

EnviCam-30 EvalBoard

Multi-gas microsensor

User Guide v1.0

VOCSens srl Rue Fond Cattelain 1 BTE 4 1435 Mont-Saint-Guibert, Belgium http://www.vocsens.com



Table of contents

e of contents	1
Introduction	3
Hardware	3
Start-up	4
Serial USB	4
Document revision	8
	e of contents Introduction Hardware Start-up Serial USB Document revision

All rights in this datasheet are the exclusive property of VOCSens. All rights reserved.

VOCSens reserves the right to modify the technical specifications or functions of its products, or to cease manufacturing any of its products, or to discontinue technical support, without any written notification and express request from its customers, and to make sure the information available to them is valid.

1. Introduction

EnviCam[™]-30 is a multi- gas microsensor for ammonia, Formaldehyde, Acetaldehyde, CO, NO2, ... detection. The document provides an overview of the EnviCam[™]-30 evaluation board (Eval Board) and covers the following sections: hardware description, how to start-up the Eval Board and how to setup serial USB.



figure 1 EnviCam[™]-30 multi-pixel gas sensing microsensor

2. Hardware

EnviCam[™]-30 Eval Board, represented by Figure 2, can accommodate one EnviCam[™]-30 and has the capability to measure gas concentration of one to eight EnviCam[™]-30 pixels (to know the targeted gases on each pixel, please contact the technical support team).

All the EnviCam[™]-30 conditioning interfaces are embedded and the Eval Board has a temperature and relative humidity sensor (SHT-31).

It is powered through an USB-C cable and data retrieved with the same cable when configured for serial communication (note that only one of the two USB-C differential pair is connected, switch the cable if the board is not detected as port COM. Section 4 provides information about serial USB configuration.

There are two ways to power-up the board and JP2 selects one of them. Short-circuit red JP2 for USB power supply or blue JP2 for battery operation (care must be taken to not connect both power-supply at the same time). For battery operation connect it to the bottom connector (battery, e.g. 103450AR2-1S-3M) and charge it with USB-C cable.



Figure 2. EnviCam-30^m evaluation board.

3. Start-up

You place the EnviCam[™]-30 Eval board in its baseline environment and startup the board by putting an USB-C cable inside the dedicated connector.

Now the device sends gas concentration, temperature and relative humidity through serial communication depending on the configuration. With serial configuration the board sends data to the terminal after 30 seconds of calibration.

A good practice after power up is to take measurements during a short period (above 30" or a couple of minutes after a long period of storage) in the baseline environment before measuring the target gas concentrations.

4. Serial USB

When configured with serial communication software, the EnviCam[™]-30 Eval Board sends data by serial communication (port COM) through the USB-C connector.

Connect the Eval Board with the USB-C cable to the computer. If this is the first time, wait that Windows installs the driver. With Windows 10, the two following boxes should appear at the bottom right of the screen.



To show the data the user need to configure a terminal like PuTTY. Apply the settings shown in Fig. 1, Fig. 2 and Fig. 3 to PuTTY. Note that if other serial terminal is used, it has to be configured in the same way.

Category:				
□- Session	Options controlling the effects of keys			
Logging Logging Logging Logging Logging Logging SSH	Change the sequences sent by: The Backspace key © Control-H © Control-? (127) The Home and End keys © Standard © rxvt The Function keys and keypad © ESC[n~ © Linux © Xtem R6 © VT400 © VT100+ © SCO			
	Application keypad settings: Initial state of cursor keys: Normal Application Initial state of numeric keypad: Normal Application NetHack Enable extra keyboard features: AttGr acts as Compose key			
I Serial	Control-Alt is different from AltGr			

Figure 3. PuTTY keyboard settings.

Category:				
Session	Options controlling local serial lines			
Logging ⊡ Terminal	Configure the serial line			
Keyboard	Speed (baud)	115200		
Bell Features	Data bits	8		
⊡ · Window	Stop bits	1		
···· Appearance ···· Behaviour	Parity	None 🔻		
	Flow control	None		

Figure 4. PuTTY Serial settings.

