iCOMOX

User Manual

Release 2.9.1

www.shiratech-solutions.com

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1. Introduction

The iCOMOX is an intelligent condition based monitoring box, used for monitoring industrial assets such as motors, pumps, gas pipes, conveyors and more. It enables displaying all data acquired by the board's sensors while performing a basic signal processing analysis. In addition, the iCOMOX Monitor GUI application displays data statistics and an acquisition plan.

The iCOMOX system (refer to Figure 1: The iCOMOX and the Monitor GUI) comprises the following components:

1. iCOMOX – Mounted on the monitored equipment.
2. USB Cable – Connects the iCOMOX to one of the USB ports of a PC for wired communication and power supply.
3. The iCOMOX Monitor GUI application – Installed and run on a PC, provides a Graphical User Interface (GUI) for communicating with the iCOMOX.

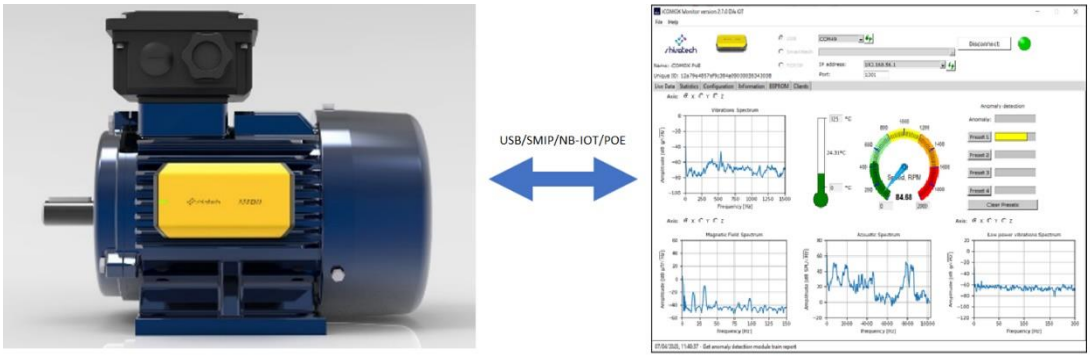


Figure 1: The iCOMOX and the Monitor GUI

After installing the iCOMOX Monitor and connecting the iCOMOX to the Monitor using the USB-C cable, live data from the sensors is streamed to the Monitor, processed using Fast Fourier Transform, and presented on the screen.

In the Statistics view, the moving average of each sensor is computed together with its standard deviation and its maximal and minimal value.

In the Configuration view, you can select the sensors whose data require being displayed. In addition, you can schedule the acquisition as either continuous, or at a specified frequency.

2. Overview

2.1 iCOMOX SMIP

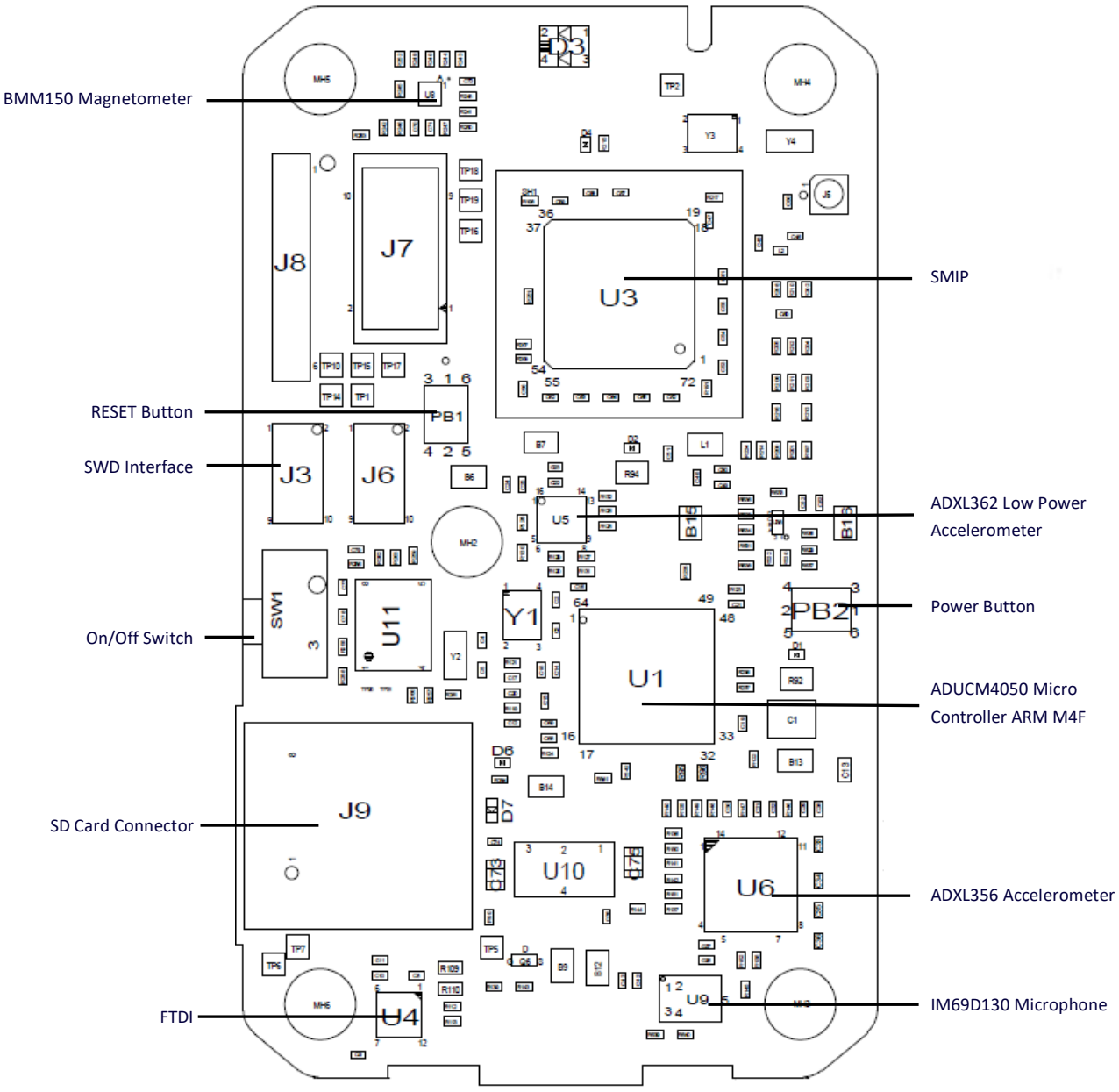


Figure 2: iCOMOX SMIP overview

2.2 iCOMOX NB-IOT

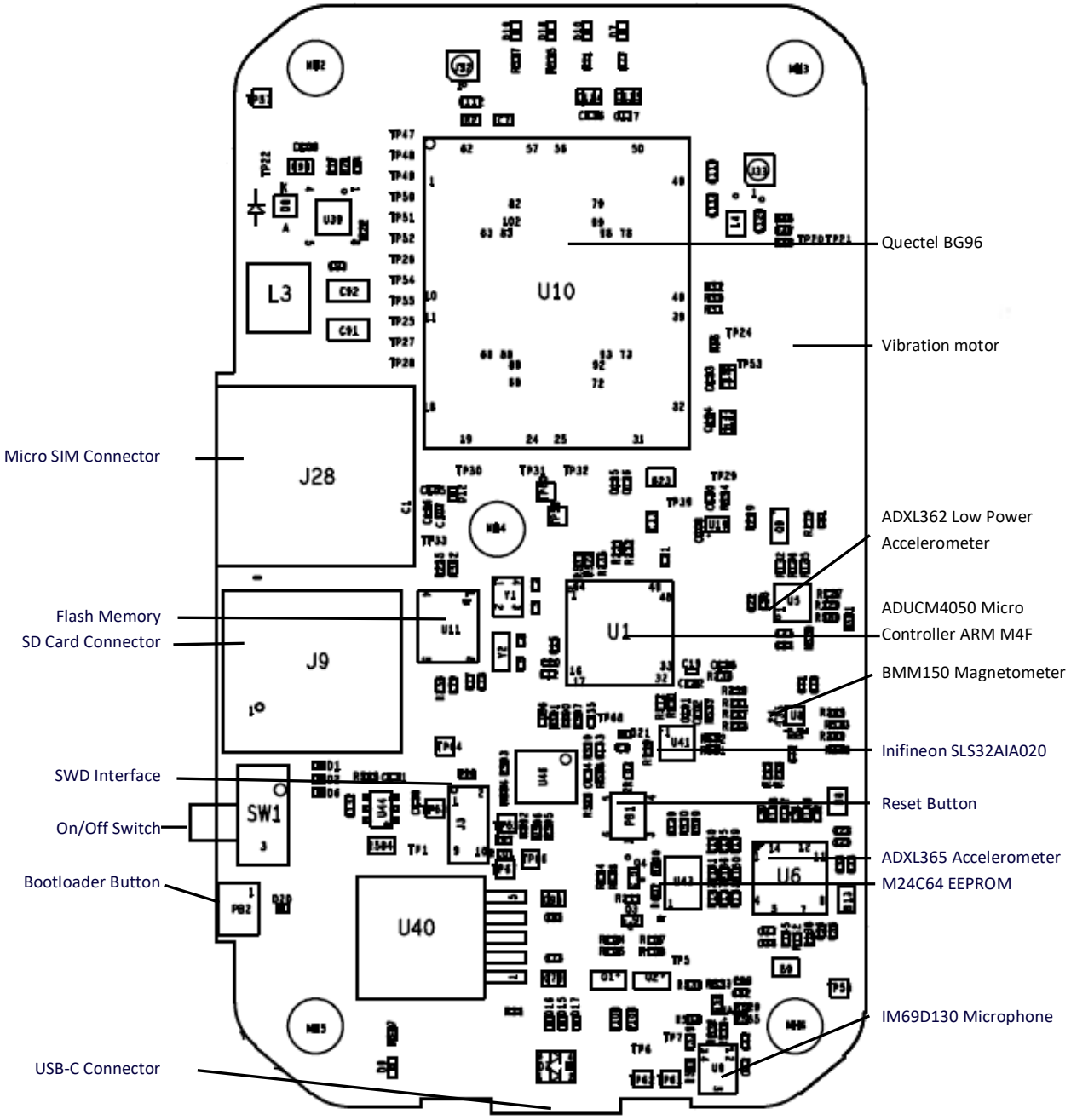


Figure 3: iCOMOX NB-IOT overview - front

2.3 iCOMOX POE

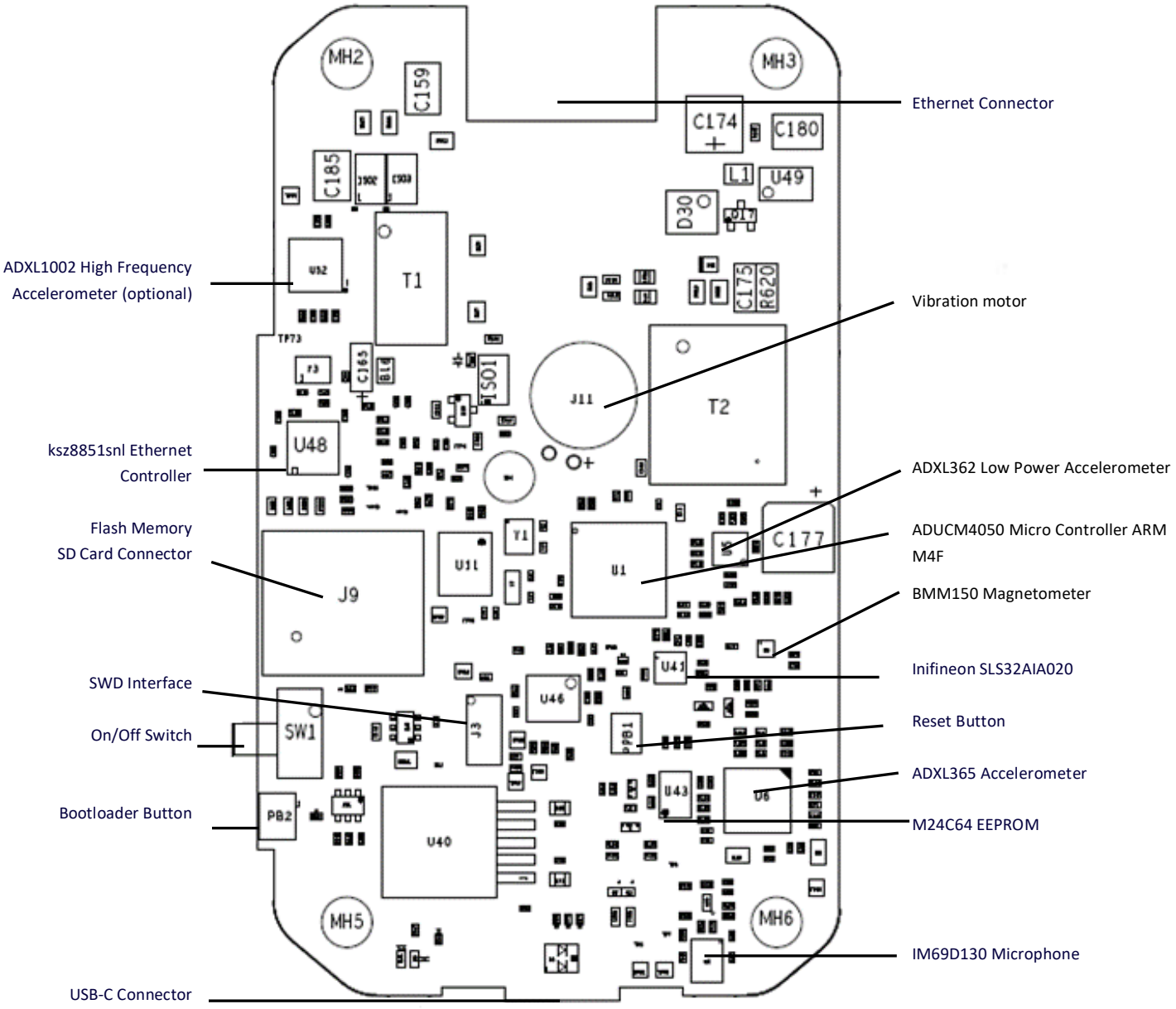
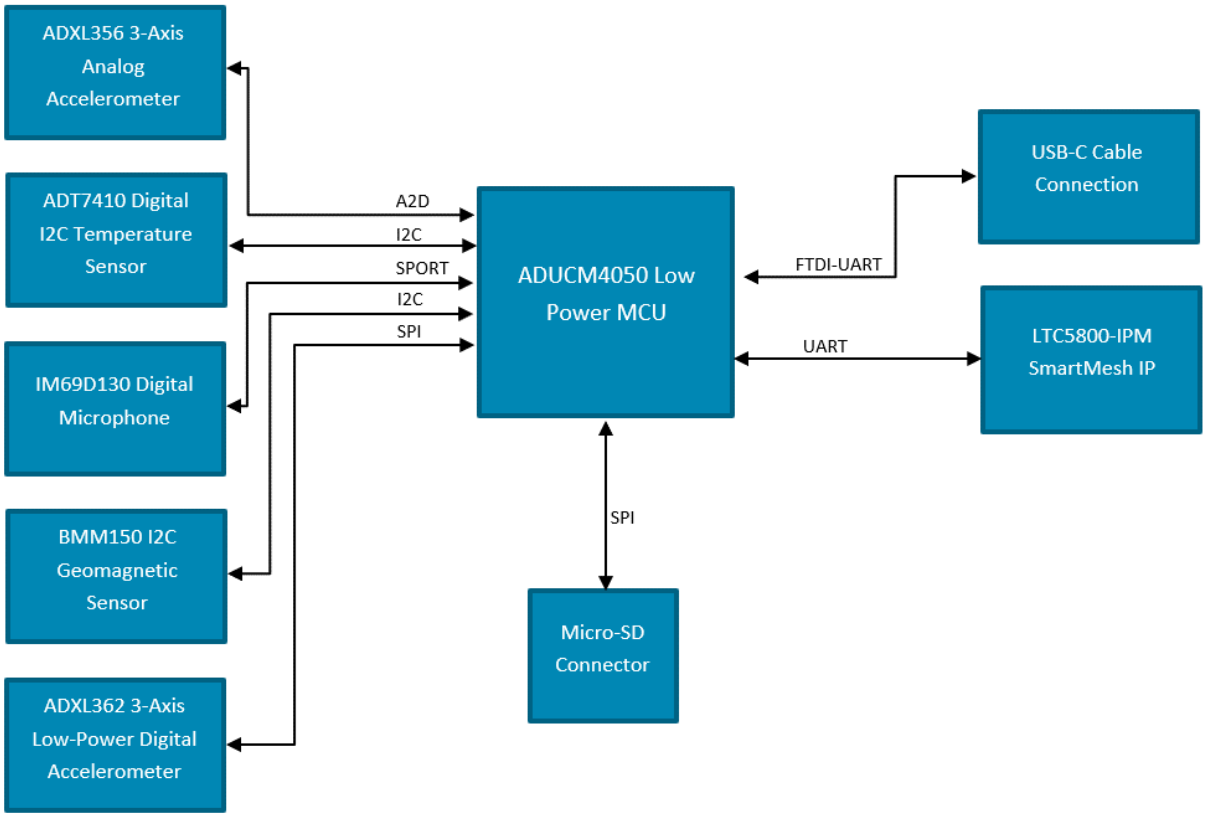


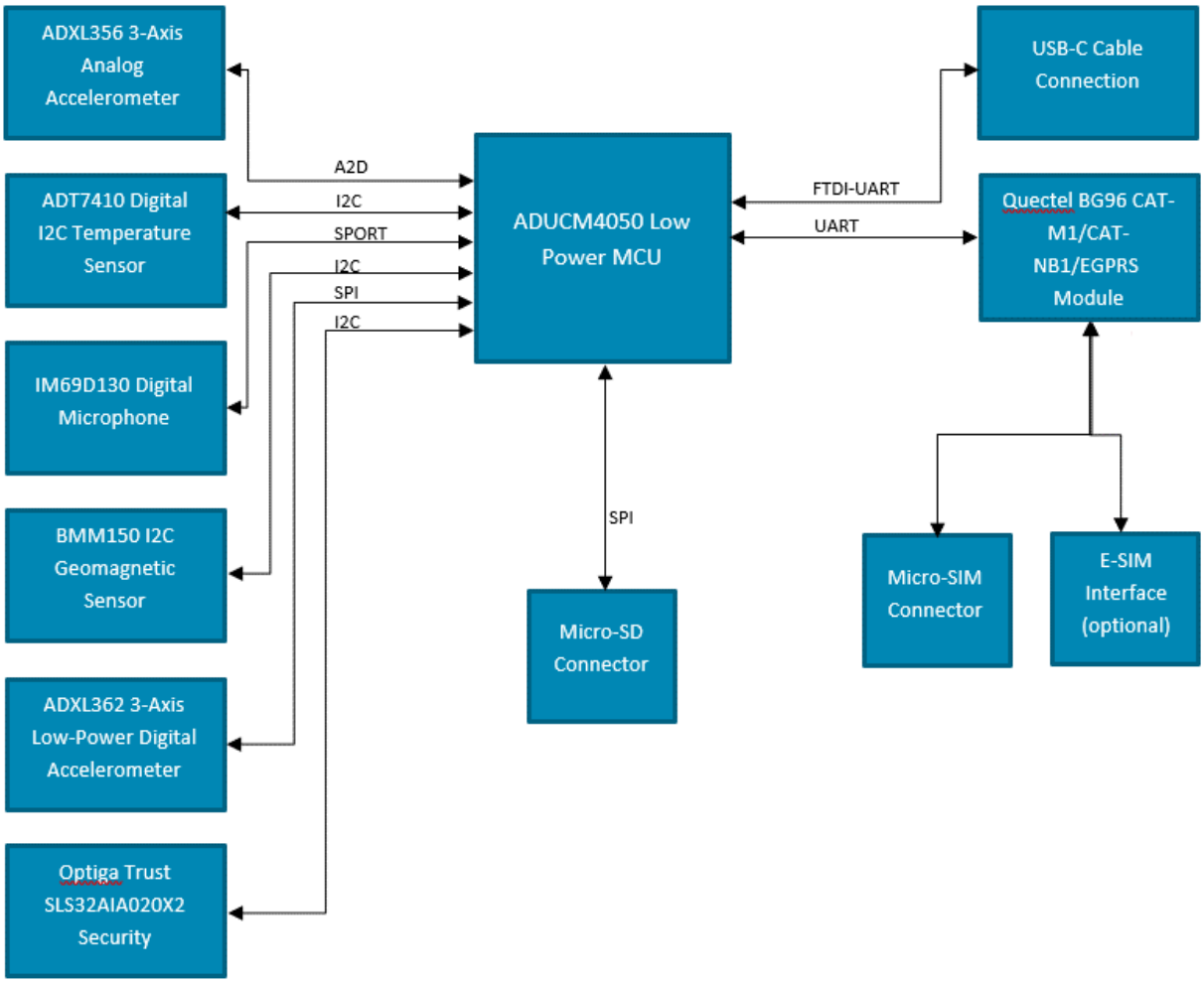
Figure 4: iCOMOX POE overview - front

3. Block Diagram

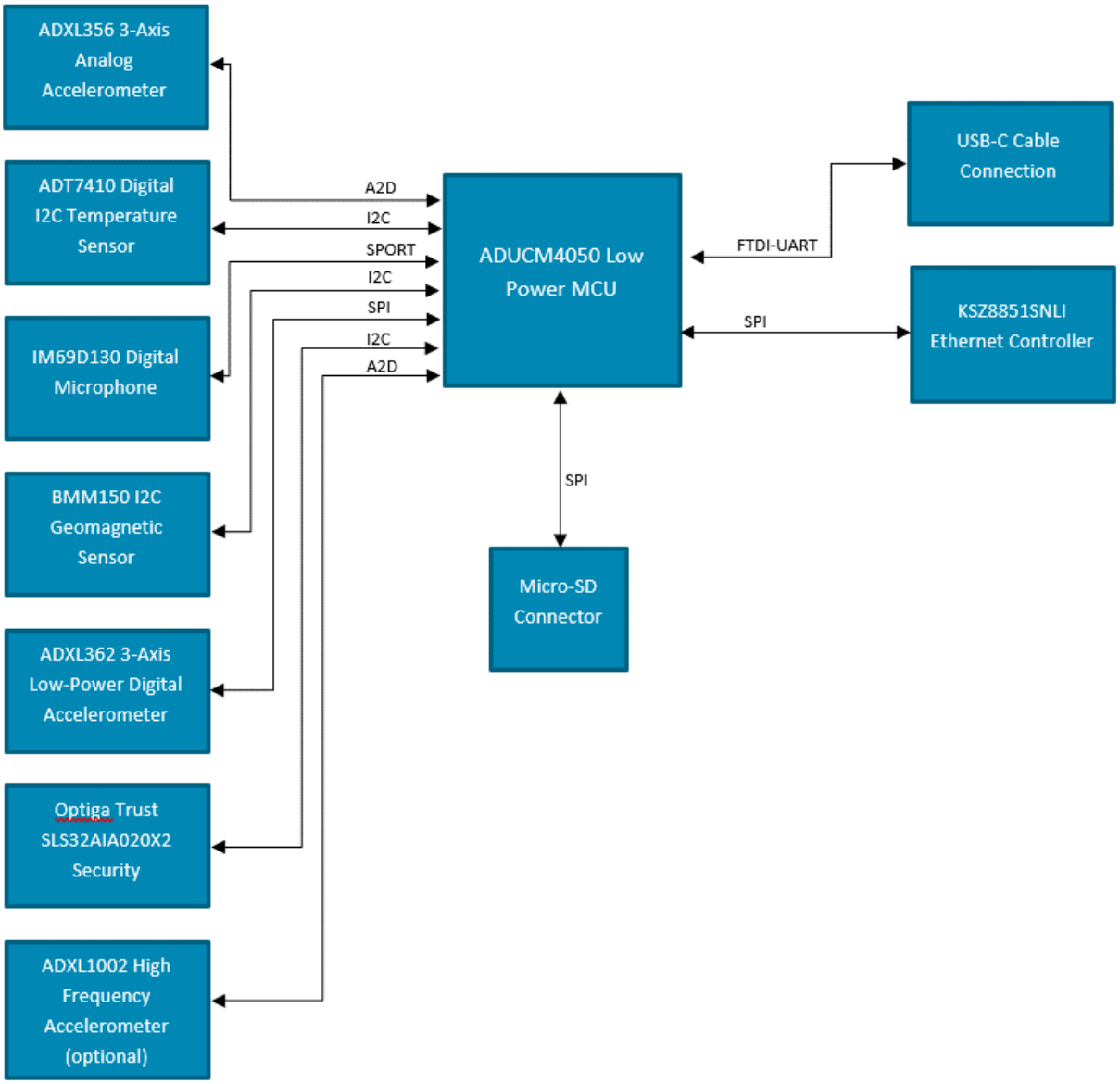
3.1 iCOMOX SMIP Block Diagram



3.2 iCOMOX NB-IOT Block Diagram



3.3 iCOMOX POE Block Diagram



4. Data Flow

Using iCOMOX SMIP requires the on-site installation of a SMIP gateway, performing SMIP manager functionality, and implementing the communication with the iCOMOX SMIP (mote functionality). The gateway sends the data to a local or remote server over TCP/IP.

