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EZO Carrier Click - Oxygen

PID: MIKROE-6010

EZO Carrier Click - Oxygen is a compact add-on board suitable for determining the dissolved oxygen of a liquid in your application. This board features the EZO-DO™, an ISO 5814 compliant embedded dissolved oxygen circuit board from Atlas Scientific. The EZO-DO™ is a small yellow additional board that comes with the carrier board and allows you to read the oxygen values in a range of 0.01 up to 100 mg/L with an accuracy of +/-0.05mg/L. The EZO-DO™ allows readings in a maximum of one reading per second. It is compatible with various galvanic measurement probes, such as the Conductivity Probe K 1.0 from Atlas Scientific.

EZO Carrier Click is fully compatible with the mikroBUS™ socket and can be used on any host system supporting the mikroBUS™ standard. It comes with the mikroSDK open-source libraries, offering unparalleled flexibility for evaluation and customization. What sets this Click board™ apart is the groundbreaking ClickID feature, enabling your host system to seamlessly and automatically detect and identify this add-on board.

How does it work?
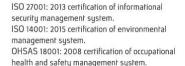
EZO Carrier Click - Oxygen is based on the EZO-DO™, an ISO 5814 compliant embedded dissolved oxygen circuit board from Atlas Scientific. It allows you to interface any galvanic measurement probe, which determines the dissolved oxygen of a liquid in your application, by sinking the probe into the solvent you want to measure the oxygen. The EZO Carrier Click - Oxygen comes with the BNC connector for interfacing the appropriate probe, which MIKROE also offers. The EZO-DO™ needs to be isolated from the host MCU; therefore, this Click™ board comes with the Si8400AB, a bidirectional isolator from Skyworks. The isolator provides standard bidirectional and I2C communication with a clock frequency of up to 1.7MHz.
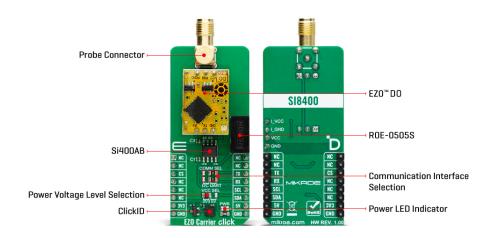
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The EZO-DO™ circuit is a very sensitive device, and the sensitivity is what gives this circuit its accuracy. It can read micro-voltages that are bleeding into the water from unnatural sources such as pumps, solenoid valves, or other probes/sensors. So, to eliminate the electrical noise, besides the Si8400AB isolator, the power supply voltage is also isolated. For this purpose, this Click™ board is equipped with the ROE-0505S, a DC/DC converter from Recom. The EZO-DO™ has a flexible calibration protocol allowing for single-point, two-point, or three-point calibration. The temperature compensation should be taken into account. The EZO-DO™ features sleep mode, continuous operation, find function, export/import calibration, on-module status LED, and many more features detailed and described in the attached datasheet.

EZO Carrier Click - Oxygen can use a standard 2-wire UART interface to communicate with the host MCU with the default baud rate of 9600bps. While using the UART interface, you can use the library we provide or a simple ASCII set of commands. You can also choose a standard 2-wire I2C interface over the COMM SEL jumpers.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this Click board™ comes equipped with a library containing easy-to-use functions and an example code that can be used as a reference for further development.

Specifications

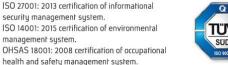| Type	Environmental,Gas
Applications	Can be used for electrochemical sensing and also capable of reading micro-voltages that are bleeding into the water from unnatural sources such as pumps, solenoid valves, or other probes/sensors
On-board modules	EZO-DO™ - embedded dissolved oxygen circuit board from Atlas Scientific
Key Features	ISO 5814 compliant, high stability and accuracy, easy-to-use data protocol, simple command structure, flexible calibration protocol, works with any off-the-shelf galvanic probe, noise immunity, completely isolated data and power supply lines, and more

Interface	I2C,UART
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on EZO Carrier Click - Oxygen corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikro™ BUS			Pin	Notes
	NC	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	NC	
ID COMM	**CS**	3	CS	RX	14	**TX**	UART TX
	NC	4	SCK	TX	13	**RX**	UART RX
	NC	5	MISO	SCL	12	**SCL**	I2C Clock
	NC	6	MOSI	SDA	11	**SDA**	I2C Data
Power Supply	**3.3V**	7	3.3V	5V	10	**5V**	Power Supply
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
JP2-JP3	COMM SEL	Right	Communication Interface Selection I2C/UART: Left position I2C, Right position UART

EZO Carrier Click - Oxygen electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Dissolved Oxygen Range	0.01	-	100	mg/L
Accuracy	-0.05	-	+0.05	mg/L

Software Support

We provide a library for the EZO Carrier DO Click as well as a demo application (example), developed using MIKROE compilers. The demo can run on all the main MIKROE development boards.

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Package can be downloaded/installed directly from NECTO Studio Package Manager(recommended), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

This library contains API for EZO Carrier DO Click driver.

Key functions

- ezocarrierdo_send_cmd Send command function.

- ezocarrierdo_send_cmd_with_par Send command function with parameter.

- ezocarrierdo_send_cmd_check Check the sent command.

Example Description

This example demonstrates the use of EZO Carrier DO click board by processing the incoming data and displaying them on the USB UART.

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager(recommended), downloaded from our LibStock™ or found on Mikroe github account.

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.EZOCarrierDO

Additional notes and informations

Depending on the development board you are using, you may need USB UART click, USB UART 2 Click or RS232 Click to connect to your PC, for development systems with no UART to USB interface available on the board. UART terminal is available in all MIKROE compilers.

mikroSDK

This Click board™ is supported with mikroSDK - MIKROE Software Development Kit. To ensure proper operation of mikroSDK compliant Click board™ demo applications, mikroSDK should be downloaded from the LibStock and installed for the compiler you are using.

For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

[Click Boards™](#)

Downloads

[EZO-DO™ Datasheet](#)

[EZO Carrier Click - Oxygen 2D and 3D files](#)

[SI8400 datasheet](#)

[EZO Carrier Click - Oxygen schematic](#)

[EZO Carrier Click - Oxygen example on Libstock](#)

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