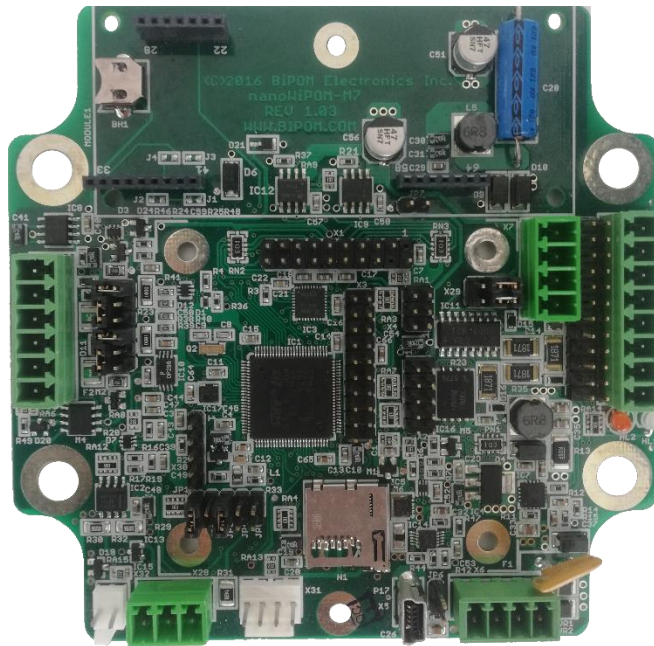# WiPOM Client
User Manual

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All trademarked names in this manual are the property of respective owners.

TABLE OF CONTENTS

1. Introduction

This document describes how to setup and configure WiPOM Client Software and BiPOM Web Portal. WiPOM Client allows monitoring and logging different physical and environmental values like voltages, currents, temperature, humidity, and many others remotely.

WiPOM Client uses either BiPOM's nanoWipom or CloudGate nanoWipom (CG9101-nanoWipom) board as the hardware platform. nanoWipomM7 is a miniature wireless remote monitoring computer based a STM32 Cortex™-M7 processor. CG9101-nanoWipomM3 is the same as regular nanoWipomM7 except that it is designed as a plug-in peripheral card for the CloudGate cellular gateway.

The software includes a Windows WiPOM Client for configuring the system and read the logged data and the BiPOM Web Portal that allows remote access to nanoWipomM7 boards for configuring the system and accessing the logged data.

Windows WiPOM Client features:

- Connect to the device over RS232 serial port, RS485 serial port, or USB
- Read current device configuration, including tags configuration
- Configure device name, date/time, hardware calibration, RS485 port settings
- Check hardware status and health information
- Add/edit/delete tags
- Configure alarm conditions individually for each tag, including SMS and email capability
- Manage contact list for SMS and email support
- Configure conversion parameters for tag value
- Start / stop logger
- Upgrade firmware
- Read collected data, events, and alarms
- Export collected data, events, and alarms to Excel compatible format

Web Portal features:

- Add/edit/delete WiPOM/nanoWipomM7 devices into customer account
- Communicate with device remotely through GSM modem (GPRS)
- Read current device configuration, including tags configuration
- Configure device name, date/time, hardware calibration, RS485 port settings
- Add/edit/delete tags
- Configure alarms conditions individually for each tag
- Configure conversion parameters for tag value
- Start / stop logger
- Upgrade firmware
- Read collected data from device to server database periodically (the period is configurable by user)
- Export collected data, events, and alarms to Excel compatible format
- Read tag's state in real/time
- Draw charts for selected tags

2. Hardware Setup

2.1 Using nanoWipomM7

Before powering, set the jumpers on the nanoWipomM7 as needed for your application. Refer to **nanoWipomM7 User Manual** for the details of jumper settings.

The simplest way to power nanoWipomM7 and communicate with the Windows PC is the mini USB cable.
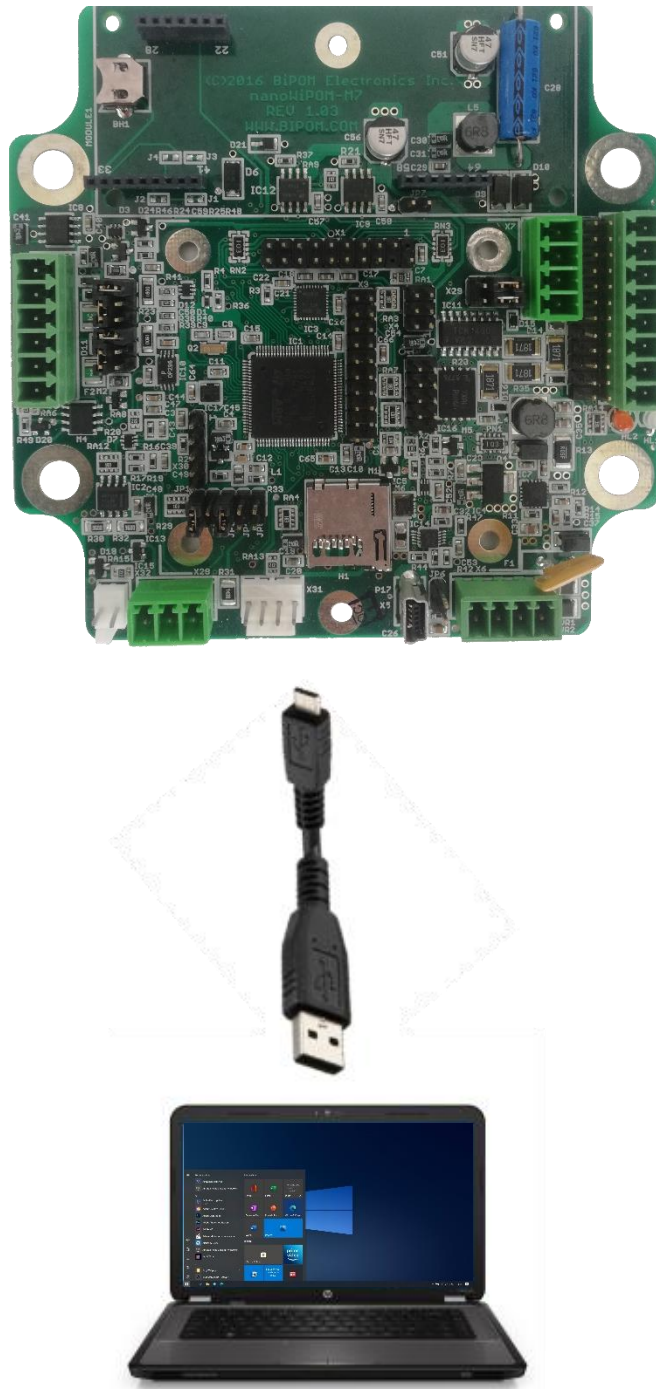
Figure 1 – Power nanoWipomM7 with USB connection

Insert the (optional) MicroSD card and connect the mini USB cable to the USB Device connector:
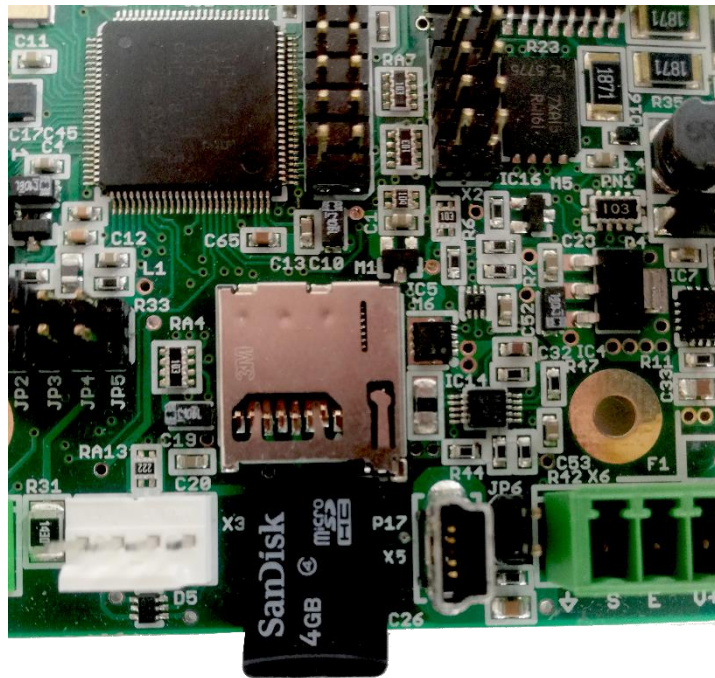
Figure 2 – Inserting MicroSD card

The LEDs should both turn on and then the bi-color LED should remain solid green while the other LED will blink orange. Solid green means the power level is good and nanoWipomM7 is ready for use.

Orange LED shows communications. Blinking **Orange LED** indicates that nanoWipomM7 is trying to establish +communications. Solid **Orange LED** indicates that the communications are established.

If the bi-color LED turns red, this shows a fault. If the bi-color LED turns solid red or blinks red, contact BiPOM Electronics for technical support.

2.2 Using CloudGate nanoWipom (Part#: CG9101-nanoWipom)

Set the jumpers on the CG9101-nanoWipom as needed for your application. Refer to **CG9101-nanoWipom User Manual** for the details of jumper settings.

Insert the (optional) MicroSD card on the CG9101-nanoWipom:
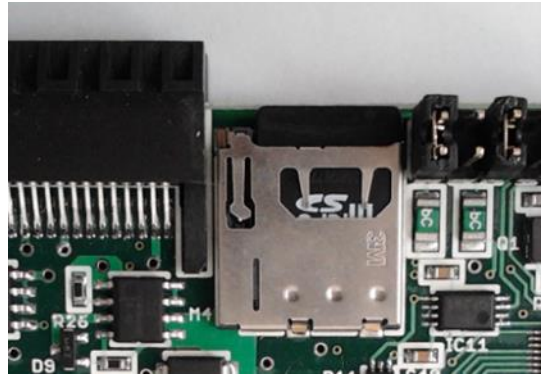
Figure 3 – Inserting MicroSD card

Insert the CG9101-nanoWipom into CloudGate front peripheral slot as shown:
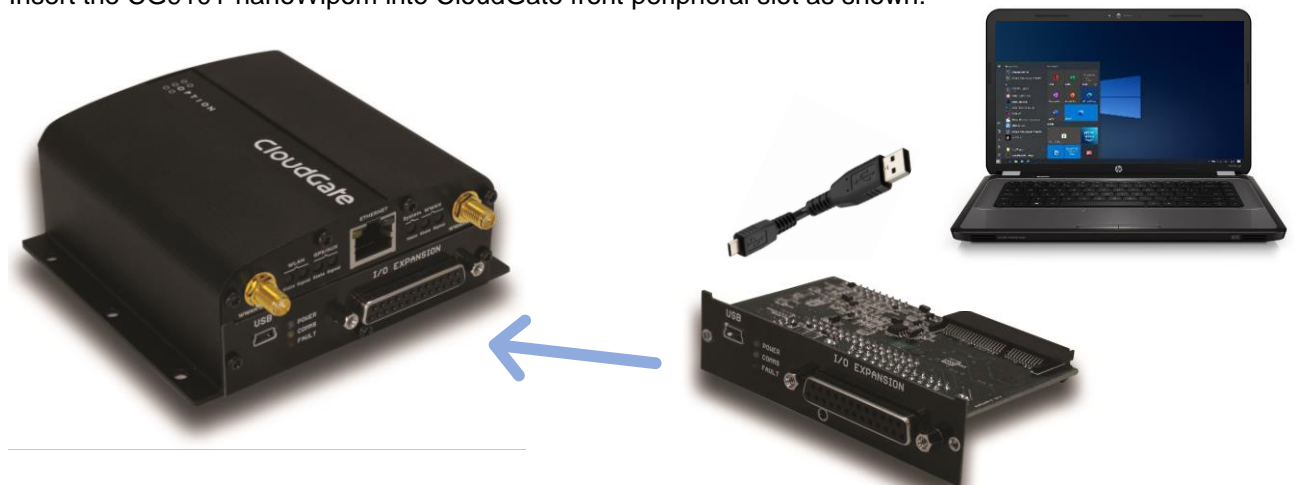
Figure 4 – Inserting CG9101-nanoWipom into CloudGate

Power CloudGate through the power connector using the CloudGate Adapter or any other power source that is capable of powering CloudGate.

The LEDs should both turn on and the **Green LED** should remain solid while the other LED will blink orange.

When power is applied **Green LED** turns ON. **Green LED** shows power status. Solid green means the power level is good and CG9101-nanoWipom is ready for use.

Orange LED shows communications. Blinking **Orange LED** indicates that CG9101-nanoWipom is trying to establish +communications. Solid **Orange LED** indicates that the communications are established.

Red LED shows a fault. If the **Red LED** turns on or blinks, contact BiPOM Electronics for technical support.

3. Software Setup

Download and run the latest WiPOM Client software setup from the BiPOM web site:

http://www.bipom.com/files/wipom/WRTUClientSetup.exe
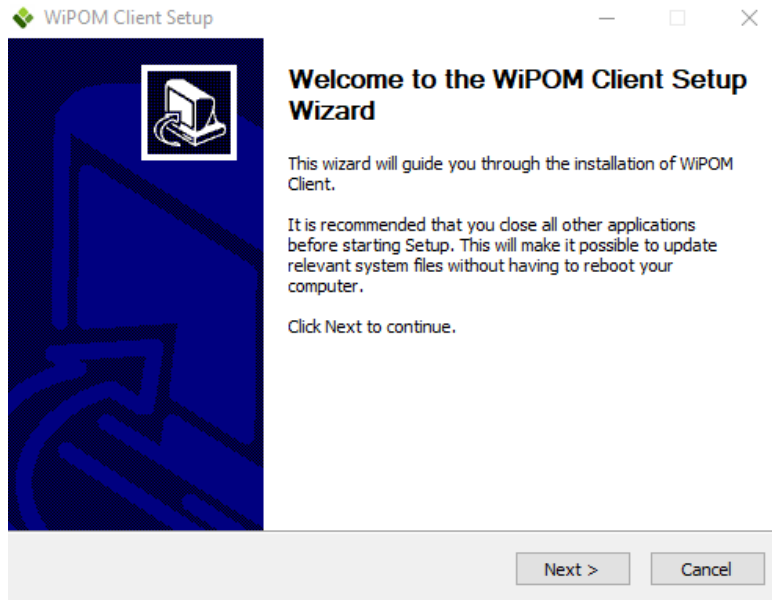
Figure 5 - WiPOM Client software setup window

Click **Next** on the Welcome window.
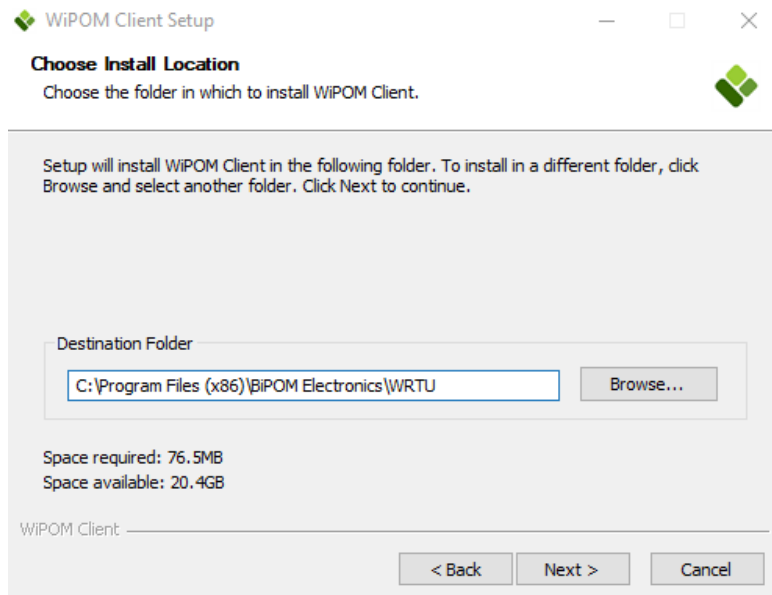
Figure 6 – Choosing to install location

