

# EvaluatIR-M Evaluation Kit User Guide

Gas Sensing Solutions Ltd.

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### INTRODUCTION

This evaluation kit is designed to provide a fast and easy method to measure and record  $CO_2$  data using the GSS ExplorIR<sup>®</sup>-M CO<sub>2</sub> sensor. Once set up, the kit is designed to run fully autonomously and can be left for weeks at a time without the need for use intervention. Actual battery life will vary depending on the sensor setup.

The evaluation kit includes the EvaluatIR-M box, and a USB cable. The EvaluatIR-M PC software application can be downloaded from the GSS web site.

### https://www.gassensing.co.uk/resources?resource=software

As well as recording CO<sub>2</sub> data, the software application allows the user to record and analyse other environmental conditions such as pressure, relative humidity and temperature.

For more technical information on the ExplorIR<sup>®</sup>-M CO<sub>2</sub> sensor used in the kit, download the appropriate data sheet from here: <u>https://www.gassensing.co.uk/resources?resource=datasheet</u>



### **INITIAL SETUP**

The EvaluatIR-M comes boxed with a USB lead.

The EvaluatIR-M requires the addition of two AA batteries to power the unit. Unscrew the battery cover using a small Phillips screwdriver.



Insert the batteries as per the directions in the battery compartment. Fit the battery cover back into place. The unit is now ready for use.

### SOFTWARE INSTALLATION



The EvaluatIR-M software is available direct from the GSS web site. Download the .zip file to your



computer. Unzip and click on Setup.exe and follow the instructions on the screen.

The software has been extensively tested to run on a Windows 10 platform. However, no guarantee can be given for successful operation on other platforms. The software will not run on Android or iOS.

### **CONFIGURING THE EVALUATIR**

Connect the EvaluatIR-M to the PC using the supplied USB lead. The green LED on the top of the unit will now illuminate.



### **USB DRIVER**

The EvaluatIR contains an integrated circuit that converts between the UART interfaces inside the box and the PC USB interface. Recent versions of Windows will automatically identify and install the USB driver when you plug in the lead. If you are prompted to locate a driver, download from the FTDI website: <u>https://www.ftdichip.com/Drivers/VCP.htm</u> Choose "VCP Drivers" and select the correct driver for your operating system.



#### **RUNNING THE SOFTWARE**

Look for the filename **GSS EvaluatIR Application**. Double click the software to launch the application. The opening screen is shown below.

🛃 GSS EvaluatIR Applica	tion 1v3		-		$\times$
EvaluatIR Connect not connected	- Download - 0 Records Dowloaded	Download	<ul><li>All Re</li><li>Last</li></ul>	cords	
Configuration No EvaluatIR Connect - - - - -	ed	Set Time	Gas Ser	SS sing Solution	5
Battery Charge Memory Used Options Config Start	View		Clear	Exit	

Click on the Connect button to access the pull-down menu.

Click on the pull-down menu to access the communication port used by the EvaluatIR-M. It may not appear as COM3 but if you are unsure what communications port the platform is attached to then go to the "Device Manager" on your machine and plug / unplug the EvaluatIR-M. This will show you which port the device is connected to.

		×
Conne	ection	
I		~
COM	13	
OK		Cancel

Select the correct COM port and click on the 'Connect' button. The software application will now show the unit is connected, the battery level and the memory status.

### **GSS** Gas Sensing Solutions

## **USER GUIDE**

🖳 GSS EvaluatIR Applic	cation 1v3		_		×
EvaluatIR Disconnect Connected	Download Records to download = 0 0 Records Dowloaded	Download	<ul> <li>All Re</li> <li>Last</li> </ul>	ecords	
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Options Config Start	View		Clear	Exit	

If this is a new setup or new batteries have been installed, the time field will be showing all zero.

Push the 'Set Time' button to set the EvaluatIR-M to the PC time. Note this will now run independently and is used to time stamp the internal measurements for subsequent read out. It will not be updated with respect to PC time or daylight saving time unless the set time button is clicked with the unit connected to the PC

The current configuration for the EvaluatIR-M is shown in the main body of the display.



### **CHANGING THE CONFIGURATION**

If the configuration is to be changed click on the "Config" button to display the setup screen.

🛃 Configure EvaluatIR	_	
SEP ID EvaluatIR		
Logging     Long Term Logging	200	
Take a measurement every Integration time for CO2 sensor is	8	seconds.
<ul> <li>Continuous Logging</li> <li>Take a measurement every</li> </ul>		seconds.
Pressure		ariation
CO2 Autocalibration		
Autocalibration every	8	days
Assumed background To switch off autocalibr Autocalibrate every 0 d	450 ration, set to ays.	ppm
Refresh Sa	ave	Close

The ID of the EvaluatIR-M unit may be set by user. Overwrite the default ID name and save. This will be output on the retrieved data file to indicate which unit the data was retrieved from. The ID is subject to a maximum character length of 20.

