

# Quick-start guide for XENSIV<sup>™</sup> PAS CO2 Sensor2Go evaluation kit

## About this document

This document will help users to work with the XENSIV<sup>™</sup> PAS CO2 Sensor2Go evaluation kit. The XENSIV<sup>™</sup> PAS CO2 Sensor2Go evaluation kit is developed as a plug-and-play module for the assessment of the XENSIV<sup>™</sup> PAS CO2 sensor.

#### Scope and purpose

This document will define XENSIV<sup>™</sup> PAS CO2 Sensor2Go evaluation kit functions, the procedure for integrating with the XENSIV<sup>™</sup> PAS CO2 mini-evaluation board, and the necessary steps required to get a readout from the kit.

#### **Intended audience**

Application engineers, system engineers, and system architects of an application where the XENSIV<sup>™</sup> PAS CO2 mini-evaluation board will be integrated.

#### Sales part codes

SP005582413 – XENSIV<sup>™</sup> PAS CO2 Sensor2Go evaluation kit

SP005577475 – XENSIV<sup>™</sup> PAS CO2 mini-evaluation board

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## **1** Introduction to XENSIV<sup>™</sup> PAS CO2 Sensor2Go evaluation kit

The XENSIV<sup>TM</sup> PAS CO2 is a real CO<sub>2</sub> sensor that improves the size and performance of existing CO<sub>2</sub> sensor solutions. This sensor has been designed based on the unique photoacoustic spectroscopy (PAS) principle. To ensure efficient and quick evaluation, the XENSIV<sup>TM</sup> PAS CO2 Sensor2Go Evaluation kit is offered. An easy-to-use PC GUI is offered along with the package. The contents of the kits are shown in Figure 1.



#### Figure 1 XENSIV<sup>™</sup> PAS CO2 Sensor2Go Evaluation kit

The complete Sensor2Go evaluation kit includes:

- XENSIV<sup>™</sup> PAS CO2 evaluation motherboard
- XENSIV<sup>™</sup> PAS CO2 mini-evaluation board
- micro-USB cable

#### Key features:

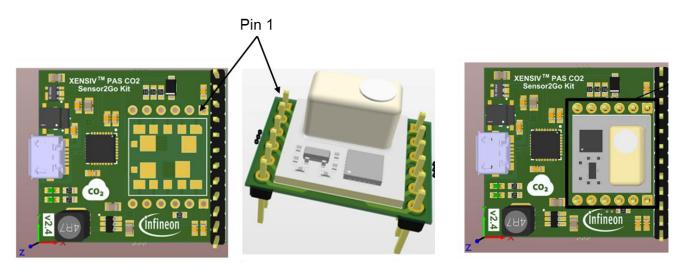
- Communication to a PC GUI via micro USB
- Power management unit ensuring stable 12V for the light source



## 2 Hardware details

## 2.1 Connection of the mini-evaluation board with the motherboard

Connect the mini-evaluation board and motherboard as shown in Figure 2. For proper connection please connect pin 1 of the mini-board as shown in the figure.



#### Figure 2 Connection of the mini-evaluation board with the sensor to go evaluation kit motherboard

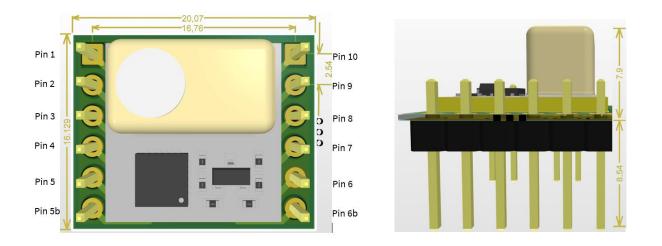
The relevant pin description of the XENSIV<sup>™</sup> PAS CO2 mini evaluation board is presented in the following table.

Pin (mini- board connection)	Pin (external pin header)	Symbol	Туре	Description
1	3	VDD3.3	Power supply (3.3 V)	3.3 V digital power supply
2	4	RX	Input	UART receiver pin
3	6	SCL	Input/Output	I <sup>2</sup> C clock pin (3.3 V domain)
4	5	TX/SDA	Input/Output	UART transmitter pin (3.3 V domain)/I <sup>2</sup> C data pin (3.3 V domain)
5	9	PWM_DIS	Input	PWM disable input pin (3.3 V domain)
5b	11	SWD	N/A	Do not connect
6b	12	SWCLK	N/A	Do not connect
6	1	GND	Ground	Ground
7	8	INT	Output	Interrupt output pin (3.3 V domain)
8	7	PSEL	Input	Communication interface select input pin (3.3 V domain)
9	10	PWM	Output	PWM output pin (3.3 V domain)
10	2	VDD12	Power supply (12 V)	12 V power supply for the IR emitter



## 2.2 XENSIV<sup>™</sup> PAS CO2 mini-evaluation board

The XENSIV<sup>™</sup> PAS CO2 sensor is assembled on the mini-evaluation board as shown in Figure 3. The minievaluation board has extended male pin headers and can be treated as a standalone sample. Its internal registers can be accessed via external pins using communication protocols such as I<sup>2</sup>C, UART, or PWM.