Using iCOMOX NB-IOT requires the use of a SIM card with a data plan. The data is transmitted over TCP/IP directly to the remote server (port forwarding should be implemented on the remote network router), or using MQTT through the MQTT broker.

iCOMOX POE connects to a local TCP/IP network using a standard POE switch. Connection to remote servers or cloud services requires a local TCP/IP gateway. It may also connect through a MQTT broker, which can be installed on the same PC as the gateway.

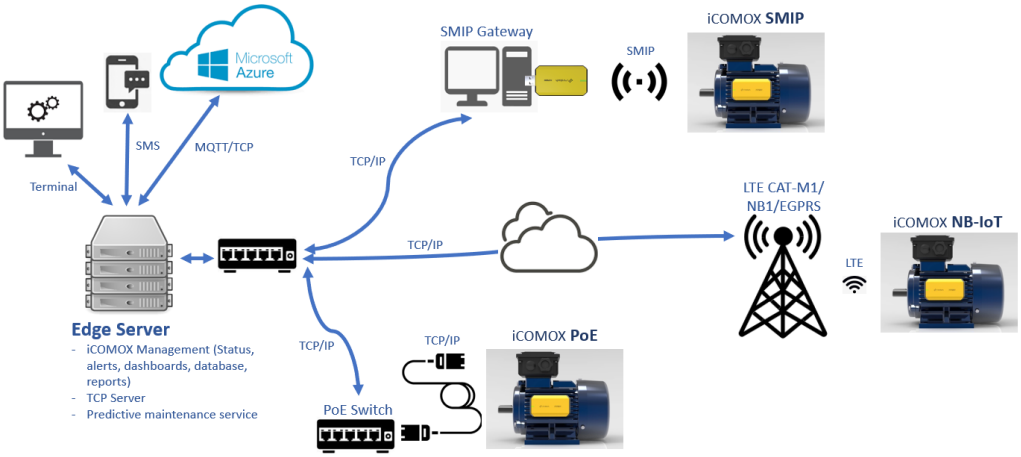


Figure 5: The iCOMOX data flow

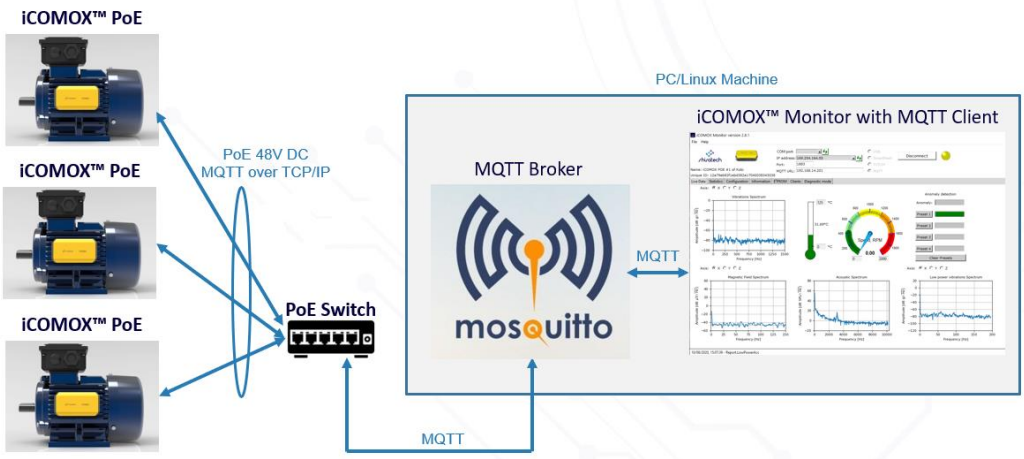


Figure 6: iCOMOX POE connected to a MQTT broker over the Local Area Network.

5. Quick Start

In this Quick Start guide we will perform the following main phases:

1. Start with downloading and flashing the latest firmware version.
2. Install the iCOMOX Monitor GUI software on your PC.
3. Connect to the iCOMOX using the USB-C cable connection.

Note: The USB-C connection process is identical for all iCOMOX types.

Note: For the PC to correctly recognize the iCOMOX, the FTDI driver must be installed. For FTDI driver installation instructions, refer to Appendix A: FTDI VCP Driver.

5.1 Connecting with the USB Cable

To connect with the USB cable, perform the following steps (identical to all iCOMOX types):

1. Connect the iCOMOX to the Windows PC using the USB-C cable.
2. Turn on the iCOMOX by sliding the slide switch on the iCOMOX (see chapter 6 -Connecting the iCOMOX Kit).
3. The iCOMOX LED will illuminate in orange and the board will vibrate briefly, indicating that the built-in test is in progress. Once completed, the iCOMOX LED will be illuminated in green, signaling that the iCOMOX has loaded successfully.
4. Launch the Device Manager and note which COM port represents the iCOMOX.
5. Launch the iCOMOX Monitor (when installation is required, refer to chapter 8.2 -Monitor Installation Instructions). Monitor Launch can take up to 40 seconds.
6. In the Communication panel, select the USB communication mode.
7. From the COM port drop-down menu, select the suitable COM port (refer to step 4).

Note: If the COM port drop-down menu is empty, click on the refresh button next to the COM port drop-down list, and repeat from Step 6.

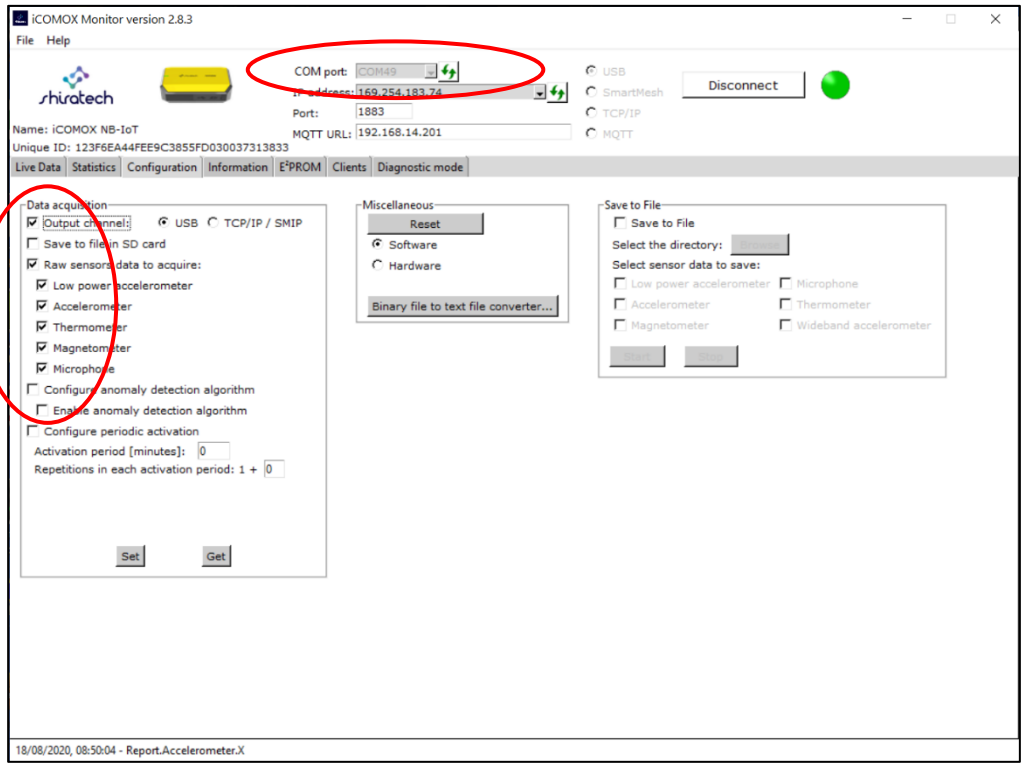


Figure 7: The iCOMOX Monitor Configuration tab

8. Click the Configuration tab and from the Configuration view, select the sensor data to be acquired, and select the USB sensors output channel.
9. Click Connect.

Note: After clicking the Connect button, the Monitor establishes communication with the iCOMOX. The Colored Status Indicator color changes, as described in the following table.

Status Indicator Color	Significance
	Disconnected
	Trying to establish wired communication with the iCOMOX.
	Wired communication established.

Table 1: The Colored Status Indicator color table – USB connection

Note: 5-10 seconds after the iCOMOX Monitor software Colored Status Indicator turns green, the signals from the sensors appear on the plots. The green LED on the iCOMOX device blinks repeatedly when data is transferred from the iCOMOX to the PC. When data is not transferred, the green iCOMOX LED does not blink.

10. Verify the following, which signifies that the connection has been established successfully:
    - The Colored Status Indicator is green.
    - The Status Bar displays the “Received SetConfiguration response OK” message.
    - The Status Bar displays the names of the reports received.
    - The iCOMOX green LED should repeatedly toggle on and off.

Figure 8: The iCOMOX Monitor Live Data tab

11. Verify that live data is displayed, in accordance with the sensors selected in Step 8.

6. Connecting With the Auxiliary Channel

6.1 Connecting with the SmartMesh IP

To connect with the SmartMesh, perform the following steps:

1. Connect the iCOMOX dongle (SMIP) to the PC to prepare for SmartMesh IP (SMIP) communication mode.
2. Turn on the iCOMOX by sliding the slide switch on the iCOMOX (see the Connecting the iCOMOX Kit chapter).
3. The iCOMOX LED will illuminate in orange and the board will vibrate briefly, indicating that the built-in test is in progress. Once completed, the iCOMOX LED will be illuminated in green, signaling that the iCOMOX has loaded successfully.
4. Launch the iCOMOX Monitor (when installation is required, refer to the Monitor Installation Instructions). Monitor Launch can take up to 40 seconds.
5. In the Configuration view, select the sensor data to be acquired, and select the TCP/IP SMIP output channel.

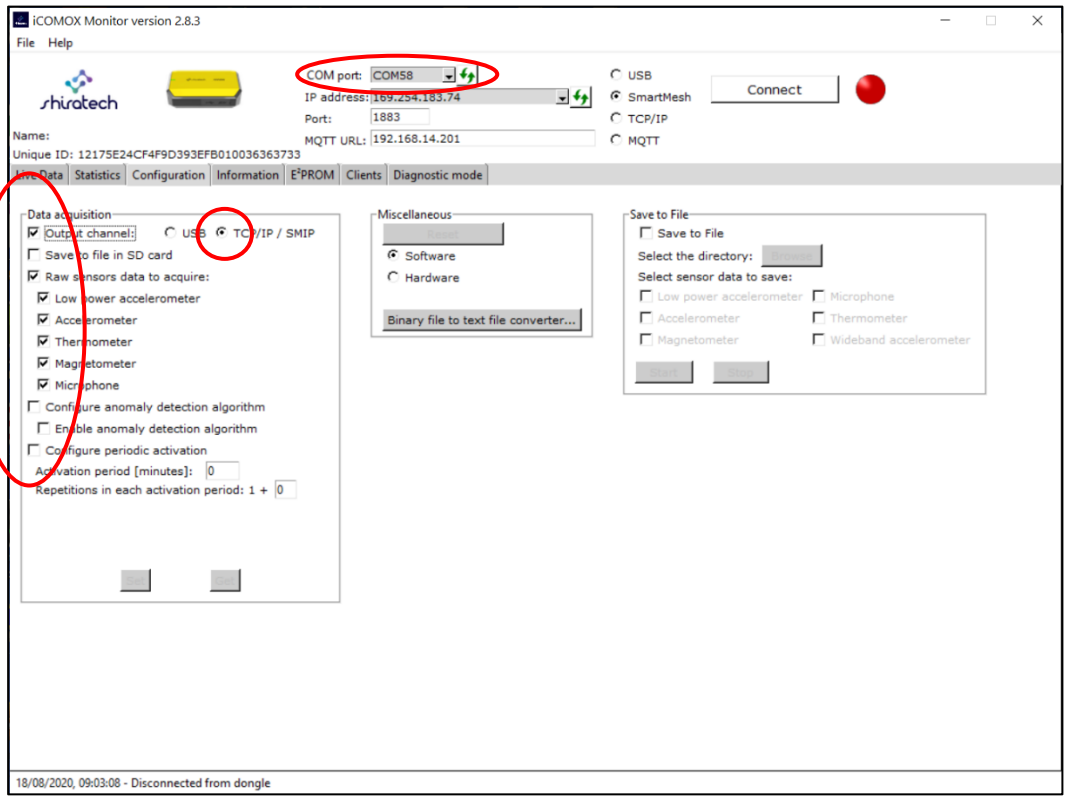


Figure 9: The iCOMOX Monitor Configuration tab

6. In the Communication panel, select the SmartMesh communication mode.
7. Open the COM port drop-down menu and select the COM port. In case no COM port appears, click the refresh button next to the COM port drop-down menu.

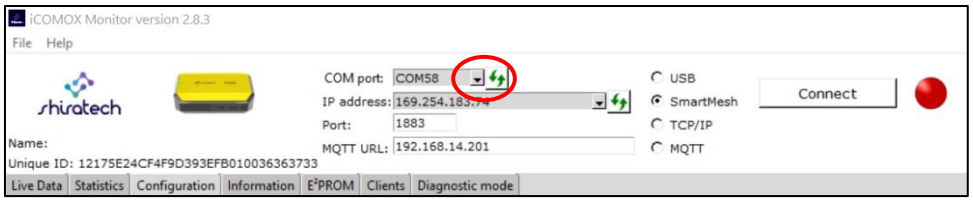


Figure 10: The iCOMOX Monitor Communication panel

8. Click Connect.

Note: After clicking the Connect button, an attempt to establish communication between the PC and the dongle will be initiated. The Colored Status Indicator color changes, as described in the following table.

Status Indicator Color	Significance
	Disconnected
	Communication is established between the PC and the dongle.
	Wireless communication with a recognized iCOMOX was established. And the iCOMOX was explicitly selected from the SMIP client list.

Table 2: The Colored Status Indicator color table – SMIP connection

Note: 5-10 seconds after the Colored Status Indicator turns green, the signals from the sensors appear on the plots. The green iCOMOX LED blinks repeatedly when data is transferred from the iCOMOX to the PC. When data is not transferred, the green iCOMOX LED does not blink.

9. Wait for the iCOMOX SMIP to appear in the client list. It may take up to 2 minutes for the iCOMOX to appear in the clients list.
10. Select the iCOMOX SMIP from the client list.

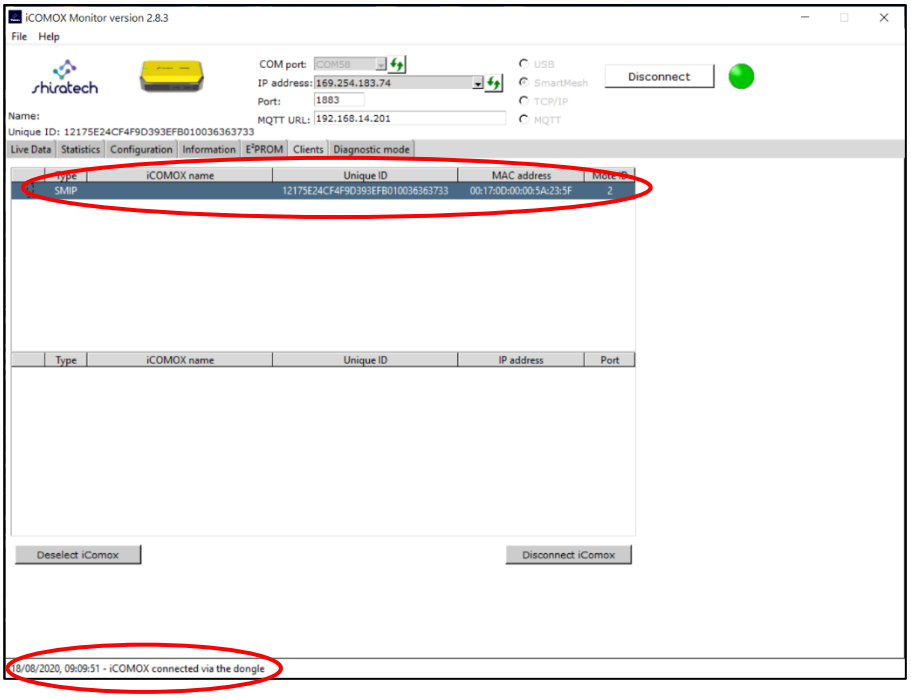


Figure 11: The clients list was updated

11. Go to the configuration tab, select the TCP/IP/SMIP output channel, select sensors data to acquire and click on ‘set’.
12. Verify that the panels selected in the Configuration tab display the received data and the Status Bar informs as to the received data packets. Every green iCOMOX LED blink represents a data packet which has been sent.

Note: The LED’s regular toggle rate can be as low as a single blink every 3 minutes, depending on the selected sensors configuration.

6.2 Connecting the iCOMOX using TCP/IP

6.2.1 Connecting the iCOMOX NB-IoT to a TCP Server Over NB-IoT

6.2.1.1 Pre-requisites

- Micro SIM card (3FF):
    - The SIM card should support LTE-CAT-M1, LTE-CAT-NB1 or EGPRS.
    - The SIM card must be activated.
    - The SIM card should be without PIN code, or with PIN code already disabled.
    - Knowledge of the correct APN settings and authentication method suitable for the acquired SIM card. The cellular operator should normally provide this information.
- Port forwarding:
  The iCOMOX Monitor includes the TCP/IP server used to communicate with the iCOMOX NB-IOT over **NB-IOT TCP-IP connection**. Therefore, prior to starting the **NB-IOT TCP-IP connection** quick start chapter, **port forwarding** must be configured, to allow the iCOMOX NB-IOT to access the PC running the TCP/IP server, as part of the iCOMOX Monitor. Please consult your IT services provider to safely enable the iCOMOX NB-IOT to communicate with a machine located inside your Local Area Network.

6.2.1.2 Operation instructions

1. On the TCP Server machine, Launch the iCOMOX Monitor (when installation is required, refer to the Monitor Installation Instructions chapter). Monitor Launch can take up to 40 seconds.
2. If not already on, turn on the iCOMOX by sliding the slide switch on the iCOMOX (see the Connecting the iCOMOX NB-IOT Kit chapter).
3. The iCOMOX LED will illuminate in orange and the board will vibrate briefly, indicating that the built-in test is in progress. Once completed, the iCOMOX LED will be illuminated in green, signaling that the iCOMOX has loaded successfully.
4. Program the required settings to the EEPROM. Typically you would need to define at least the APN settings, and the TCP server IP address and port (see the Programming the EEPROM chapter).
5. In the Communication panel, select the TCP/IP communication mode.
6. Open the drop-down menu, and configure the server listening IP address, then type the server listening port number in the nearby text field (the same local IP address and port configured in the router port forwarding).
7. Click Connect.

Note: After clicking the Connect button, the TCP/IP server is now listening for client connections. The Colored Status Indicator color changes, as described in the following table.

Status Indicator Color	Significance
	Disconnected
	Listening for client connections.
	TCP/IP communication established. At least one iCOMOX client is connected to the server and the client was explicitly selected from the TCP/IP clients table.

Table 3: The Colored Status Indicator color table – TCP/IP connection

8. When switched on, the iCOMOX NB-IOT is continuously attempting to connect to the server. It may take up to 3 minutes for a single TCP/IP connection attempt, depending on network conditions. In case that the iCOMOX-NBIOT client does not connect to the server after 6 minutes, please refer to the Troubleshooting section.

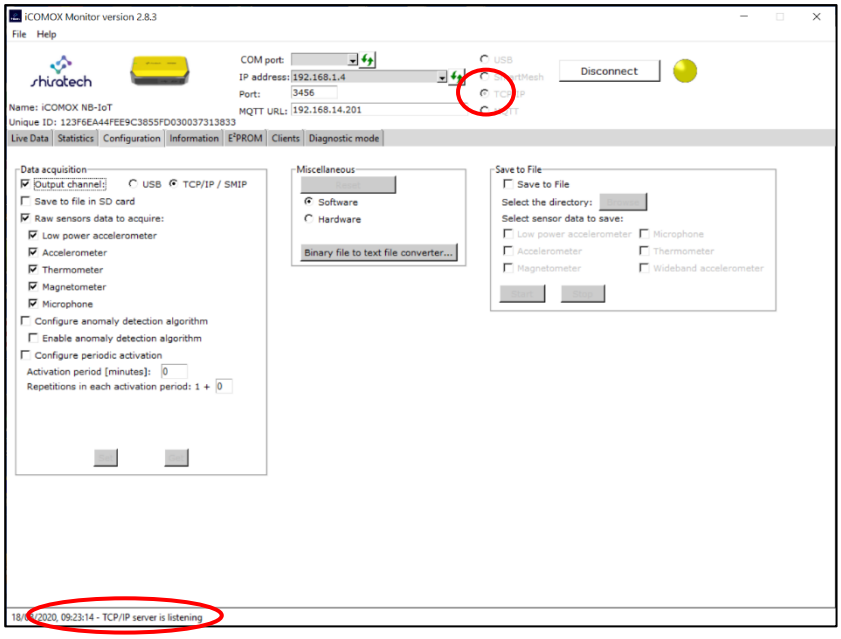


Figure 12: TCP/IP server is listening for client connections

9. Once the iCOMOX NB-IOT created a connection with the Monitor, a row will be added to the clients table. Select the client from the clients table.
10. After selecting the iCOMOX NB-IOT client from the clients table, the Colored Status Indicator will change to green, the status bar will display 'iCOMOX connected via the TCP/IP socket' and a row will be added to the clients table in the Clients tab. Select the client from the clients table.

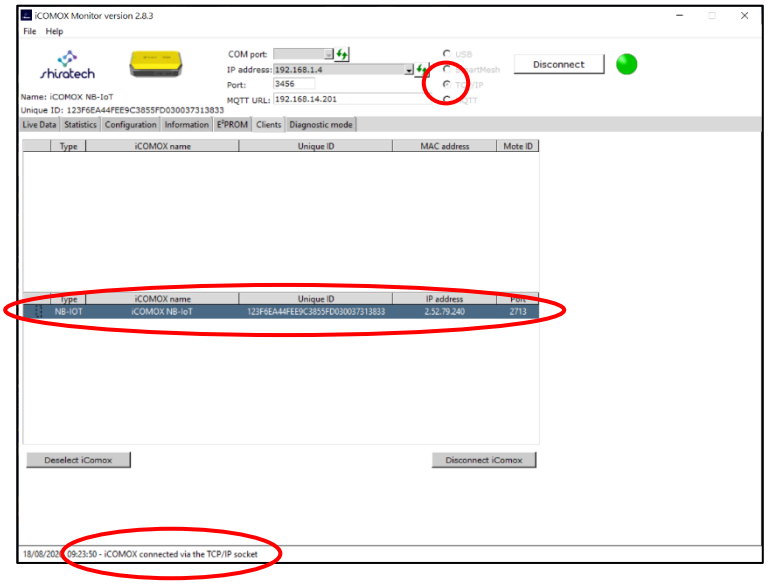


Figure 13: An iCOMOX NB-IOT client appears on the clients table

11. Switch to the iCOMOX Monitor's Configuration view, select the sensor data to be acquired, select the TCP/IP sensors output channel, and click on the 'Set' button.

