AtlasScientific Environmental Robotics

v 2.5 Updated 4/25

New Version

Atlas Desktop Monitoring Software

This is an evolving document, check back for updates.

Table of contents

Installation guide	3	
Home screen	4	
Reading screen	5	
Calibration screen	6	
Sensor setup screen	7	
Alarm screen	8	New feature
Disable / Enable graphs	9	
Settings menu	10	
Record / Export settings	11	
How to import the JSON file	12	
Sensor Simulation	15	New feature

For Advanced Users

MQTT settings	16
MQTT with Mosquitto	18
API settings	20

Installation guide

Step 1

The AtlasDesktop[™] Monitoring Software is 100% free.

Click **HERE** to download the AtlasDesktop[™] Monitoring Software for Windows. (~101mb)

Step 2

Once the *.zip file has been downloaded, open the *.zip and run the Setup file.



The Atlas Desktop Monitoring Software uses .NET Core; if you do not have it on your computer, the installer may request that you download and install .NET Core.



Continue following the on-screen instructions for the rest of the installation.

Step 3

When the installation is complete, run the Atlas Desktop Icon on your desktop to launch the monitoring software. (A web browser will open)



Home screen

The AtlasDesktop[™] Monitoring Software runs in a browser; when you run the software, the first page you'll see is the Home screen. Here you can see which EZO sensors have been connected to your PC, and their current readings.

In the image below, two EZO sensors are shown (*pH & Temperature*). Each, taking its own readings and graphing the data as time passes. There is also timer on the top of the home page, click once to start and again to stop; Allowing you to run timed experiments from the home screen, should you wish to do so.

You can have up to **9** sensors on the screen at one time; this includes multiple sensors of the same type.



If the software cannot detect any Atlas Scientific EZO sensors, you'll see this message:

Reading screen

Clicking on one of the EZO sensors from the home screen, will take you to that sensors reading screen; Within this screen you will find the sensors current reading, graphed data, sensor setup and calibration page.





Home Button Returns to home screen



Gears Button Sensor calibration / Setup



Trash Button Clears graph data



Calibration screen

Clicking on the gears button will bring you to that sensors calibration screen (*not all sensors have a calibration screen*). From here, you can re-calibrate the sensor, clear the sensors calibration, go back to home or enter the Senors setup / Alarms page.

Performing sensor calibration is easy to do, and very intuitive. Just follow the on-screen calibration steps.

Basic understanding of the sensor calibration is required. For more information on calibration, see the specific sensors datasheet.





Back Button Go back one screen



Gear & Wrench Button Sensor setup / Alarms



Sensor setup / Alarms screen

The sensor setup screen is mostly the same for all EZO sensors.

On this screen you can see the sensors version number, give the sensor a specific name *(if there are more than one of the same type)*, see the voltage being used, see the sensors I2C address, enable / disable the LEDs, and set the sensors temp compensation *(if a temperature sensor is also connected to the software)*.

You can also set an alarm for this sensor, which we'll cover in the next page.

рН		Atlas Scientific
Version:	2.17	
Device Name:		
Voltage:	3.84	
Address:	СОМЗ	
LED:	Off ● On ●	
Temp Compensation Address:		
Alarms Comparison Type: - Compared To: S	ensor v Sensor: COM3 v	
Save		



Home Button Returns to home screen



Back Button Go back one screen



Alarms

The alarm is a silent indication that an event has triggered. When an alarm has triggered, the top of that sensors window will turn red. As you can see in the example below; The top of the ORP window has turned red. Indicating an alarm has been triggered.



To simplify the process, every Atlas Scientific sensor has the same alarm settings.

Comparison Type

This field allows you to set how the alarm will trigger. Options within this field are: < Less than, <= Less than or Equal, = Equal, => Greater than or Equal, and > Greater than.

To disbale the alarm choose the "--" blank option.

Compared To

This field allows you to choose how to compare your readings; to a value or to a sensor.

Value / Sensor

This field allows you to set a specific value or you can set it to a specific sensor. This is great if you wanted to compare readings from two of the same type of sensor.





Disable / Enable graphs

It's possible to disable the graphs on the home screen; Simply hover over the menu icon, on the home screen and click on "Disable Graphs". During this time the sensors are still gathering data and plotting points to the graphs, although it will not be visible to you.

If you would like to re-enable the graphs, return to the menu and click on "Enable Graphs"



Within this menu, you can also clear all graphs and go to the software settings menu.