#### Figure 3 Top and side view of XENSIV<sup>™</sup> PAS CO2 mini-evaluation board; all dimensions are in mm

The relevant pin descriptions of the XENSIV<sup>™</sup> PAS CO2 mini-evaluation board are presented in the following table.

Pin	Symbol	Туре	Description
1	VDD3.3	Power supply (3.3 V)	3.3 V digital power supply
2	RX	Input	UART receiver pin
3	SCL	Input/Output	I <sup>2</sup> C clock pin (3.3 V domain)
4	TX/SDA	Input/Output	UART transmitter pin (3.3 V domain)/I <sup>2</sup> C data pin (3.3 V domain)
5	PWM_DIS	Input	PWM disable input pin (3.3 V domain)
5b	SWD	N/A	Do not connect
6b	SWCLK	N/A	Do not connect
6	GND	Ground	Ground
7	INT	Output	Interrupt output pin (3.3 V domain)
8	PSEL	Input	Communication interface select input pin (3.3 V domain)
9	PWM	Output	PWM output pin (3.3 V domain)
10	VDD12	Power supply (12 V)	12 V power supply for the IR emitter

Note: Before performing the evaluation, it is recommended to perform Forced Compensation (FC) or enable Automatic Baseline Offset Correction (ABOC).



## 3 Software

XENSIV<sup>™</sup> PAS CO2 Sensor2Go kit can be evaluated on the XENSIV<sup>™</sup> PAS CO2 Sensor2Go GUI. It is a plug-and-play solution. Just install the tool in your PC, connect the evaluation kit with your PC and start evaluating the CO<sub>2</sub> sensor.

## 3.1 Step 1: Downloading the GUI

Before installing the XENSIV<sup>™</sup> PAS CO2 Sensor2Go GUI, please uninstall any previous version of the same GUI. The XENSIV<sup>™</sup> PAS CO2 Sensor2Go GUI can be downloaded from the Infineon toolbox. Please, download the toolbox from the following link:

Link to Toolbox: https://www.infineon.com/cms/en/tools/landing/infineontoolbox.html

Then search for 'XENSIV PAS CO2 Sensor2Go GUI' within the toolbox launcher and install the latest version.



Figure 4 XENSIV<sup>™</sup> PAS CO2 Sensor2Go GUI download from the toolbox

## 3.2 Step 2: Installing the GUI

Press the install button from figure 4 and go through the following steps.

Step 1	
Setup - XENSIV PAS CO2 Sensor2Go GUI version 3.0.0.202111171522	- 🗆 ×
nformation Please read the following important information before continuing.	infineon
When you are ready to continue with Setup, dick Next.	
Environmental Sensor GUI v3.0.0 (November, 2021)	^
Environmental Sensor GUI Features: 	
Environmental Sensor GUI Bugfix:	
<ul> <li>Fixed number of measurements with CSV file and chart</li> <li>Fixed dicking disabled buttons (revert/apply)</li> <li>Fixed disconect icon that becomes green in some scenarios</li> <li>Fixed hot unplug scenarios</li> </ul>	
Environmental Sensor GUI v2.8.6 (October, 2021)	
General Bugfix:	~

Step 2	
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License Agreement Please read the following important information before continuing.	neor
Please read the following License Agreement. You must accept the terms of this agreement before conti with the installation.	nuing
Infineon Technologies AG Evaluation Software License Agreement	^
By DOWNLOADING and/OR using the Software, Licensee agrees to be bound by THE terms and conditions of this Agreement. If Licensee does not agree to ALL Terms and Conditions of this Agreement, LICENSEE (LICULDING YOU) shall not DOWNLOAD, use AND/OR Copy THE SOFTWARE BUT IMMEDIATELY DELETE IT (to the extent that it was downloaded already).	
DEFINITIONS     1. 'Affiliate' means an entity listed in the Registration which is controlled by Licensee either directly on indirectly through one or more intermediaries. Control shall mean the direct or indirect ownership of more than fifty (50) percent of the shares or ownership interests representing the right to make decisions for that entity, as long as such ownership interests.     1.2 "Agreement" means this Evaluation Software License Agreement.     1.3 "Documentation" means the technical information potentially provided along with the Software.     1.4 "Licensee" means the company or individual indicated in the Registration.     1.5 License." Means Theorem Education Software License Agreement.     1.5 License." means the information AG.	~
<ul> <li>I accept the agreement</li> </ul>	
○ I do not accept the agreement	
Back Next	Cancel