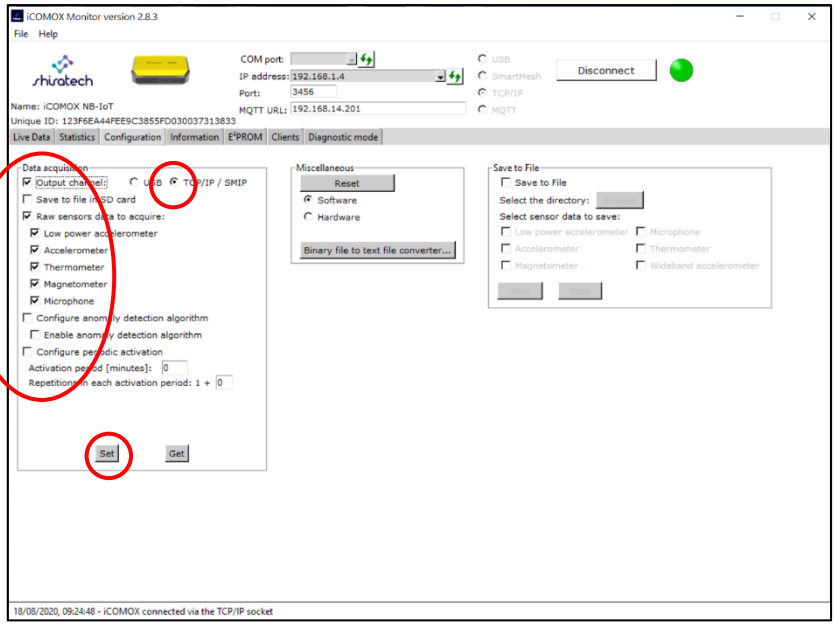


Figure 14: The Monitor Configuration tab

12. Verify that live data is displayed, in accordance with the sensors selected in the previous step.

Note:

- In case no SD card is inserted to the iCOMOX, make sure to un-check the 'Save to file in SD card' checkbox. Leaving the checkbox checked will stop sensor data from being sent.
- The green iCOMOX LED blinks repeatedly when data is transferred from the iCOMOX to the server. When data is not transferred, the green iCOMOX LED does not blink.

6.2.2 Connecting the iCOMOX POE to a TCP Server Using TCP Over Ethernet

To connect over TCP-IP, perform the following steps:

1. On the TCP Server machine, Launch the iCOMOX Monitor (when installation is required, refer to the Monitor Installation Instructions chapter). Monitor Launch can take up to 40 seconds.
2. Program the required network settings to the EEPROM (see the Programming the EEPROM chapter).
3. If not already on, turn on the iCOMOX by sliding the slide switch on the iCOMOX (see the Connecting the iCOMOX POE Kit chapter).
4. The iCOMOX LED will illuminate in orange and the board will vibrate briefly, indicating that the built-in test is in progress. Once completed, the iCOMOX LED will be illuminated in green, signaling that the iCOMOX has loaded successfully.
5. In the Communication panel, select the TCP/IP communication mode.
6. Open the drop-down menu, and configure the server listening IP address, then type the server listening port number in the nearby text field.

Note: In case the iCOMOX POE is connected to a network external to your Local Area Network, the IP address and port must be accessible from outside your server's Local Area Network, using port forwarding. Firewall settings should also be configured to enable communication through the selected port.

7. Click Connect.

Note: After clicking the Connect button, the TCP/IP server is now listening for client connections. The Colored Status Indicator color changes, as described in the following table.

Status Indicator Color	Significance
	Disconnected
	Listening for client connections.
	TCP/IP communication established. At least one iCOMOX client is connected to the server and the client was explicitly selected from the TCP/IP clients table.

Table 4: The Colored Status Indicator color table – TCP/IP connection

8. When switched on, the iCOMOX POE is continuously attempting to connect to the server. It may take up to 10 seconds for a single TCP/IP connection attempt, depending on network conditions. In case that the iCOMOX POE client does not connect to the server after 30 seconds, please refer to the Troubleshooting section.

Figure 15: TCP/IP server is listening for client connections

9. Once the iCOMOX POE client establishes a connection with the iCOMOX Monitor TCP server, a row will be added to the clients table. Select the new client.
10. The Colored Status Indicator will change to green and the status bar will display 'iCOMOX connected via the TCP/IP socket', and will next display the received reports names.

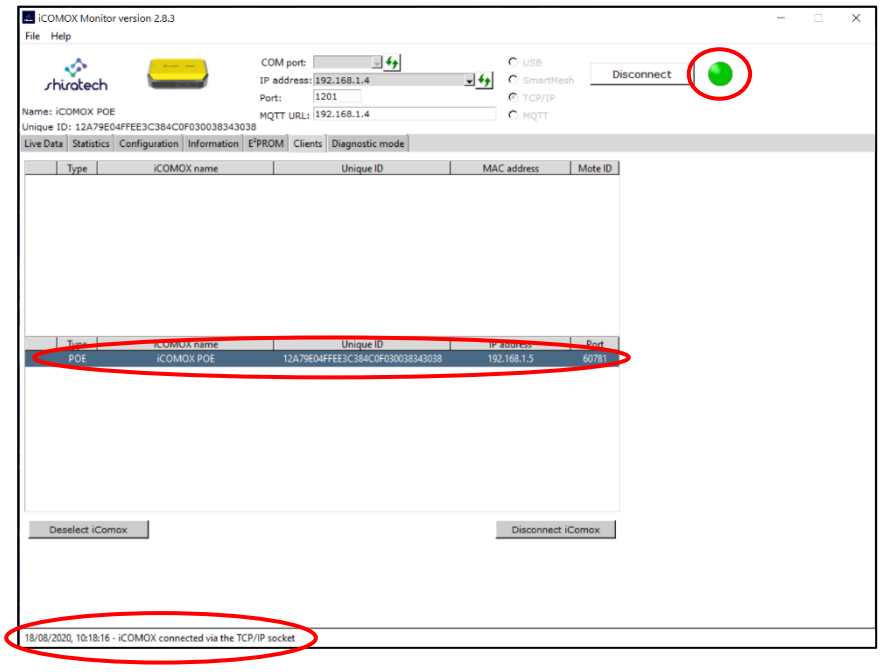


Figure 16: An iCOMOX POE client appears on the clients table

11. Switch to the iCOMOX Monitor's Configuration view, select the sensor data to be acquired, select the TCP/IP sensors output channel, and click on the 'Set' button.

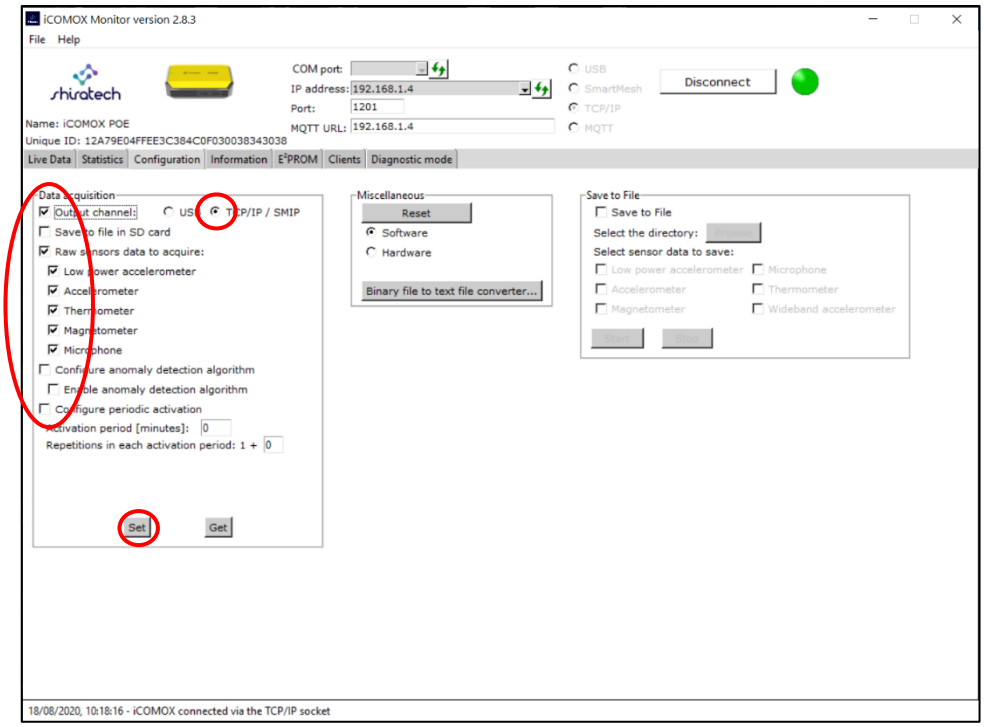


Figure 17: The Monitor Configuration tab

12. Verify that live data is displayed, in accordance with the sensors selected in the previous step.

Note:

- In case no SD card is inserted to the iCOMOX, make sure to un-check the 'Save to file in SD card' checkbox. Leaving the checkbox checked will stop sensor data from being sent.
- The green iCOMOX LED blinks repeatedly when data is transferred from the iCOMOX to the server. When data is not transferred, the green iCOMOX LED does not blink.
- In case the iCOMOX POE and the Monitor TCP /IP Server do not reside on the same Local Area Network, **port forwarding** must be configured, to allow the iCOMOX POE to access the PC running the TCP/IP server, as part of the iCOMOX Monitor. Please consult your IT services provider to safely enable the remote iCOMOX POE to communicate with a machine located inside your Local Area Network.

6.3 Connecting the iCOMOX using MQTT

MQTT is a popular standard protocol for the Internet of Things (IoT). Using this Publisher-Subscriber protocol, the iCOMOX subscribes to one topic to receive control messages from the Monitor, and publishes sensor data and alerts to another topic, to be received by the Monitor. Both the iCOMOX and the Monitor GUI connect to the MQTT broker (server), which is responsible for handling the communication, so that the communication between them is indirect (unlike raw TCP/IP mode).

The **iCOMOX** default topic configuration is:

- Subscribed to control commands on “iCOMOX/<Unique ID>/OUT”
- Publishes to “iCOMOX/<Unique ID>/IN”

The **Monitor** default topic configuration is:

- Subscribed to any topic of the structure “iCOMOX/<Unique ID>/IN” (with a <Unique ID> wild card).
- Publishes commands to each iCOMOX using its Unique ID on “iCOMOX/<Unique ID>/OUT”

Note: It is possible to run the MQTT broker/server as a separate task on the same PC running the iCOMOX Monitor. It is up to the user to decide on the specific system architecture. Please see appendix C for more information about installing and running the Mosquitto MQTT broker/server.

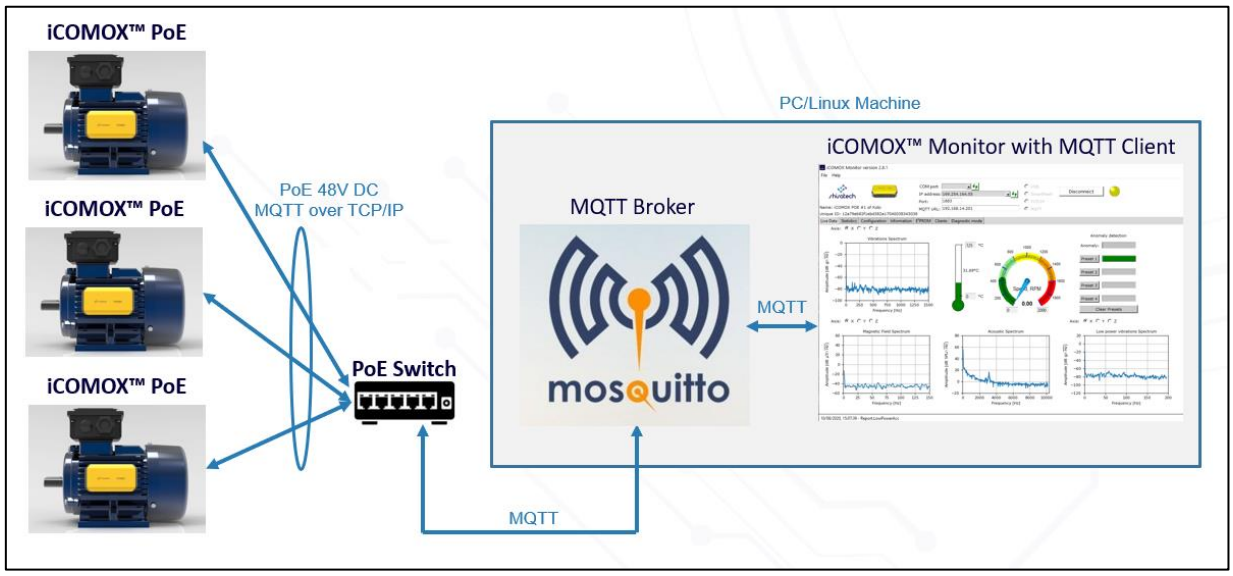


Figure 18: iCOMOX POE connected to a MQTT broker over the Local Area Network.

To connect the iCOMOX over MQTT, perform the following steps:

1. On your PC, Launch the iCOMOX Monitor (when installation is required, refer to the Monitor Installation Instructions chapter). Monitor Launch can take up to 40 seconds.
2. Program the required network settings to the EEPROM (see the Programming the EEPROM chapter).
3. If not already on, turn on the iCOMOX by sliding the slide switch on the iCOMOX (see the Connecting the iCOMOX POE Kit chapter).
4. The iCOMOX LED will illuminate in orange and the board will vibrate briefly, indicating that the built-in test is in progress. Once completed, the iCOMOX LED will be illuminated in green, signaling that the iCOMOX has loaded successfully.
5. In the Communication panel, select the MQTT communication radio button.
6. Type the MQTT broker URL (or IP address) into the 'MQTT URL' field, then type the server listening port number in the corresponding text field. To install and setup a Mosquitto MQTT broker, please refer to Appendix C.

Note: In case you are using the iCOMOX NB-IoT, or using an iCOMOX POE which is connected to a network external to your Local Area Network, the MQTT broker (server) IP address and port must be accessible from outside your broker's Local Area Network, using **port forwarding**. Firewall settings should also be configured to enable communication through the selected port.

7. Click Connect.

Note: After clicking the Connect button, the Monitor connects to the MQTT broker, and serves as a MQTT client.

Status Indicator Color	Significance
	Disconnected
	Connected to the MQTT broker. Listening for incoming client connections (on the subscribed topic).
	At least one iCOMOX client is connected to the broker and was explicitly selected from the Monitor's client table.

Table 4: The Colored Status Indicator color table – TCP/IP connection

8. When switched on, the iCOMOX is continuously attempting to connect to the MQTT broker. It may take up to 10 seconds for the iCOMOX POE to connect to the broker, and up to 5 minutes for the iCOMOX NB-IoT, depending on network conditions. In case that the iCOMOX client does not connect to the server after 30 seconds for the iCOMOX POE, or 5 minutes for the iCOMOX NB-IoT, please refer to the Troubleshooting section.

Figure 19: The Monitor is connected to the MQTT broker and listening for client connections

9. Once the iCOMOX establishes communication with the iCOMOX Monitor over the MQTT broker, a row will be added to the clients table. Select the new client.
10. The Colored Status Indicator will change to green and the status bar will display 'iCOMOX connected via the TCP/IP socket'.

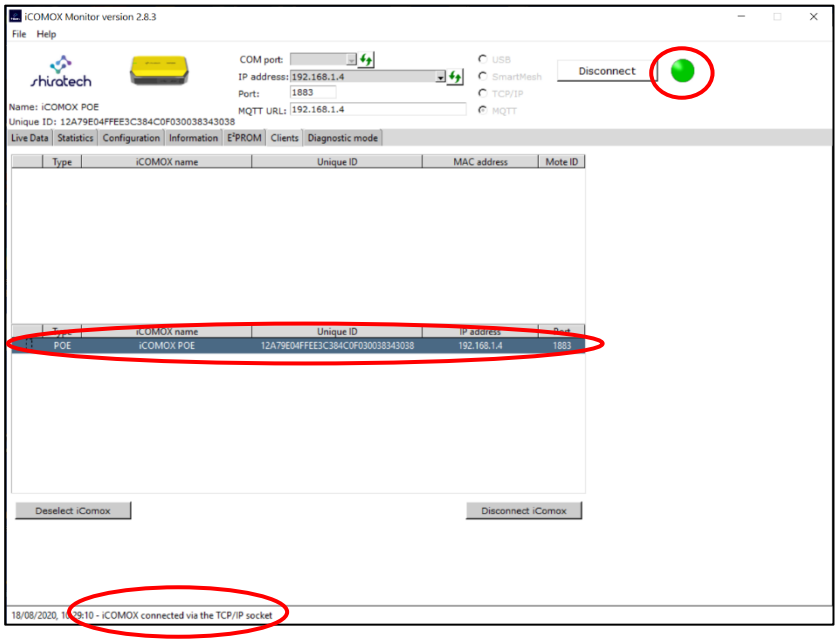


Figure 20: An iCOMOX client appears on the clients table

11. Switch to the iCOMOX Monitor's Configuration view, select the sensor data to be acquired, select the TCP/IP sensors output channel, and click on the 'Set' button.

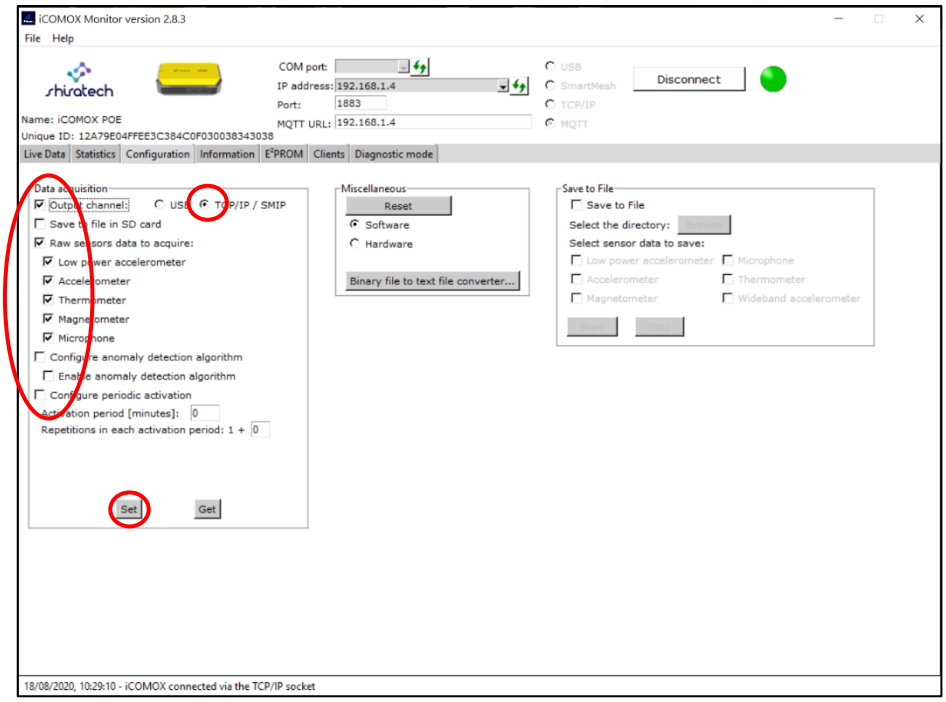


Figure 21: The Monitor Configuration tab

12. Verify that live data is displayed, in accordance with the sensors selected in the previous step.

Note:

- In case no SD card is inserted to the iCOMOX, make sure to un-check the 'Save to file in SD card' checkbox. Leaving the checkbox checked will stop sensor data from being sent.
- The green iCOMOX LED blinks repeatedly when data is transferred from the iCOMOX to the server. When data is not transferred, the green iCOMOX LED does not blink.

7. Anomaly Detection

The iCOMOX Monitor automatically distinguishes between iCOMOX boxes running the Demo Mode AI module, and iCOMOX boxes running the Autonomous Mode AI module, and displays the suitable menu accordingly.

7.1 Demo Mode

The Demo mode anomaly detection algorithm allows the user to configure up to 4 different preset states to be learned by the algorithm, then consequently receive reports on anomalies which are displayed as relative deviations from these preset states.

Once one or more preset states are configured, the bars next to each preset state display the relative similarity of the current sensor data state to the corresponding preset state.

To configure and use the anomaly detection algorithm, follow this example:

1. Connect and start running your device in either USB, TCP/IP over Ethernet or MQTT mode sending a set configuration command with the 'Configure anomaly detection algorithm' and the 'Enable anomaly detection algorithm' checkboxes checked.
2. In case you would not wish to send a new set configuration command, you may click on the 'Clear Presets' button in order to initialize the anomaly detection module. A 'Get anomaly detection module report error 3' error message will appear in the status bar – this is normal and indicates that no state has yet been trained.

Figure 22: Preset Training in Progress

3. Bring your monitored equipment to a regular work state. In this example we will use a simple 3-phase motor. We bring our motor to approximately 250rpm.
4. To allow the algorithm to learn the current motor state, click on the 'Preset 1' button. The bar next to the button will start to fill up in yellow, and 'Get anomaly detection module train report' will appear in the status panel, indicating that the learning is currently in progress.
5. Once learning of the state is completed, we expect to see a full green bar next to preset 1, indicating that the current sensor data state resembles preset 1 in 100% (relative to the other presets. Since there are no other presets, there is a 100% resemblance), and an empty anomaly bar, indicating that no anomaly is currently detected.
6. Next, we will increase the speed to 566 rpm. The Anomaly bar will fill up in red, indicating that a deviation from the preset was detected:

Figure 23: Anomaly Detected

7. Assuming that the preset state defined is described as 'normal operation' state, and assuming that 155 rpm is also a part of the normal state, we can define it as such by clicking again on the preset 1 button.
8. After training is completed, we expect the bar next to preset 1 to be green, and the anomaly bar to be empty. Now both of the two working states (85 rpm and 155 rpm) are associated with preset 1.
9. You may use the 3 other presets to define additional working modes for your equipment (for example, driving a different load).
10. To stop using the module, go to the configuration tab, check the 'Configure anomaly detection algorithm' checkbox, and un-check the 'Enable anomaly detection algorithm' checkbox, then click on 'Set'.

Clicking on ‘Clear Presets’ does not stop the module’s operation. It clears all trained presets and re-initializes the module.

7.2 Autonomous Mode

The Autonomous mode anomaly detection algorithm allows the user to configure a single preset state to be learned by the algorithm, then consequently receive reports on anomalies which are displayed as relative deviations from the preset state. Autonomous allows the user to select the sensors to be used by the algorithm and configure the training duration, as well as to store the learning result in non-volatile memory.

Once the preset state was configured, the ‘Anomaly’ bar displays the relative deviation of the current sensor data state from the trained preset state.

To configure and use the anomaly detection algorithm, follow these instructions:

1. In case you have already performed the training process, and want to use the existing trained state, navigate to the Live Data tab and click on ‘Enable AI’ to start receiving anomaly detection reports.
2. If this is the first time you are using the Autonomous mode anomaly detection feature, or if you wish to delete the previously trained preset state, start with training a new preset state.
3. Navigate to the Configuration tab, and select the desired sensors to be used.

Note: The ADXL362 low power accelerometer data is ignored in Autonomous Mode.

4. Go to the Live Data tab. If you wish to pre-define the learning duration, select the training duration in minutes. The possible range is 1 to 65535 minutes. (you may also manually start and stop the training process).
5. Click on ‘Configure AI’ to prepare the module to start training.
6. Click on ‘Start training’ to start training. The training will continue for the defined number of minutes. Clicking on ‘Stop training’ will stop the training immediately. In case 0 minutes were selected, training will not stop until ‘Stop training’ has been clicked.
7. Click on ‘Enable AI’ to start receiving anomaly detection reports while referring to the newly trained preset state.

Note: You may continue to train an existing preset state by performing steps 4 through 7 **without** clicking on ‘Configure AI’.

8. Saving Data to SD Card

8.1 Supported SD Card Formats

- The iCOMOX Supports VBR (Volume Boot Record).
- FAT and FAT32 (rev 0.0) file systems are supported.
- Sector sizes of 512 1024 2048 and 4096 bytes are supported.
- Minimum supported volume size: 128 sectors
- Maximum volume size: 4294967295 (2^32 – 1) sectors for FAT and FAT32.

8.2 Save Instructions

1. Back-up any information of any importance located on the SD card, as it may be overwritten.
2. Navigate to the configuration tab, and select the “Save to file in SD card” check-box.
3. Connect to the iCOMOX, to start acquiring data (for detailed instructions on connecting the iCOMOX, please refer to the Quick Start chapter).
4. In case a binary file cannot be created, the iCOMOX will not send any reports, and an error message will appear in the status bar: “Error in saving file to SD card”.

