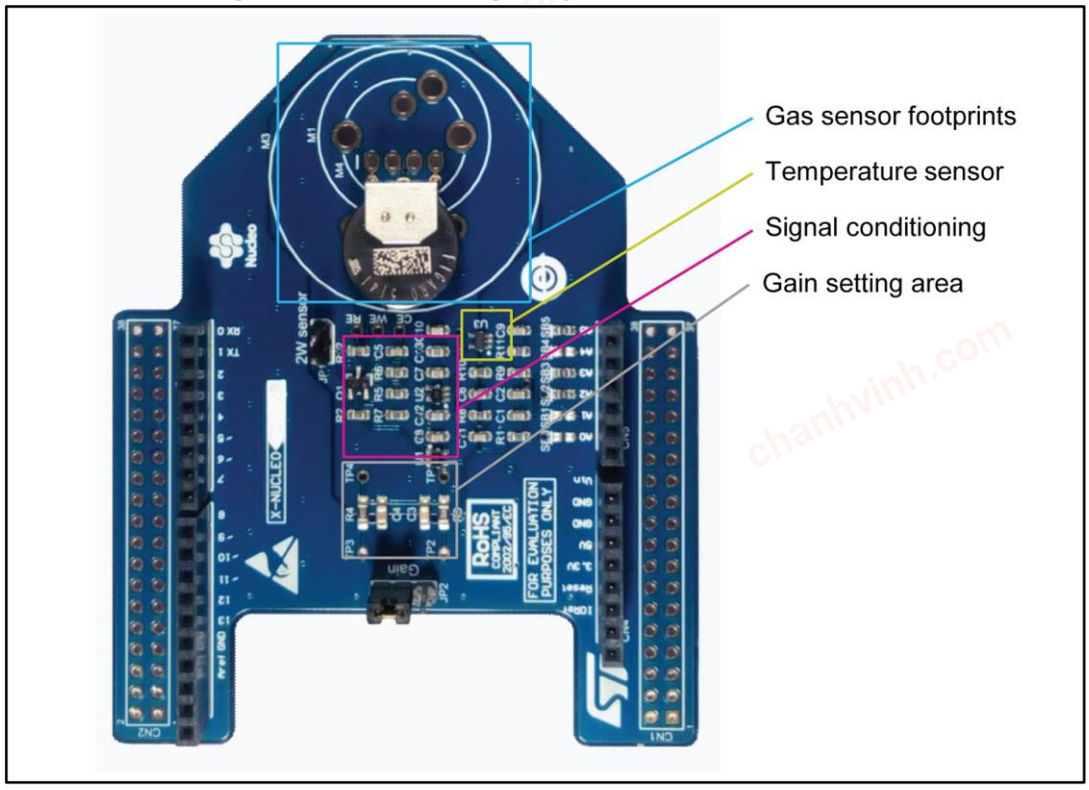
1 Board description

STM32 Nucleo gas expansion board consist of three main blocks

- gas sensor footprints – attached carbon monoxide sensor TGS5141
- operational amplifiers TSU111 for signal conditioning
- precision analog temperature sensor STLM20 for temperature compensation

Information regarding the NUCLEO-L053R8 and NUCLEO-F401RE development boards can be found at http://www.st.com/stm32nucleo

Figure 1: STM32 Nucleo gas expansion board architecture



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2 STM32 Nucleo gas expansion board

The STM32 Nucleo gas expansion board is compatible with most X-NUCLEO expansion boards. See the following figure and table for configuration and compatibility information, respectively.

Figure 2: Configuration of solder bridges

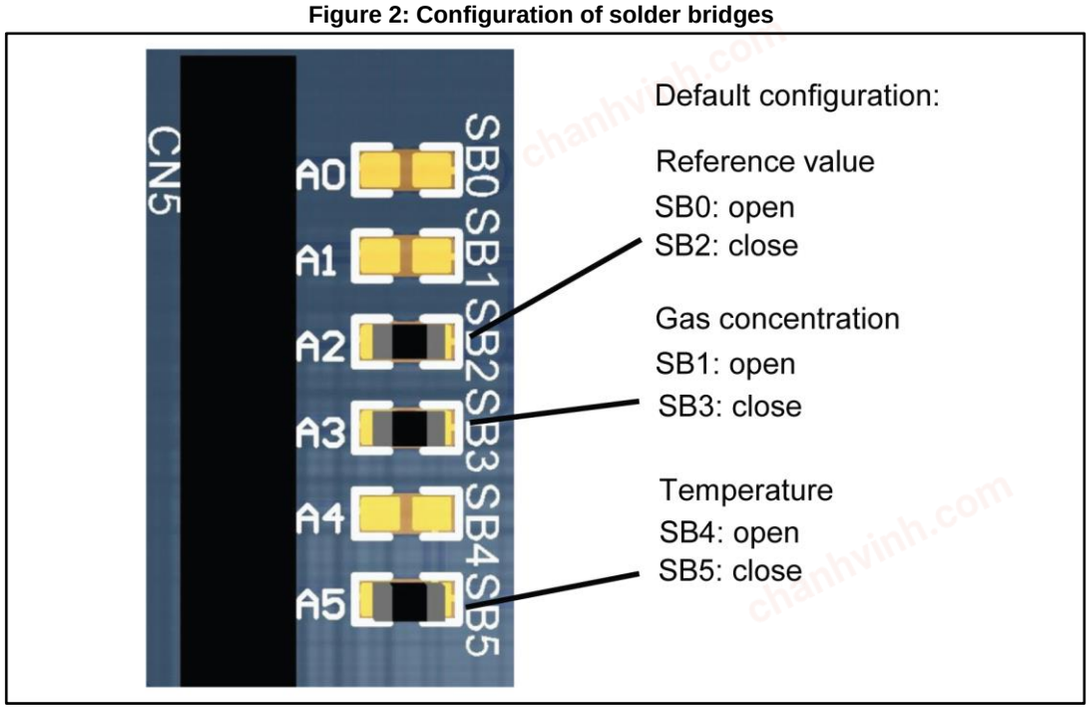


Table 1: Compatibility table

Extension board	Reference	Gas reading	Temperature
X-NUCLEO-IDB0xA1	Default	Default	Default
X-NUCLEO-IDW01M1	Default [a]	Default	Default
X-NUCLEO-IDS01Ax	Default [b]	Default [b]	Default [b]
X-NUCLEO-IKS01Ax	Default [c]	Default [c]	Default [c]
X-NUCLEO-IKA01A1	Alternative	Default	Default

[a] Alternative connection of GPIO13 of Wi-Fi module cannot be used

[b] Optional SPI connection and GPIO pins of SPSGRF module cannot be used

[c] Limited usage of INT on DIL24 and DRDY – see schematic pack and used alternative configuration. It is possible to use humidity sensor on board to provide temperature and humidity compensation

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3 Ordering information

Table 2: Order code

Order code	Description
P-NUCLEO-IKA02A1	STM32 Nucleo pack: Electrochemical toxic gas sensor expansion board

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4 Revision history

Table 3: Document revision history

Date	Version	Changes
19-Jun-2017	1	Initial release.

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