Either use default install location or choose a different location and click **Next**.
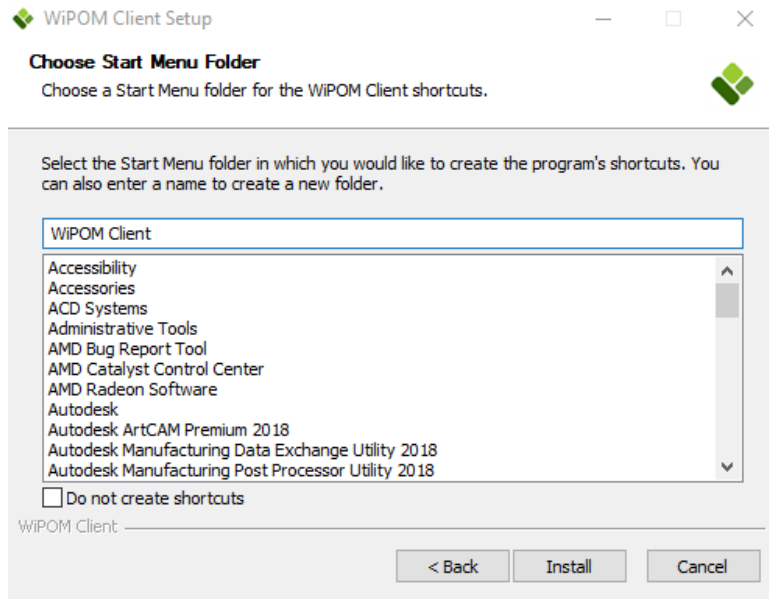
Figure 7 – Choosing start menu folder

Use the default **Start Menu Folder** name and click **Install**.
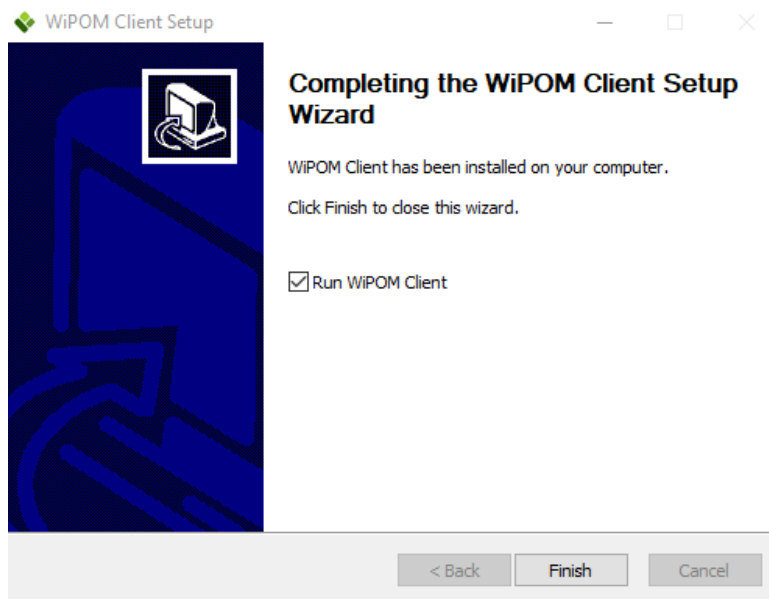
Figure 8 – WiPOM Client setup completing window.

After all, files are installed, the last window of installation has the option to start WiPOM Client after installation is completed. Click **Finish** to complete installation. The WiPOM Client will be installed on your PC.

4. Windows WiPOM Client

4.1 Run WiPOM Client

On Windows 8.1 and 10, open the **Start Menu** and click the **WiPOM Client** icon.

After the WiPOM client starts, then the following screen will appear:
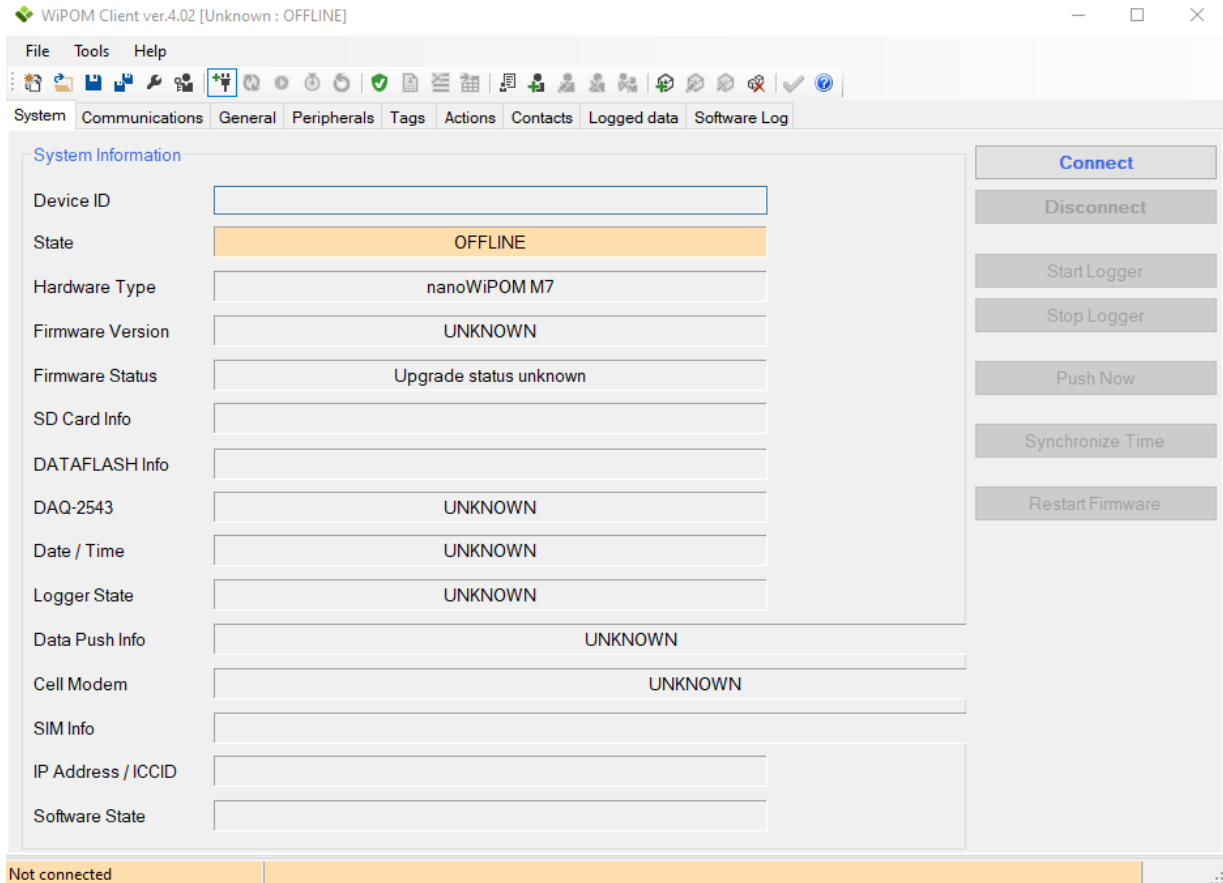
Figure 9 – The main window of the WiPOM Client in OFFLINE state

To run WiPOM Client, the following steps can apply;

1. Powerboard
2. Connect the USB cable from the board to the PC.
3. Click the Connect button on the WiPOM client System tab.
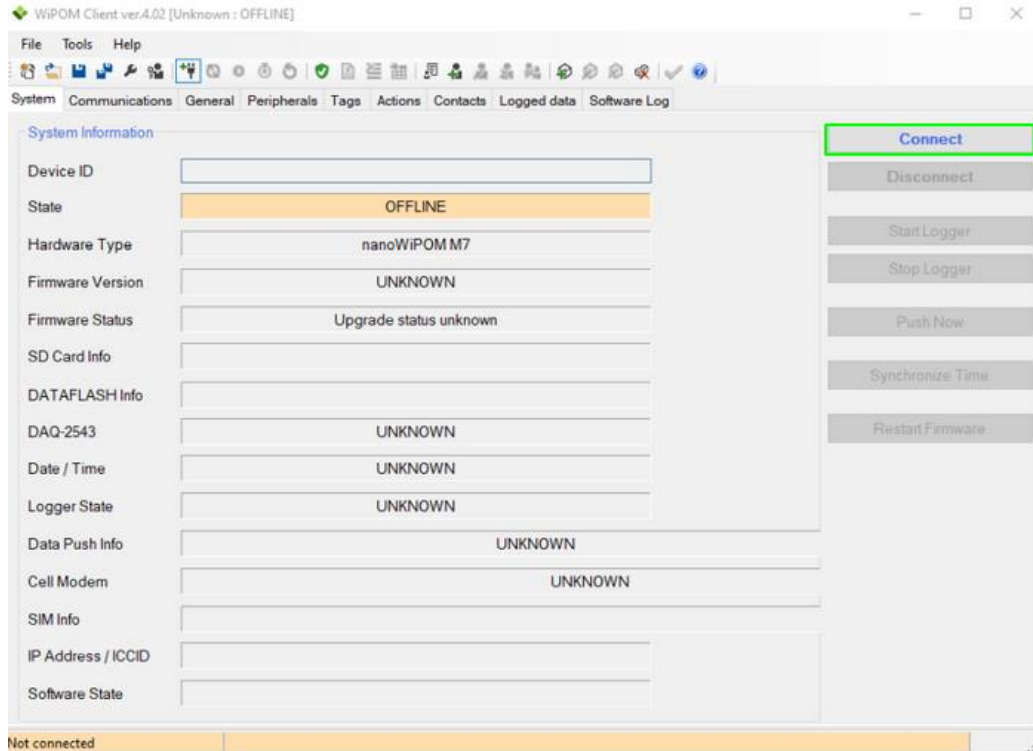
Figure 10 – Connect button in the main screen

Select COM port for USB. nanoWipomM7 USB port appears as a serial (COM) port to Windows. It is typically a higher port number such as COM3.
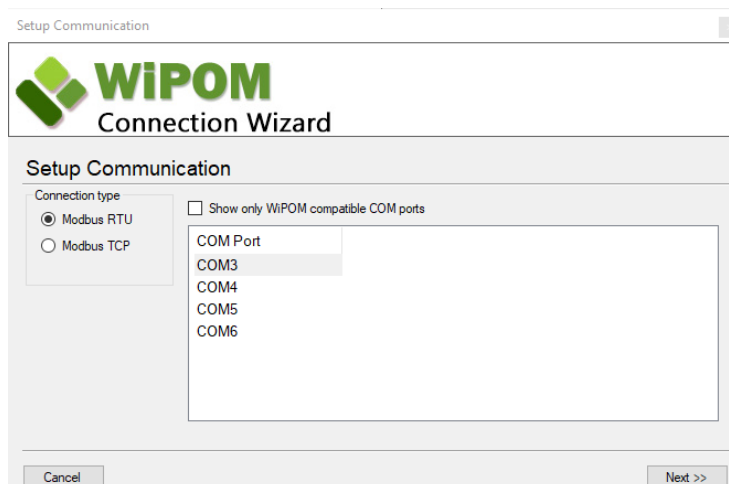
Figure 11 – Selecting COM port window

Click Next.
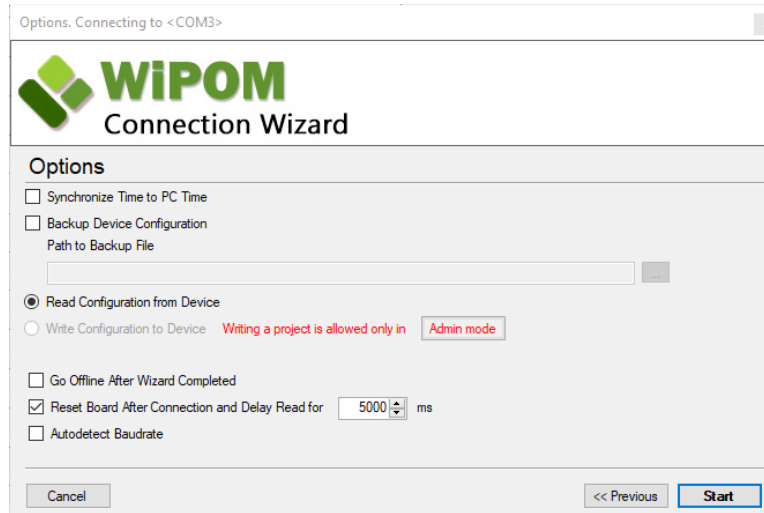
Figure 12 – Set synchronization options

Click Start.
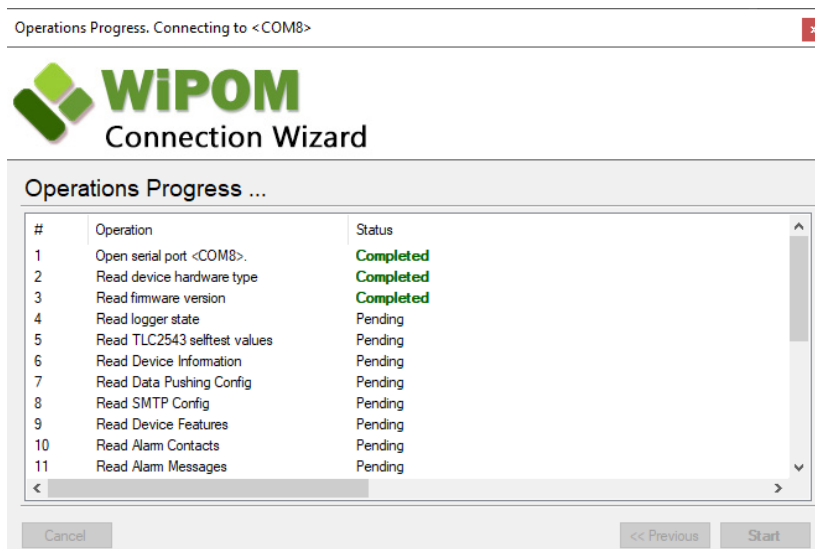
Figure 13 – Synchronization progress window

When software reads all information from the board it will show the status of the device on the main window.
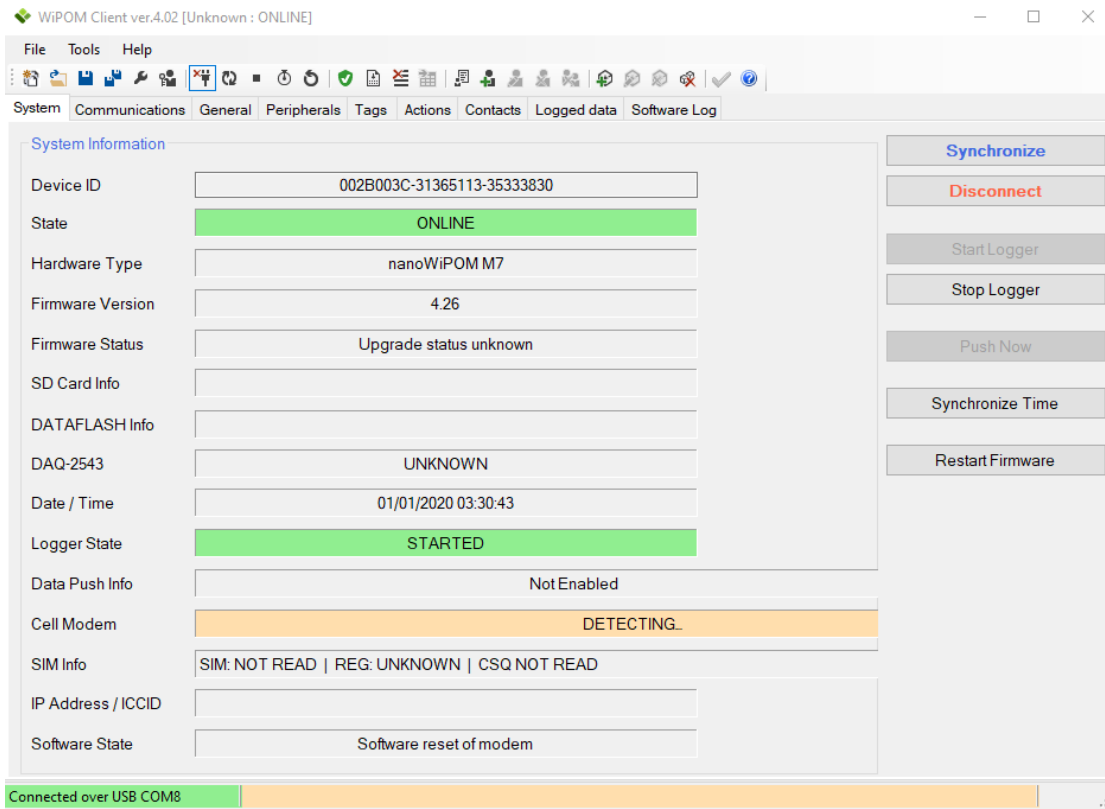
Figure 14 – WiPOM Client in ONLINE state

4.2 File Menu

When the **WiPOM Client** starts, it creates a new project with default values. You can edit and change the project configuration even when the nanoWipomM7 board is not connected to the PC. Any changes can be saved to the Project file. Also, you can load the previously saved project file into **WiPOM Client**.