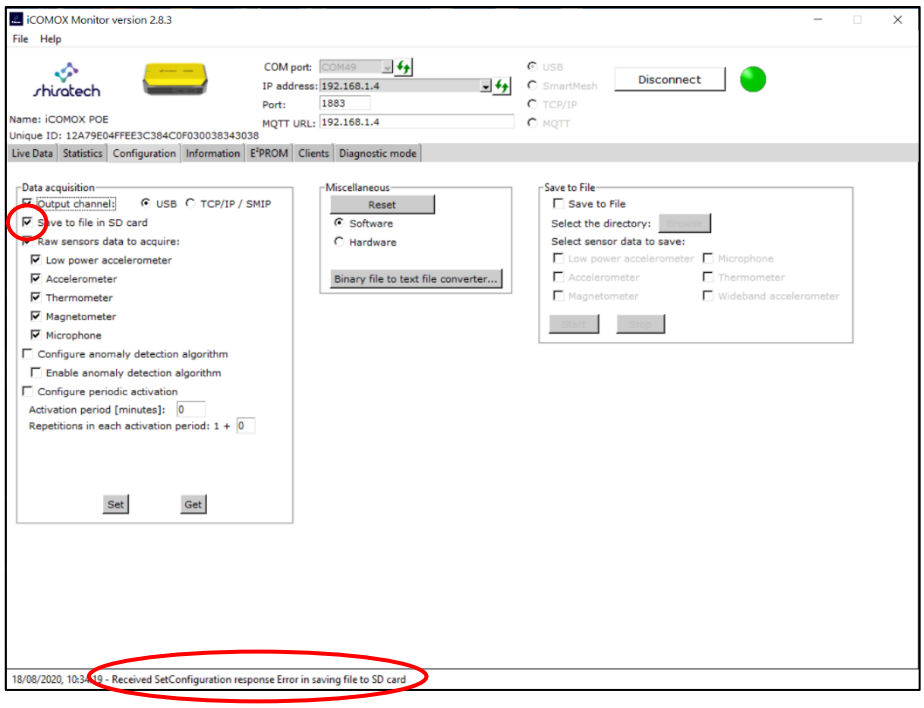


Figure 24: Save to file in SD card, and error message.

5. Please refer to the troubleshooting section to resolve the cause of the error, then, after the error is resolved, click Disconnect and then Connect, to resume acquiring data.
6. To finish saving the data to SD card, uncheck the ‘Save to file in SD card’ checkbox and click ‘Set’.

8.3 Binary File Format

The binary file header contains the following information:

- binary file type format
- iCOMOX board type (SMIP/NB-IOT/POE)
- iCOMOX board version
- MCU serial number
- Firmware release version
- Firmware build version

The rest of the file contains the various sensors' binary report messages, without modification, as received by the Monitor.

8.4 Conversion to Text Format

1. Switch to the Configuration tab, uncheck the 'Save to file in SD card' checkbox and click 'Set' to finish acquiring data. Wait for a 'Received SetConfiguration response OK' to appear in the status bar.
2. Extract the SD card from the iCOMOX, and insert it to the PC.

Note: A 'Set' command with an un-checked 'Save to file in SD card' checkbox must be sent prior to extracting the SD card from the iCOMOX. Extracting the SD card from the iCOMOX without performing this action first will result in undefined behavior.

3. In the Configuration tab, click on "Binary file to text file converter…".
4. Navigate to the SD card, and select the desired .bin file.
5. A message would appear on the screen, detailing the number of report messages received and saved to the SD card. Click OK.
6. Using the Windows File Explorer, navigate to the SD card. A .txt file with the same name as the selected .bin file will appear in the folder. The data is now visible using any common text editor.

8.5 Binary Files Naming System

The binary file created by the iCOMOX naming format is of the form "iCOMOX-YYYY-MM-DD_HH-MM-SS.bin", which represents the file's creation time.

CAUTION: Make sure to back up previous information saved on the SD card before re-inserting the card to the iCOMOX, as files with identical file names will be overwritten.

9. Programming the EEPROM

Note:

- The iCOMOX SMIP does not have an EEPROM component installed. The SMIP-EEPROM tab is intentionally greyed out.
- It is recommended to go through the USB cable connection section of the quick-start guide before moving forward to the next steps.

9.1 Programming the EEPROM for the First Time on the iCOMOX NB-IOT

To program the EEPROM for the first time, perform the following steps.

1. Connect the iCOMOX POE to the PC using the USB-C cable and switch the iCOMOX on using the slide switch.
2. Launch the iCOMOX Monitor.
3. Open the configuration tab, select the USB output channel and un-check the 'Raw sensors data to acquire' check-box in the Data Acquisition section, except for 'Output channel'.

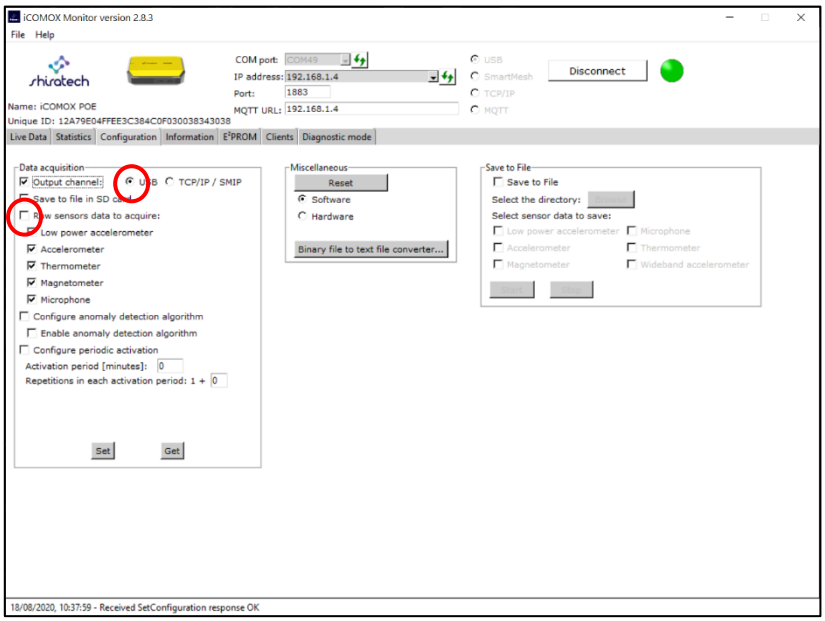


Figure 25: Un-check sensor data checkboxes

4. Select USB mode, select the suitable COM port, and click on the Connect button. (Please refer to the Connecting with the USB Cable chapter).

Note: Though not recommended, it is possible to program the EEPROM via TCP/IP connection. In any case where a wrong IP address and port are configured and programmed, TCP/IP connection with the iCOMOX-POE will be lost, and can only be restored by physically accessing the iCOMOX device, connecting via USB cable and re-programming the EEPROM.

5. Once connection with the iCOMOX NB-IOT has been successfully established, open the EEPROM tab.
6. Enter the iCOMOX name (maximum length: 32 UTF8 characters). For example, “iCOMOX-NBIOT 3 phase Motor #421”.
7. It is usually recommended to:
    - Check the ‘Use default SIM configuration’ checkbox.
    - Un-check the ‘Manual operator selection’ checkbox.
    - Check the ‘Enable roaming’ checkbox.
    - Unless required otherwise, set authentication to ‘None’.

Note: The cellular operator should provide information regarding the authentication method and other relevant settings.

8. If you wish to connect via TCP/IP, select the TCP tab and enter the TCP/IP server IP address and port, and the cellular carrier’s APN settings (APN settings fields maximum length: 32 ASCII characters).
9. If you wish to connect via MQTT, select the MQTT tab and enter at least the broker/server IP address or URL and broker/server port. If the topic fields are left blank, and ‘Shiratech Cloud’ is selected, they will be automatically set to default (default values will be displayed by clicking the ‘default topics’ button).
10. The use of SSL is enabled on the iCOMOX NB-IoT (currently without the ability to upload certificate/key files to the iCOMOX). If you wish to use SSL, check the ‘Use SSL’ checkbox, and configure the relevant parameters.
11. To program the EEPROM with the selected configurations, click on the Program EEPROM button. The green bar will be filled from left to right, and “Programming succeeded” will appear in the status bar.
12. In case of error, “Programming failed” will appear in the status bar. Please see the Troubleshooting section for further details.
13. To read or verify the configurations already programmed on the EEPROM:
    - Click the “Read from EEPROM button”. The green bar will be filled from left to right, and “Reading succeeded” will appear in the status bar. The EEPROM tab fields will be updated with the data that is currently programmed to the EEPROM.
    - The Verify EEPROM button allows you to verify whether the exact configurations you have entered in the EEPROM tab are already programmed on the iCOMOX EEPROM. To verify, first enter the desired configurations, then click on the “Verify EEPROM” button.

- In case the verifying has succeeded (the configuration data in the Monitor EEPROM tab matches the configurations programmed on the iCOMOX EEPROM) the green bar will be completely filled from left to right, and “Verifying succeeded” will appear in the status bar.

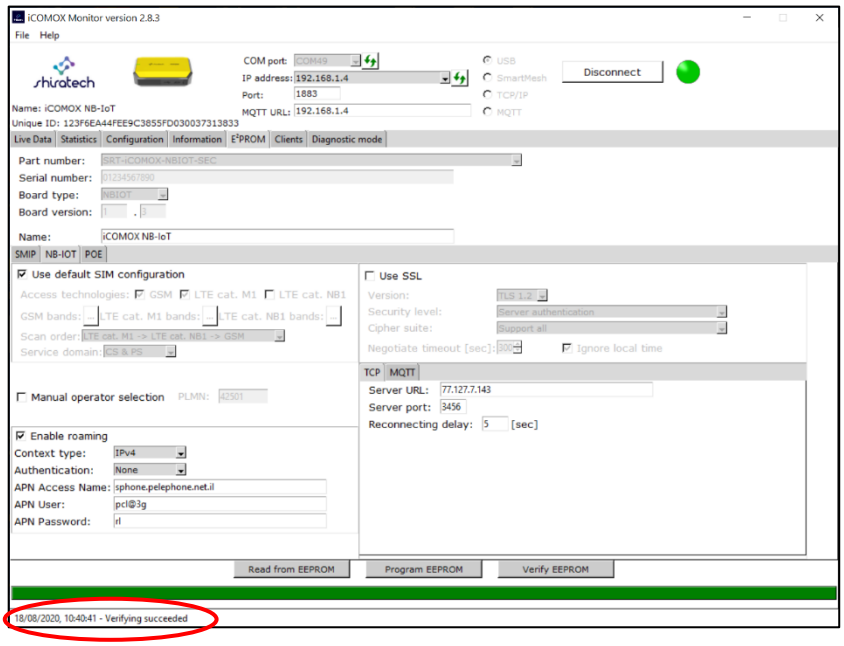


Figure 26: Verifying succeeded.

- In case the verifying has failed (the configuration data in the Monitor EEPROM tab does not exactly match the configurations programmed on the iCOMOX EEPROM) the green bar will be partially filled, then switch to red and “Verifying failed” will appear in the status bar.

9.2 Programming the EEPROM for the First Time on the iCOMOX POE

To program the EEPROM for the first time, perform the following steps.

1. Connect the iCOMOX POE to the PC using the USB-C cable and switch the iCOMOX on using the slide switch.
2. Launch the iCOMOX Monitor.
3. Open the configuration tab, select the USB output channel and un-check the 'Raw sensors data to acquire' check-box in the Data Acquisition section.

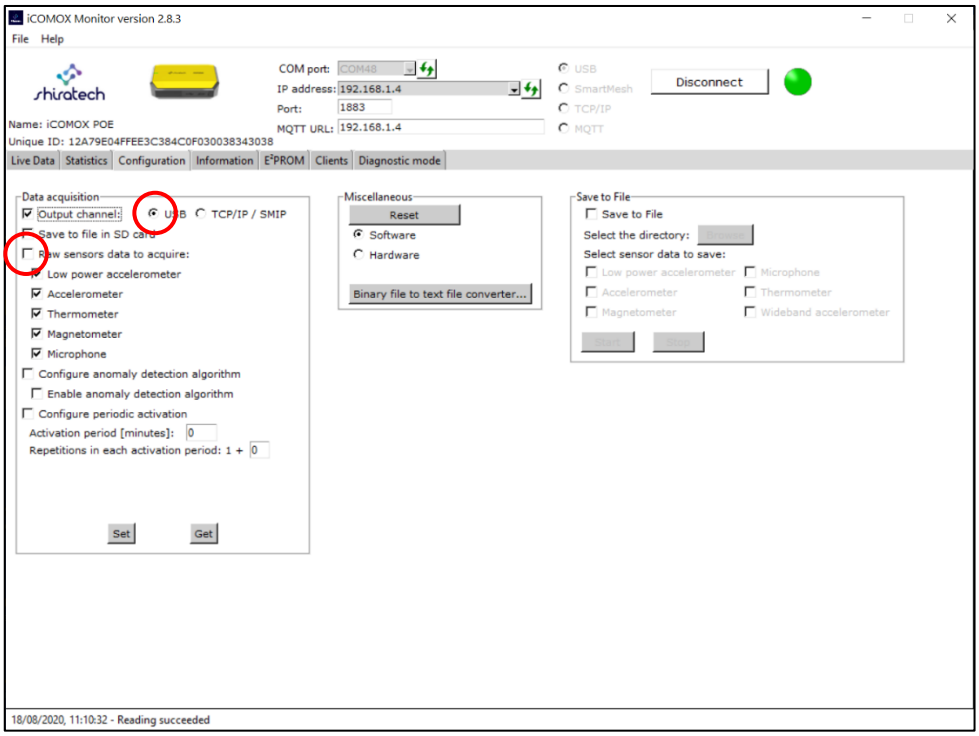


Figure 27: Un-check sensor data checkboxes.

4. Select USB mode, select the suitable COM port, and click on the Connect button. (Please refer to the Connecting with the USB Cable chapter).

Note: Though not recommended, it is possible to program the EEPROM via TCP/IP connection. In any case where a wrong IP address and port are configured and programmed, TCP/IP connection with the iCOMOX-POE will be lost, and can only be restored by physically accessing the iCOMOX device, connecting via USB cable and re-programming the flash.

5. Once connection with the iCOMOX POE has been successfully established, open the EEPROM tab, then select the POE tab.
6. Enter the iCOMOX name (maximum length: 32 UTF8 characters). For example, "iCOMOX-POE 3 phase Motor #421".
7. Select a static IP address for the client, and enter it.

Note:

- The client's IP address must be unique. Make sure that no other client or machine on the network is using the same IP address.
- Unless intentionally configured otherwise, verify that the client's IP address has the same network fields (i.e. only the last rightmost field should contain different numbers for IP address class C).

8. Configure the Mask Address field (should typically be 255.255.255.0).
9. Configure the Default gateway field. You may follow these steps to obtain the correct value to be configured:
   a. On the bottom right corner of the screen, right click on the network icon and choose 'Open Network & Internet Settings' to open the Network Status menu.
   b. From the Network Status menu, choose 'Change Adapter Settings'.
   c. Right click on the 'Ethernet' icon, and choose 'properties'.
   d. From the properties tab, select the 'Internet Protocol Version 4 (TCP/IPv4)' line, and click on 'Properties'.
   e. Copy the IP address which appears in the 'Default Gateway' field, and paste it to the corresponding field in the iCOMOX Monitor EEPROM tab.
10. Insert the gateway and DNS server IP address.
11. You may want to select the DHCP check-box (optional), to have the network's DHCP server automatically assign an IP address, mask address and default gateway and DNS server address to the iCOMOX POE client.

Note:

- Checking the DHCP check-box will make the 'Client static IP address', mask address, DNS, and default gateway fields meaningless, as they will be assigned by the DHCP.
- SSL settings are intentionally greyed out on the POE tab, since SSL is currently not supported on iCOMOX-POE.

12. If you wish to connect using TCP/IP, insert the Server IP address and port. Make sure that these are the same IP address and port that the TCP-IP server is listening on, which appear next to the Monitor's TCP/IP radio button.
13. If you wish to connect via MQTT, select the MQTT tab and enter the broker/server URL (or IP address) and broker/server port. If the topic fields are left blank, and 'Shiratech Cloud' is selected, the topics will be automatically set to default (default values will be displayed by clicking the 'default topics' button).
14. In case the iCOMOX connection with the server is interrupted, the iCOMOX will try to re-establish it. In order to prevent network overloading with multiple clients reconnection

attempts, configure the “Delay before connecting” field, to have the iCOMOX wait a configurable number of seconds before each reconnection attempt.

15. To program the EEPROM with the selected configurations, click on the Program EEPROM button. The green bar will be filled from left to right, and “Programming succeeded” will appear in the status bar.

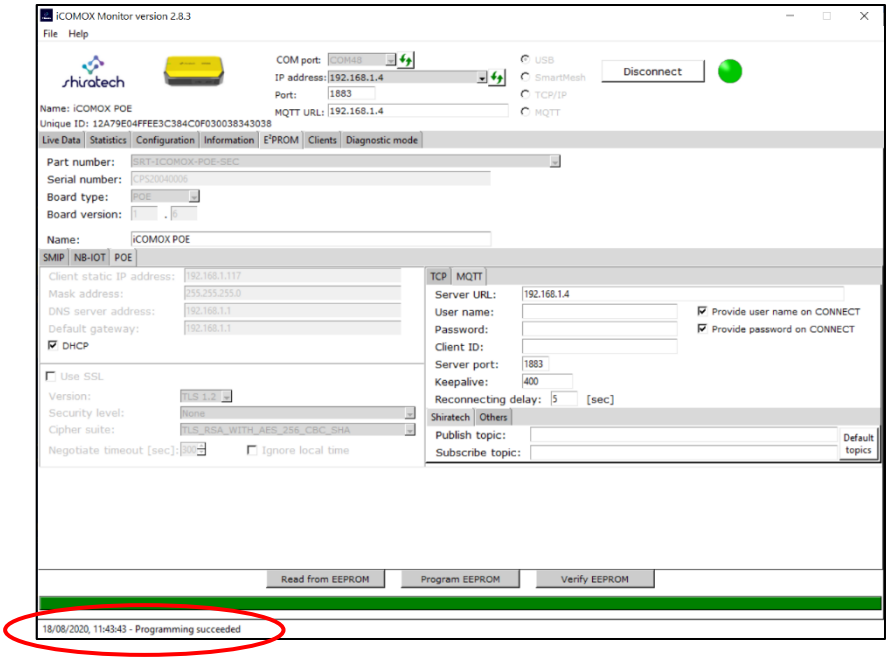


Figure 28: Programming succeeded

16. In case of error, “Programming failed” will appear in the status bar. Please see the Troubleshooting section for further details.

17. To read or verify the configurations already programmed on the EEPROM:

    a. Click the “Read from EEPROM” button. The green bar will be filled from left to right, and “Reading succeeded” will appear in the status bar. The EEPROM tab fields will be updated with the data that is currently programmed to the EEPROM.

    b. The Verify EEPROM button allows you to verify whether the exact configurations you have entered in the EEPROM tab are already programmed on the iCOMOX EEPROM. To verify, first enter the desired configurations, then click on the “Verify EEPROM” button.

    c. In case the verifying has succeeded (the configuration data in the Monitor EEPROM tab matches the configurations programmed on the iCOMOX EEPROM) the green bar will be completely filled from left to right, and “Verifying succeeded” will appear in the status bar.

    d. In case the verifying has failed (the configuration data in the Monitor EEPROM tab does not exactly match the configurations programmed on the iCOMOX EEPROM) the green bar will be partially filled, and “Verifying failed” will appear in the status bar.

10. Connecting the iCOMOX Kit

10.1 Prerequisites

- An iCOMOX Kit (SMIP/NB-IOT/POE).
- A PC running Windows 10.

10.2 USB-C Cable connection

Note: USB Cable connection instructions are identical for all iCOMOX types.

To connect the iCOMOX to the PC using the USB-C cable, perform the following steps.

1. Connect the iCOMOX POE to the PC using the USB-C cable.

Figure 29: USB-C cable connection

Note: It is recommended to fasten the screws of the USB-C cable to the iCOMOX.

2. Turn on the iCOMOX by sliding the slide switch on the iCOMOX to the direction opposing the USB-C cable (see figure 14).

Figure 30: Switching the iCOMOX on

3. Verify that the green iCOMOX LED is illuminated.

Figure 31: The green LED is illuminated

10.3 SMIP connection

To connect the iCOMOX to the PC using SMIP, perform the following steps.

1. Connect the Dongle (if SmartMesh communication is required) to one of the USB ports on the PC.

Figure 32: Connecting the dongle

2. Turn on the iCOMOX by sliding the slide switch on the iCOMOX in the direction of the LED - the opposite direction of the USB-C cable (see Figure 30: Switching the iCOMOX on).
3. Verify that the green iCOMOX LED is illuminated (see Figure 31: The green LED is illuminated).

Note: The iCOMOX is equipped with batteries. When the USB cable is disconnected, the iCOMOX, when turned on, is powered by the batteries instead of by the USB-C cable. When not in use, make sure that the iCOMOX is off when the USB-C cable is disconnected.

10.4 TCP/IP over NB-IOT connection

To connect the iCOMOX NB-IOT to the PC using TCP/IP over NB-IOT, perform the following steps.

1. Turn on the iCOMOX NB-IOT by sliding the slide switch on the iCOMOX NB-IOT in the direction opposing the USB-C cable (see Figure 30: Switching the iCOMOX on). The iCOMOX NB-IOT may be powered by the USB-C cable. The internal batteries are only a power supply backup.
2. Verify that the green iCOMOX NB-IOT LED is illuminated (see Figure 31: The green LED is illuminated).

Note: The iCOMOX is equipped with batteries. When the USB cable is disconnected, the iCOMOX, when turned on, is powered by the batteries instead of by the USB-C cable. When not in use, make sure that the iCOMOX is off when the USB-C cable is disconnected.

10.5 TCP/IP over Ethernet connection

To connect the iCOMOX POE to the PC using TCP/IP, perform the following steps.

1. Connect the iCOMOX POE to your Local Area Network using an Ethernet cable.
2. Turn on the iCOMOX POE by sliding the slide switch on the iCOMOX POE in the direction opposing the USB-C cable (see Figure 30: Switching the iCOMOX on). The iCOMOX POE may be powered by the USB-C cable.
3. Verify that the green iCOMOX POE LED is illuminated (see Figure 31: The green LED is illuminated).

Note: In any case where the Ethernet cable does not provide power supply, the iCOMOX can be powered by the USB-C cable while working in TCP/IP over Ethernet mode. When connected, the USB power supply has priority over the POE's power supply.