The EvaluatIR-M can be set up to log CO<sub>2</sub> levels either periodically or continuously.

For periodic logging, click on 'Long Term Logging' and set the measurement period. The integration time is the length of time the  $CO_2$  values are averaged every measurement period. In the example, 8 seconds of  $CO_2$  values are averaged every 300 seconds.



For continuous logging, the EvaluatIR-M will log CO<sub>2</sub> values at the pre-set period.

The sensor can also be set up to provide a pressure compensated  $CO_2$  value. This uses the internal pressure sensor to compensate the  $CO_2$  value for any pressure variations. Note this is only used to correct the output when it is downloaded. It can therefore be changed to download both corrected and uncorrected versions of the same dataset.

The EvaluatIR-M has an 'Auto-Zero' function, where the zero set point is periodically reset. See the ExplorIR<sup>®</sup>-M sensor data sheet for more details. The EvaluatIR-M can be set to force a background zeroing of the sensor to a user defined  $CO_2$  value at a period set by the user.

Once all the values are set, they must be saved by hitting the 'Save' button. 'Close' exits the configuration without saving. 'Refresh' updates the values to the last saved configuration. The values will be updated on the main body screen by pressing 'Refresh'.



### DATA RECORDING

Once the Evaluation platform has been configured, it can now be used to record data. Click the 'Start' button and the EvaluatIR-M will start logging indicated by the logging enabled script in the application. The script 'Logging Disabled' highlighted in red will change to 'Logging Enabled' in green.

GSS EvaluatIR Ap	plication 1v3	- 🗆 X	🛃 GSS EvaluatIR App	lication 1v3	- 🗆	>
EvaluatIR Disconnect Connected	Download Records to download = 0 Download 0 Records Dowloaded	All Records     Last	EvaluatIR Disconnect Connected	Download Records to download = 0 Download 0 Records Dowloaded	All Records     Last	
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Options Config Sta	it View	Clear Exit	Options Config Stop	View	Clear Ex	it

The evaluation platform can now be disconnected from the USB cable and will record data autonomously. The LED on the EvaluatIR-M will flash briefly at each reading point. Note that if the measurement interval is long, this will happen infrequently.

### Note, the EvaluatIR-M must be disconnected from the USB cable, before data will be recorded.



#### DATA RETRIEVAL

Launch the software application as before. Plug the USB lead into the EvaluatIR-M and the PC. Click 'Connect'. The software application will show the number of data points that have been stored since the EvaluatIR-M was started.

EvaluatIR	Download			
Disconnect	Records to download = 648	Download	All Re	cords
Connected	0 Records Dowloaded		🔿 Last	
Configuration				
EvaluatIR			-	CC
EvaluatIR Date-Time 14/01/20 10:15:43 Set Time				
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To download data, firstly select 'All Records' or "Last' and enter the number of records to download. Click the 'Download' button. The next screen will ask for a location to save the file to, and the file name.

→ ↑ ↑ 🗄 > This PC > Document	s >	v õ	, Search D	ocuments
ganise 🔻 New folder				- III -
🚒 Leading Solutions Accounts 🔷	Name	1	Date modified	Туре
MK Electronics	Arduino		21/05/2017 17:40	File folder
Photoccasions	Custom Office Templates		20/05/2017 12:42	File folder
Gas Sensing Solutions Ltd	eM Client	-	26/11/2019 15:32	File folder
Constant Addison Supervised Date	📑 Garmin	1	20/07/2019 22:05	File folder
Graeme Addison - Supply and Dem	GSS		27/03/2019 16:12	File folder
OneDrive - Gas Sensing Solutions Ltc	Leading Solutions	1	26/04/2019 14:57	File folder
GSS Engineering	Notes		21/05/2017 17:40	File folder
7	CneNote Notebooks	-	23/05/2019 13:05	File folder
This PC	C PDF Pro	-	28/01/2019 11:42	File folder
3D Objects	Personal	1	26/04/2019 15:03	File folder
Documents	<			_
File name:				
Save as type: txt files (*.csv)				

Once these have been input select the save button. The data will now download, and a green progress bar will move across the lower part of the screen.



When the data download is complete, a box will appear indicating the download is complete. This can be cleared as required. Note that if a file name is used, the new data will be appended to the old file. The file is in CSV format.

Download	×
Download Comp	lete
0	K

The data file can now be accessed via a spreadsheet solution for subsequent analysis.