The **File** menu has all the operations related to project management:

New Project	– The device is determined for the new project
Load Project	– Opens a dialog to select previously saved project file and load it into the WiPOM Client
Save Project	– Saves changes to the project
Save Project As	– Allows saving the project using a different file name
Recent Project	– Opens the last worked projects
Reset Project	– Resets the configuration to its default values
Exit	– Close the WiPOM Client
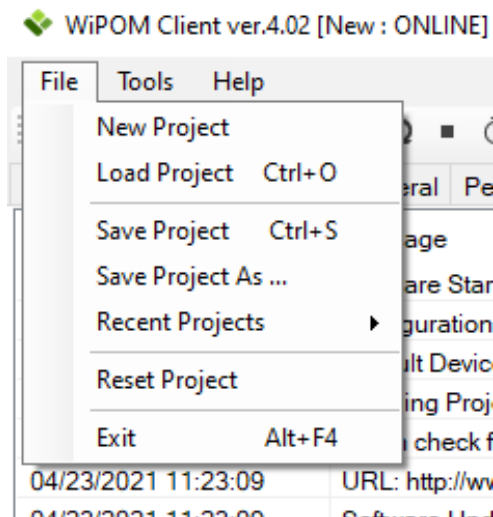
Figure 15 – File menu

Note that the project file does NOT contain and save the following values:

- Status of the logger, modem, peripherals, date/time, firmware version. These values available only when the nanoWipomM7 board is connected to PC and the **WiPOM Client** is in **Online** mode.

- All values from the **Peripherals** tab. These values are hardware-related and available only in **Online** mode.

- Logged data is also not saved.

To save a project:

- Run WiPOM Client
- Make the required changes to the configuration
- Go to the **File** menu and click **Save Project**
- Select the file in opened dialog or enter a new name and click **OK**

To load a project:

- Run WiPOM Client
- Go to the **File** menu and click **Load Project**
- Select the file in opened dialog and click **OK**

To set default values to the project:

- Go to the **File** menu and click **Reset Project**

IMPORTANT: All changes made in the current project will be applied to the board only during connection to the board or when synchronization is started manually using the **Synchronize** button

4.3 Tools Menu

Tools menu has 3 sub-setting menus;
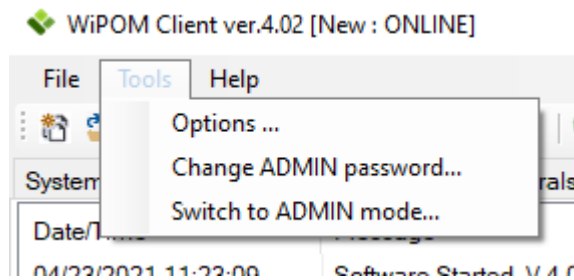
Figure 16 – Tools menu

4.3.1 Options
To change WiPOM Client options do the following steps:

- Run WiPOM Client
- Go to main menu **Tools** and click **Options …**
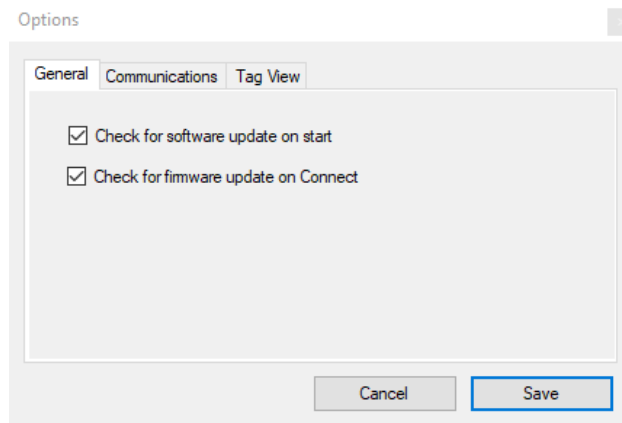
Figure 17 – WiPOM Client Options – General tab

There are 3 tabs and their subsections.

4.3.1.1 General

2 options can be enabled or disabled:

Check for software update on start:

If this option is enabled, then WiPOM Client checks for available updates on BiPOM website every time the WiPOM Client is started.

Check for firmware update on Connect:

If this option is enabled, then the WiPOM Client checks if the firmware on the connected nanoWipomM7 board is older than the firmware available in WiPOM Client setup. If the board has old firmware, WiPOM Client will prompt to upgrade the firmware to the latest one.

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4.3.1.2 Communications

There are 4 configuration setups.
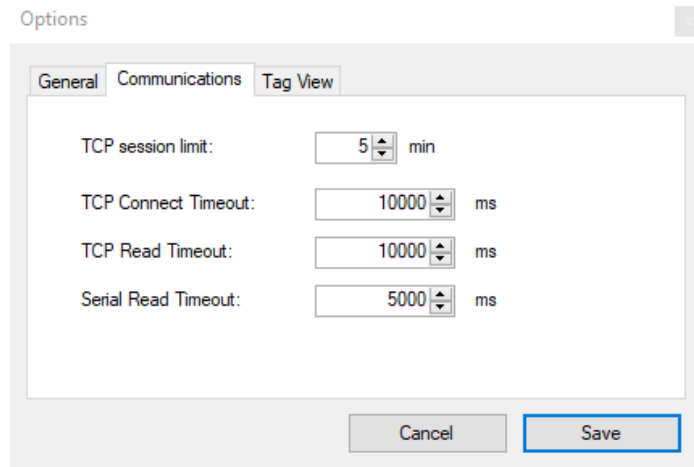
Figure 18 – WiPOM Client Options – Communications Tab

TCP session limit

A single listening port can accept more than one connection simultaneously.

TCP Connect Timeout

TCP specification [RFC0793] defines a local, per-connection "user timeout" parameter that specifies the maximum amount of time that transmitted data may remain unacknowledged before TCP will forcefully close the corresponding connection.

TCP Read Timeout

TCP read timeout; a client hasn't received data from the server after [READ_TIMEOUT] time.

Serial Read Timeout

Gets or sets the number of milliseconds before a time-out occurs when a read operation.

Send the message to the device; Read from the serial port until a response had been received or a timeout occurred.

4.3.1.3 Tag View

12 options can be enabled or disabled;

Name, scan, RTU, address, type, log period(sec.), alarms, holding register, real-time value, holding register value, units, raw value.
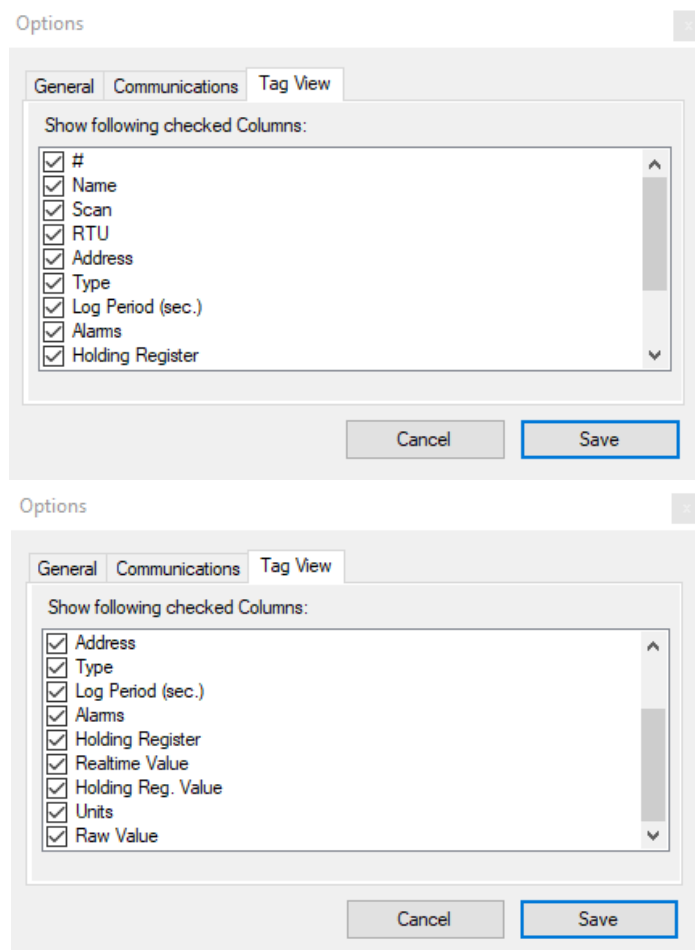
Figure 19 – WiPOM Client Options – Tag View Tab

4.3.2 Change Admin Password

Users can change the Admin Password.
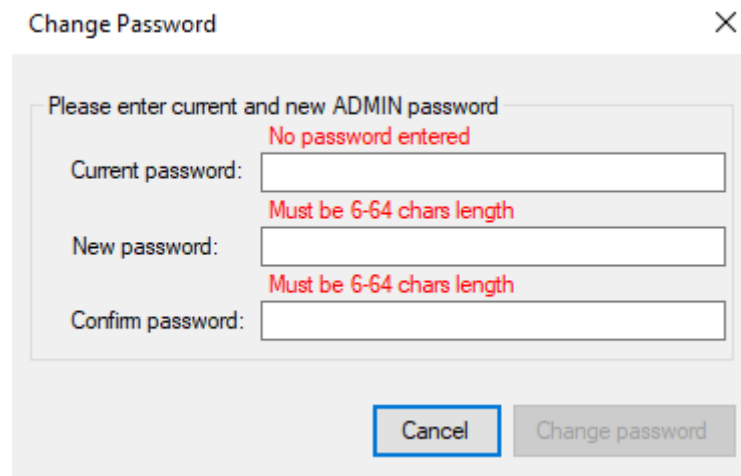
Figure 20 – Change password window

4.3.3 Switch to ADMIN Mode

Users can switch to Admin mode.
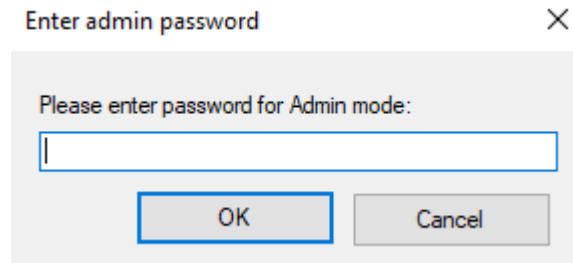
Figure 21 – The password window for Switch the Admin Mode

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4.4 Help Menu

There are 2 sections in the **Help** menu.

4.4.1 About WiPOM Client

To get information about WiPOM Client installed on your PC:

- Run WiPOM Client
- Go to main menu **Help** and click **About …**

Figure 22 – WiPOM Client About Dialog

The main information is **Version** and **Release Date**. This information is helpful for troubleshooting and technical support.

4.4.2 Checking for software updates

By default, WiPOM Client software checks for new updates on every start. This option can be disabled to check for new updates manually. To check for new updates:

- Start WiPOM Client
- Select the **Help** menu and select **Check New Version**

WiPOM Client then accesses BiPOM web site (www.bipom.com) and checks if a new version of WiPOM Client is available. If there is no new version on the web, the following window is shown:
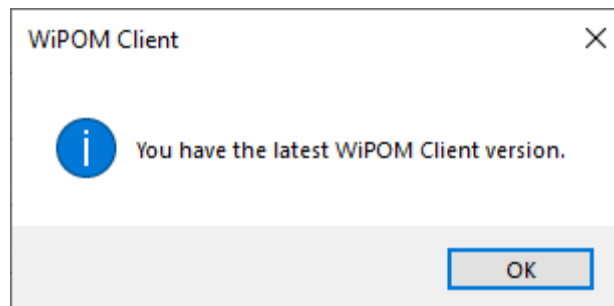
Figure 23 – Window when no software updates available

If a new version of the WiPOM Client exists on BiPOM web, the following window is shown:
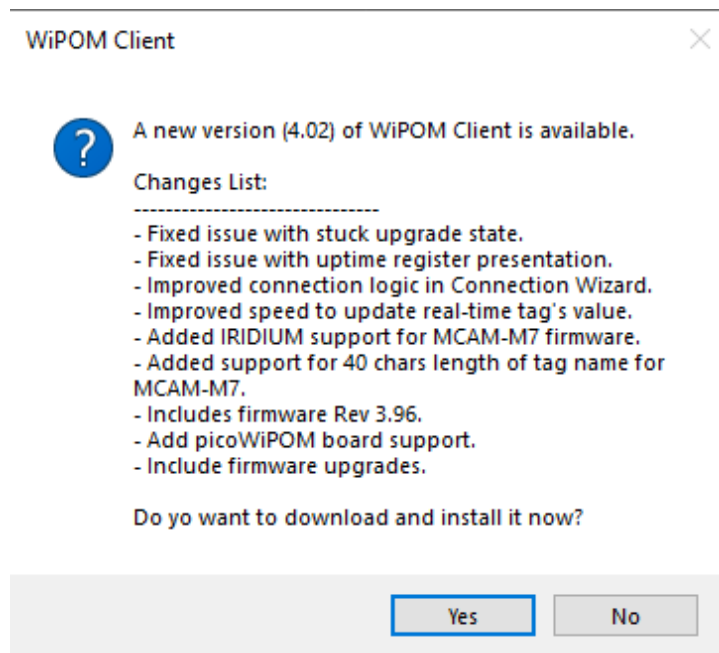
Figure 24 – Window when software updates are available.

If a new version is found, click **Yes,** and the WiPOM Client downloads and installs the new version in the background.

When the download completes, the following window is shown:
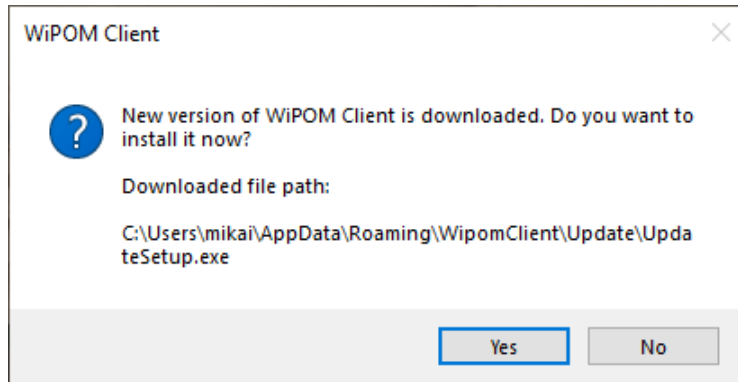
Figure 25 – Warning window when starting the software update.

If you click **Yes,** then the current the **WiPOM Client** software is closed, and all project changes will be saved automatically. If changes are done in the new project, then the software will prompt to select the file where save changes. After this system will start to update the installer.

If you click **No,** then the window is closed, and no further action is taken.

4.5 Toolbar Icons

WiPOM Client has many shortcut icons. In this way, the user can give many commands without entering the menus.

a b c d e f g h i j k l m n o p q r s t u v w x y z

a. New Project
The device is determined for the new project.
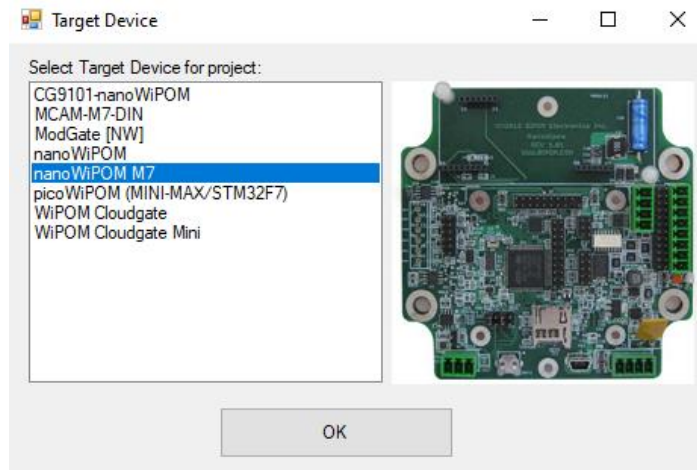
Figure 26 – New Project window

b. Open Project
Opens dialog to select previously saved project file and load it into WiPOM Client.

c. Save Project
Saves changes to the project. All changes in device configuration can be saved as a **WiPOM Project File (.wproj)**. This helps create a configuration once and use it for several devices.

d. Save Project As
Allows saving the project using a different file name.

e. Open Option Window
See section **4.3.1 Options** topic for more information about tag window controls.

f. Switch to ADMIN Mode
Users can switch to Admin mode.

g. Connect/Disconnect
Connect or disconnect to the device.

h. Synchronize
Write current configuration loaded in the client to the connected device.

i. Start/Stop Logger
Start Data Logger on the connected device. This means that the device will watch inputs, log data and generate alarms. Stop Data Logger on the connected device. This means that the device will not watch inputs, so no logged data and no alarms will be generated.

j. Sync Time
Set current PC time to RTC on the device.

k. <u>Restart Firmware</u>
Send command to the device to restart firmware. WRTU Client will be switched to offline mode automatically.

l. <u>Upgrade Firmware</u>
Start firmware upgrading.

m. <u>Read Logged Data</u>
Read all logged records from the device.

n. <u>Erase Logged Data</u>
Erase all logged data on the device.

o. <u>Export Data</u>
Export read records to Excel or CSV (comma-separated value) file.

p. <u>Import Contacts</u>
Imports contacts from an Excel file.

q. <u>Add Contact</u>
Adds a new contact.

r. <u>Edit Contact</u>
Edits the selected contact.

s. <u>Delete Contact</u>
Deletes the selected contacts from the project.

t. <u>Delete All Contacts</u>
Deletes all contacts from the project

u. <u>Add Tag</u>
This button opens Adding New Tags where a new tag can be created and configured.

v. <u>Edit Tag</u>
This button opens Editing Tags where existing tags can be configured.

w. <u>Delete Tag</u>
This button deletes all the selected tags from the project.

x. <u>Delete All Tags</u>
This button deletes all the tags from the project.

y. <u>Apply Changes</u>
Apply all changes of WiPOM Client.

z. <u>Open Help</u>
To get help about WiPOM Client online:

- Run WiPOM Client
- Go to the **Help** menu and click **Online Help**

This will open online help in the default Internet browser.