11. Mechanical Structure

11.1 The Sensor Pack

11.1.1 The iCOMOX SMIP Sensor Pack

The iCOMOX SMIP Sensor Pack comprises the following equipment:

- LED indicators (1)
- Case (2)
- SD and on/off switch cover (3)
- Gasket (4)
- Case cover (5)
- Electronic card (6)
- Case - Cover connection screws (7)
- Case – Electronic card connection screw (8)

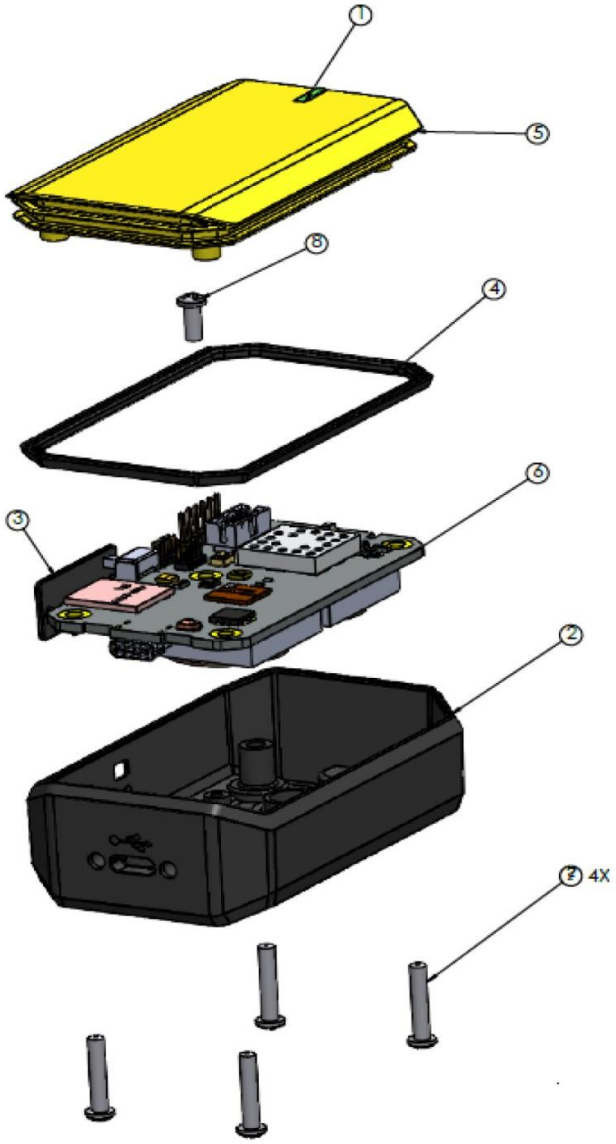


Figure 33: iCOMOX SMIP mechanical structure

11.1.2 The iCOMOX NB-IOT Sensor Pack

The iCOMOX NB-IOT Sensor Pack comprises the following equipment:

- Case (1)
- Cover (2)
- Electronic card (3)
- Screws (4) (5)

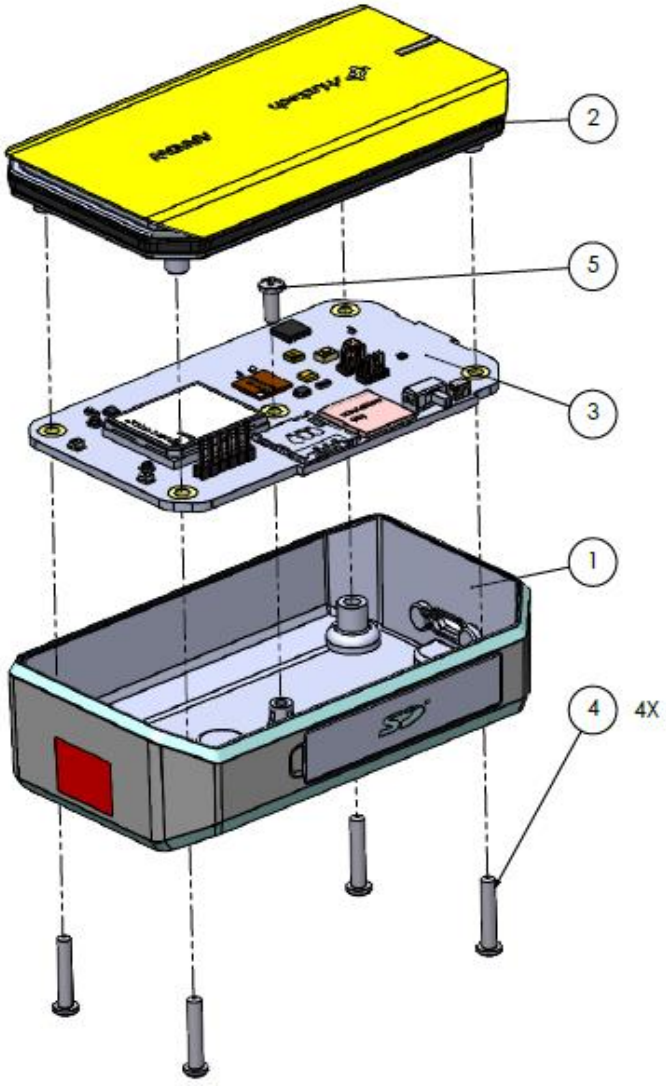


Figure 34: iCOMOX NB-IOT mechanical structure

11.1.3 The iCOMOX POE Sensor Pack

The iCOMOX POE Sensor Pack comprises the following equipment:

- Case (1)
- Cover (2)
- Electronic card (3)
- Screws (4) (5)
- Sealing (6)

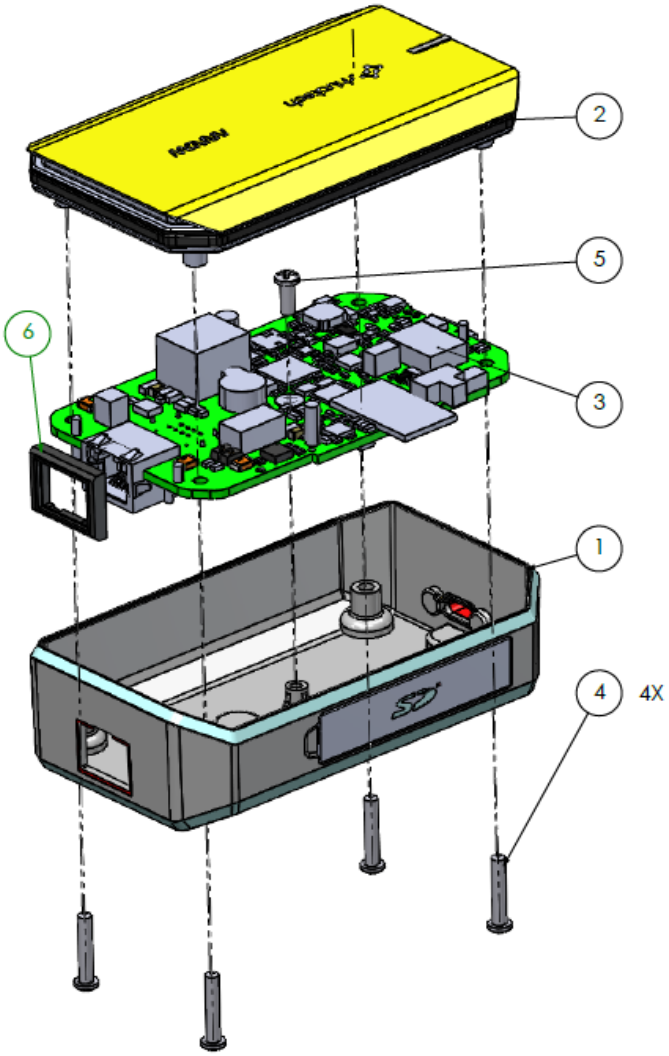


Figure 35: iCOMOX POE mechanical structure

11.2 The Mounting Kit

11.2.1 The iCOMOX SMIP Mounting Kit

The Mounting Kit (Figure 36: iCOMOX SMIP Mounting Kit Adaptors) provides a versatile solution for mounting the iCOMOX SMIP sensor pack onto the monitored equipment.

The Mounting Kit includes the following two adaptors:

1. Two-screw Adaptor (3) – secures to the iCOMOX SMIP sensor pack with two screws (4). This adaptor has a hole at each end, which can enable fitting to such motors as the three-phase, Size 63 Induction Motor.
2. Slot Adaptor (1) – designed with slots instead of holes, providing additional versatility. If the Two-screw Adaptor (3) fits your equipment, you do not require the Slot Adaptor (1).

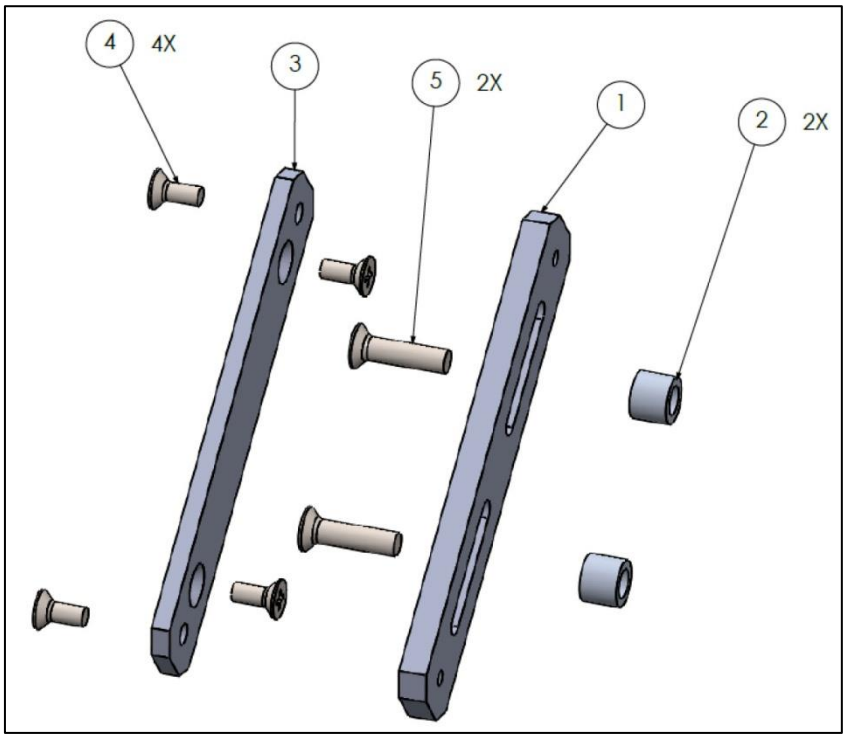


Figure 36: iCOMOX SMIP Mounting Kit Adaptors

Item No.	Part Number	Description	Qty
1	0009-00-00-0004		1
2	0009-00-00-0001		2
3	0009-00-00-0008		1
4	DIN EN ISO 7046-1-M4 x 10 - Z – 10N		4
5	DIN EN ISO 7046-1-M4 x 20 - Z – 20N		2

Table 5: iCOMOX SMIP Mounting Kit Components

11.2.2 The iCOMOX POE/NB-IOT Mounting Kit

The Mounting Kit (Figure 37: iCOMOX POE/NB-IOT Mounting Kit Adaptors) provides a versatile solution for mounting the iCOMOX sensor pack onto the monitored equipment.

The Mounting Kit includes the following two adaptors:

3. Two-screw Adaptor (3) – secures to the iCOMOX sensor pack with two screws (4). This adaptor has a hole at each end, which can enable fitting to such motors as the three-phase, Size 63 Induction Motor.
4. Slot Adaptor (3) – designed with slots instead of holes, providing additional versatility. If the Two-screw Adaptor (3) fits your equipment, you do not require the Slot Adaptor (3).

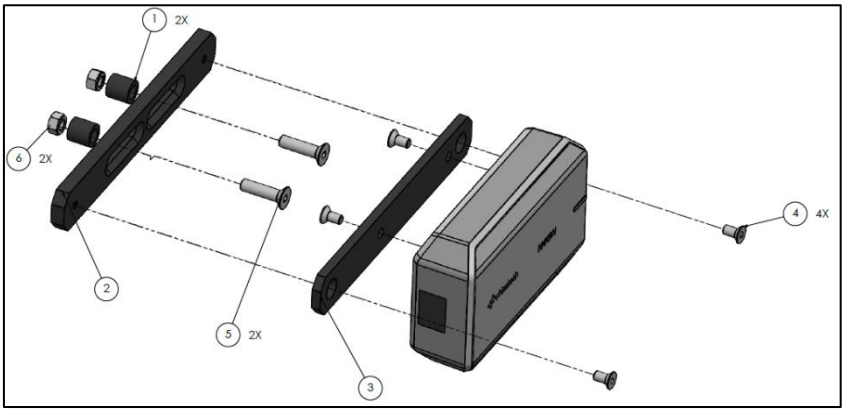


Figure 37: iCOMOX POE/NB-IOT Mounting Kit Adaptors

Item No.	Part Number	Description	Qty
1	MK-03-R02	SPACER	2
2	MK-02-R02	MOTOR PLATE	1
3	MK-01-R02	NBIOT/POE PLATE	1
4	DIN 965 – M4 x 6	FH SCREW PH M4X6, BLACK OXIDE	4
5	DIN 965 – M5 x 25	FH SCREW PH M5X25, BLACK OXIDE	2
6	Hexagon Nut ISO 4032 – M5	HEX NUT M5, BLACK OXIDE	2

Table 6: iCOMOX POE/NB-IOT Mounting Kit Components

11.3 Creating an Adaptor

When the supplied adaptors do not fit your equipment, you can produce an adaptor according to the dimensions of the supplied adaptor in the following figures.

For more information/support, contact support@shiratech-solutions.com .

11.3.1 Creating an Adaptor for iCOMOX SMIP

Note: Only the 73mm distance holes are to be considered during the design. These holes are made to accommodate m4 screws.

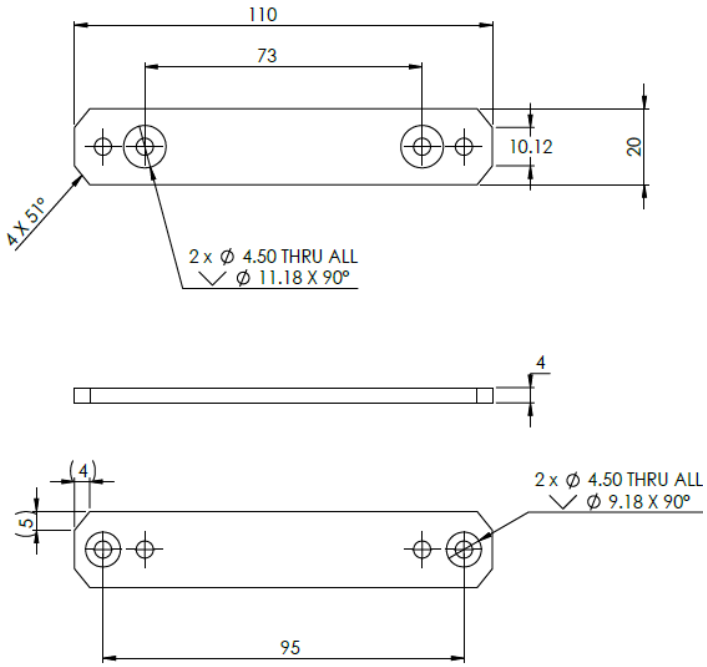


Figure 38: The mounting adaptor - iCOMOX SMIP

11.3.2 Creating an Adaptor for iCOMOX POE/NB-IOT

Note: Only the 61.25mm distance holes are to be considered during the design. These holes are made to accommodate m4 screws.

For more information/support, contact support@shiratech-solutions.com .

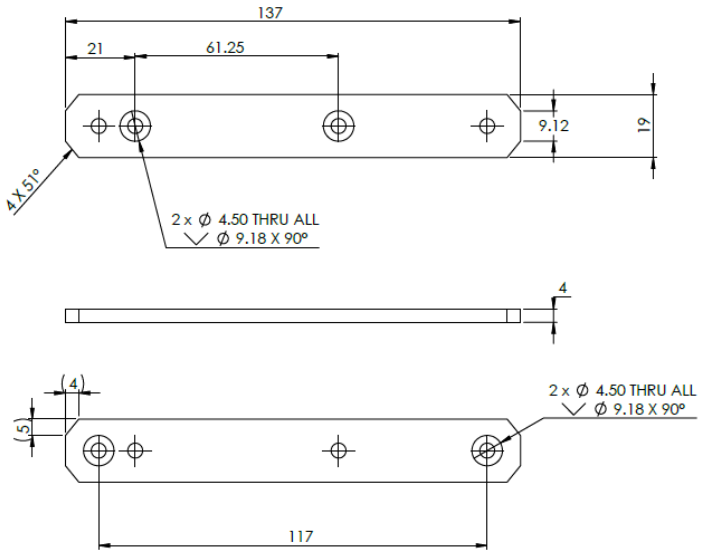


Figure 39: The mounting adaptor – POE/ iCOMOX NB-IOT

12. Replacing the Batteries

The iCOMOX SMIP contains two CR2450N batteries. To replace the batteries, perform the following steps:

1. Disconnect the USB cable from the iCOMOX SMIP.
2. Using a Phillips screwdriver, dismount the iCOMOX SMIP from the motor.

Figure 40: Loosen the Screws to Detach the iCOMOX SMIP

3. Carefully remove the thermal conductor.

Figure 41: Removing the Thermal Conductor

4. Remove the mounting element from the back-side of the iCOMOX SMIP.

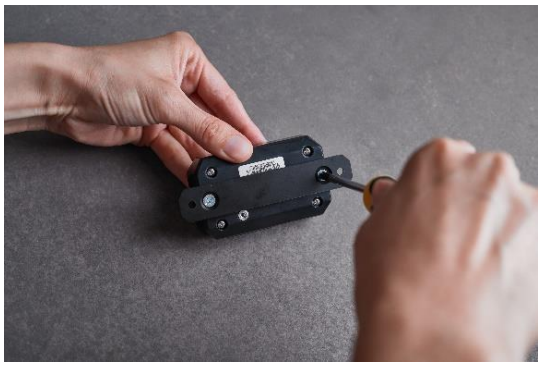


Figure 42: Removing the Mounting Adaptor

5. Remove the four screws at the back side of the iCOMOX SMIP.

Figure 43: Loosen the screws to Open the iCOMOX SMIP

6. Remove the yellow cover.

Caution: Do not detach the SmartMesh antenna that is connected to the card.

Figure 44: Opening the iCOMOX SMIP yellow cover

7. Remove the screw at the middle of the electronic card to disconnect the electronic card from the cover.

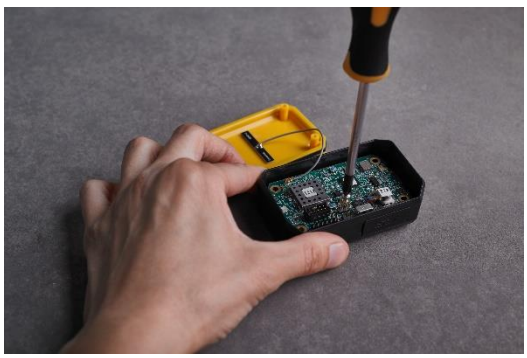


Figure 45: Removing the iCOMOX SMIP from the cover

8. Replace the two batteries with new CR2450N batteries.

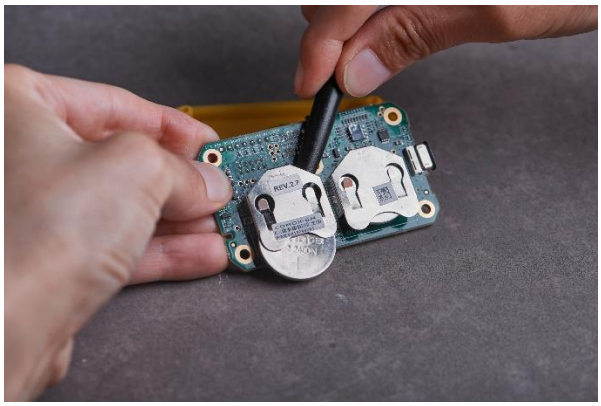


Figure 46: Removing the batteries

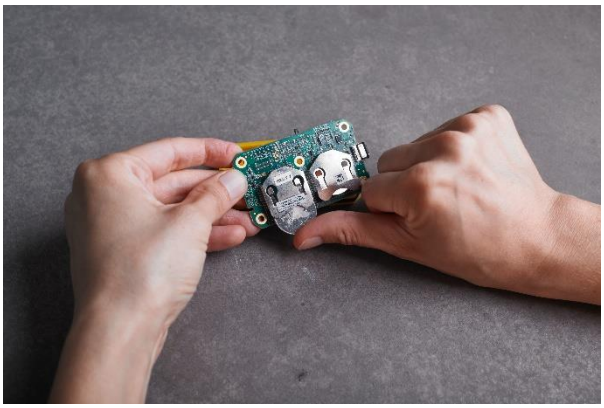


Figure 47: Inserting new batteries

9. Assemble the iCOMOX SMIP and then reinstall the iCOMOX SMIP onto the motor.

13.Flash Programmer

The iCOMOX Flash Programmer is a Windows utility for programming the flash memory of the iCOMOX via the USB-C port. It is based on the CrossCore Serial Flash Programmer™ by Analog Devices.

13.1 Installing the iCOMOX Flash Programmer

To install the iCOMOX Flash Programmer, perform the following steps:

1. Download and run the latest version of the *iCOMOX Flash Programmer* from: https://www.shiratech-solutions.com/products/icomox/
   The iCOMOX Flash Programmer Setup Wizard opens.

Figure 48: iCOMOX Flash Programmer installer

2. Click Next. The Setup Type window opens.

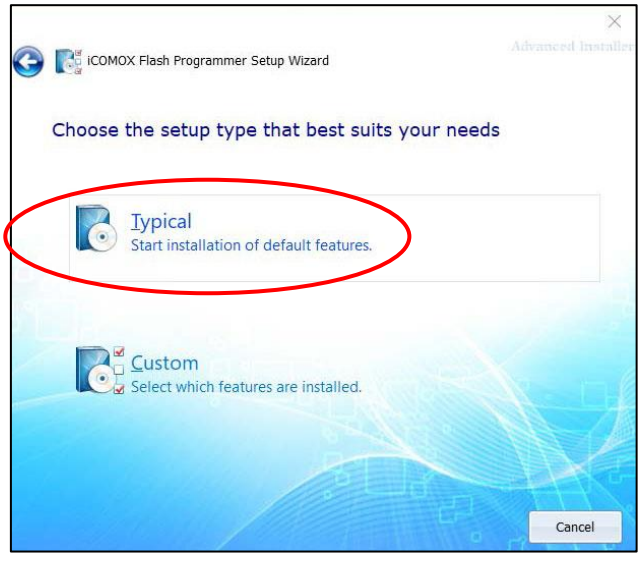


Figure 49: iCOMOX Flash Programmer installer

3. Click Typical. The Select Installation Folder window opens.

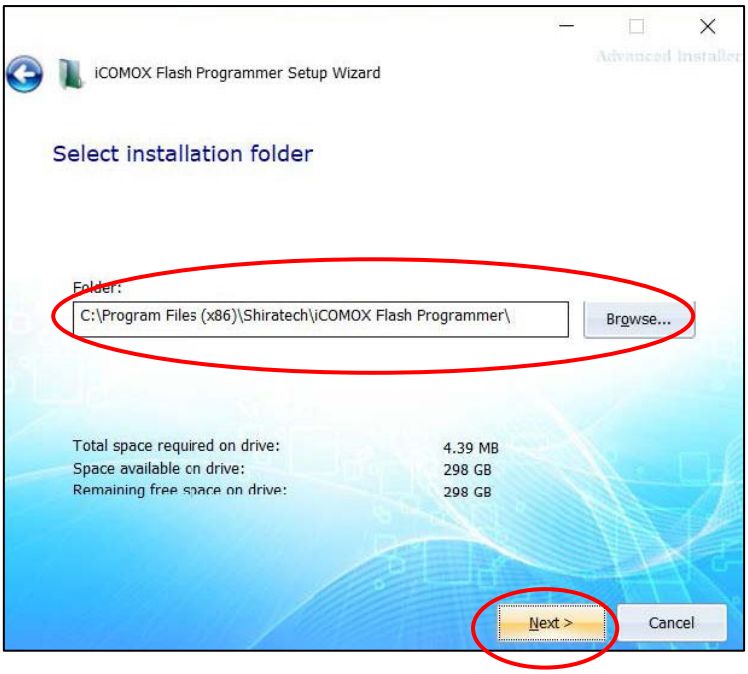


Figure 50: iCOMOX Flash Programmer installer

4. Browse to the installation path on your PC and click Next. The Begin Installation window opens.

Figure 51: iCOMOX Flash Programmer installer

5. Click Install to begin installation. The License Terms window appears.

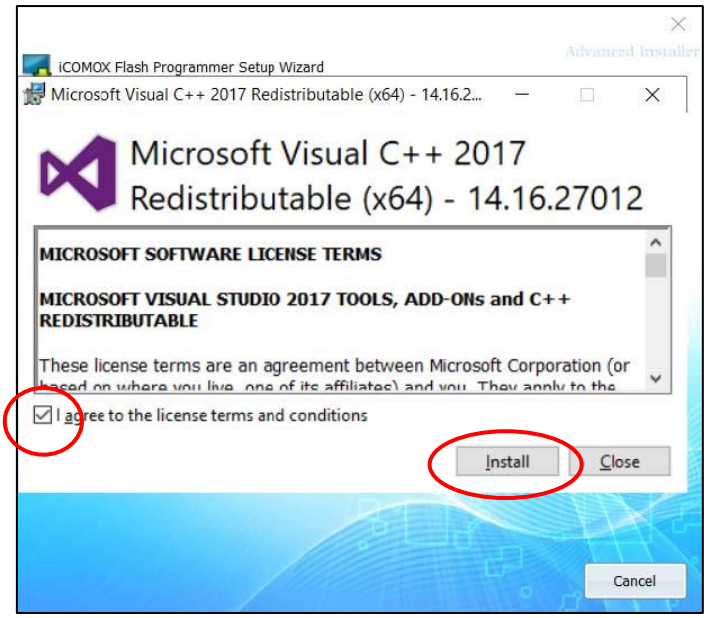


Figure 52: iCOMOX Flash Programmer installer

6. When additional installations are required:
   a. Follow the relevant instructions.
   b. Select the 'I agree to the license terms and conditions' checkbox.
   c. Click Install, restart the PC and repeat the installation process from Step 1.
7. When additional installations are **not** required:
   a. Select the 'I agree to the license terms and conditions' checkbox.
   b. Click Install. The Successfully Installed window appears.