Disable Graphs		
Settings	рН	C Temperature
Clear Graphs	-η/Υ~~η Ο Ο	25.15 C





Settings menu

You can access the settings menu from the home screen, by hovering over the menu icon, and choosing "Settings"



*The software version number is displayed on the top left corner of this screen.





Home Button Returns to home screen

View Log Button Opens log file

Within this screen you'll see three options: Record / Export, Sensor Simulation and MQTT Settings.

Record / Export

Allows you to save and export all of your sensor readings.

Sensor Simulation

Allows you to enable / disable simluation of all our compatible EZO sensors.

MQTT Settings*

Allows you to publish your readings to another device. *this setting is for advanced users.



Record / export settings

Record/Export Settings		Atlas Scientific
Database File Name	Download (Export) Location	
./AtlasDesktop.db	Select a location	•
This is NOT the export file name	This is the location the database will be exported to.	
Note: Setting both Minutes and Seconds to Zero will disable logging. Interval (Mins) Interval (Secs)	Export Database (JSON)	
1 0 10		
Clear Database		
Save		

Database File Name - The file name and location of your recoreded readings.

AtlasDesktop.db - is the default file name.

Interval (mins) / (secs) - Sets how often the database is recoreded.

Example - 1 minute / 10 seconds

*Setting both minute and seconds to zero will disable data logging.

Download (Export) Location - Exports saved data to Documents or an external drive.

Example - Documents

The exported file is a *.JSON file, and can be imported directly into Excel.

How to import the JSON file into Excel

After you have exported your readings into a JSON file, you can then import this file directly into Excel.

Step 1

Within Excel, click on the Data tab, and then click the "Get Data" button located at the top right coner. Then click on "From File" and then "From JSON".

Ŕ	AutoSave Off		⊇ Book1	- Excel						
	File Home Insert Pa	age Layo	out Formulas	Data Review	/ Vie	w Auton	nate H	elp Acro	obat	
	Get Get Data \checkmark From Text/CSV From Web	Fro 🔂 Rec	m Picture ~ cent Sources sting Connections	Refresh All ~ By)ueries 8 ropertie Vorkboo	t Connectio s k Links	ns	Stocks	Currencies	Geogra
4	From <u>F</u> ile	>	From Exce	el <u>W</u> orkbook	& Coni	nections			Data Types	
4	From <u>D</u> atabase	>	From <u>T</u> ext	t/CSV						
1	From <u>A</u> zure	>	From <u>X</u> ML		G	Н	I	J	К	L
2 3	From Po <u>w</u> er Platform	, >	JSON From JSOI	N						

Step 2

Choose the JSON file you want to open. After chosing the file, a new window will open in Excel. Click on the "To Table" Button, and then click "OK" within the new window.



How to import the JSON file into Excel

Step 3

Click on the ◀I₱ icon, and uncheck the box that says "Use Original Column name as prefix", then click "OK".



Step 4

The window will now update with the readings you have saved. From here, click on the "Close & Load" button.

File	Home	Transform		Add Column View									~ 🕐
Close & Load ▼	Refresh Preview •	Propertie	es d Edito -	or Choose Remove Columns • Columns •	Keep Remove Rows ▼ Rows ▼	Split Column	Data Type: Any ▼ Data Type: Any ▼ Use First Row as Group T By ↓ 2 Replace Values	s Headers 🔻	Merge Queries Append Queries Combine Files	Manage Parameters	Data source settings	Pew Source ▼ Correct Sources ▼ Enter Data	
Close		Query		Manage Columns	Reduce Rows Sort		Transform		Combine	Parameters	Data Sources	New Query	
Queries [1]	sJSONDat	≮ ta json2	\mathbf{X}	f_X = Table.	xpandRecordColumn(#"Conve	erted to Table", "Column1"	", {"HexCo	lor", "created_at"	, V	Query Se	ttings	×
				123 HEXCOLO	123 Created_at	· ·		123 WOULLE	туре 123	neading		5	
			1	#FFFFFF	0001-01-01100:00:00		2.11	RGB	262	,266,262	Name		
			2	#FFFFF	0001-01-01100:00:00		2.11	RGB	261	,266,262	AtlasJSOND	ata json240604110027	
			3	#FFFFFF	0001-01-01100:00:00		2.11	RGB	262	,266,262	All Propertie	c	
			4	#FFFFFF	0001-01-01T00:00:00		2.11	RGB	261	,266,262	Antroperae		
			5	#FFFFFF	0001-01-01T00:00:00		2.11	RGB	262	,266,262	▲ APPLIED ST	EPS	
			6	#FFFFFF	0001-01-01T00:00:00		2.11	RGB	262	,266,262	Source		8
			7	#FFFFFF	0001-01-01T00:00:00		2.11	RGB	262	,266,262	Converte	ed to Table	8
			8	#FFFFFF	0001-01-01T00:00:00		2.11	RGB	262	,266,262	× Expande	d Column1	-8-
			9	#FFFFFF	0001-01-01T00:00:00		2.11	RGB	262	,266,262	2 Copulation	d column	-
			10	#FFFFFF	0001-01-01T00:00:00		2.11	RGB	262	,266,263			
			11	#FFFFFF	0001-01-01T00:00:00		2.11	RGB	262	,266,263			
			12	#FFFFFF	0001-01-01T00:00:00		2.11	RGB	262	,266,263			