## Quick-start guide for XENSIV<sup>™</sup> PAS CO2 Sensor2Go evaluation kit



Step 3					Step	4	
Setup - XENSIV PAS CO2 Sensor2Go GUI version 3.0.0.20211117	1522	-		🏟 Setu	up - XENSIV PAS CO2 Sensor2Go GUI version 3.0.	.0.202111171522	- 🗆 🗙
Information Please read the following important information before continuing.		Ín	fineon		ct Destination Location /here should XENSIV PAS CO2 Sensor2Go GUI be insta	alled?	infineon
When you are ready to continue with Setup, click Next.					Setup will install XENSIV PAS CO2 Sensor2Go GU	UI into the following folder.	
Copyright (C) Infineon Technologies AG. All rights reserved.				т	o continue, click Next. If you would like to select a diffe	erent folder, click Browse.	
					:\Infineon\Tools\XENSIV PAS CO2 Sensor2Go GUI\3.	J.O.202111171522	Browse
				A	t least 96.5 MB of free disk space is required.		
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E Setup will create the program's shortcuts in the following Start	t Menu folder.			c	Tick Install to continue with the installation, or click Ba	ck if you want to review or	change any settings.
To continue, click Next. If you would like to select a different folder, a	click Browse.				Destination location: C:\Infineon\Tools\XENSIV PAS CO2 Sensor2Go G	JUI\3.0.0.202111171522	^
XENSIV PAS CO2 Sensor2Go GUL_3.0.0.202111171522		B	rowse		Start Menu folder: XENSIV PAS CO2 Sensor2Go GUI_3.0.0.2021111		
					Additional tasks: Additional shortcuts: Create a desktop shortcut		
Don't create a Start Menu folder					<		>
	Back	Next	Cancel			Back	Install Cancel

After performing all the necessary steps, Press ,Finish' to exit setup and launch XENSIV<sup>™</sup> PAS CO2 Sensor2Go GUI. The startup screen will look like Figure 5.



Settings Windows Help		
Connect Start Acquisition		<b>=</b> 🤤
	DEVICE DISCONNECTED	

Figure 5 Start-up screen

## 3.3 Step 3: Connect XENSIV<sup>™</sup> PAS CO2 Sensor2Go

Connect a XENSIV<sup>™</sup> PAS CO2 Sensor2Go evaluation kit using a micro USB cable as shown in Figure 6.



#### Figure 6 XENSIV<sup>™</sup> PAS CO2 Sensor2Go Evaluation kit connection to PC via micro USB cable

After connecting the sensor, start the data acquisition by pressing a connect button. XENSIV<sup>™</sup> PAS CO2 Sensor2Go GUI supports connection to multiple PAS CO2 devices (max 10). After pressing Connect button, all the connected devices are listed in a tree view in the expandable CO<sub>2</sub> devices pane. Device settings and information are available for each device (see Figure 7).



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5			3600	)
Sensor	Port	Status	Info	Config
▼ PAS CO2		0	0	0
COM58	58	0	()	©.
COM75	75	$\bigcirc$	0	100

#### Figure 7 Expandable section view

**Note:** Data acquisition stops if the connected sensor loses power supply. For long-term measurements please make sure that the laptop/PC is not entering into sleep mode or power-saving mode.

#### 3.4 Main Toolbar

The main toolbar of the XENSIV<sup>™</sup> PAS CO2 Sensor2Go GUI consists of controls grouped in four sections according to the functionality they provide (see Figure 8). Those sections are following:

- Connectivity → Device selection and connection controls
- Acquisition  $\rightarrow$  Acquisition controls
- Logging → Logging Settings button
- Help/Forum → For general GUI features

CO2 (COM7) V () Disconnect Stop Acquisition	Ë	P	?	
---	---	---	---	--

Figure 8 Main Toolbar for XENSIV<sup>™</sup> PAS CO2 Sensor2Go GUI.

#### Data Logging:

XENSIV<sup>™</sup> PAS CO2 Sensor2Go GUI application provides a possibility to log measurements and save them into a CSV file. Automatic Logging is turned on by default. The default logging path is "C:\Infineon\Fusion\_GUI\_Exports".