Online help available at the web address:

http://help.bipom.com/index/4379895.html

4.6 System Information

System information is displayed on the **System** tab. The available actions and presented information depended on the current mode of the **WiPOM Client**. The **System** tab in **Offline Mode** is shown in Figure 15.
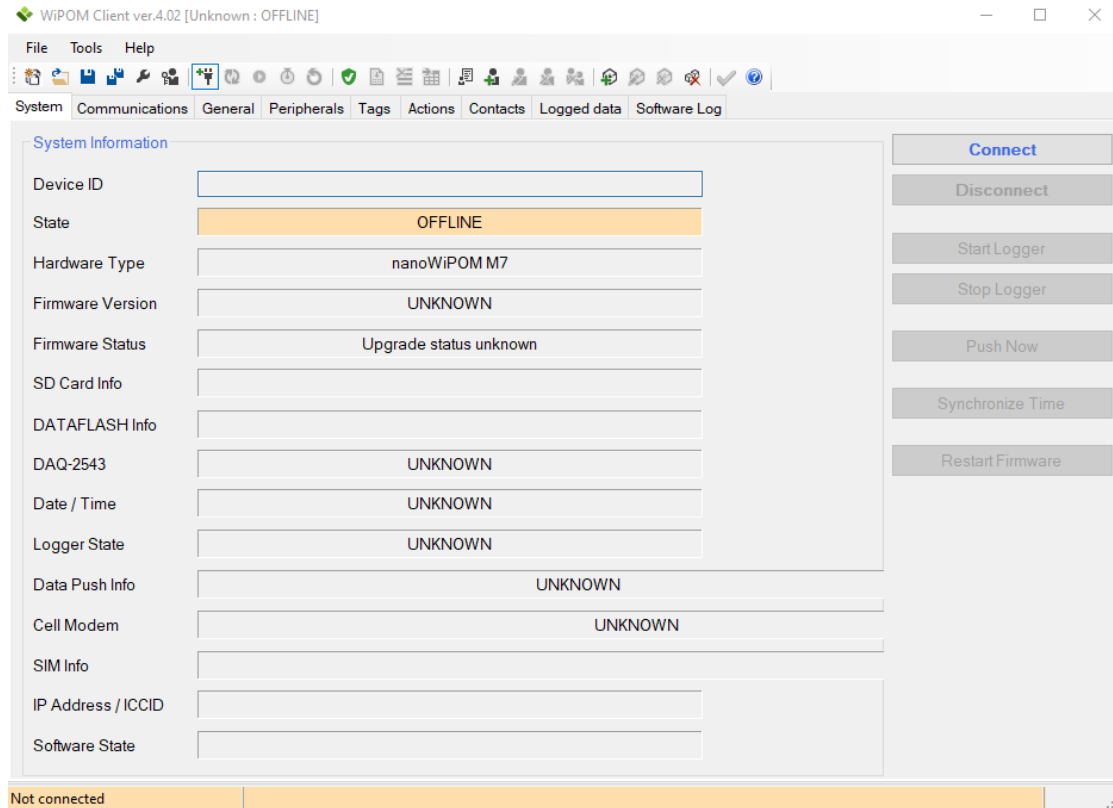
Figure 27 – System tab (Offline Mode)

In **Offline Mode** the only available actions are **Connect** and **Upgrade Firmware …**.

<u>**Connect**</u>
When you click **Connect** button you run **Connection Wizard** which helps connect to the board and switch the client to **Online Mode**.

Also, device information is not available in **Offline Mode**. It will be updated only when **WiPOM Client** will be switched to **Online Mode**.

<u>**Upgrade Firmware …**</u>
When you click **Upgrade Firmware …** button you can select the WiPOM firmware HEX file and upload it to the device.
This will work even when WiPOM Client is not connected to the device.

The System tab in Online Mode is shown in Figure 27:
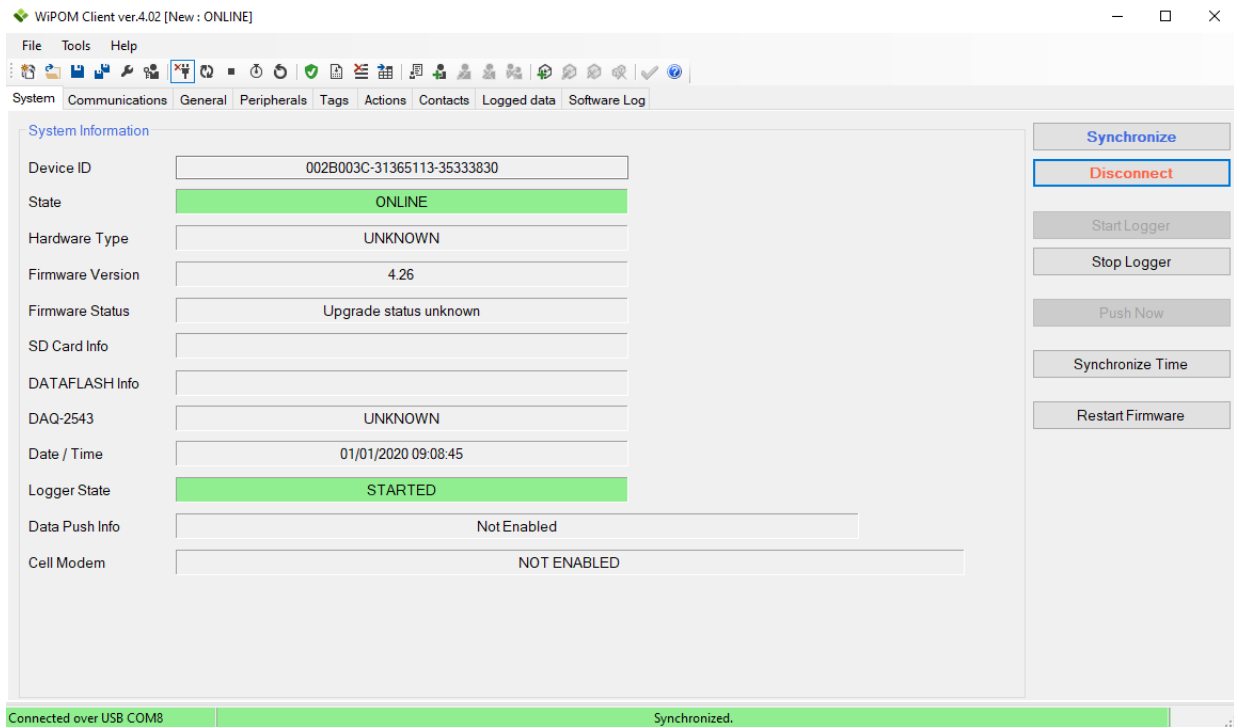
Figure 28 – System tab (Online Mode)

When WiPOM Client changes to Online Mode, the following information is updated:

State

The current state of the **WiPOM Client**: it can be ONLINE or OFFLINE.

ONLINE   – the client is connected to the device

OFFLINE   – the client is not connected to the device

Hardware Type

The board name in hardware setup. Depending on the board, WiPOM client may have different features and capabilities.

Possible values: UNKNOWN, WiPOM, nanoWipomM7, CG9101-nanoWiPOM

UNKNOWN   - hardware type is no. Is shown when client not connected to hardware

WiPOM   - hardware has installed **WiPOM** board

nanoWipomM7   - hardware has installed **nanoWipomM7** board

CG9101-nanoWiPOM   - Cloudgate version of nanoWiPOM

More information about **WiPOM** board: http://www.bipom.com/products/us/4379874.html

More information about **nanoWiPOM** board: http://www.bipom.com/products/us/4357735.html

Firmware Version
The version of the firmware running on the device.

Firmware Status
Each WiPOM Client release also includes the latest firmware binary file. When the Client connects to the device, it checks if the current firmware is an older version.

If so, the Client shows a prompt to upgrade the firmware to the latest version. Possible messages:

Upgrade not required - This means that the device has the latest firmware. The upgrade button will be disabled.

New version is available - This means that the client has a more recent version of the firmware than the one on the device. The upgrade button will be enabled.

> **NOTE:** It is recommended to upgrade to the latest firmware when it is available. **WiPOM Client** may have features available only for the latest firmware. Also, the latest firmware may include bug fixes and other improvements.

DAQ2543
This status field shows information about the **DAQ2543** peripheral board. If firmware detected this board, then the text will be **DETECTED**. If the firmware didn't detect this board, then the text will be **NOT DETECTED/FAILED**.

Cell Modem
This status field shows information about **Cell Modem**. If firmware detected the modem, then the text will be **DETECTED**. If the firmware didn't detect the modem, then the text will be **NOT DETECTED/FAILED**.
Also, it shows the type of detected modem:

WMP50 2G
HE910-D 3G
Unknown (a modem was detected but it is an unsupported model)

Date / Time
This field shows the current date and time from the device and updates this information every second.

Logger State
This status field shows information about the data logger state. The data logger state can be in 2 modes: started and stopped. If the data logger is started, then the device shows the text **STARTED**. Also, when the data logger is stopped it shows the text **STOPPED**.

When **WiPOM Client** in Online Mode it can do the following actions:

Synchronize
Write current configuration loaded in the client to the connected device.

Disconnect
Switch WiPOM Client to offline mode

Start Logger
Start Data Logger on the connected device. This means that the device will watch inputs, log data and generate alarms.

Stop Logger
Stop Data Logger on the connected device. This means that the device will not watch inputs, so no logged data and no alarms will be generated.

Synchronize Time
Set current PC time to RTC on the device.

Restart Firmware
Send command to the device to restart firmware. WiPOM Client will be switched to offline mode automatically.

Upgrade Firmware
Start firmware upgrading.

4.7 Communications Settings

All communications options are grouped on the **Communications** tab:
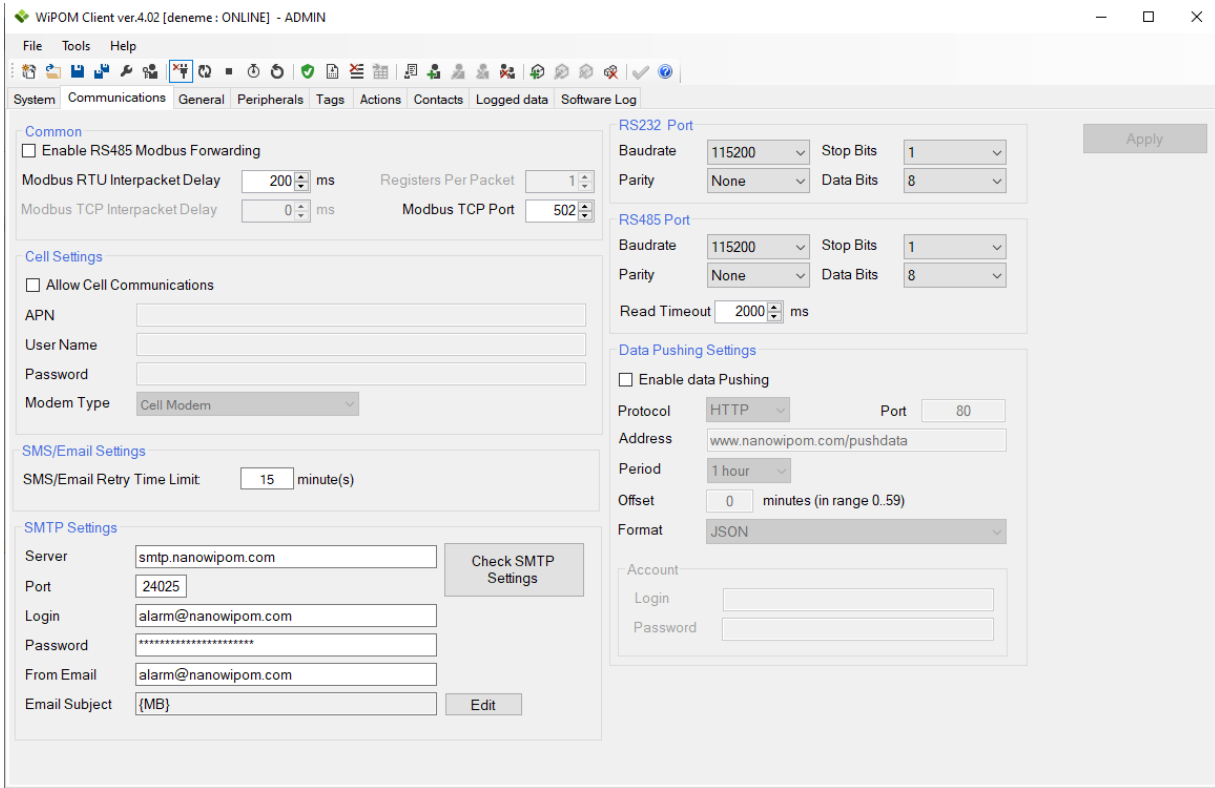
Figure 29 – Communications Settings

Common

On Enable RS485 Modbus Forwarding option can be enabled or disabled.

- Modbus RTU Interpacket Delay
- Modbus TCP Interpacket Delay
- Register Per Packet
- Modbus TCP Port

Cell Settings

Enable/disable cell communications. If this option is disabled, no SMS alarms or requests through GPRS will be processed.

- APN server name. Used for initializing cell modem GPRS internet. This comes from the SIM card plan.
- User Name/Password; These are usernames and passwords required by the APN server. If they are not required, leave these fields blank.
- Modem Type (Cell Modem, Iridium Satellite Modem)

SMS/Email Settings

SMS/Email Retry Time Limit can be set as minute(s).

SMTP Settings

The following information can be edited. After can use the **Check STMP Settings** button.

- Server address
- Port
- Login/Password
- From Email
- Email Subject

RS232 Port

RS232 serial port communication options. This port is used for processing incoming MODBUS requests.

- Baudrate (1200 – 115200)
- Parity (None, Even, Odd)
- Stop Bits
- Data Bits

RS485 Port Settings

RS485 serial port communications options for communicating with other MODBUS devices.

- Baudrate (1200 – 115200)
- Parity (None, Even, Odd)
- Stop Bits
- Data Bits
- Read Timeout

Data Pushing Settings

Enable/Disable data pushing.

- Protocol
- Port
- Address
- Period (1 Hour - 1 Day)
- Offset
- Format

Account

Login and Password can be entered in this section.

IMPORTANT: RS485 and RS232 port settings are applied only after a firmware restart.

4.8 General Settings

<u>**Name**</u>
The device name. Any text up to 31 characters.