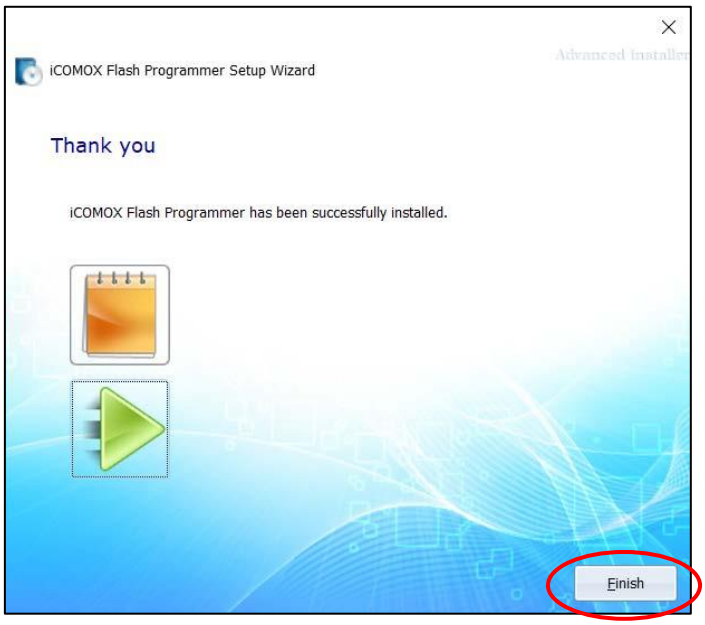


Figure 53: iCOMOX Flash Programmer installer

8. Click Finish to complete the installation process.

13.2 Flashing

13.2.1 Flashing the iCOMOX SMIP

To program the Flash, perform the following steps:

1. Disconnect the USB cable from the iCOMOX SMIP.

Note: After disconnecting the USB cable, make sure that the switch is off, to prevent the iCOMOX SMIP from consuming the batteries.

2. Detach the iCOMOX SMIP from the motor, by removing the mounting element from the back side of the iCOMOX SMIP.
3. Remove the 4 screws on the back of the iCOMOX SMIP to remove the iCOMOX SMIP cover.

Note: For more detailed instructions regarding the unmounting and opening of the iCOMOX, refer to the Replacing the Batteries section.

Figure 54: Removing the iCOMOX cover

4. Launch the iCOMOX Flash Programmer.
5. Click the Browse button to select the .hex file to be programmed.

Figure 55: iCOMOX Flash Programmer

Note: For the PC to correctly recognize the iCOMOX, the FTDI driver must be installed. For installation instructions, refer to appendix A.

6. Connect the iCOMOX SMIP to the PC using the USB-C cable and turn the iCOMOX SMIP on by sliding the slide switch on the iCOMOX SMIP in the direction of the LED (the direction opposing the USB-C cable).

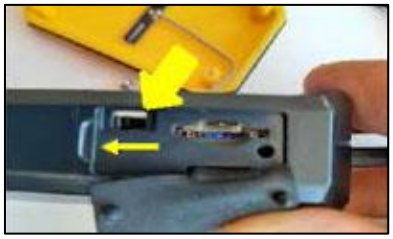


Figure 56: Switching the iCOMOX on.

7. Locate the BOOT and RESET buttons on the iCOMOX SMIP and perform the following sequence:
   c. Hold down both the BOOT and the RESET buttons.
   d. Release the RESET button
   e. Release the BOOT button.

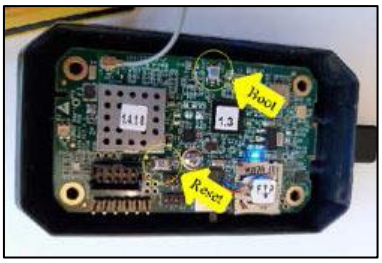


Figure 57: The BOOT and the RESET buttons.

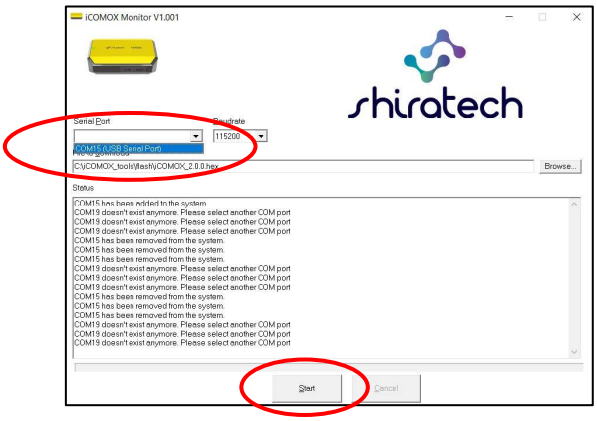


Figure 58: The Serial Port drop-down menu.

CAUTION: While programming of the flash is in progress, do not stop the programming process or disconnect the USB cable, as it may result in permanent and irreversible damage to the flash.

8. Select the suitable COM port (USB Serial Port) from the drop-down menu and click Start. Flashing should begin.

Note: You can launch the Device Manager prior to performing this step, to verify which COM port to choose in later steps.

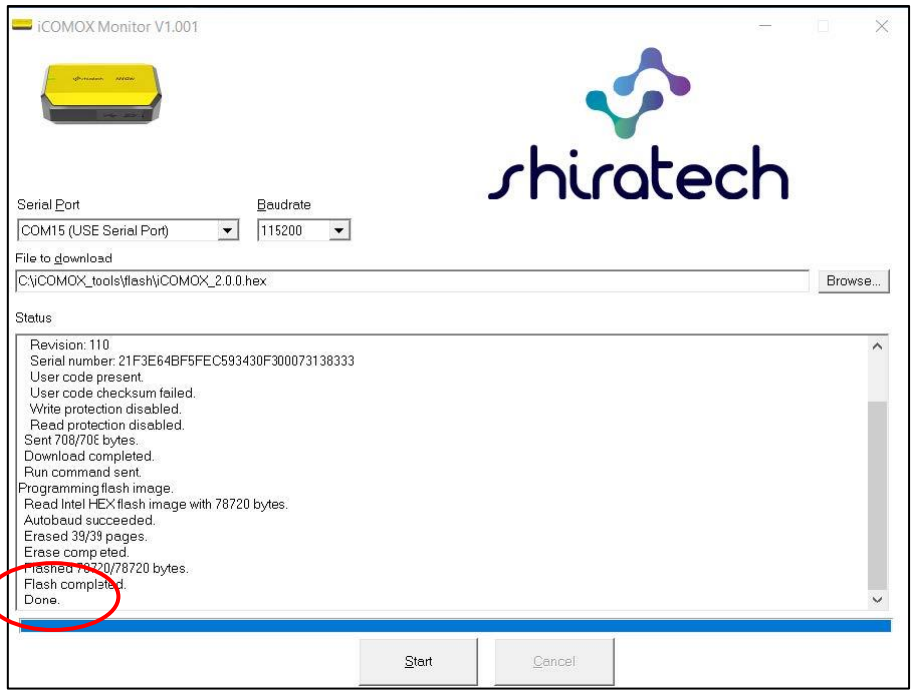


Figure 59: "Done"

9. Verify that "Done" appears at the end of the status report, indicating that flashing was successful.
10. Restart the iCOMOX by clicking the RESET button (see image 34) on the iCOMOX, or by disconnecting the USB cable and switching the iCOMOX switch off and then back on.
11. Launch the iCOMOX Monitor, connect to the iCOMOX using the USB cable, then navigate to the Information tab. To verify that the flashing was successful, verify that the Information tab displays the correct firmware version.

Note: In case that the Information tab does not display the iCOMOX firmware version, please first try reconnecting by using the Disconnect/Connect button.

13.2.2 Flashing the iCOMOX NB-IOT/POE

To program the Flash, perform the following steps:

CAUTION: While programming of the flash is in progress, do not stop the programming process or disconnect the USB cable, as it may result in permanent and irreversible damage to the flash.

1. Launch the iCOMOX Flash Programmer.
2. Click the Browse button to select the .hex file to be programmed.

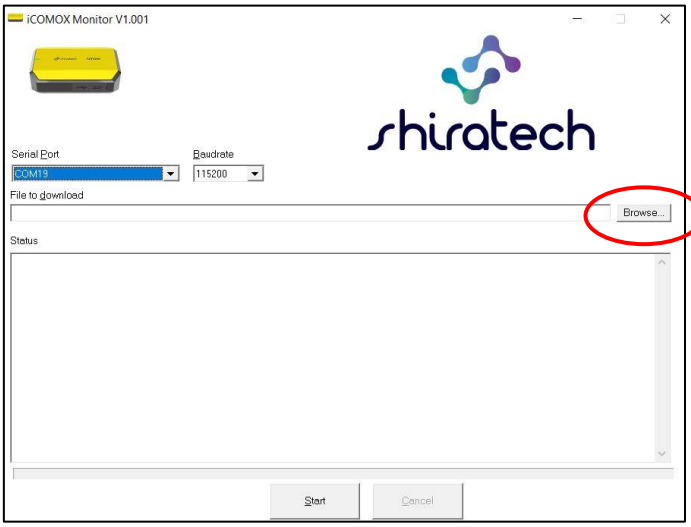


Figure 60: iCOMOX Flash Programmer

Note: For the PC to correctly recognize the iCOMOX, the FTDI driver must be installed. For installation instructions, refer to appendix A.

3. Perform the following sequence:
   A. Connect the iCOMOX to the PC using the USB-C cable.
   B. hold down the Bootloader button (the button next to the power switch).
   C. Turn the iCOMOX on by sliding the slide switch on the iCOMOX in the direction opposing the USB-C cable.
   D. Release the Bootloader button.

Figure 61: Switching the iCOMOX on.

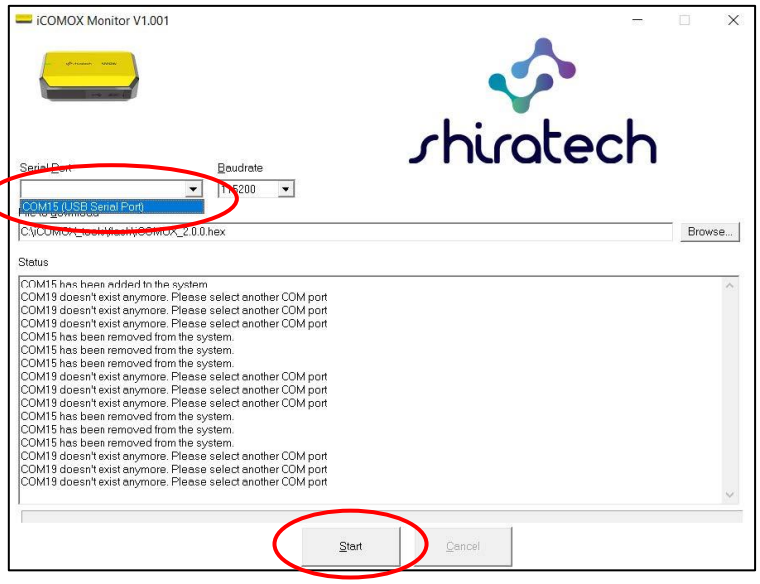


Figure 62: The Serial Port drop-down menu.

4. Select the suitable COM port (USB Serial Port) from the drop-down menu and click Start. Flashing should begin.

Note: You can launch the Device Manager prior to performing this step, to verify which COM port to choose in later steps.

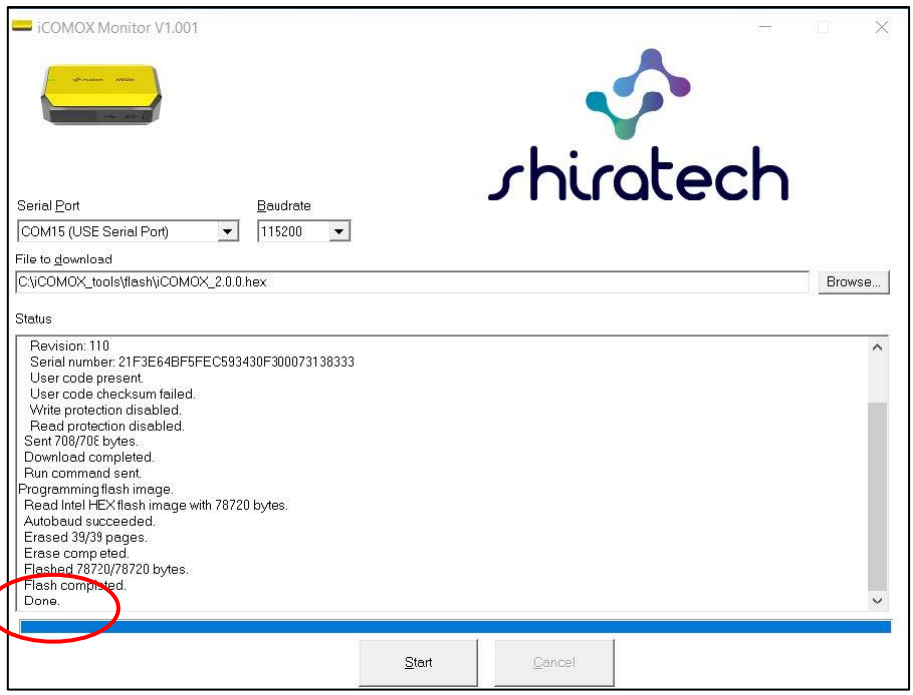


Figure 63: "Done"

5. Verify that "Done" appears at the end of the status report, indicating that flashing was successful.
6. Restart the iCOMOX by switching the iCOMOX switch off and then back on.
7. Launch the iCOMOX Monitor, connect to the iCOMOX using the USB cable, then navigate to the Information tab. To verify that the flashing was successful, verify that the Information tab displays the correct firmware version.

Note: In case that the Information tab does not display the iCOMOX firmware version, please first try reconnecting by using the Disconnect/Connect button.

14. Monitor

14.1 Overview

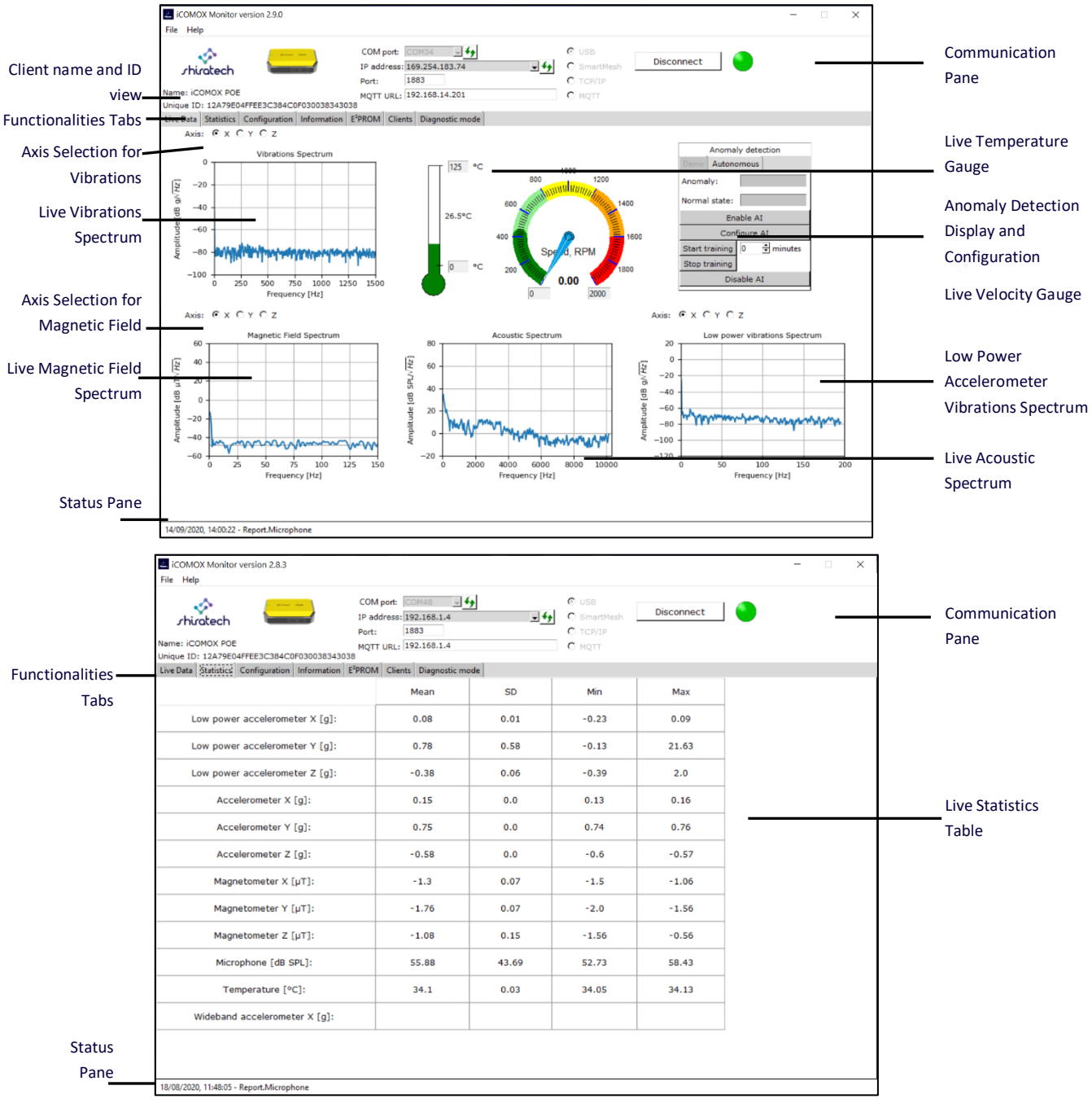


Figure 64: Monitor overview

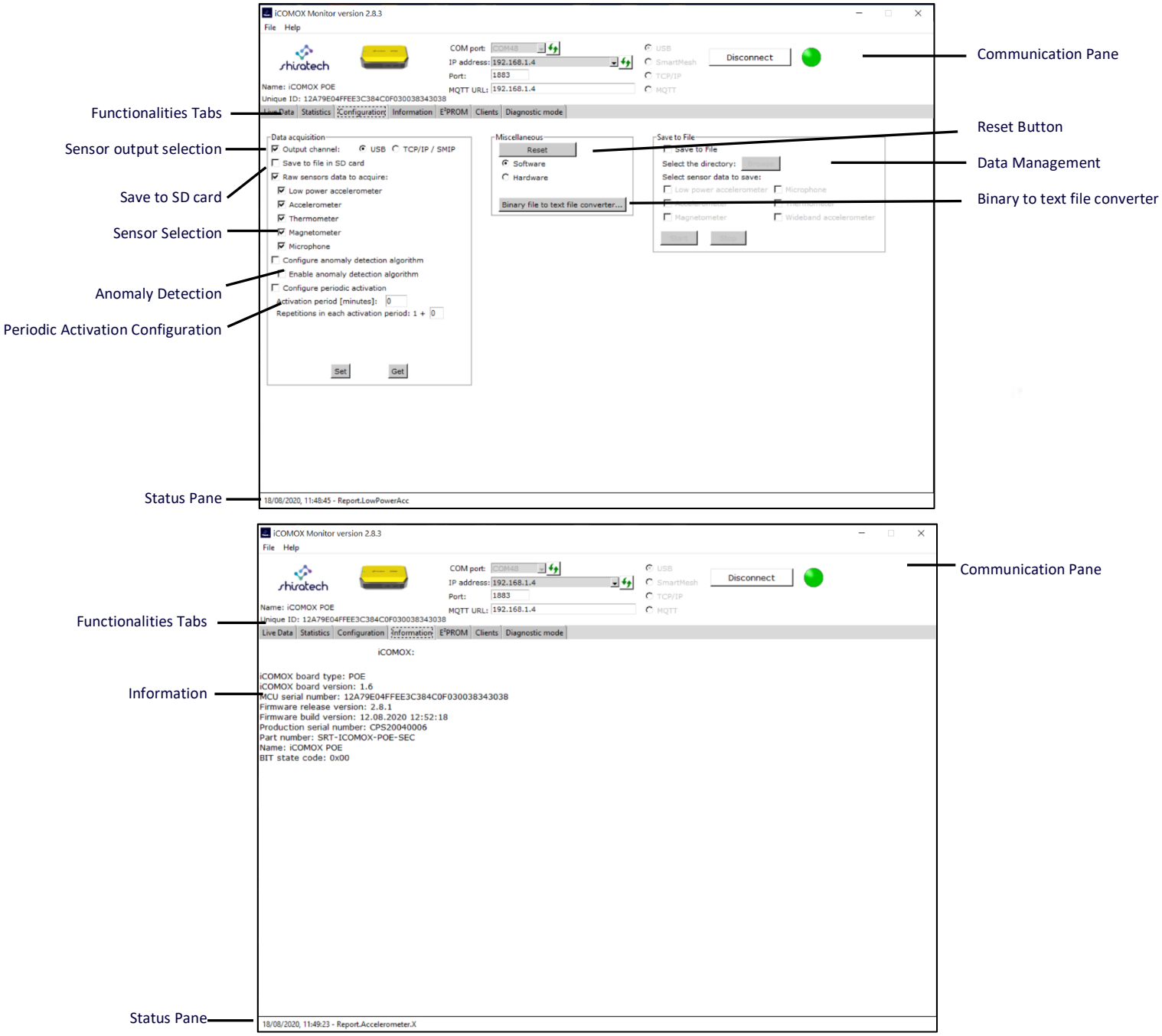


Figure 65: Monitor overview

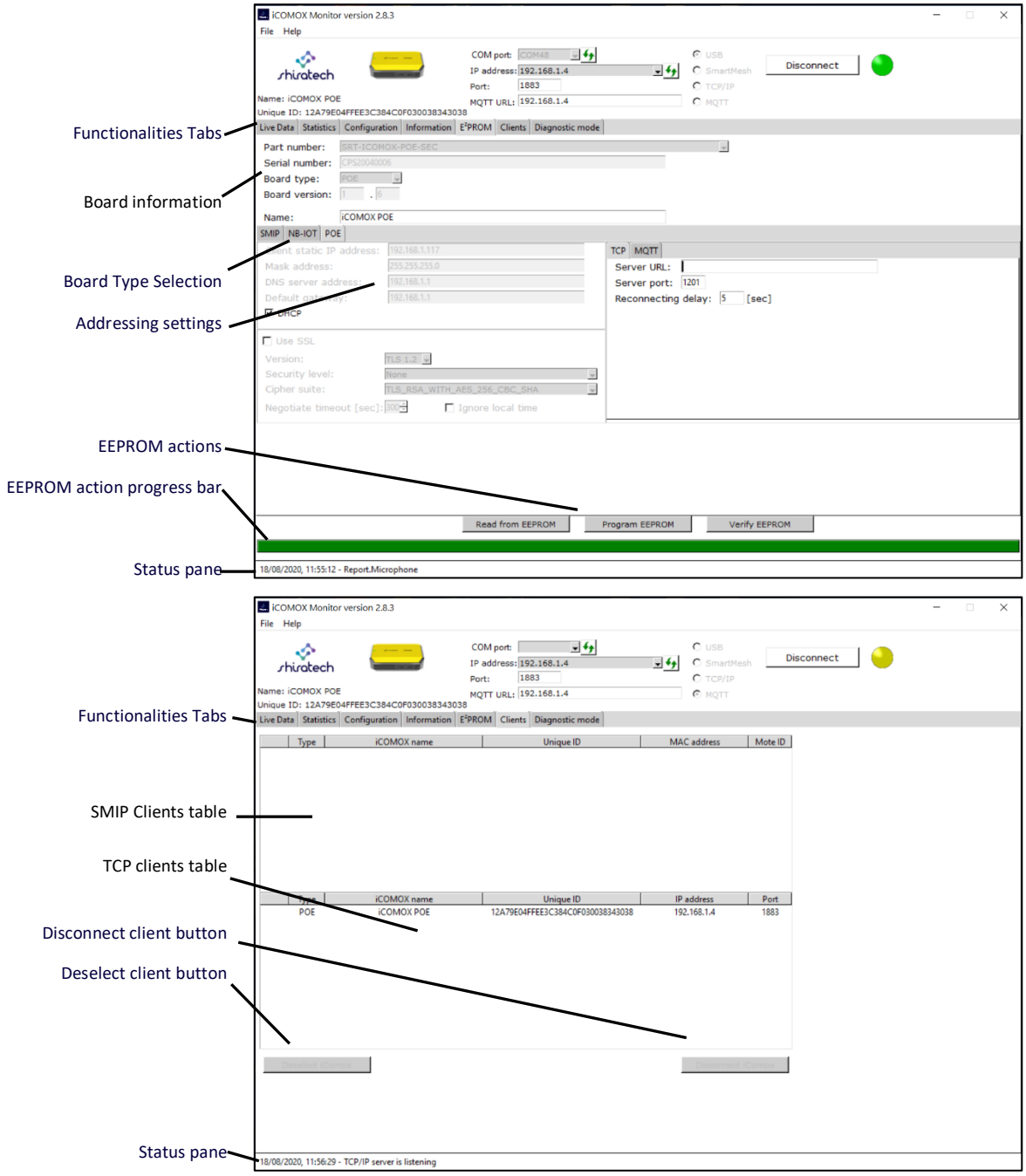


Figure 66: Monitor overview

14.2 Main Window

Figure 67: Monitor Main window

Main Window comprises the following components:

- Top Menu Bar – Displays the File – Exit and Help – About tabs.
- Communication Panel - contains the following features:
  - USB/SMIP/TCP-IP communication selection (1).
  - Drop down menu for the COM port selection of the iCOMOX USB Manager (2).
  - Connect/Disconnect button to enable/disable communication (3).
  - Colored Status Indicator (4).
  - Drop down menu and text field for the TCP server IP address (5).
  - Connected client name and Unique ID (6). Double click to copy to clipboard.
  - TCP or MQTT port (7).
  - MQTT broker URL (8).