Category:	
Session	Options controlling the terminal emulation
 Session Logging Terminal Keyboard Bell Features Window Appearance Behaviour Translation Selection Colours Connection Data Proxy Telnet Rlogin SSH 	Set various terminal options Image: Set various terminal options Auto wrap mode initially on DEC Origin Mode initially on Implicit CR in every LF Implicit LF in every CR Use background colour to erase screen Enable blinking text Answerback to ^E: PuTTY
	Line discipline options Local echo:
Serial	Remote-controlled printing Printer to send ANSI printer output to:

Figure 5. PuTTY Terminal settings.

The formatted output is a proprietary version of cayenne LPP:

Cayenne LPP stands for Cayenne Low Power Payload and is used as the format to transmit data over Lora Wan. We will also use it for the UART interface of the Demo Boards.

It consists of a sequence of bytes described in this table:

1 Byte	1 Byte	N Bytes	1 Byte	1 Byte	M Bytes	
Data1 Ch.	Data1 Type	Data1	Data2 Ch.	Data2 Type	Data 2	

- The first byte defines the channel of the sensor
- The second byte defines the type of sensor (temperature, humidity, ...) and the format of the data (decimal position and the number of bytes).
- The following sequence of bytes contains the data.

Channel-Id:

channel	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08
Sensor	Gas							
	sensing							
	element							
	01	02	03	04	05	06	07	08

Temperature & Relative humidity sensors:

Channel	Sensor
0x80 (128)	Temperature

0x81 (129)	Relative humidity

					Data	
Туре	IPSO	LPP	Hex	Data Size	Resolution	
					per bit	
Digital Input	3200	0	0	1	1	
Digital Output	3201	1	1	1	1	
Analog Input	3202	2	2	2	0.01	
Analog Output	3203	3	3	2	0.01	
Illuminance	3301	101	65	2	1	
Sensor	3301	101	05	2		
Presence Sensor	3302	102	66	1	1	
Temperature	3303	103	67	2	0.1°C Signed	
Sensor	5505	105	07	2	MSB	
Humidity Sensor	3304	104	68	1	0.5 %	
	5504	104	08		Unsigned	
					0.001 G	
Accelerometer	3313	113	71	6	Signed MSB	
					per axis	

Туре

VosSens decided to use some of the unused types to send values for the sensors. The custom *style* for each information we want to send on the same channel-id (sensing element) is described below:

Туре	LPP	Hex	Data Size	Data Resolution per bit	range
f [Hz]	255	0xFF	3	1	[0: 1: 16_777_215]
Rs [Ω]	254	0xFE	3	1	[0: 1: 16_777_215]
<i>R0</i> [Ω]	253	0xFD	3	1	[0: 1: 16_777_215]
C _{Raw} [ppm]	252	0x7D	3	0.01	[0: 0.01: 167_772.15]
Vbias	251	0xFC	3	0.000001	[0: 0.000001: 16.77215]

Example output on terminal:

8067010081687E**01FE000194**01FD00017502FE0D8A8902FD0C67C703FE09A42E03FD009D0C04FE00 017F04FD00016B05FE03243A05FD00006306FEFFFFF06FD00155C07FEFFFFF07FD016EC708FE112 44708FD10F7F8

80670100: channel = 80 = temperature | type = 67 = temp sensor | value = 2 bytes = 0100

81687E: channel = 81 = Relative humidity | type = 68 = humidity sensor | value = 1 byte = 7E

01FE000194: channel = 01 = sensing element (pixel) 1 | type = FE = Rs |value = 3 bytes = 000194

•••

08FD10F7F8: Channel = 08 = sensing element (pixel) 8 | type = FD = C [ppm] |value = 3 bytes = 10F7F8

Envisoft:

The concentration value C on the terminal is the raw value from the sensor without compensation for temperature and humidity. VOCSens provides <u>EnviSoft</u> an online software application for the calibration and evaluation of the sensor. please request an account at <u>sales@vocsens.com</u>

5. Document revision

User Guide version

V1.0

Modification/addition

Initial