<u>**RTU Number**</u>
A number from 1 to 255; is used in MODBUS communication. Only requests with this RTU Number will be processed by the device.
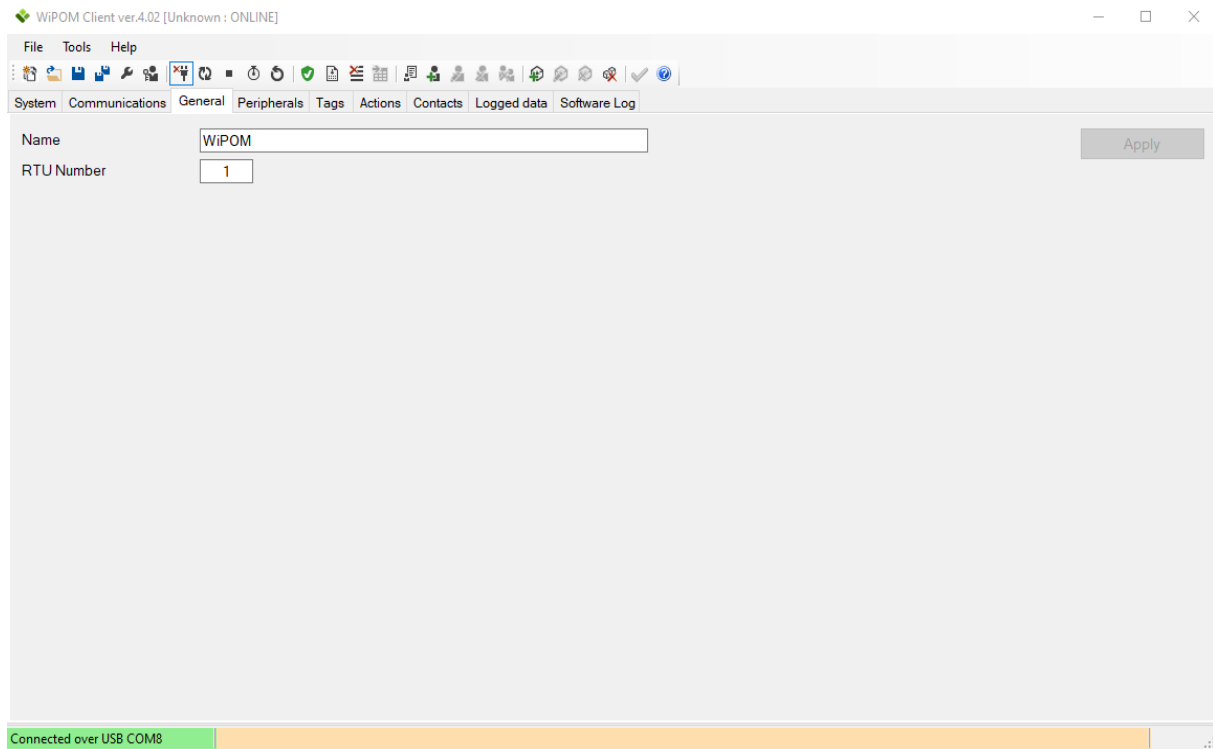
Figure 30 – General Settings

4.9 Peripherals

ADC Calibration

When tags with types of **Voltage RMS** are used, it is recommended to calibrate zero levels on AN2 and AN3 ADC inputs to minimize errors. These options are under the **Peripherals** tab.
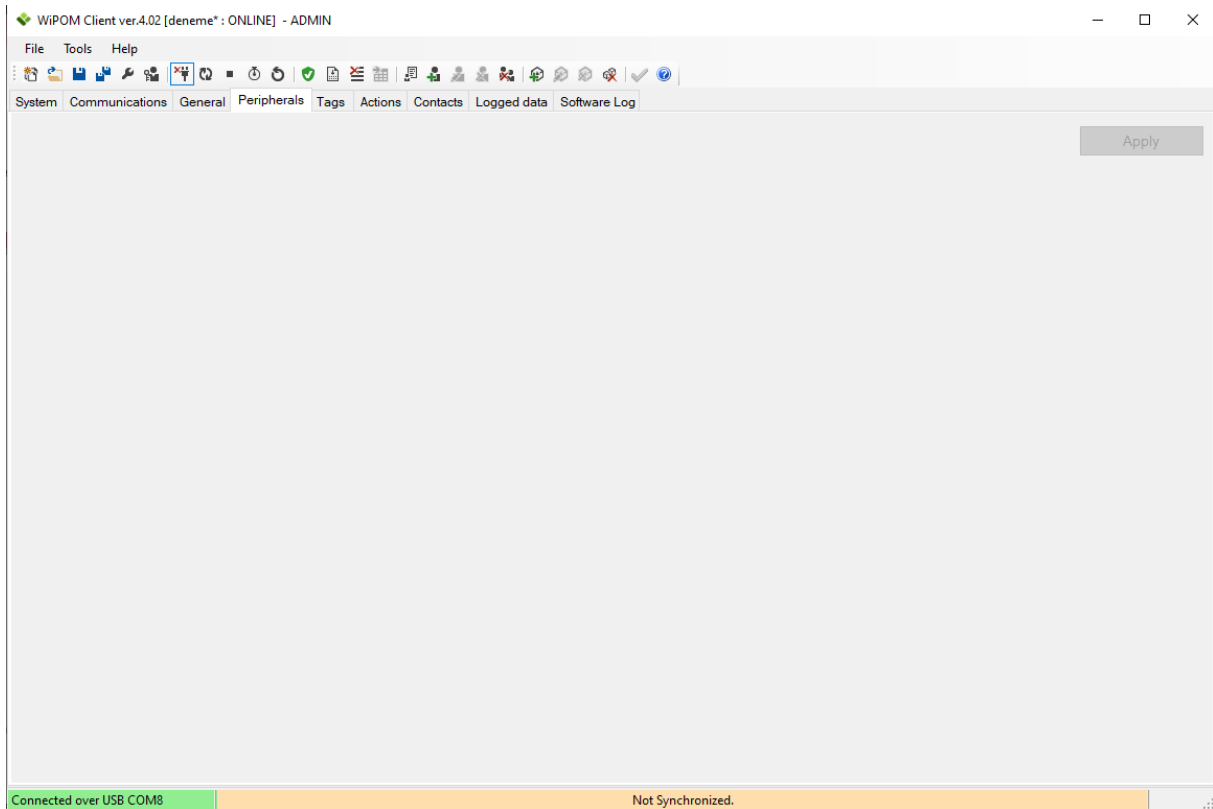
Figure 31 – Peripherals information

The current calibration levels are shown in read-only text fields (if the calibration was done previously). To save the new zero level the **WiPOM Client** must be in **Online mode**. After this, apply zero level signals to ADC input, and when the signal is stabilized click **Calibrate** button. This will force hardware to read the current ADC input value and save it as **Zero Level** in the configuration on the device.

DAQ2543 Self-Test Values

Each **DAQ2543** peripheral board has 3 inputs for self-test. These inputs setup to always return bottom, middle and top values. These values are shown on the **Peripherals** tab. Please see Figure 8.

If the **DAQ2543** board is installed and accessible, then these values should be very close to the following:

Point	Value
Bottom	0
Middle	2047
Top	4095

Table 1 – Good DAQ2543 Self-Test Values

If the DAQ2543 board is missing, then values will be:

Point	Value
Bottom	4095
Middle	4095
Top	4095

Table 2 – Bad DAQ2543 Self-Test Values

If the DAQ2543 board has a hardware problem, then the values may range from 0 to 4095.

LCD Options

Screens Delay – this option controls how fast screens on LCD will be switched. LCD shows the information on several screens:

Main screen – show general information about the device.
Modem Status screen – shows information about modem current status.
Tags data screen – shows information about current values of configured tags (if a lot of tags added system will have more than 1 tag's screen)

The screens Delay option allows you to change the delay between screens. Then larger delay – than longer each screen will be presented on LCD.

4.10 Tags

WiPOM uses tags to monitor inputs, control outputs, and describe logging options and alarm settings for each input. Tags are entered by the user and they are typically assigned meaningful names when they are first created. The tags in the current configuration are displayed under the **Tags** tab:
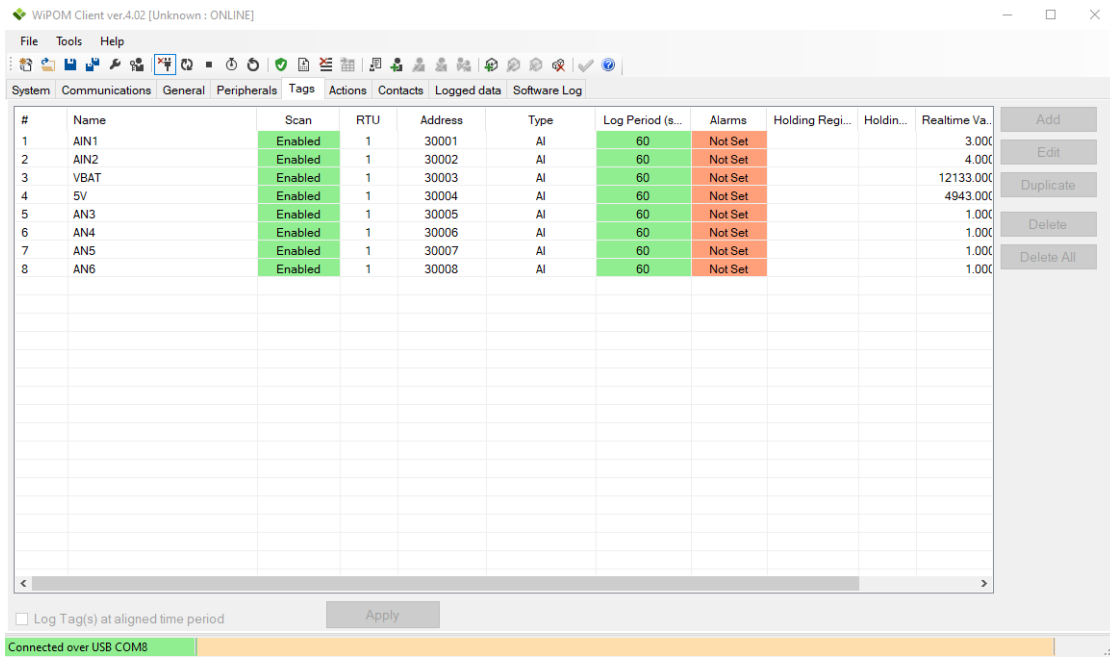
Figure 32 – Tags tab

On this tab, user can add new tag(s), edit existing tag(s) duplicate tag(s), and remove tag(s).

Add

This button opens **Adding New Tags** where a new tag can be created and configured.

Edit

This button opens **Editing Tags** where existing tags can be configured.

Duplicate

This button duplicates the selected tags from the project.

Delete

This button deletes all the selected tags from the project.

Delete All

This button deletes all the tags from the project.

4.10.1 Adding New Tags

When the user clicks the button **Add** then **Adding New Tags** is opened:

Figure 33 – Add New Tag Window

This window has 4 tabs: General, Values Map, Calculations & Scaling, Alarms.

4.10.2 Adding New Tags: General Settings

Figure 34 – Adding New Tags: General Settings

This tab provides general information about the tag:

Name

Descriptive name of the tag

Type

Type of data source for the tag

Address

MODBUS address of the tag. Depending on the selected **Type,** the list of available MODBUS registers will be updated.

Units

Units for the tag's value when the value is shown somewhere (on the display, in Logged Data table in WiPOM Client or when exported to a file)

Enable Logging

Flag to enable/disable data logging for the tag. This is typically used when the tag is used only to generate an alarm(s) and there is no need to log the data for the tag.

33

Log Period

Data logging period (in several seconds) for the tag.

0 means log data as fast as possible.

RS485 MODBUS Slave Parameters

If the tag's **Type** is selected as the **RS485 MODBUS** then **RS485 MODBUS Slave Parameters** list is shown to specify RS485 tag addressing.

RS485 MODBUS is a special tag type that is used when the tag's data is read from a slave MODBUS RS485 device using MODBUS RTU protocol. To communicate with a MODBUS device over RS485 using MODBUS RTU, WiPOM has to know the RTU Number of the slave device and the MODBUS register address.

RS485 MODBUS Slave Parameters provides a set of controls that allow configuring these parameters:

RTU Number

RTU Number of the slave device

Register Type

The type of target MODBUS register. This helps to accurately check if the registered address is entered correctly.

MODBUS Register

Address of target MODBUS register. WiPOM will check if the address is correct depending on the selected **Register Type**.

4.10.3 Adding New Tags: Values Map Settings
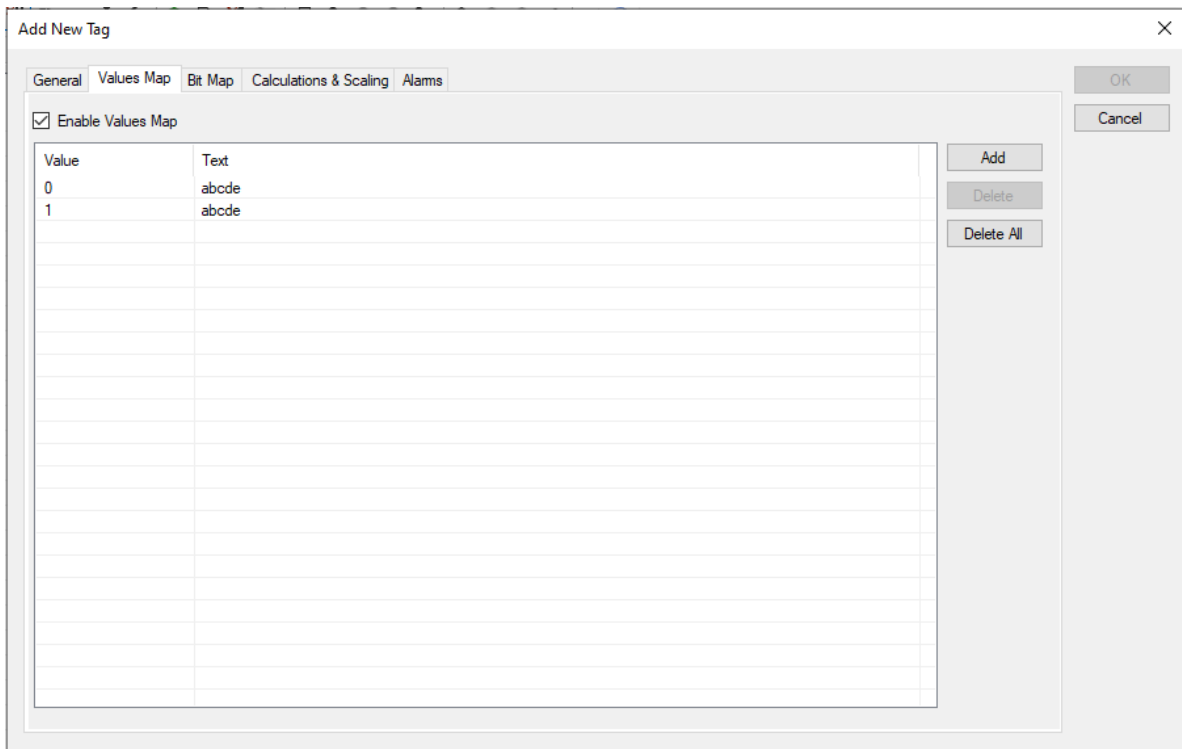
Figure 35 – Adding New Tags: Values Map Settings

This tab provides controls to configure Values-To-Text mapping for some types of tags. This is useful when a tag's values are limited to a set of constants that can be mapped to text. After such mapping, the tag's value can be displayed as text instead of a number.

For example, register #40107 returns the reason for the latest board reset as an integer constant. Since this register returns a limited set of values (0 to 6), each value can be mapped to a corresponding text.

Enable Values Map

This flag enables/disables this feature.

Only the following tag types support the values map feature:

- Analog Input
- Holding Register
- DAQ2543 ADC
- RS485 Modus (when **Register Type** set to Holding Register)

Add

Add button creates a new entry in the values map. Each entry contains 2 values:

Value   - A number (tag's value)
Text   - A string that will be shown instead of the number in the Value column.

Delete
Deletes the selected entry.

Delete All
Deletes all entries.

4.10.4 Adding New Tags: Calculations & Scaling

Figure 36 – Adding New Tags: Calculations & Scaling Settings

This tab provides controls to configure Calculations and Scaling rules on the tag's value.

WiPOM can convert the raw numeric value to a more meaningful value using predefined equations and/or scaling rules.

Calculations

Raw tag data can be converted using one of the predefined equations.

Type

Supported equation types:

No Calculations: Value is not converted.

Linear: Value is converted using the linear equation **Y = A * X + B**

Quadratic: Value is converted using the quadratic equation **Y = A * (X ^ B)**

Where:

X: Tag's raw value

Y: Tag's converted value

A and **B**: Constant coefficients, entered in **Value A** and **Value B** fields

* : Multiplication operation

^: Power operation

For example, the tag for MODBUS register 30005 returns the on-board 5 Volt line voltage reading as the number of milliVolts. To convert the value to Volts, select Linear as the type of calculations:

Then enter:

Value A = 0.001
Value B = 0

As a result, if the tag has a raw value of 5000, the converted value will be 5.0 after the calculations.