Step 5

The readings will now import into Excel.

A	1 ~	$\therefore f_x$									
	А	В	С	D	E	F	G	н	1	J	К
1	HexColor	created_at	VersionInfo 💌	ModuleType 💌	Reading 💌	Address 💌	Name 💌	LEDLevel 💌	LEDTrigger 💌	Lux 👻	CIE
2	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,266,262	128		5	TRUE	343	0.312,0.332,343
3	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	261,266,262	128		5	TRUE	342	0.312,0.332,342
4	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,266,262	128		5	TRUE	343	0.312,0.332,343
5	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	261,266,262	128		5	TRUE	343	0.312,0.332,343
6	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,266,262	128		5	TRUE	343	0.312,0.332,343
7	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,266,262	128		5	TRUE	343	0.312,0.332,343
8	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,266,262	128		5	TRUE	343	0.312,0.332,343
9	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,266,262	128		5	TRUE	343	0.312,0.333,343
10	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,266,262	128		5	TRUE	343	0.312,0.333,343
11	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,266,263	128		5	TRUE	343	0.312,0.332,343
12	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,266,263	128		5	TRUE	343	0.312,0.333,343
13	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,266,263	128		5	TRUE	343	0.312,0.332,343
14	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,266,263	128		5	TRUE	343	0.312,0.333,343
15	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,266,263	128		5	TRUE	343	0.312,0.332,343
16	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,266,263	128		5	TRUE	343	0.312,0.332,343
17	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,266,263	128		5	TRUE	343	0.312,0.332,343
18	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	263,267,263	128		5	TRUE	344	0.312,0.332,344
19	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,267,263	128		5	TRUE	344	0.312,0.332,344
20	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,266,263	128		5	TRUE	343	0.312,0.332,343
21	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,267,263	128		5	TRUE	343	0.312,0.332,343
22	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,266,263	128		5	TRUE	343	0.312,0.332,343
23	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,267,263	128		5	TRUE	344	0.312,0.332,344
24	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	262,267,263	128		5	TRUE	343	0.312,0.332,343
25	#FFFFFF	0001-01-01T00:00:00	2.11	RGB	263,267,263	128		5	TRUE	344	0.312,0.332,344

Import Complete!



Sensor Simulation

Simulating our line of EZO sensors is incredibly easy to do. Simply choose the sensor you would like to simulate by clicking **on** to enable, or **off** to disable; Then click save.



These simulated sensors function exactly like their real counterparts, however you cannot adjust their reading values. You can however, configure the settings, adjust calibration and get comfortable the functions of each sensor.

You can also have real EZO sensors running along simulated ones.

All simulated sensors will have the tag "- **SIM**" next to their sensor type.



MQTT Settings

For Advanced Users

MOTT Settings

This Feature is for advanced users who wish to send readings to a remote

Note: By Default, MQTT uses port 1883. This port will need to be open on your firewall to connect to external MQTT servers.

MQTT Enabled 🔽	
Broker Name	

		1883
Client ID		Торіс
Password		SSL Protocol
Banna a star		¥
	Client File	
	Choose File	
	Client ID Password	Client ID Password Client File Client File Choose File

Port #

Broker Name - The web address of your MQTT broker.

Example - io.adafruit.com

Port # - This port will need to be opened on your firewall to connect to an external MQTT server.

Default - 1883

Interval (Secs) - How often the software should send to data to the broker.

Example - 60

Client ID - A random Client ID. (no spaces)

Example - My_device

Topic - The MQTT topic the data will be sent out under.

Example - /RTD/add_102/MyName

If there is no name set, we leave off that subtopic.

Note We append on some subtopics /SensorType/Add_(SensorAddress)/SensorName

See http://www.steves-internet-guide.com/understanding-mgtt-topics/



MQTT Settings

For Advanced Users

MQTT Settings

This Feature is for advanced users who wish to send readings to a remote

server.