Both the logging path and automatic logging option can be set in the Logging Settings window. The logging settings window can be opened with the Logging setting button (see Figure 8) visible in the main application toolbar and also in Main Menu  $\rightarrow$  Settings.



## 3.5 Additional features

In the installed GUI, customers can use different functionalities of the XENSIV<sup>™</sup> PAS CO2 sensor. For accessing additional features, for each of the individual sensors, steps are mentioned in the following figure 9.

©•	Alarm:	000	1			0.	Alarm:		) <b>O</b> on			Alarm threshold		1200	
	Sampling Time [s]			-	10			Sampling Time [s]			10		0 Pressure compe	5000	
	5			360				5			3600		Pressure compe	nsation [nPa]	1013
	Sensor ▼ PAS CO2 COM58 COM75	58 75	Status	i i	Config ©o	-		Sensor PAS CO2 COM58 COM75	90rt 58 75	0	Info Config	•	750 Reference CO2 b 350	1150 aseline [ppm] 900	400
													ABOC: Or	Start calibration	in

#### Figure 9 Additional feature window

#### Alarm threshold [ppm]:

The customer can set the alarm threshold values. If that threshold is surpassed then the customer can see the change in the status color for the set sensor respectively. The alarm threshold will provide the visual alert only.

#### Pressure compensation [hPa]:

Pressure compensation can be triggered by manually setting the pressure values either via the slider box or typing directly into the text box.

#### ABOC:

Automatic Baseline Offset Correction (ABOC) can be turned ON/OFF and the baseline value can be adjusted by manually setting the  $CO_2$  values in the "reference CO2 baseline [ppm]" either via the slider box or by typing directly into the text box.

After changing the related settings press enter and click the "Apply all settings" button from the bottom left corner of the screen as shown in Figure 10.



#### Figure 10 The "Apply all settings" button



#### **Forced compensation:**

Force compensation can also be triggered from the popup from figure 9 with the help of the following steps.

- 1. Configure the "Reference CO2 baseline [ppm]" via the slider box or by typing directly into the text box
- 2. After changing the baseline value press enter and click the "Apply all settings" button (figure 10)
- 3. Start the Forced compensation by pressing the "Start Calibration" button
- 4. Timer for completion of the forced compensation pops up and the status of the device changes

Note:

Before enabling the Force compensation, the reference CO2 concentration needs to be determined.

#### Sampling time configuration [s]:

The customer can set the sampling rate of the sensors via the slider box or by typing directly into the text box as shown in figure 11. After changing the related settings press enter and click the "Apply all settings" button from the bottom left corner of the screen as shown in Figure 10.

*Note:* Changes in the Sampling time is global for all devices

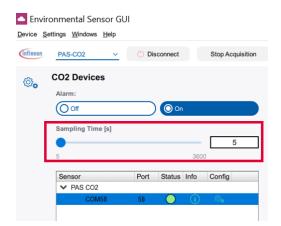


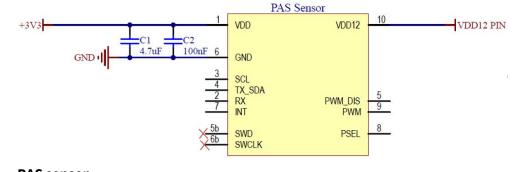
Figure 11 Sampling time configuration [s]:



## 4 Appendix

## 4.1 Schematics for evaluation motherboard

Customers who are using the XENSIV<sup>™</sup> PAS CO2 mini-evaluation board or standalone XENSIV<sup>™</sup> PAS CO2 sensor without the XENSIV<sup>™</sup> PAS CO2 evaluation motherboard are encouraged to use the same application circuits for a single and stable power supply.





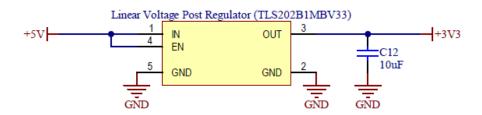


Figure 13 Infineon fixed linear voltage post regulator

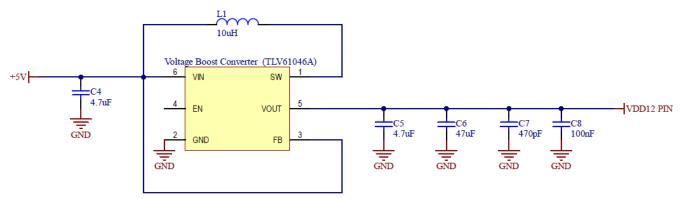


Figure 14 Example voltage boost converter to generate stable 12V



## **Revision history**

Document version	Date of release	Description of changes
V1.0	02.06.2021	Creation
V1.1	26.08.2021	Updated notes
V1.2	14.01.2022	GUI update

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