Scaling

Scaling allows scaling raw tag values according to calibrated values.

Enable Scaling

This flag enables or disables the scaling feature.

Current Counts

This field shows the current raw value for the selected tag.

This value is updated every second when the WiPOM Client is in ONLINE state.

This value is not updated when the WiPOM Client is in OFFLINE state.

Zero Scale Counts

Tag's raw value for bottom/zero level

To simplify the calibration, the WiPOM client has the **Set** button that copies the **Current Counts** value to this field.

Full-Scale Counts

Tag's raw value for top/full level

To simplify the calibration, the WiPOM client has the **Set** button that copies the **Current Counts** value to this field.

Zero Scale Output

Output value which maps to bottom/zero level.

Full-Scale Output

Output value which maps to top/full level.

Software use 2 points linear scaling logic of value between zero and full points.

This feature is useful when the displayed/logged value needs to be scaled to a meaningful physical value instead of the raw value.

One possible application is converting pressure sensor raw value to PSI, Bars, or other values.

4.10.5 Adding New Tags: Alarm Settings
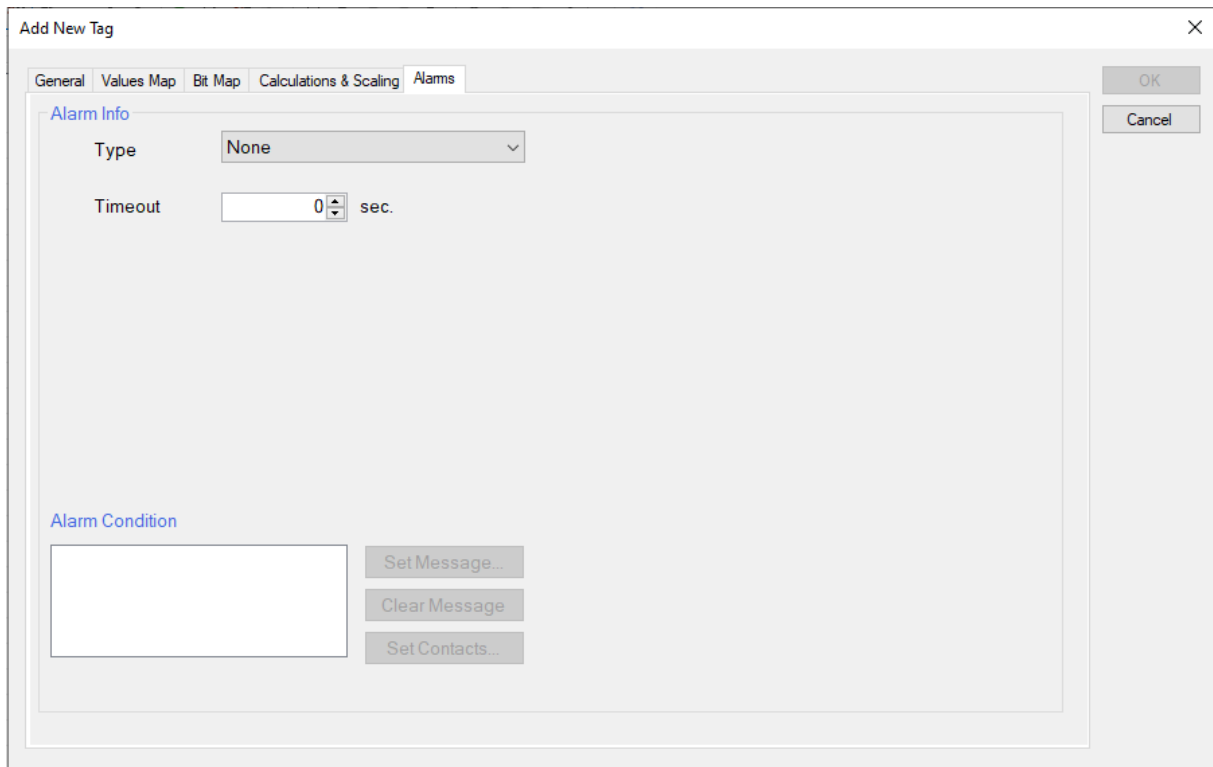
Figure 37 – Adding New Tags: Alarm Settings

This tab allows configuring alarm conditions for a tag. Each tag can have an alarm condition and WiPOM will check the tag's value to see if it matches the configured alarm condition. When an alarm condition is detected, WiPOM sends the configured SMS message to the assigned **Contact(s)**.

Type

Type of alarm

System supports 2 types of alarm conditions: **Limit** and **Value Changed**

Limit: Alarm is generated when the tag's value crosses a preset level.
Value Changed: Alarm is generated when the tag's value is changed.

Timeout

The alarm condition should be present during this Timeout period (number of seconds) before the system will generate an alarm. This prevents the system from generating false alarms when the value is quickly varying around the preset alarm level.

Deadband

The tag's value should cross the Deadband zone before the system will generate an alarm. This prevents the system from generating false alarms when the value is quickly varying around the preset alarm level.

When the Limit type of alarm is selected, WiPOM can check several thresholds: Low Low, Low, Normal, High, and High High. Only the desired thresholds can be enabled using the checkboxes to the right side of each alarm level.
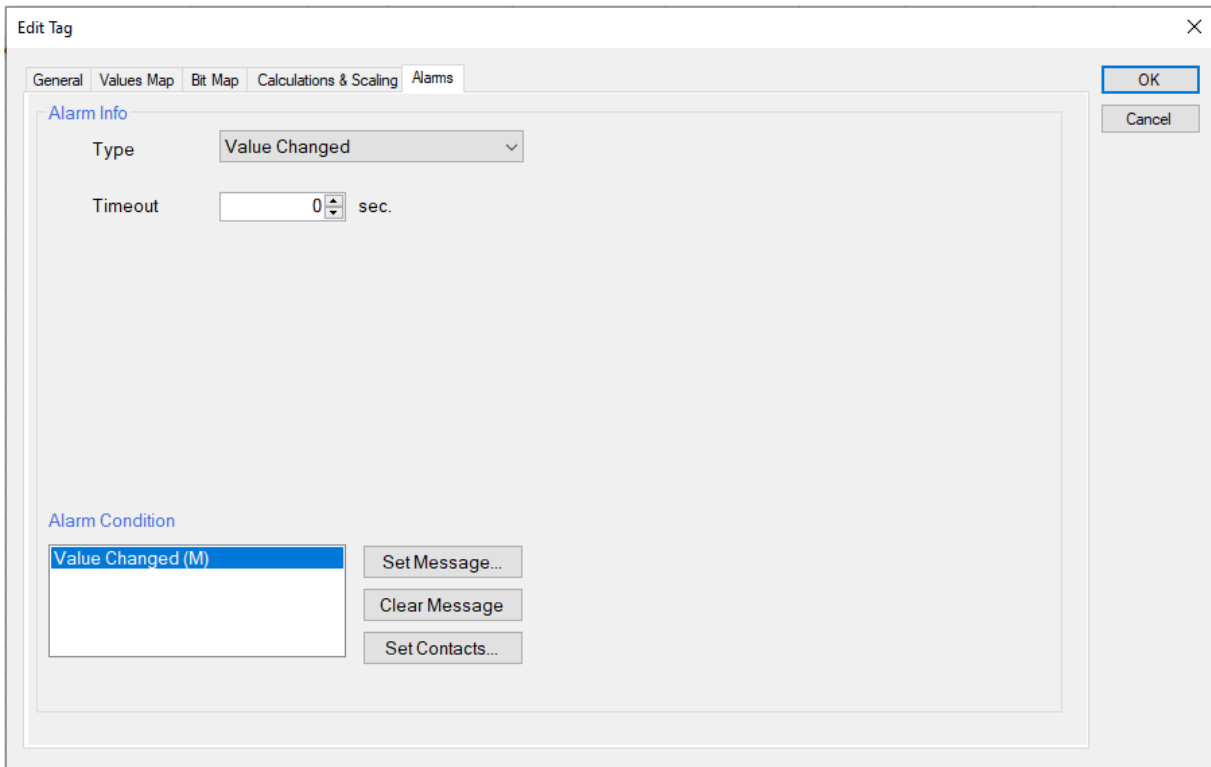
Figure 38 – Adding New Tags: Enabling Alarm Levels

WiPOM Client checks that all the alarm thresholds have correct values according to the rule:

Low Low $<$ Low $<$ High $<$ High High

If Deadband is not zero, then Deadband is also used for checking the entered threshold values according to the rules:

Low Low + Deadband $<$ Low

Low + Deadband $<$ High

High + Deadband $<$ High High

Alarm Condition

This list is used for assigning SMS messages and **Contact(s)** to each alarm condition configured for the tag.

Assign SMS message

To assign an SMS message to the alarm condition:

- Select desired alarm condition in the list
- Click the **Set Message** button

This opens the Message window:
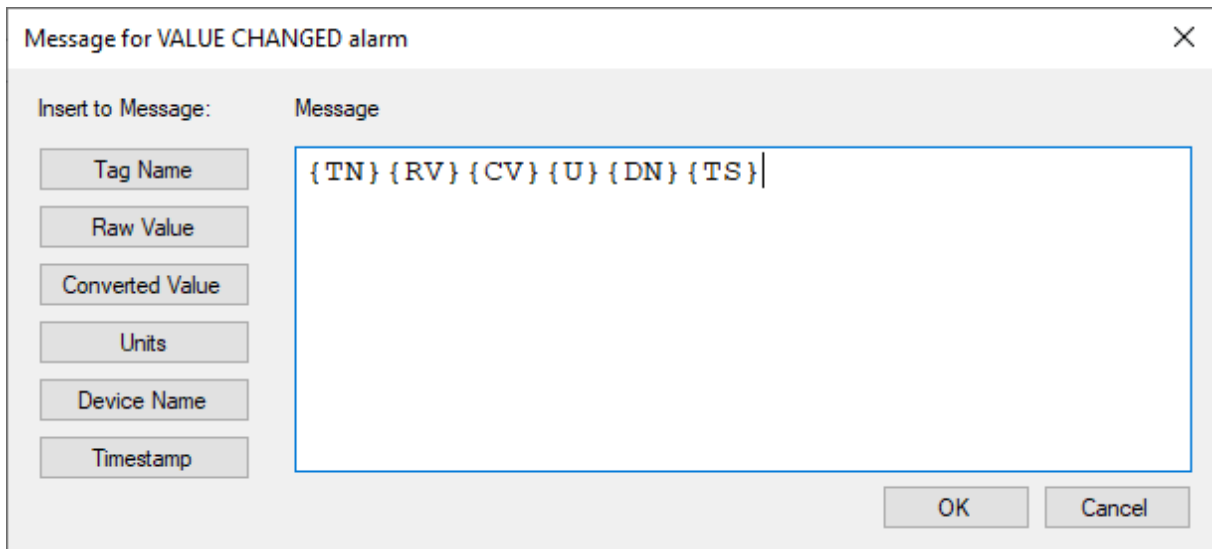
Figure 39 – Adding New Tags – Message Window

Using the Message window, enter the desired text that will be sent out when the alarm condition is detected.

Note that the message can contain some embedded keywords for substitution:

{DN}   : Substituted with the device name

{TN}   : Substituted with the tag name

{RV}   : Substituted with the tag's raw value

{CV}   : Substituted with the tag's value after calculations or scaling

{U}   : Substituted with **Units** text.

The buttons on the left side of the window allow quickly inserting these substitution keywords into the message text.

When the message is composed click the **Save** button to save the message in the tag's configuration or click **Cancel** to exit without saving.

Assign Contact(s)

To assign Contact(s) to the alarm condition:

- Select desired alarm condition in the list
- Click the **Set Message …** button

This opens the Alarm Contacts window:
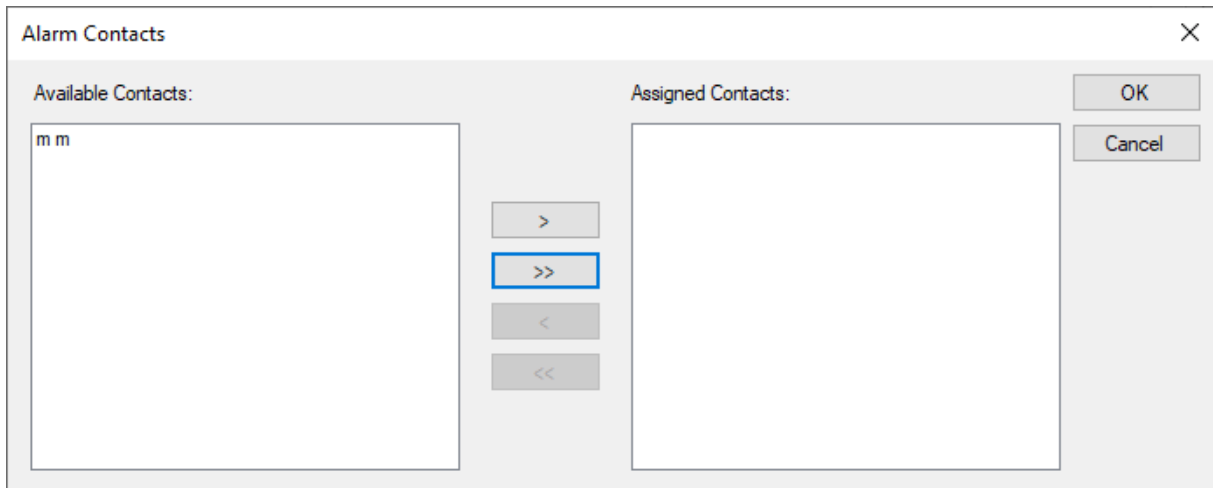
Figure 40 – Adding New Tags – Contacts Window

This window has two lists: **Available Contacts** and **Assigned Contacts**

Available Contacts

The list of contacts that were added to the project and not assigned to this alarm condition.

Assigned Contacts

The list of contacts that were assigned to this alarm condition.

There are 4 buttons in the middle:

>   : Moves the selected contact from **Available Contacts** to **Assigned Contacts**
>>   : Moves all contacts from **Available Contacts** to **Assigned Contacts**

<   : Moves the selected contact from **Assigned Contacts** to **Available Contacts**
<<   : Moves all contacts from **Assigned Contacts** to **Available Contacts**

The assigned SMS message will be sent only to the contacts that are in the **Assigned Contacts** list.

To save the selected contacts in the tag's configuration, click the **Save** button. Click the **Cancel** button to exit without saving.

Note that when the alarm condition has an assigned SMS message, then the letter **M** is added to the list item.

When alarm condition has an assigned Contact, then letter **C** is added to the list item:
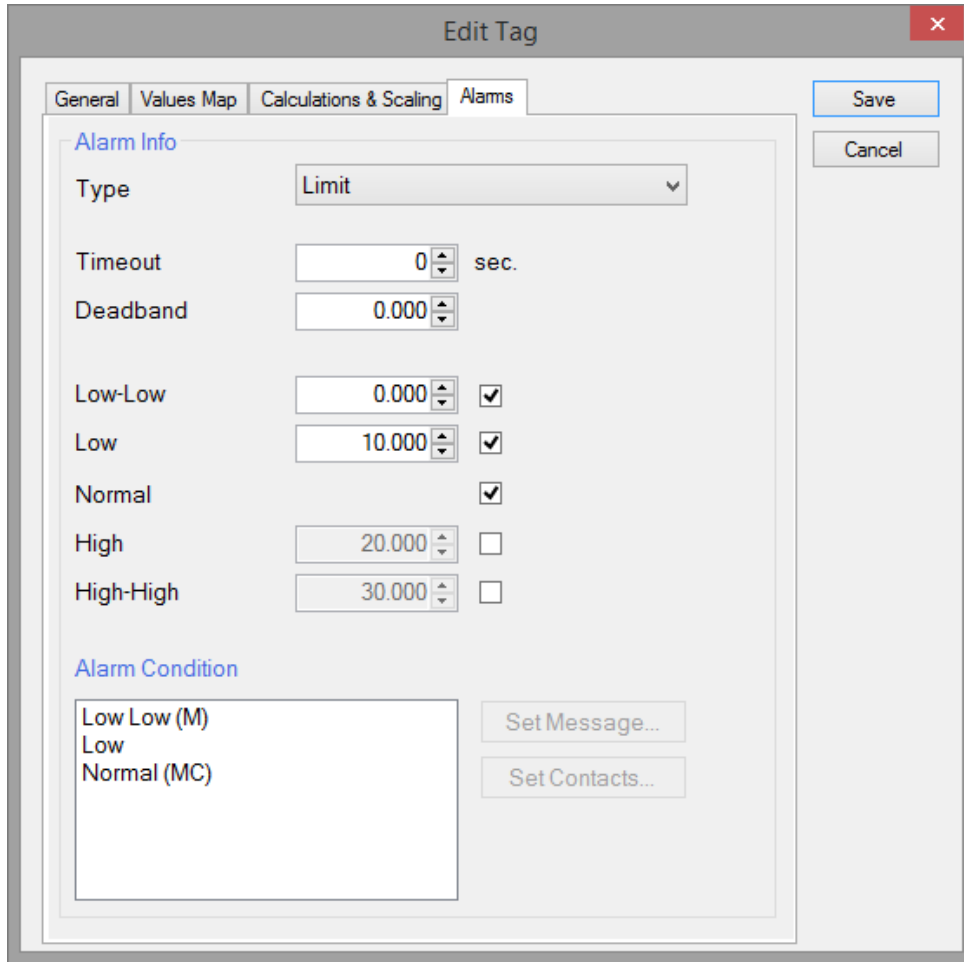
Figure 41 – Adding New Tags – Alarm Condition List

In this screenshot, the tag has 3 alarm conditions: Low Low, Low and Normal.