Note: By Default, MQTT uses port 1883. This port will need to be open on your firewall to connect to external MQTT servers.

MQTT Enabled 🔽				
Broker Name			Port #	
			1883	
Interval (Secs)	terval (Secs) Client ID		Торіс	
0				
User ID	Password		SSL Protocol	
			¥	
Authority File	Cli	ient File		
Choose File	C	hoose File		

User ID - If your broker requires a login, this is where your user ID goes.

Example - myUserID

Password - If your broker requires a login, this is where your password goes.

Example - mypassword

SSL Protocol - The SSL protocol can be set to any of the following:

Example -	None (default if an error is made)
	sslv3
	tlsv1_0
	tlsv1_1
	tlsv1 2

Authority File - Set the path of your Certificate Authority file.

Example - YourPathHere

Client File - Set the path of the Client Key file.

Example - YourPathHere



MQTT with Mosquitto

For Advanced Users

Note: By default, MQTT uses port 1883. This port will need to be open on your firewall to connect to external MQTT servers.

Mosquitto is an open source MQTT broker that works quite well and is easy to troubleshoot. It can be found at <u>https://mosquitto.org</u> and is well supported.

If you assume your mosquitto broker is on a computer called **MyComputer**. Your settings for the Atlas Desktop Monitoring Software would be

Broker Name	MyComputer
Interval (Secs)	60 is a good place to start
Client ID	My_Device (No spaces)
Торіс	MyTopic (I usually do NOT put the starting "/")
User ID	leave blank, if you did not setup a user ID
Password	leave blank, if you did not setup a password

We will append a series of subtopic onto your topic

Example

If you are running an EZO RTD Temperature Circuit on the default address, and have named it, mosquitto will receive the topic **MyTopic/RTD/add_102/SensorName**

If the circuit is unnamed (default) it will be MyTopic/RTD/add_102

If you have multiple sensors, there will be multiple topics, all underneath **MyTopic**. You should see them in your mosquitto_sub session

MQTT Settings			
This Feature is for adv. server. Note: By Default, MQTT uses port 1883	anced users	who wish t	to send readings to a re
MQTT Enabled 🗹			
Broker Name MyComputer			Port # 1883
Interval (Secs)	Client ID		Торіс
60	My_Device		МуТоріс
User ID	Password		SSL Protocol
Authority File		Client File	
		Channe File	
Choose File		Choose File	

MQTT with Mosquitto

For Advanced Users

Troubleshooting

If we assume that you have installed mosquitto on a computer called **MyComputer** (see their website <u>https://mosquitto.org</u> for ports to open, etc),

You can monitor all traffic to that broker with a program call **mosquitto_sub** (comes in the install package) The Manual can be found by clicking <u>HERE</u>

Assuming you have not setup mosquitto for login, the command would be **mosquitto_sub -v -h MyComputer -t '#'**

That command subscribes to ALL topics ('#') in a verbose manner.



API Settings

We've added web API support to the Atlas Desktop Monitoring software.

Simply go into your web browser and enter in:

[Your raspberry pi address]/api/values/

Displayed in your browser will be a JSON containing all of the connected EZO[™] circuits and senors, along with their readings, device name, and device addresses.

Example

[{"created_at":"2021-07-23T17:08:39.4038617Z","ModuleType":"CO2","value":"1005","Address":77," Name":"test)co2"},{"Temperature":24.7,"Humidity":35.25,"THI":69.79,"HeatIndex":75.46,"created_at":"2 021-07-23T17:08:38.8037542Z","ModuleType":"HUM","value":"35.2","Address":111,"Name":""}]

From the example above, you can see the readings from two EZO[™] sensors: **EZO-CO2[™]** and **EZO-HUM[™]**

[{"created_at":"2021-07-23T17:08:39.4038617Z","ModuleType":<mark>"CO2","value":"1005","Address":77,"</mark> Name":"test)co2"},{"Temperature":24.7,"Humidity":35.25,"THI":69.79,"HeatIndex":75.46,"created_at":"2 021-07-23T17:08:38.8037542Z","ModuleType":"HUM","value":"35.2","Address":111,"Name":""}]

You can also display the readings of a specific EZO[™] circuit or sensor, by entering their I2C or USB address after the API command in your web browser.

[Your raspberry pi address]/api/values/77

Example

[{"created_at":"2021-07-23T17:08:39.4038617Z","ModuleType":<mark>"CO2","value":"1005","Address":77,"</mark> Name":"test)co2"}]

You will only see the readings from the **EZO-CO2**[™] as this sensors I2C address is 77.