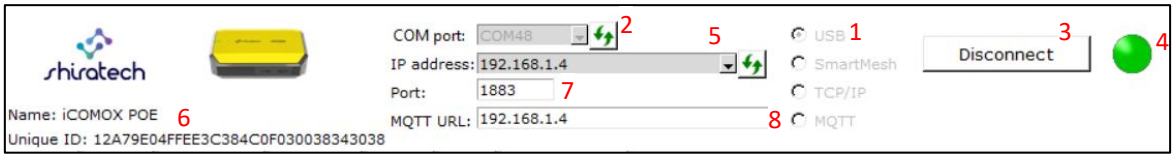


Figure 68: Communication panel

- Status Bar - Displays connection status, errors, SMIP data packets numbering and report types, along with the event time.

14.2.1 Tab Views

The Main Window provides the following six tab views:

- Live Data
- Statistic
- Configuration
- Information
- EEPROM
- Clients
- Diagnostic mode

14.2.1.1 Live Data View

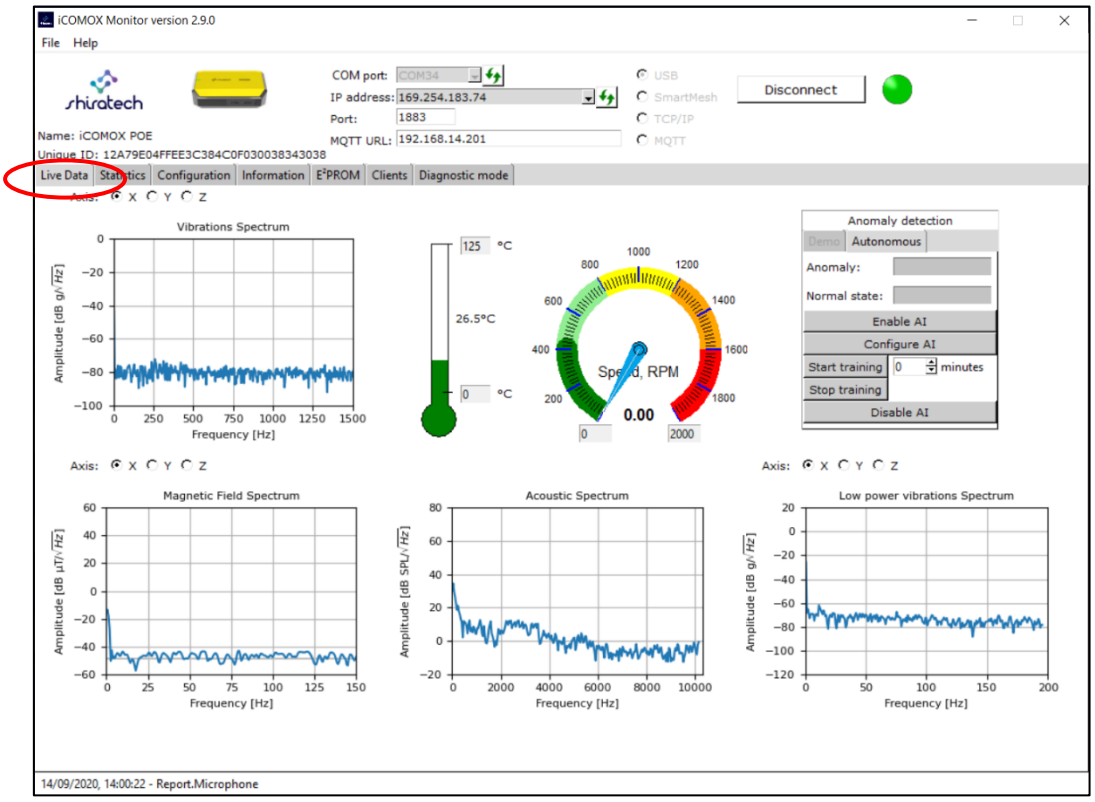


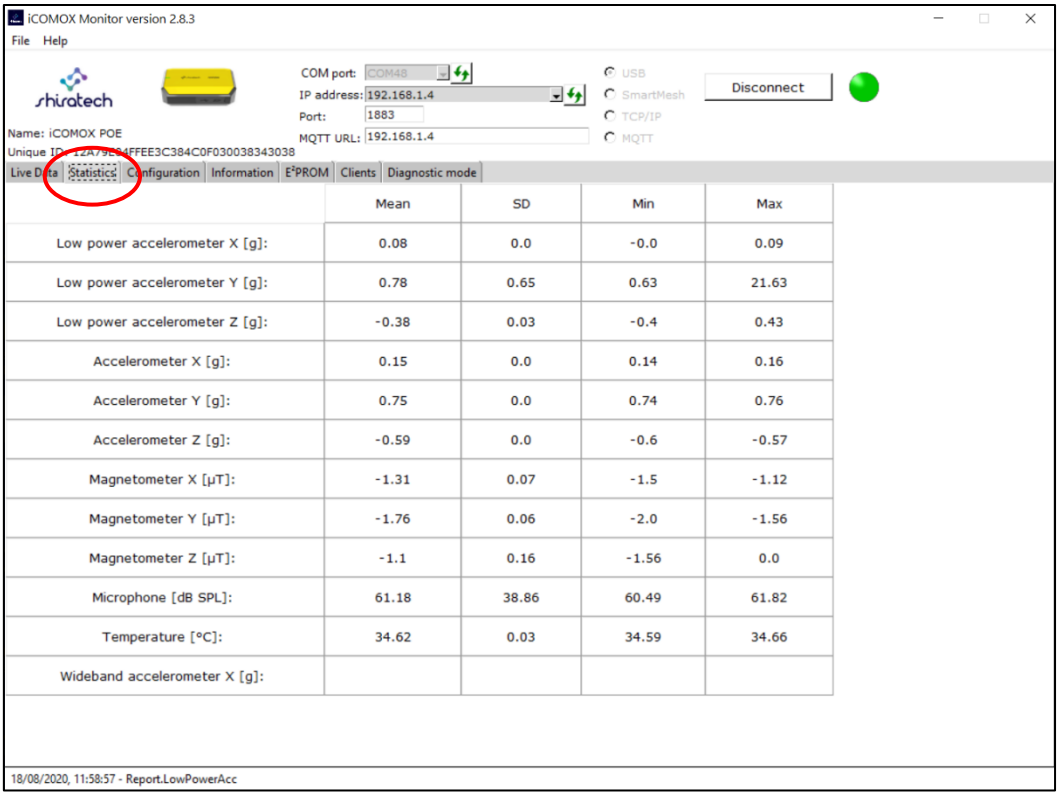
Figure 69: Monitor Live Data View

The Live Data view provides a live display of the collected data as well as anomaly detection algorithm configuration and display. The following data are displayed:

- Axis selection.
- Vibrations Spectrum (from both analog and low power accelerometers).
- Magnetic Field Spectrum, including noise floor estimator.
- Tachometer - Displays the motor speed, calculated by sensing the variations in the motor's magnetic field.
- Acoustic Spectrum.

14.2.1.2 Statistics View

The Statistics view displays live statistical information extracted from the acquired sensor data. The information for each axis is presented separately. For each sensor and axis, the table displays its mean value, standard deviation, minimum and maximum values. All values are calculated since the last connect event.



	Mean	SD	Min	Max
Low power accelerometer X [g]:	0.08	0.0	-0.0	0.09
Low power accelerometer Y [g]:	0.78	0.65	0.63	21.63
Low power accelerometer Z [g]:	-0.38	0.03	-0.4	0.43
Accelerometer X [g]:	0.15	0.0	0.14	0.16
Accelerometer Y [g]:	0.75	0.0	0.74	0.76
Accelerometer Z [g]:	-0.59	0.0	-0.6	-0.57
Magnetometer X [µT]:	-1.31	0.07	-1.5	-1.12
Magnetometer Y [µT]:	-1.76	0.06	-2.0	-1.56
Magnetometer Z [µT]:	-1.1	0.16	-1.56	0.0
Microphone [dB SPL]:	61.18	38.86	60.49	61.82
Temperature [°C]:	34.62	0.03	34.59	34.66
Wideband accelerometer X [g]:				

Figure 70: Monitor Statistics View

14.2.1.3 Configuration View

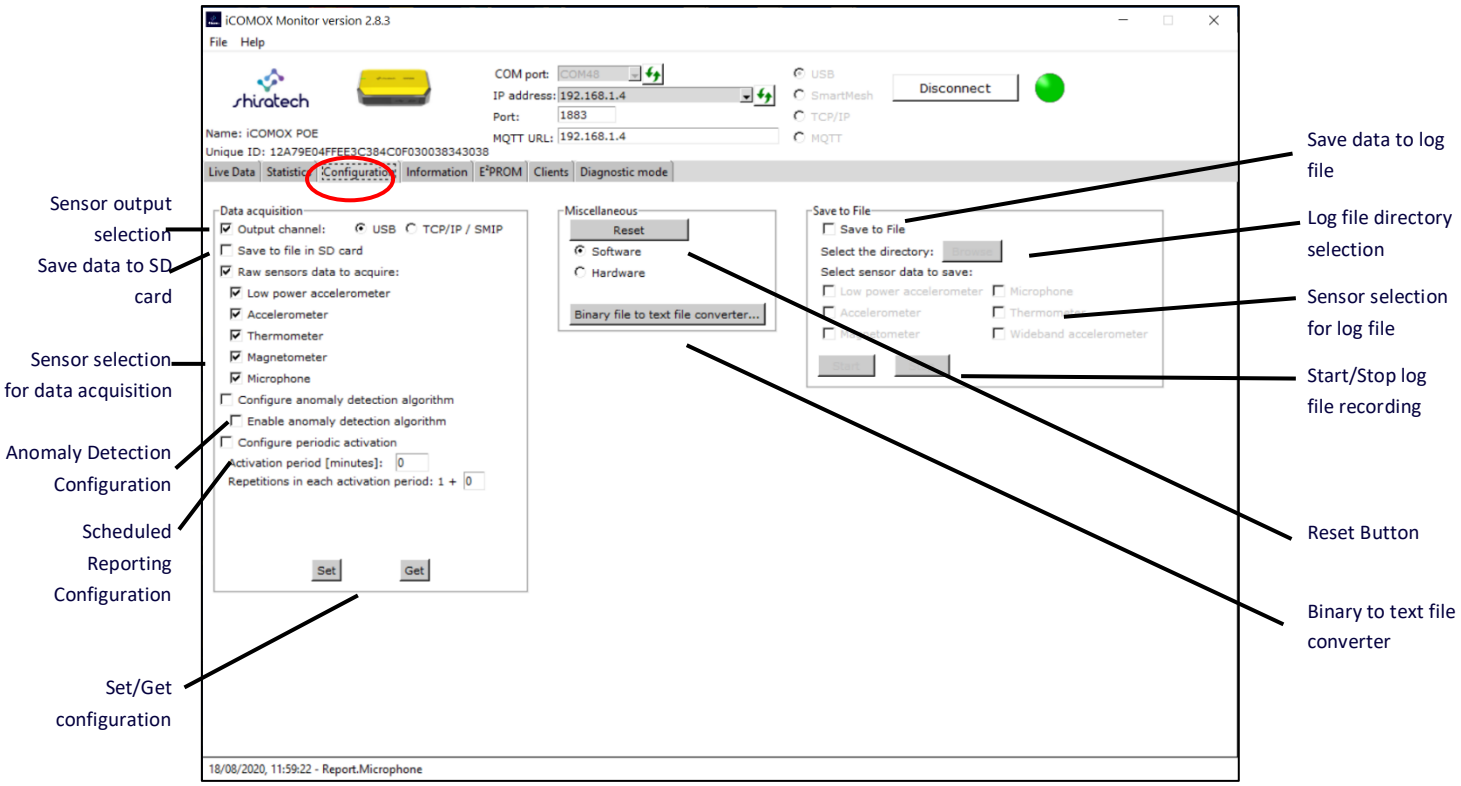


Figure 71: Monitor Configuration View

The Configuration View displays the following three main functional areas:

- Data Acquisition:
  - Output channel selection – USB or Auxiliary (TCP/IP / SMIP).
  - Raw data mode sensor selection for data acquisition and display in the Main Window.
  - Save data to SD card – Refer to the SD Card chapter.
  - Anomaly detection – enables the use of anomaly detection algorithm (configured and displayed in the Live Data tab) – Refer to the Anomaly Detection chapter.
  - Configure periodic scheduled reporting – Set the iCOMOX POE to transmit a fixed amount (repetitions) of selected sensors samples, every certain amount of minutes (activation period).
  - Set – Send a set configuration command to the iCOMOX, to have it configured in accordance with the selected checkboxes.
  - Get – Read and display the iCOMOX current configuration.
- Save to File - Enables saving currently acquired live sensor data into a log "xlsx" file.
  - Select the directory – choose the path on your PC for the data file to be saved.
  - Select sensor data to save - Select which sensors data should be saved to the data file.
  - Start/stop log file recording.

Note: After selecting the Save to File option, the directory for file storage must be specified by clicking Browse button. Afterwards, the required sensor data to be saved into the log file must be selected. Once this has been done, the user can click the "Start" button at any time, while the iCOMOX is connected, to start the data recording. When the user presses the "Stop" button, the system stops recording the data and saves the log file in the specified directory.

- Miscellaneous:
  - Reset – sends a hardware or software reset command to the iCOMOX. Software reset resets the iCOMOX by performing a soft reset to the ADUCM4050 MCU. Hardware reset shuts down the circuit's input voltage, then starts it again.

Note: After resetting the iCOMOX using the Monitor Reset button, to complete the reset action it is necessary to:

- In USB mode - click 'Disconnect' and then 'Connect'.
- In TCP/IP mode – re-select the iCOMOX POE client from the client table.

  - Binary file to text file conversion – Converts the binary data file to readable text format.

14.2.1.4 Information View

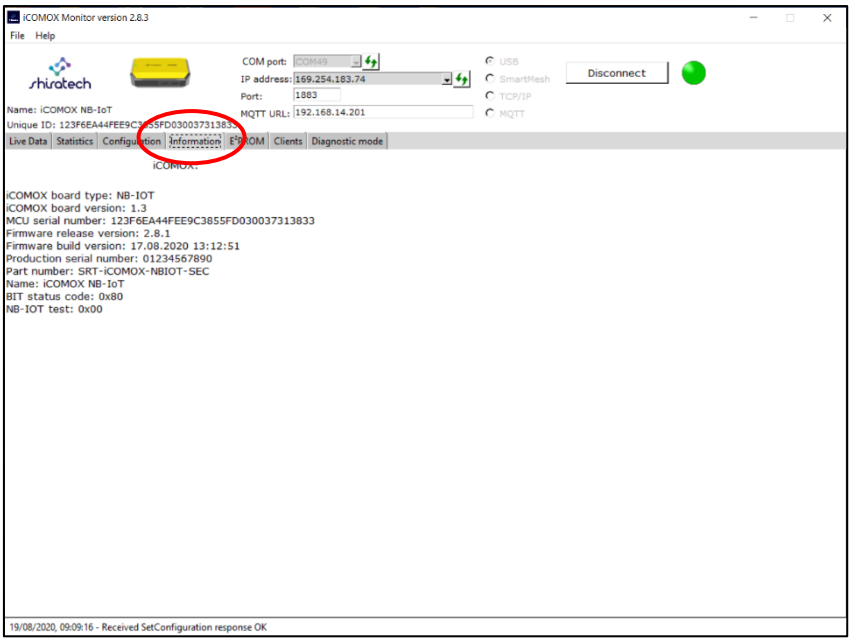


Figure 72: Monitor Information View

The Information View displays the following data:

- iCOMOX hardware information:
  - Type/Edition.
  - Board revision.
  - MCU serial number (which also serves as the Unique ID).
- iCOMOX firmware information:
  - Firmware release version.
  - Firmware build version.
  - Production serial number.
  - Part number.
- Name – User configurable string, describing the iCOMOX client.
- BIT status code – Built-in test result.
  - 0x00 means that all components passed the test successfully. Other status codes represent sensors that did not pass the test (in such case, please refer to the Troubleshooting section).

14.2.1.5 EEPROM View

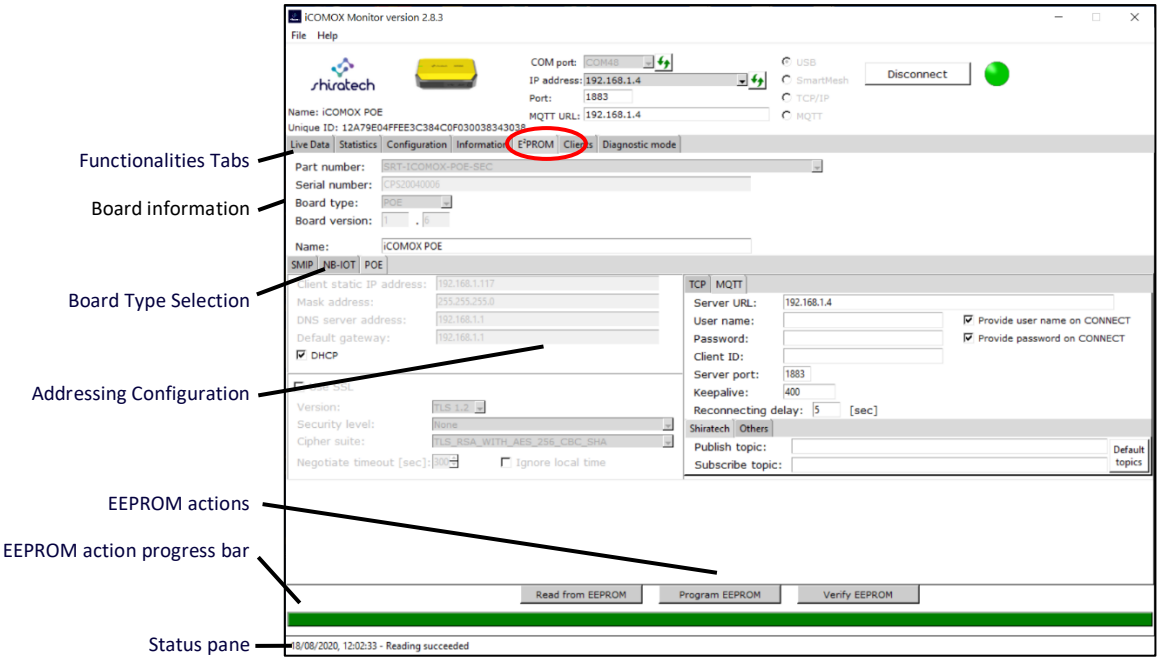


Figure 73: Monitor EEPROM View

The Configuration View displays the following functionalities:

- Part number text field (read only) – displays the part number.
- Serial number (read only) – displays the connected iCOMOX POE unique serial number.
- Name (r/w) – Allows the user to set the iCOMOX with a custom identification string (for example, “Water pump A floor 2”).
- Board type (read only) – displays the iCOMOX board type: NBIOT/SMIP/POE.
- Board revision (read only) – displays the board revision.
- Client static IP address – Configures a static IPv4 for the iCOMOX client within the LAN.
- Mask address – The IPv4 mask address of the LAN in which the iCOMOX and the PC running the iCOMOX Monitor reside.
- DNS server address – The IPv4 address of the DNS server (used if the URL field is not an IP address).
- Default gateway – The IPv4 default gateway of the LAN in which the iCOMOX and the PC running the iCOMOX Monitor reside.
- DHCP – Check to automatically acquire the fields above the DHCP checkbox by the nearby router or DHCP server.
- Server URL (r/w) – The URL or IPv4 address of the machine running the iCOMOX Monitor (TCP), or of the machine running the MQTT broker (MQTT).

- Server port (r/w) – The listening port number on the machine running the iCOMOX Monitor (TCP) or the MQTT broker (MQTT). Integer 1024-65535.
- Delay before connecting [sec] – A delay in seconds between each re-connection attempt. Integer 0-255.
- Shiratech/Others tab – Only 'Shiratech' is currently supported. It means that the same API and protocol used in other modes (TCP/IP and USB) is used here over MQTT. For more details about the API please refer to the SDK document.
- Publish topic – The iCOMOX will publish to this topic. Leaving this field blank will automatically set it to the default: "iCOMOX/<Unique ID>/IN
- Subscribe topic – The iCOMOX will listen for incoming messages from this topic. Leaving this field blank will automatically set it to the default: "iCOMOX/<Unique ID>/OUT
- Read EEPROM button – Clicking this button will display the settings already programmed to the EEPROM in the text corresponding text fields.
- Default topics – Presents the default topic strings in the publish topic and subscribe topic fields.
- Program EEPROM button – Clicking this button will result in programming the settings inserted in the text fields to the EEPROM.
- Verify EEPROM button – Clicking this button will perform a comparison between the settings written in the text fields, and the settings programmed to the EEPROM, and display success/failure in the status bar.

14.2.1.6 Clients View

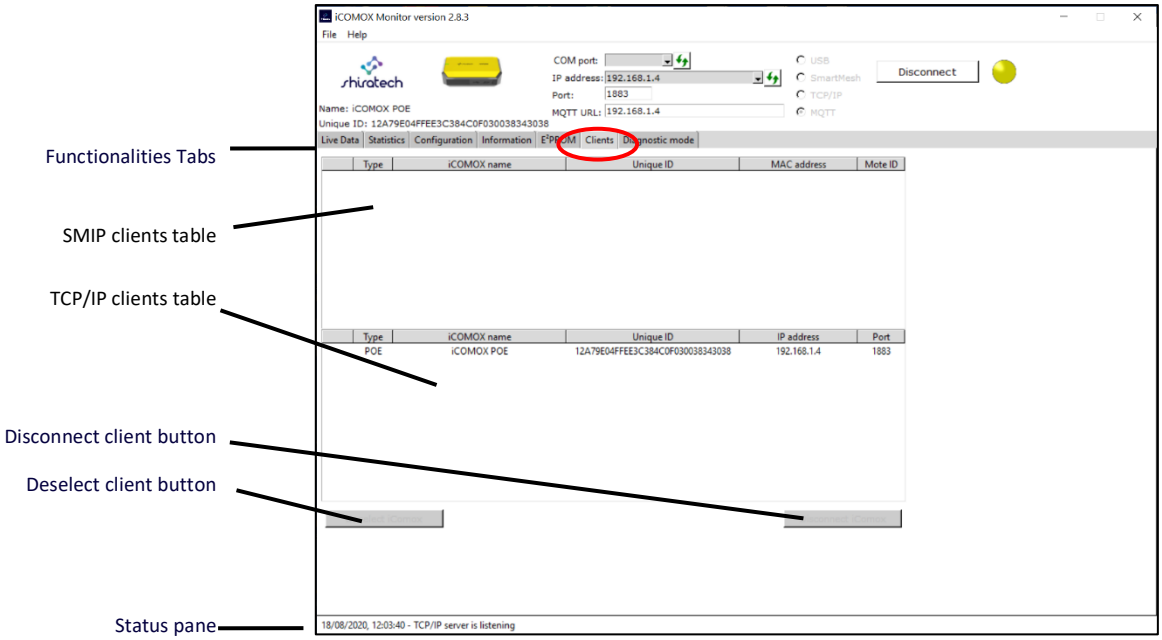


Figure 74: Monitor Clients View

- Client table – Displays the list of iCOMOX clients currently connected to the TCP/IP server.
    - Type – SMIP/NB-IOT/POE
    - iCOMOX Name – User configurable string, for example: “POE Roof, Antenna motor”
    - Unique ID – A factory programmed ID, unique to each individual iCOMOX board.
    - IP address + Port – Shows the remote IP address and port of an iCOMOX client.
    - MAC address – The MAC address of the iCOMOX-SMIP radio.
    - Mote ID – A temporary identification number for the iCOMOX SMIP. May be changed with each connection the SMIP network.
- Deselect client button – Stops the selected iCOMOX live data from being displayed in the Live Data view. Once clicked, get/set commands from the configuration tab will no longer apply.
- Disconnect client button – Disconnects the iCOMOX client from the TCP/IP server. Has the same implications as the Deselect buttons with the addition of causing the iCOMOX POE/NB-IoT to re-connect to the TCP/IP server, and causes the iCOMOX-SMIP to reconnect to the dongle.