Low Low alarm condition has only an SMS Message assigned.

Low alarm condition does not have either SMS message or Contact(s) assigned.

Normal alarm condition has both an SMS message and Contact(s) assigned.

Note that if an alarm condition item has only an SMS message assigned or only a Contact assigned, WiPOM Client detects this as incorrect configuration and shows a warning:
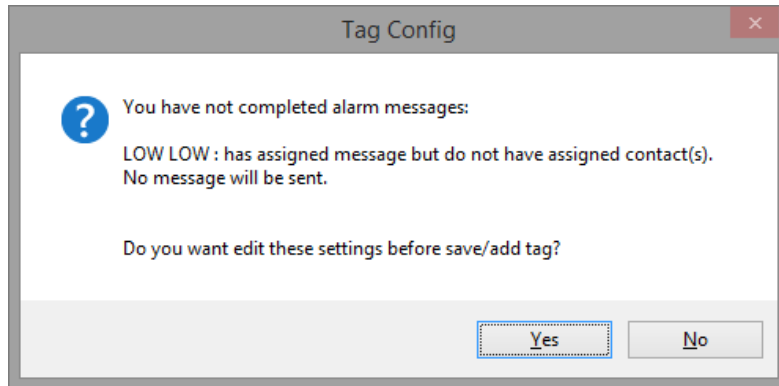
Figure 42 – Warning message when alarm condition configuration is not completed.

When the tag's configuration is completed, click the **Save** button to save the configuration in the current project. The correctly configured tag will be saved and added to the tags list.

4.10.6 Editing Tags

Tags can be edited using the **Edit** button.

Editing Tags window is the same as Adding New Tags, but all fields are filled with tag's configuration data when the window is opened.

See section **4.10.1 Adding New Tags** topic for more information about tag window controls.

4.11 Actions

The WiPOM can have action entries that describe the people who will receive the alarms that are generated by the actions. The contacts included in the current configuration are displayed under the **Actions** tab:
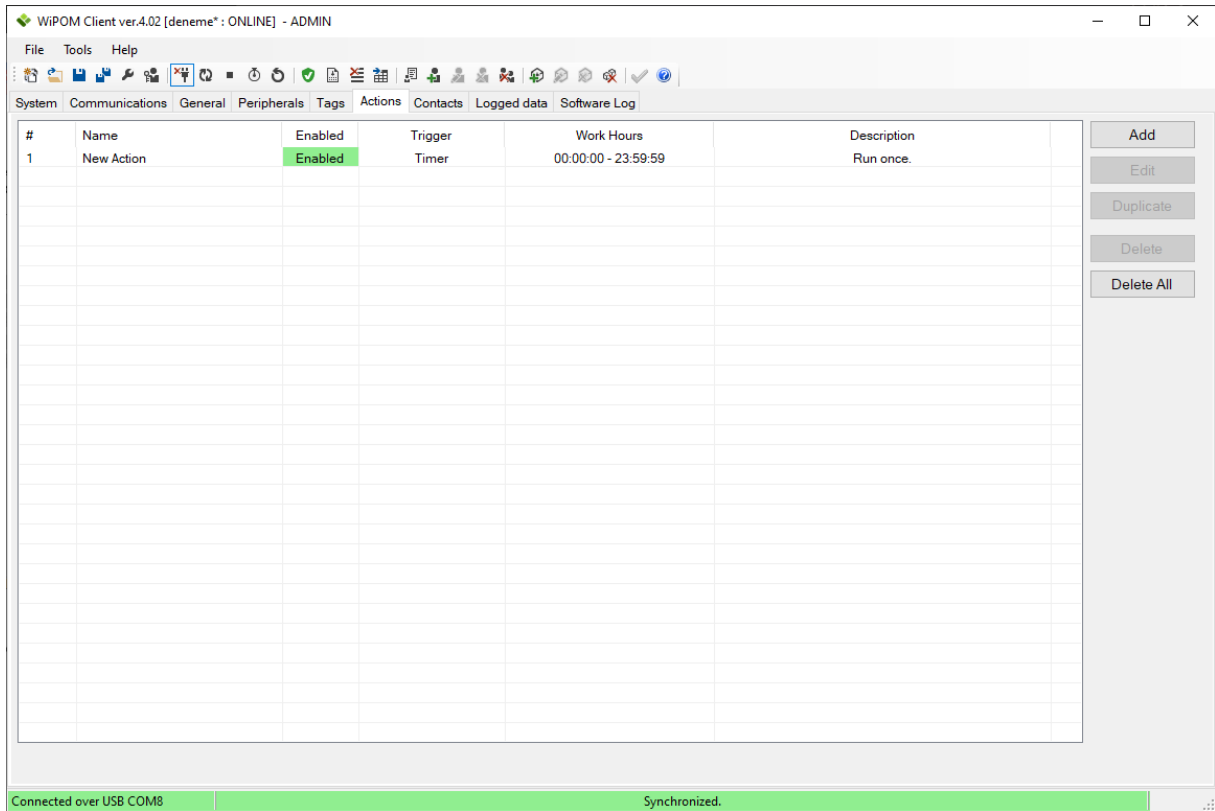
Figure 43 – Actions Tab

On this tab user can add new action(s), edit existing action(s) duplicate action(s), and remove action(s).

Figure 44 – Add New Actions window

Add

This button opens **Adding New Actions** where a new action can be created and configured.

Edit

This button opens **Editing Actions** where existing actions can be configured.

Duplicate

This button duplicates the selected actions from the project.

Delete

This button deletes all the selected actions from the project.

Delete All

This button deletes all the actions from the project.

4.12 Contacts

The WiPOM can have contact entries that describe the people who will receive the alarms that are generated by the tags. The contacts included in the current configuration are displayed under the **Contacts** tab:
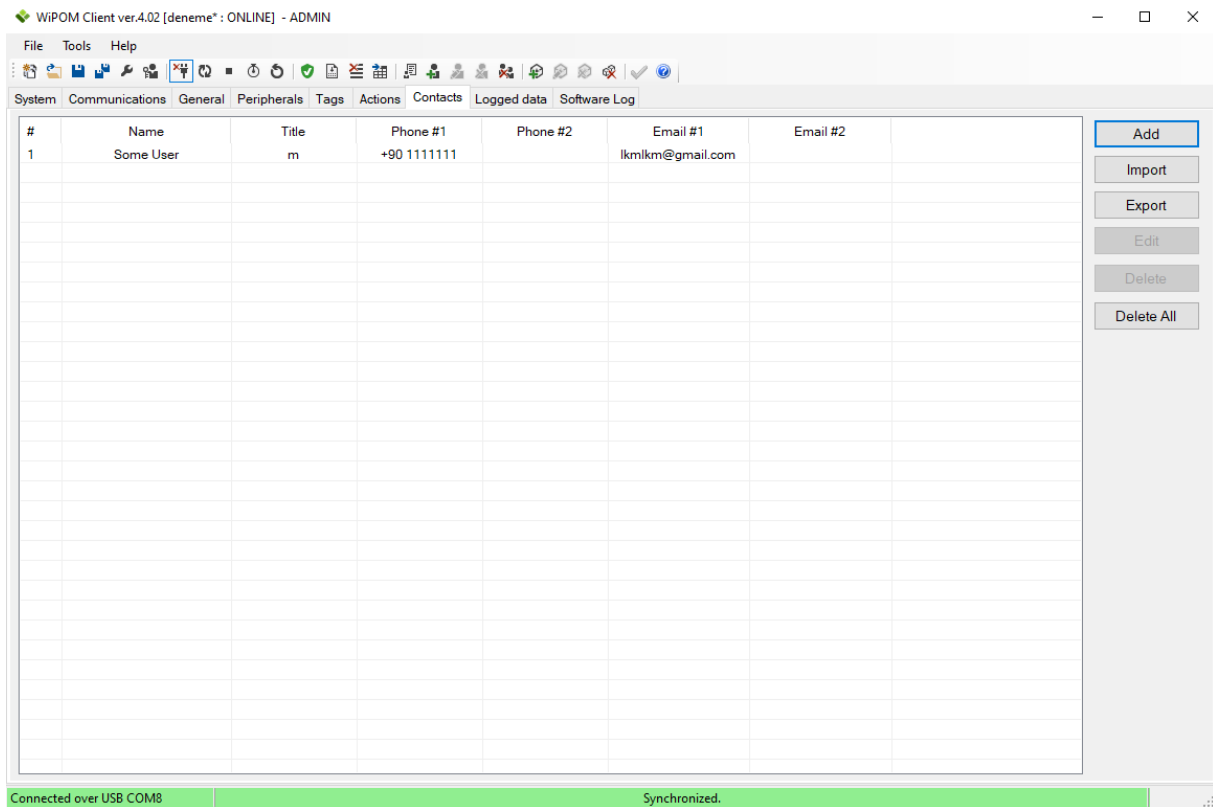
Figure 45 – Contacts Tab

Add

Adds a new contact

Import

Imports contacts from an Excel file

Export

Exports contacts to Excel file

Edit

Edits the selected contact

Delete

Deletes the selected contacts from the project

Delete All

Deletes all contacts from the project

4.12.1 Excel Import Contacts

Contacts can be imported to the project from an Excel spreadsheet file using the following format:

Column #	Value
1	First Name
2	Last Name
3	Phone 1 Country Code
4	Phone 1 Phone Number (without country code)
5	Phone 2 Country Code
4	Phone 2 Phone Number (without country code)
5	Email 1
6	Email 2
7	Title

Table 3 – Contacts Excel File Format

Sample of valid Excel spreadsheet file for contacts:

	A	B	C	D	E	F	G	H	I
1	Some	User	1	555-555-7802	1	555-555-7803	some.user1@wipom.net	some.user2@wipom.net	Mr.
2	Another	User	1	555-555-7804			another.user@wipom.net		
3	Third	User			1	555-555-7805		third.user@wipom.net	
4									
5									

Figure 46 – Contacts Excel File Sample

4.12.2 Adding New Contacts

Click Add button on the Contacts tab to open Add New Contacts window:

Figure 47 – Adding New Contacts

Fill in only the required fields and click Add button to add contacts to the project.

Only the **First Name** field is mandatory; other fields can be blank.

To be able to send SMS messages, at least one phone number and the corresponding country code field should be filled in.

Phone numbers can contain only digits and dashes. Phone numbers cannot have dashes at the beginning of the end.

4.13 Logged Data

Logged Data tab allows uploading log records from device to the computer, clearing log records, and exporting log records:
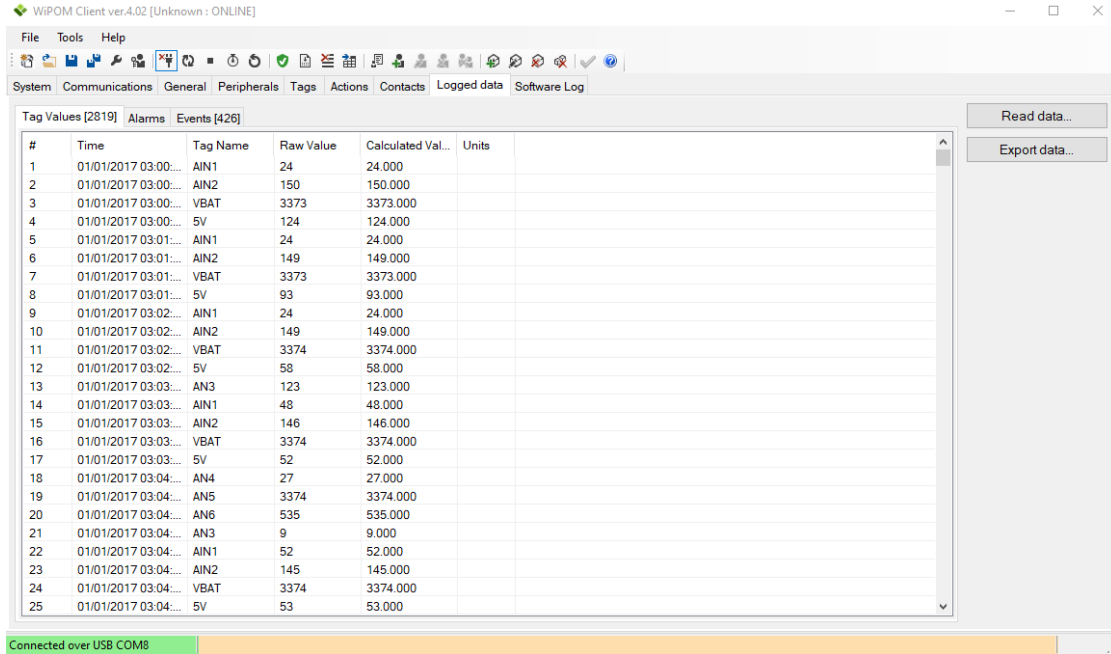
Figure 48 – Logged Data Tab

Note: The WiPOM Client has to be in ONLINE state to be able to read the logged data from the device.

Read Data

Read all logged records from the device

Export Data

Export read records to Excel or CSV (comma-separated value) file

Read Data

Click the **Read Data** button to start reading log records from the device. While records are being read, the **Reading Data** window is shown:
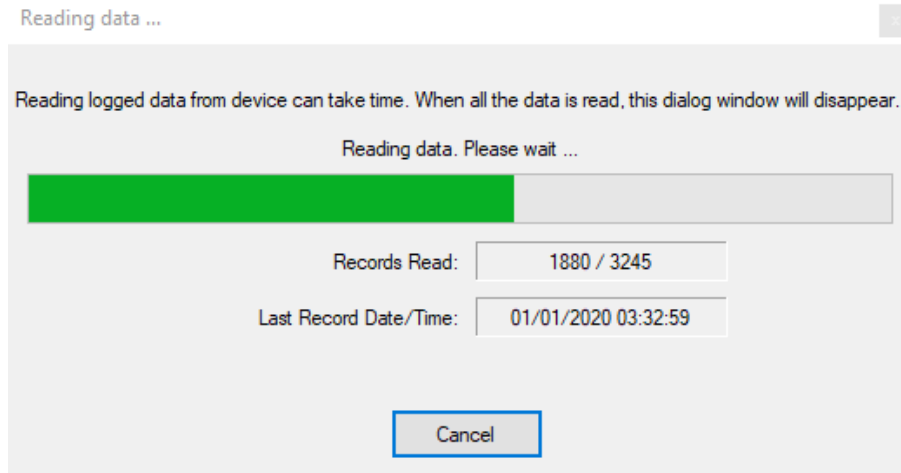
Figure 49 – Reading Data Window

The **Reading Data** window shows the status of data reading operation: Number of reading records and date of last read record.

