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EZO Carrier Click - Conductivity





PID: MIKROE-6011

EZO Carrier Click - Conductivity is a compact add-on board for measuring conductivity, salinity, and Total Dissolved Solids (TDS) in various applications from chemical production to hydroponics. This board features the EZO-EC™, an ISO 7888 compliant embedded conductivity circuit board from Atlas Scientific. The EZO-EC™ is a small green additional board that comes together with the carrier board and allows you to read a conductivity in a range of 0.07 to over 500,000µS/cm. Still, it can also accurately measure salinity up to 42 PSU (ppt), TDS as ppm, and the specific gravity of seawater between 1.00 and 1.300. This Click board™ is ideal for reliable water chemistry measurements, supporting probes ranging from K 0.01 to K 10.2 of any brand, 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.

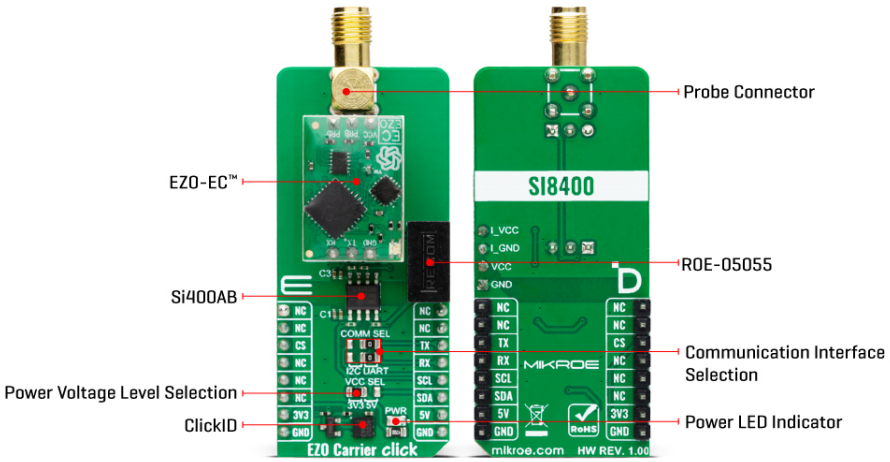
How does it work?

EZO Carrier Click - Conductivity is based on the EZO-EC™, an ISO 7888 compliant embedded conductivity circuit board from Atlas Scientific. This is a versatile and accurate solution for measuring conductivity, salinity, and Total Dissolved Solids (TDS) in various applications from chemical production to hydroponics. With a conductivity range of 0.07 to over 500,000 µS/cm, it can also accurately measure salinity up to 42 PSU (ppt), TDS as ppm, and specific gravity of seawater between 1.00 and 1.300. This advanced module offers the precision and functionality comparable to high-end bench-top conductivity meters, making it an ideal choice for

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embedding into projects that require reliable water chemistry measurements.



Boasting an accuracy of +/- 2% and a quick EC reading time of 600ms, the EZO-EC™ supports probes ranging from K 0.01 to K 10.2 of any brand. It allows for both two-point and three-point calibration, ensuring precise measurements. Additionally, it features temperature compensation for more accurate readings across various conditions.

This circuit is a very sensitive device, and the sensitivity gives it its accuracy. That's why the EZO-EC™ 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. 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.

EZO Carrier Click - Conductivity 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. From calibration to timed readings, the Atlas Scientific EZO-EC™ circuit is a drop-in solution to a complex measurement. It 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.

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,Measurements
Applications	Can be used or measuring conductivity, salinity, and Total Dissolved Solids (TDS) in various applications from chemical production to hydroponics
On-board modules	EZO-EC™ - embedded conductivity circuit board from Atlas Scientific

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Key Features	ISO 7888 compliant, high stability and accuracy, easy-to-use data protocol, simple command structure, works with any off-the-shelf K 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 - Conductivity corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				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 - Conductivity electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Conductivity Range	0.07	-	500.000	µS/cm
Salinity Range	0	-	42	ppt
Sea Water Gravity	1.00	-	1.300	-

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Accuracy	-2	-	+2	%

Software Support

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

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 EC Click driver.

Key functions

- ezocarrierec_send_cmd Send command function.
- ezocarrierec_send_cmd_with_par Send command function with parameter.
- ezocarrierec_send_cmd_check Check the sent command.

Example Description

This example demonstrates the use of EZO Carrier EC 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.EZOCarrierEC

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.

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Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

Downloads

EZO Carrier Click - Conductivity example on Libstock

EZO Carrier Click - Conductivity 2D and 3D files

SI8400 datasheet

EZO-EC datasheet

EZO Carrier Click - conductivity schematic

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