14.2.1.7 Diagnostic mode View

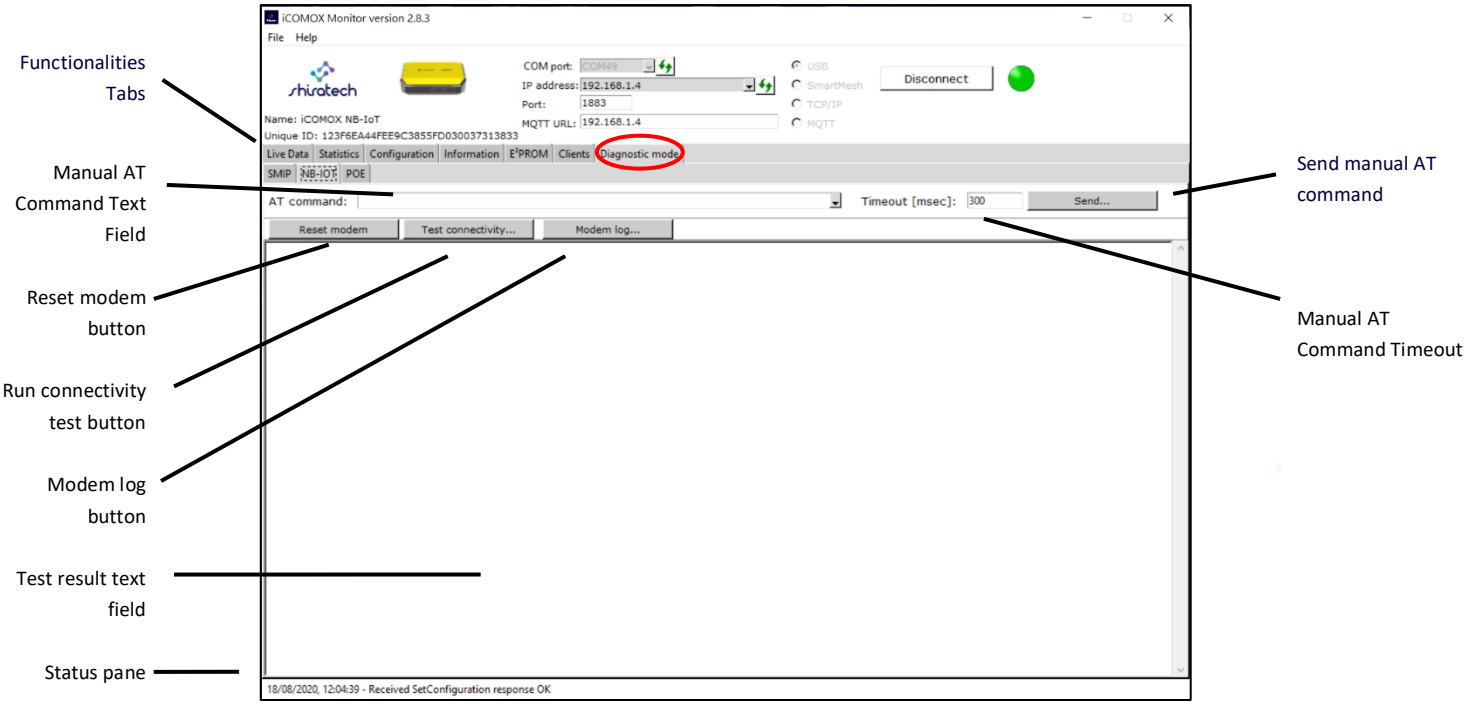


Figure 75: Monitor Clients View

Diagnostic mode is used to investigate TCP/IP connectivity issues with the iCOMOX NB-IoT, and gain information regarding the BG96 configurations and connection status.

To use Diagnostic mode or Modem log, you must connect to the iCOMOX via the USB-C connection, with the 'Raw sensors data to acquire' checkbox un-checked. After connectivity test was finished, to continue using the iCOMOX, it is necessary to reset the iCOMOX.

CAUTION: Do not use Diagnostic mode, or click any of this view buttons while connected via TCP/IP. Doing so will result in losing connection with the iCOMOX. In such case, connection can be restored only by physically accessing the iCOMOX and resetting it manually using the slide switch.

- Test connectivity – Shifts the iCOMOX into a connectivity test mode. The iCOMOX will send a series of AT commands to the BG96. The commands responses provide useful information in case of connectivity problems. The test duration may reach up to 15 minutes.
- Modem log – Outputs the AT command responses while the BG96 is performing its normal AT command sequence. To obtain meaningful insights from it, it is recommended to configure the EEPROM to connect to a Monitor running on a different PC than the one where the Monitor with the Modem log feature is running.
- Reset modem – Stops the normal operation of the iCOMOX and resets the BG96 (lasts about 10 seconds). Manual sending of AT commands is only possible after resetting the modem.

- Send… - Sends the AT command currently entered in the AT command text box, with a timeout in milliseconds as entered in the timeout text box. The command response should only be expected after the timeout has passed. Can only be used after reset was clicked.
- Timeout (msec) – The number entered in this field dictates the timeout in milliseconds which will be waited for the manually sent AT command response.
- AT command – The AT command entered into this text field will be sent by the 'Send…' button.
- Test result text field – AT commands responses will be outputted here.

14.3 Installing the iCOMOX Monitor

To install the iCOMOX Monitor, perform the following steps:

1. Download the iCOMOX installer file from: https://www.shiratech-solutions.com/icomox/
2. Run the installer file (the 'iCOMOX Monitor 2.8.3.msi' file) to launch the installer. The Setup Wizard opens.

Figure 76: iCOMOX Monitor Installer

3. Click Next, and follow the installation instructions.

Figure 77: iCOMOX Monitor Desktop icon

15. Troubleshooting

Problem	Possible Reason	Solution
On USB connection, PC does not recognize the iCOMOX	Missing driver for the FTDI.	Follow the instructions in Appendix A: FTDI VCP Driver.
On USB connection, Monitor does not connect to the iCOMOX. The Colored Status Indicator on the Monitor appears red instead of green after clicking the Connect button.	iCOMOX is not operating.	1. Turn the iCOMOX off and on again. 2. Verify that the Colored Status Indicator on the Monitor is green.
	USB cable is not connected properly.	1. Verify that the USB is connected properly. 2. Close the Monitor, turn the iCOMOX off and on again. 3. Re-launch the Monitor.
	USB cable is damaged.	1. Replace the USB cable. 2. Close the Monitor and turn the iCOMOX off and on again. 3. Verify that the LED is flashing. 4. Re-launch the Monitor.
	Firmware version and Monitor version are not compatible.	1. Download and flash the latest firmware version to the iCOMOX. 2. Download and run the latest iCOMOX Monitor version.
On USB connection, the plots on the Monitor are not updated.	Communication is lost.	1. Try to reconnect by clicking the Disconnect button and then the Connect button on the Monitor. 2. Re-launch the Monitor. 3. If communication is still not re-established, close the Monitor and turn the iCOMOX off and on again.
	Save File to SD Card is checked while no SD card is inserted.	Click disconnect, un-check the Save File to SD Card checkbox, then reconnect.

Monitor does not appear on the screen.	The Monitor requires a great deal of memory.	Wait for the Monitor to appear. It can take up to 40 seconds to appear for the first time.
Monitor COM port drop-down menu is empty. (And the refresh button doesn't help)	USB connection was not recognized by the operating system.	Close the iCOMOX Monitor window, turn the iCOMOX off and then on again.
Monitor Reset button does not reset the connection.	Connection has to be reset manually.	Click the Monitor's 'Disconnect' button, then click 'Connect'.
BIT status code different than 0x00	Built-in test detected a hardware malfunction. Each bit in the status code represents a different sensor.	Contact technical support.
Monitor Information tab does not display the firmware version.	iCOMOX started transmitting information before actually connecting.	1) In the Monitor, click 'Disconnect' and then 'Connect'. 2) Restart the iCOMOX by switching the iCOMOX off and back on.
Error in saving file to SD card.	SD card bad format, or no format at all.	1) Save any existing data on the SD card. 2) reformat the SD card. 3) Re-insert the SD card to the iCOMOX.
	SD card is not inserted.	Insert the SD card.
	Not enough available space on the SD card.	1) Save the information on the SD card. 2) Clean the SD card. 3) Re-insert the SD card to the iCOMOX.
	Read only SD card.	Remove write protection from SD card, or get another SD card.
Program EEPROM failed.	Slow program rate due to sensor data, or SD card checked but no SD card inserted.	Un-check all checkboxes in the configuration tab and try again.

On TCP over NB-IOT connection, Monitor is listening for client connections, iCOMOX NB-IOT is switched on, but connection is not established.	Wrong IP address and port are programmed to the EEPROM.	Connect using the USB-C cable, read EEPROM settings and: 1. Verify that the IP address and port are indeed the server's public IP address, and the port configured for port forwarding in the server's router. 2. Verify that the port was configured for port forwarding in the server's router.
	Wrong IP address and port are selected in the Monitor.	Verify that the IP address and port selected in the Monitor drop-down menu are the same IP address and port configured for port forwarding.
	Port forwarding is not configured in the server's router/NAT device.	Consult your IT services provider and implement port forwarding.
	Wrong APN Settings are programmed to the EEPROM	Connect using the USB-C cable read the EEPROM settings and: 1. Verify that the settings were correctly programmed. 2. Consult your service provider to verify the correctness of the APN settings.
	Varying network conditions and signal quality.	Under certain network conditions, it may take up to 6 minutes for the iCOMOX NB-IOT to connect.
	An unknown error occurred.	Run the connectivity test in the Monitor 'Diagnostic mode' tab. Send the outputted logs to technical support.

On TCP over NB-IOT connection, iCOMOX NB-IOT client is connected via TCP/IP connection, but the plots in the Live Data view are not updated.	Client is not selected in the clients table.	1. Open the Clients tab, and select the client from the clients table, then go to the Configuration tab, select the desired sensors and click on 'Set'. 2. In case the client does not appear in the list, it is possible that the client got disconnected due to network conditions. Please wait for 6 minutes for the client to re-appear on the clients tab.
	Wrong sensors output channel is selected.	In the configuration tab, in the Data Acquisition view, verify that TCP/IP / SMIP radio button is selected under 'Sensors output channel'.
	Save File to SD Card is checked while no SD card is inserted.	Un-check the Save File to SD Card checkbox, then send another 'Set' command.
	An unexpected error occurred. Undefined state.	1. Select the iCOMOX NB-IOT client in the client list and click on the 'Disconnect client' button. 2. Wait for the iCOMOX NB-IOT to re-connect (may take up to 6 minutes). 3. If possible, shut down the TCP server for 2 minutes, then re-launch it and bring it to 'listening for client connections' state, then wait for the iCOMOX to reconnect.

On TCP over Ethernet connection, Monitor is listening for client connections, iCOMOX POE is switched on, but connection is not established.	Wrong IP address and port are programmed to the EEPROM.	Connect using the USB-C cable, read the settings programmed to the EEPROM and: 3. Verify that the IP address and port are indeed the server's public IP address, and the port configured for port forwarding in the server's router.
	Wrong IP address and port are selected in the Monitor.	Verify that the IP address and port selected in the Monitor drop-down menu are the same IP address and port configured for port forwarding.
	iCOMOX is connected on a network external to the Monitor PC's LAN. Port forwarding is not configured in the server's router/NAT device.	Consult your IT services provider and implement port forwarding.
	Wrong subnet mask or default gateway.	Consult your IT services provider
	Another client in the LAN is already using the IP address which was defined as the iCOMOX POE's client's static IP address	1. Try using a different static IP address for the iCOMOX. 2. Try checking the DHCP checkbox in the EEPROM tab, program the EEPROM and reset the iCOMOX, to have the DHCP server assign an IP address to the iCOMOX (consult with your IT services provider to verify that DHCP is properly configured in your LAN).

iCOMOX POE client is connected via TCP/IP connection, but the plots in the Live Data view are not updated.	Client is not selected in the clients table.	3. Open the Clients tab, and select the client from the clients table, then go to the Configuration tab, select the desired sensors and click on 'Set'. 4. In case the client does not appear in the list, it is possible that the client got disconnected due to network conditions. Please wait for 6 minutes for the client to re-appear on the clients tab.
	Wrong sensors output channel is selected.	In the configuration tab, in the Data Acquisition view, verify that TCP/IP / SMIP radio button is selected under 'Sensors output channel'.
	Save File to SD Card is checked while no SD card is inserted.	Un-check the Save File to SD Card checkbox, then send another 'Set' command.
	An unexpected error occurred. Undefined state.	4. Select the iCOMOX POE client in the client list and click on the 'Disconnect client' button. 5. Wait for the iCOMOX POE to re-connect (may take up to 6 minutes). 6. If possible, shut down the TCP server for 2 minutes, then re-launch it and bring it to 'listening for client connections' state, then wait for the iCOMOX to reconnect.

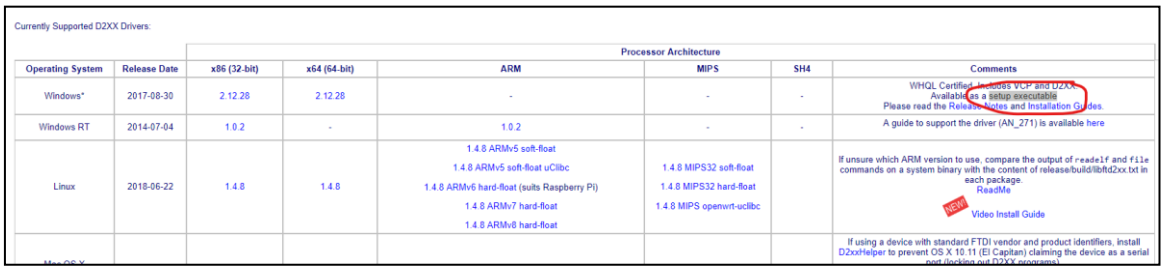
It is not possible to flash the iCOMOX using the flash programmer.	Some unexpected error occurred during the previous flashing (for example, the cable got disconnected while flashing).	1. Go back to the flashing instructions chapter and verify that you have followed the instructions in a precise manner. 2. Verify that the USB cable you are using is not damaged. 3. Perform the instructions in Appendix B – Erasing the flash. 4. Flash the iCOMOX again with the latest firmware according to the instructions.
In SMIP mode, mote does not get recognized by the Monitor for more than one minute.	Possible jamming due to conflicting transmission sources	Verify that no 2.4Ghz transmission sources are near the dongle or the iCOMOX.
iCOMOX Monitor window is too big and does not fit into the screen	Various screen sizes exist.	1. Go to Windows Display Settings (type 'Display Settings' into Start menu). 2. Go to 'Resolution' drop down menu and change the resolution.
Connectivity problems on MQTT		Since the MQTT runs over TCP/IP, refer to the relevant TCP/IP troubleshooting steps.

16. Appendix A: FTDI VCP Driver

VCP drivers allow the iCOMOX monitor (and other applications as well) direct access to the USB device through a DLL file.

To install the driver from FTDI website:

1. Go to https://www.ftdichip.com/Drivers/VCP.htm.
2. Press the setup executable which is often found on the top-right side of the table (see the below figure).



Currently Supported D2XX Drivers:

		Processor Architecture					
Operating System	Release Date	x86 (32-bit)	x64 (64-bit)	ARM	MIPS	SH4	Comments
Windows*	2017-08-30	2.12.28	2.12.28	-	-	-	WHQL Certified. Includes VCP and D2XX. Available as a setup executable. Please read the Release Notes and Installation Guides.
Windows RT	2014-07-04	1.0.2	-	1.0.2	-	-	A guide to support the driver (AN_271) is available here
Linux	2018-06-22	1.4.8	1.4.8	1.4.8 ARMv5 soft-float 1.4.8 ARMv5 soft-float uClibc 1.4.8 ARMv6 hard-float (suits Raspberry Pi) 1.4.8 ARMv7 hard-float 1.4.8 ARMv8 hard-float	1.4.8 MIPS32 soft-float 1.4.8 MIPS32 hard-float 1.4.8 MIPS openwrt-uclibc		If unsure which ARM version to use, compare the output of `readelf` and `file` commands on a system binary with the content of release/build/libftd2xx.txt in each package. ReadMe NEW! Video Install Guide
Mac OS X							If using a device with standard FTDI vendor and product identifiers, install D2xxHelper to prevent OS X 10.11 (El Capitan) claiming the device as a serial port (locking out D2XX programs)

Figure 53: Setup executable FTDI D2XX driver

17.Appendix B: Erasing the Flash

In case, for some reason, it is no longer possible to flash the iCOMOX, as a last resort, you may attempt to erase the flash.

Note: Before moving forward to erasing the flash, be sure to have carefully read the regular flashing instructions, and verify that you have correctly followed these instructions.

1. Download the CrossCore Serial Flash Programmer utility from this link.
2. Install and run the CrossCore Serial Flash Programmer utility.
3. Select the same settings as in the below screenshot:

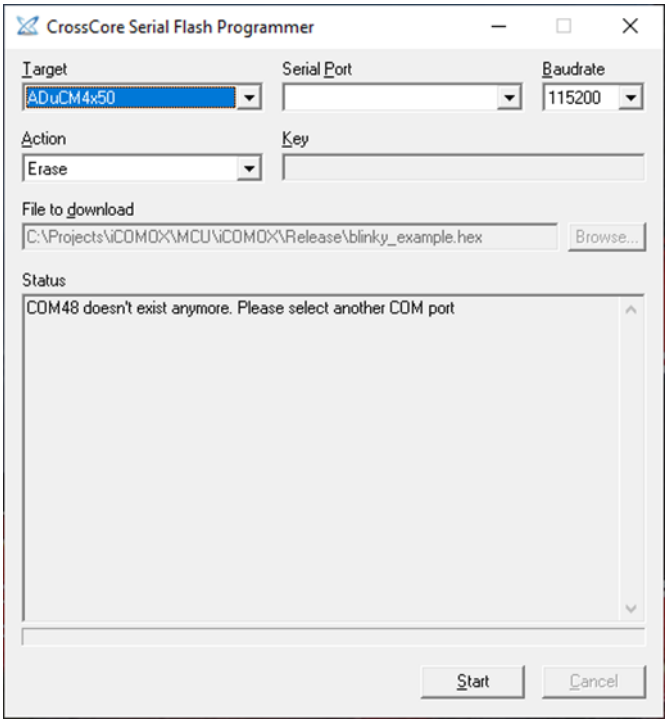


Figure 54: CrossCore Serial Flash Programmer settings selection.

4. Make sure to select the correct Serial Port which the iCOMOX is connected to.
5. Perform the same button pressing sequence described in the flashing instructions.
6. Perform the erasing action by pressing ‘Start’.
7. Once erasing is completed, you are ready to flash the iCOMOX again with the latest firmware.

18. Appendix C: Mosquitto MQTT Broker

Mosquitto is an open source MQTT broker. To setup the Mosquitto broker on your PC, and connect the iCOMOX using this broker, please follow the instructions below:

1. Download and install the Mosquitto broker from the Mosquitto project download page. Make sure that it is installed as a broker/server.
2. Go to the Mosquitto installation folder (Typically "Program Files\Mosquitto"), and open the Mosquitto.conf file with a text editor in administrator mode. Alternatively, you may copy the file to a path outside of "Program Files", edit it there (without administrator mode), then paste it into the Mosquitto installation folder to overwrite the existing file.
3. To enable communication with the Mosquitto broker, you will have to change a few default settings. Go to line 374 of the .conf file.

```
# ================================================================
# Extra listeners
# ================================================================

# Listen on a port/ip address combination. By using this variable
# multiple times, mosquitto can listen on more than one port. If
# this variable is used and neither bind_address nor port given,
# then the default listener will not be started.
# The port number to listen on must be given. Optionally, an ip
# address or host name may be supplied as a second argument. In
# this case, mosquitto will attempt to bind the listener to that
# address and so restrict access to the associated network and
# interface. By default, mosquitto will listen on all interfaces.
# Note that for a websockets listener it is not possible to bind to a host
# name.
# listener port-number [ip address/host name]
listener 1883 192.168.1.4
```

4. If commented, uncomment the line and change the IP to your PC local IP address. You may acquire your PC local IP by opening the Command Prompt, and typing "ipconfig". Typically, you would want to use the address from the line "IPv4 Address. . . . . : 192.168.1.4". Make sure you look at the address at the correct interface, i.e. Ethernet/Wi-Fi. You may also change the port number but make sure not to remove it completely from this line.
5. In the command prompt, navigate to the Mosquitto installation folder, and type:
   mosquitto.exe -c mosquitto.conf -v
   The Mosquitto broker will start.

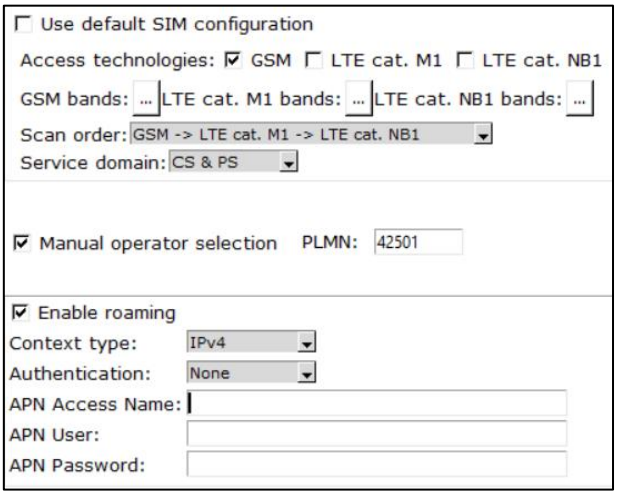
   The -c flag instructs the Mosquitto to read configurations from the .conf file, and the -v (verbose) flag makes the Mosquitto log get printed to the command prompt.

19. Appendix D: E-SIM Configuration

Certain iCOMOX NB-IoT hardware versions contain a Arkessa E-SIM. The Arkessa E-SIM is a hardware component, physically installed on the iCOMOX PCB, eliminating the need to insert a plastic SIM to the iCOMOX. The Arkessa E-SIM installed in the iCOMOX NB-IoT contains a pre-paid data plan, which can be later extended or changed according to changing data consumption needs.

To use the iCOMOX NB-IoT with the Arkessa E-SIM, suitable EEPROM configurations should be performed. Country specific knowledge of locally supported operators and technologies is required in order to perform these configurations:

- 'Use default SIM configuration' must be un-checked.
- 'Pick Access technologies' must be configured to the locally supported technology.
- 'GSM bands' configuration is optional (can speed up the initial network search).
- 'Scan order' should be configured to start with the supported technology selected above.
- 'Service domain' should be selected according to the local provider instructions (it is usually 'CS & PS').
- 'Manual operator selection' should be checked, and the supported operator's PLMN should be typed in the corresponding text box.
- 'Enable roaming' must be checked. The Arkessa E-SIM operation is, by definition, roaming.
- 'Authentication' should be selected according to the local operator's definitions.
- 'APN' settings fields should be selected according to the local operator's definitions.



In case any difficulties occur while trying to configure the EEPROM correctly, please:

1. Run the 'Test connectivity' tool, and save the result log.
2. Email support@shiratech-solutions.com, with detailed description of the configurations, and attached the log from step 1.

The Arkessa E-SIM identifier is typically the ICCID.
To acquire the Arkessa E-SIM ICCID:

1. Connect to the iCOMOX NB-IoT via USB.
2. In the configuration tab, select the USB output channel, un-check the ‘Raw sensors data to acquire’ check box and click on ‘Set’.
3. Go to the ‘Diagnostic mode’ tab.
4. Click on ‘Reset modem’.
5. Type ‘AT+QCCID’ into the ‘AT command’ window, and click on ‘Send…’.
6. The ICCID will be displayed in the text box.

20. Document Revision History

Revision	Date	Author	Status and Description
2.0	30.07.2019		Initial version
2.0	30.08.2019	M Elias	Revision
3.0	12.09.2019	Ori Makover	Re-organization
3.0	15.09.2019	M Elias	Revision
3.1	06.10.2019	Ori Makover	New software release - update
3.2	28.10.2019	Ori Makover	New software release – update
3.3	20.11.2019	Ori Makover	New software release - update
3.4	19.01.2020	Ori Makover	NB-IoT
3.5	07.04.2020	Ori Makover	POE
3.6	22.04.2020	Ori Makover	Unified doc – SMIP/NB-IOT/POE
3.7	14.07.2020	Ori Makover	New software release – 2.8.0
3.8	17.07.2020	Ori Makover	New software release – 2.8.3
3.8	18.08.2020	Kobi de Trenewan	Technical review
3.8	19.08.2020	Ori Makover	Final updates
3.9	07.10.2020	Ori Makover	New software release 2.9.1
3.9	26.10.2020	Ori Makover	E-SIM appendix addition

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