All read records can be viewed under 3 different tabs: Tag Values, Alarms, and Events

On each tab, the number of records in that tab is shown:
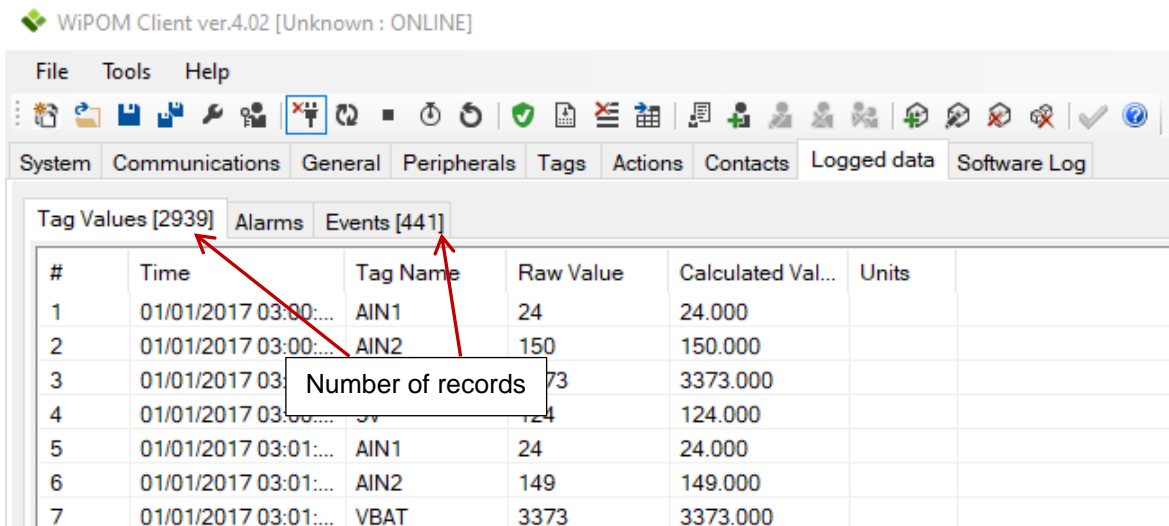
Figure 50 – Number of records in tab titles

Export Data

All read log records can be exported to an Excel or a CSV (comma delimited) file.

Click the **Export Data** button to open the **Export Data** Window:
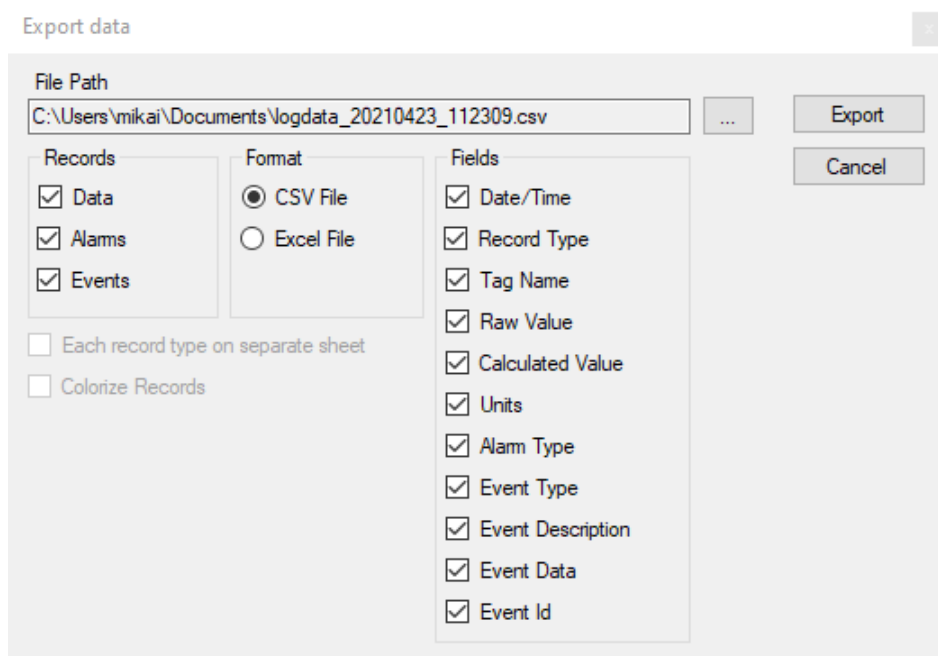
Figure 51 – Export Data Window

File Path
Path to file to save log records

Records
These checkboxes allow saving only the desired type(s) of records.

Format
Output file format.
Excel – Microsoft Excel file format
CSV – Comma Separated Value text CSV file format.

Fields
These checkboxes allow selecting only the required fields for each record.

Each record type on a separate sheet

This option is available only in Excel file format. If this option is checked then Data, Alarm, and Event records are grouped in 3 separate Excel sheets in the same Excel workbook. If this option is unchecked, all records are put on the same Excel sheet.

Colorize records

This option is available only in Excel file format. If this option is checked, then Data, Alarm, and Event records have different background colors. This makes viewing easier when all the records are placed on the same Excel sheet.

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4.14 Software Log

The **Software Log** tab shows all the messages generated by the WiPOM Client. This is useful information for troubleshooting any problems:
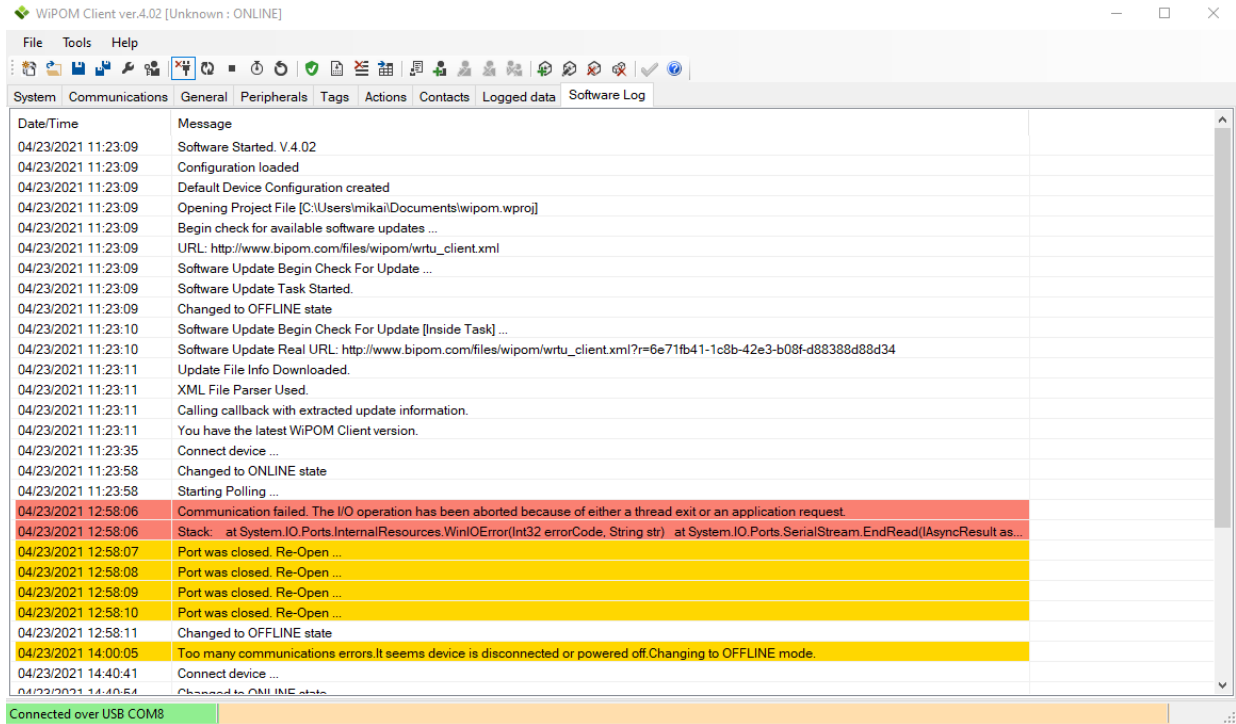
Figure 52 – Software Log tab

In this window, **Right-Click** menu is available; this menu includes standard commands to copy text messages to Windows Clipboard:

Select All

This command selects all the messages in the list.

Copy Selected

This command copies selected message(s) to Windows Clipboard.

Copy All

This command copies all messages (selected or not selected) to Windows Clipboard.

Clear Messages

This command removes all messages from the list.

Appendix A: Sources of Firmware Reset

Code	Description
UNKNOWN	Unknown source of system restart
POR	Power on Reset
EXTERNAL	A low level on the Reset pin
LOW PWR	Low-power management reset
WDT	Independent watchdog timed out
WIN WDT	Windowed watchdog timed out
SOFTWARE	Software Reset

Appendix B: Error Codes

General

Internal errors (not shown on LCD).

Code	Description
1	Invalid Argument. Some functions received wrong input data.
2	The queue is empty when trying to read the next alarm/event from the queue
3	The alarm/event queue is locked
4	Timeout on wait operation

Application Subsystem

Code	Description
101	Starting the main task failed
102	Starting cell modem task failed
103	Starting RS485 server task failed
104	Starting USB server task failed
105	Starting UART0 server task failed
106	Starting data logger task failed

Configuration Subsystem

Code	Description
201	No space for new tags
202	Load device configuration failed
203	Load tag's configuration failed
204	No space for a new contact record
205	Invalid contact record ID
206	Invalid contact record index
207	Unsupported version of the contact record
208	Load contact records failed
209	Load message records failed
210	No space for a new message record
211	Invalid message record ID
212	Invalid message record index
213	Unsupported version of the message record
214	Unsupported version of tag configuration

Core MODBUS Subsystem

Code	Description
401	Unsupported register address
402	Unknown function ID
403	RTU is incorrect in reply
404	Function ID is incorrect in reply
405	CRC16 is incorrect in reply

MODBUS RTU Subsystem

Code	Description
501	Request data is not complete (broken)
502	Too big request data (no space in internal buffer)
503	Unknown function ID
504	Bad CRC16 of MODBUS request/reply
505	Processing MODBUS request failed

MODBUS TCP Subsystem

Code	Description
601	Request data is not complete (broken)
602	Too big request data (no space in internal buffer)
603	Unknown function ID
604	Processing MODBUS request failed
605	Unknown Protocol ID
606	Length in MODBUS TCP header is incorrect

RS485 Driver

Code	Description
701	RS485 driver is not initialized
702	Failed to clear RX buffer
703	Failed to clear TX buffer
704	Read Timeout
705	Write Timeout
706	No data to read
707	Echo not received

Cell Modem Driver

Code	Description
801	Cell Modem Driver is not initialized
802	Failed to clear RX buffer
803	Failed to clear TX buffer
804	Read Timeout
805	Write Timeout
806	Read operation didn't return any data
807	No incoming TCP connection
808	No reply for AT command
809	Unknown reply for AT command
810	Data to read is available

Hardware Subsystem

Code	Description
901	Hardware subsystem not initialized
902	DAQ2543 / ADC self-test failed
903	DAQ2543 / ADC not initialized
904	Incorrect ADC channel number
905	Incorrect DI pin number
906	Incorrect DO pin number
907	Write DO failed
908	Read DI failed
909	LCD Contrast adjustment failed
910	LCD Backlight adjustment failed
911	LCD initialization failed
912	Incorrect LCD line number
913	Configure Cell Modem input port failed
914	DATAFLASH initialization failed
915	SD card initialization failed
916	No storage device detected (no SD card and no DATAFLASH)
917	Incorrect frequency channel number
918	Incorrect DAQ2543 channel number

Data Storage Subsystem

Code	Description
1001	Unknown storage device ID
1002	Storage device not initialized
1003	Version structure has an incorrect signature byte
1004	Version structure has incorrect version byte
1005	Version structure has incorrect LRC byte
1006	Data block has incorrect CRC16
1007	No data available to read
1008	Deep data check failed (read data is different from written data)
1009	Read operation failed
1010	Write operation failed
1011	Find structure not initialized
1012	Search action already started
1013	Find the end of log records
1014	The sector number is incorrect

UART1 Driver

Code	Description
1101	UART1 driver is not initialized
1102	Failed to clear RX buffer
1103	Failed to clear TX buffer
1104	Read Timeout
1105	Write Timeout
1106	No data to read

USB Driver

Code	Description
1201	UART1 driver is not initialized
1202	Failed to clear RX buffer
1203	Failed to clear TX buffer
1204	Read Timeout
1205	Write Timeout
1206	No data to read

Communication Protocol

Code	Description
1301	Unknown command received

Appendix C: Internal MODBUS Registers

Digital Inputs

Code	Description
10001	Digital Input #1
10002	Digital Input #2
10003	Digital Input #3
10004	Digital Input #4

Digital Inputs (Frequency Counter)

Code	Description
40113	Digital Input #1
40114	Digital Input #2

Digital Inputs (Pulses Counter)

Code	Description
40122	Digital Input #1 (High 2 bytes of LONG value)
40123	Digital Input #1 (Low 2 bytes of LONG value)
40124	Digital Input #2 (High 2 bytes of LONG value)
40125	Digital Input #2 (Low 2 bytes of LONG value)
40126	Digital Input #3 (High 2 bytes of LONG value)
40127	Digital Input #3 (Low 2 bytes of LONG value)
40128	Digital Input #4 (High 2 bytes of LONG value)
40129	Digital Input #4 (Low 2 bytes of LONG value)

NOTE: Bytes placed in the following order:

High byte	Low byte	High byte	Low byte
High register		Low register	
UNSIGNED LONG value (4 bytes)			

←

High bytes   Low bytes
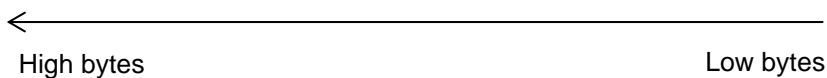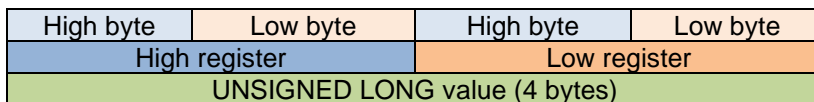
For example, read values for DI #1 in Pulses Counter mode
Register #40122 returns 0xA102
Register #40123 returns 0x0C15
The result unsigned long value will be 0xA1020C15

Digital Outputs

Code	Description
1	Digital Output #1
2	Digital Output #2

Analog Inputs

Code	Description
30001	Analog Input #1 (AN2)
30002	Analog Input #2 (AN3)
30003	Analog Input #3 (PC3)
30004	Analog Input #4 (Battery voltage)
30005	Analog Input #5 (5V)

Analog Inputs (RMS mode)

Code	Description
30006	Analog Input #1 (AN2)
30007	Analog Input #2 (AN3)

DAQ-2543 Inputs

Code	Description
30008	Channel #0
30009	Channel #1
30010	Channel #2
30011	Channel #3
30012	Channel #4
30013	Channel #5
30014	Channel #6
30015	Channel #7
30016	Channel #8
30017	Channel #9
30018	Channel #10

Holding Registers

Code	Description
40001	Hardware Id. 0 – nanoWiPOM, 1 – WiPOM, -1 – unknown device
40100	RTU number
40101	RTC - Year
40102	RTC - Month
40103	RTC - Day
40104	RTC - Hour
40105	RTC - Minutes
40106	RTC - Seconds
40107	RESET Reason: 1 - POR (Power-On-Reset) 2 - External Pin Reset 3 - Low Power Reset 4 - Watchdog Reset 5 - Window Watchdog Reset 6 - Software Reset
40108	Last System Error Code (See Appendix B for list of possible errors)
40109	Uptime in seconds (low word)
40110	Uptime in seconds (high word)
40111	Hardware Status. Please see Note C.1 below.
40112	Firmware Version. Please see Note C.2 below.
40115	Total MODBUS Errors (counter reset on system start)
40116	Total MODBUS Exceptions (counter reset on system start)
40117	Total DATAFLASH Write Errors (counter reset on system start)
40118	Total DATAFLASH Read Errors (counter reset on system start)
40119	Total SD card Write Errors (counter reset on system start)
40120	Total SD card Read Errors (counter reset on system start)
40121	Cell Modem Type 0 – Unknown 1 – WMP50 (2G) 2 – HE910D (3G) 3 – CloudGate (nanoWiPOM used as a peripheral board on CloudGate device)

Read-only Registers

Hardware Status

Bit #	Description
0	Core system initialized
1	UART0 driver initialized
2	UART1 driver initialized
3	UART2 driver initialized
4	UART3 driver initialized
5	USB driver initialized
6	IO driver initialized
7	ADC driver initialized
8	UART0 service initialized
9	RS485 service initialized
10	Cell modem service initialized
11	USB service initialized
12	Display driver initialized
13	DAQ2543 driver initialized
14	Cell modem detected

If bit set to 0 – it means that device/driver/subsystem was not initialized (some issues detected)
If bit set to 1 – it means that device/driver/subsystem was initialized

Firmware Version

The firmware version is encoded as an integer value.
It contains 2 parts: Major version number and minor version number.

To get the correct version it should be processed as:

Major = VALUE / 100
Minor = VALUE % 100

/   - integer divide
%   - modulus

For example, if register returns value 211 (decimal), this means:

Major = 211 / 100 = 2
Minor = 211 % 100 = 11

Version = 2.11