### COMMUNICATING WITH THE CO2 SENSOR

Access to all  $CO_2$  sensor functions and register settings is available to the user using the Terminal View. Terminal View allows the user to read and write directly to the ExplorIR<sup>®</sup>-M sensor using the UART command set. Click on 'Speak to  $CO_2$  Sensor'.

The 'Speak to  $CO_2$  Sensor', when selected allows commands to be sent directly to the sensor. Refer to the ExplorIR<sup>®</sup>-M sensor datasheet for description of these commands.

'Sensor Calibration', when the 'Speak to  $CO_2$  Sensor' option is selected, you are able to re-zero the sensor by entering the current  $CO_2$  level in the test box and clicking 'Calibrate'. The sensor will then be adjusted to read this value. This can be confirmed by polling the sensor.

🖳 Sensor Viewer		-		$\times$
.00001 Z 00711 z 00711 a 00016 Z 00712 z 00728 Z 00712 z 00705 .00001 Z 00711 z 00695 Z 00711 z 00716 Z 00714 z 00728 Z 00716 z 00722 S 0				^
M 08:19:54,15/10/19,Pressure,993.81,Temperatur Voltage,3.03	e,19.56,Humidity,50.90,C0	02,728,	Battery	
1				~
Transmit	Info			
O Speak to CO2 Sensor	Poll Sensors			
Speak to Sensor Evaluation Platform	idle			
Cond				
Send				
Calibrate CO2				
Calibrate CO2 CO2 Concentration is:				
Calibrate CO2 CO2 Concentration is: CO2 Sensor Filter = 16 Calibrate				

### **POLL SENSORS**

By clicking the Poll button, the sensor is accessed and read according to the setup parameters. If the configuration is set for long term logging, the sensor will be read in the same way. After power on, wait the configured integration time before the reading is displayed. A seconds count down will be displayed.

The above image shows the result of a Poll Sensors request, showing values for Pressure, Temperature, Humidity, CO<sub>2</sub> and battery voltage.



### COMMUNICATING WITH OTHER SENSOR

The 'Speak to Sensor Evaluation Platform' is primarily for debug purposes. They are not intended to be used in normal operation.

Command	Rd / Wr	Parameters (n)	Description
%S n	Wr	0 or 1	Sensor on / off
%L	Rd	None	Returns status of logging, 0 disabled 1
			enabled
%L n	Wr	0 or 1	0 disables logging, 1 enables logging
%D	Wr	None	Download all data
%D n	Wr	1 – number of logs	Download last n logs
%RESET	Wr	None	Full reset of unit, factory reset
%O n	Wr	2 - 120	Sensor on time (s)
%P n	Wr	2 - 3600	Period between measurements (s)
%Т	Rd	None	Read time
			hours:mins:secs day/month/year
%T dd/mm/yy	Wr	DOW day/month/year	Set time DOW Mon = 1
hh:mm:ss		hours:mins:secs	DOW day/month/year
			hours:mins:secs
%I	Rd	None, Status	Returns device ID, + other status
		ID,BV,BS,USED,INT,ON,	BV – battery voltage (mv)
		PRESS,BG,DAYS	BS - battery status
			0 ok, 1 low
			USED- 0-1 scale of used mem
			INT- measurement period (s)
			ON- sensor on time (s)
			PRESS- Pressure compensation,
			0 off, 1 on
			BG – background CO <sub>2</sub> level
			DAYS – auto-zero interval
%l str	Wr	Str, max 20 characters	Writes SEP ID string
%M	Rd	None	Forces a read of sensors
%С	Rd	None	Returns pressure compensation
			status
			0 disabled, 1 enabled
%С	Wr	0 or 1	Sets pressure compensation status
			0 disabled, 1 enabled
%A	Rd	None	Returns auto-zero status
			Days
			Level
%A n m	Wr	Days, level	Set auto-zero to period days & target
			value
%V	Rd	none	Return firmware version info





### TROUBLESHOOTING

The EvaluatIR-M can be configured easily and will operate "out of the box". In the event of any issues please try the following troubleshooting steps.

Unit does not log	Check batteries are correctly inserted
	Replace batteries
	Check settings
	Check logging is enabled
Unit does not retain real time	Check batteries are correctly inserted
clock settings	Replace batteries
Unit does not connect to PC	Ensure software is installed correctly – if necessary, please de- install and re-install as required
	Check the correct com port has been selected as per the device manager note above
Unit flattens batteries	Set logging to a longer period to reflect the measurement
prematurely	frequency required



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#### **REVISION HISTORY**

DATE	RELEASE	DESCRIPTION OF CHANGES	PAGES
28/01/2020	1.2	Re-write	All
27/11/2020	1.3	Minor updates	All
2/06/2021	1.4	Additional detail added	All
11/06/2021	1.5	Update to website links	P. 3