WiPOM Client
User Manual

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1. Introduction

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

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

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 nanoWiPOM boards for configuring the system and accessing the logged data.

Windows WiPOM Client features:

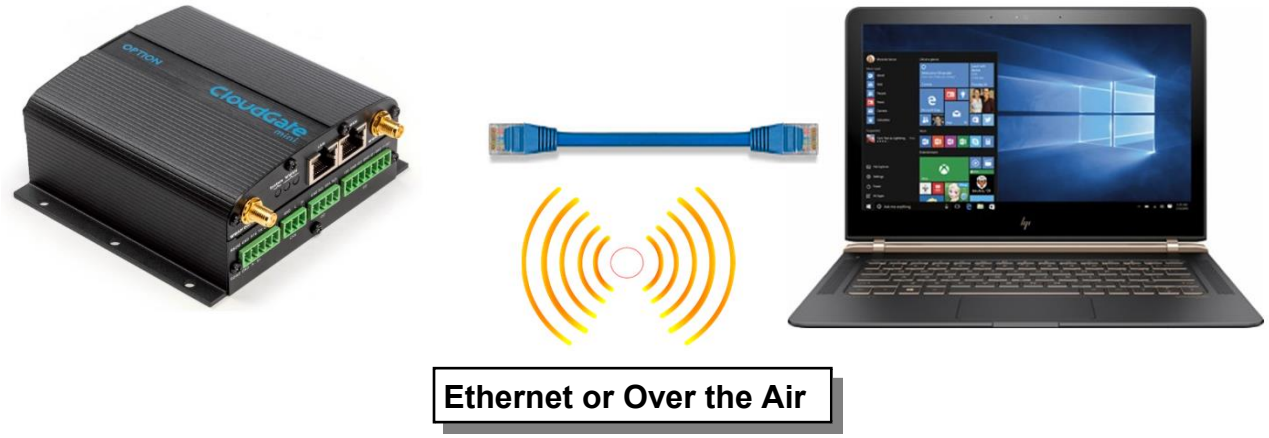
- Connect to device over RS232 serial port, RS485 serial port or USB
- Read current device configuration, including tags configuration
- Configure device name, date/time, hardware calibration, RS485 port settings
- Check hardware status and health information
- Add/edit/delete tags
- Configure alarm conditions individually for each tags, 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/nanoWiPOM 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 tags
- Configure conversion parameters for tag value
- Start / stop logger
- Upgrade firmware
- Read collected data from device to server database periodically (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

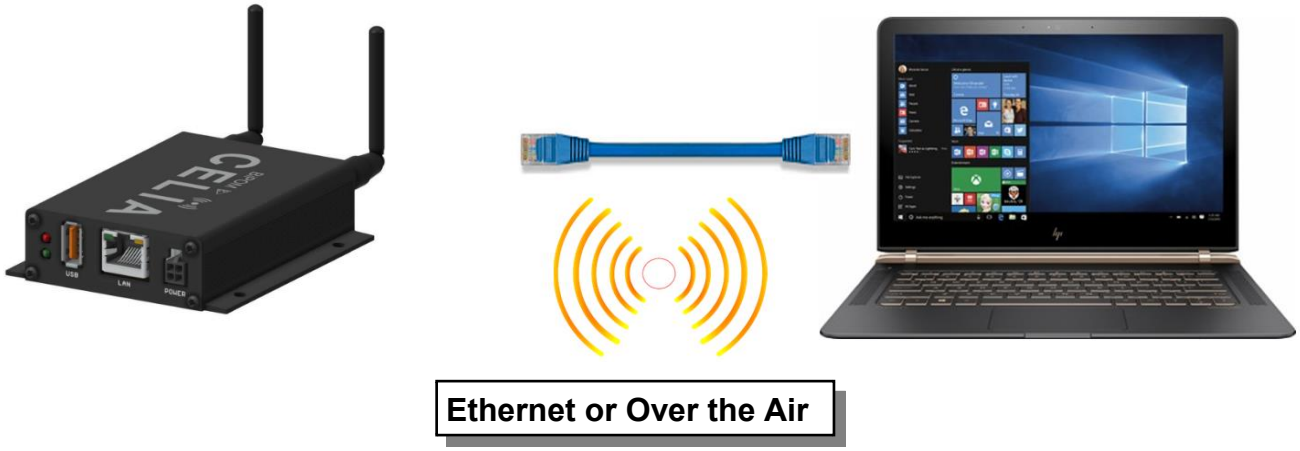
2.1 Using with CloudGate Cellular Gateways



2.2 Using with FX30 and FX30S Cellular Gateways

USB, Ethernet or Over the Air

2.3 Using with CELIA-E Linux Board and Cellular Gateway



2.4 Using with picoWiPOM Microcontroller Board

2.5 Using with nanoWiPOM Microcontroller Board

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

The simplest way to power nanoWiPOM and communicate with the Windows PC is the mini USB cable.

Figure 1 – Power nanoWiPOM with USB connection

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

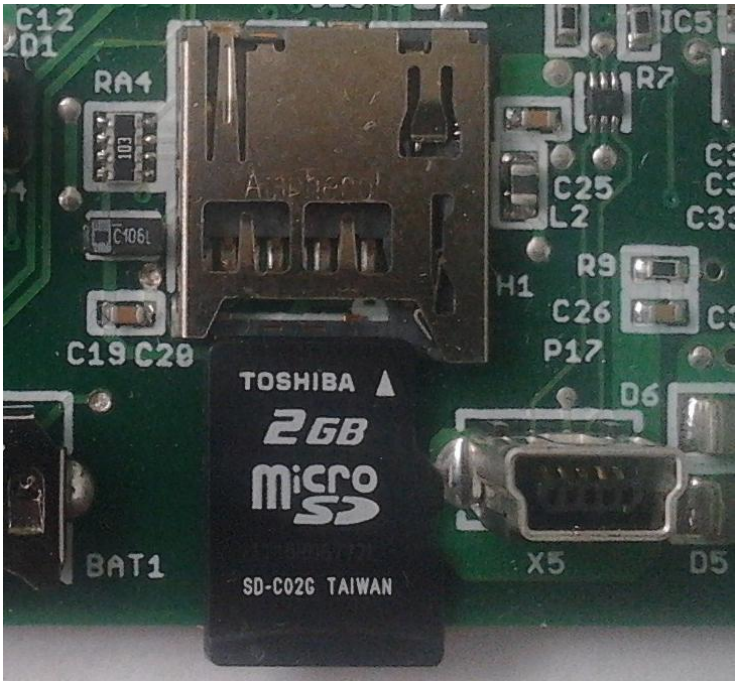


Figure 2 – Inserting MicroSD card

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

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

2.6 Using with CloudGate nanoWiPOM Peripheral Board (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:

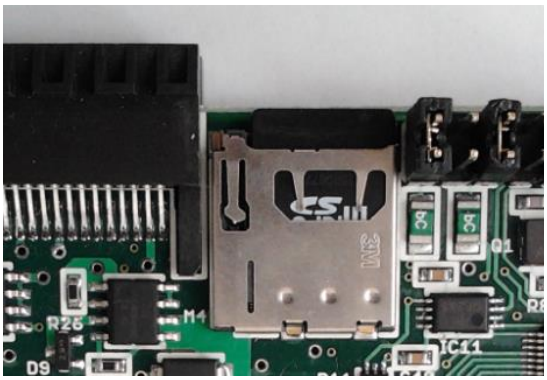
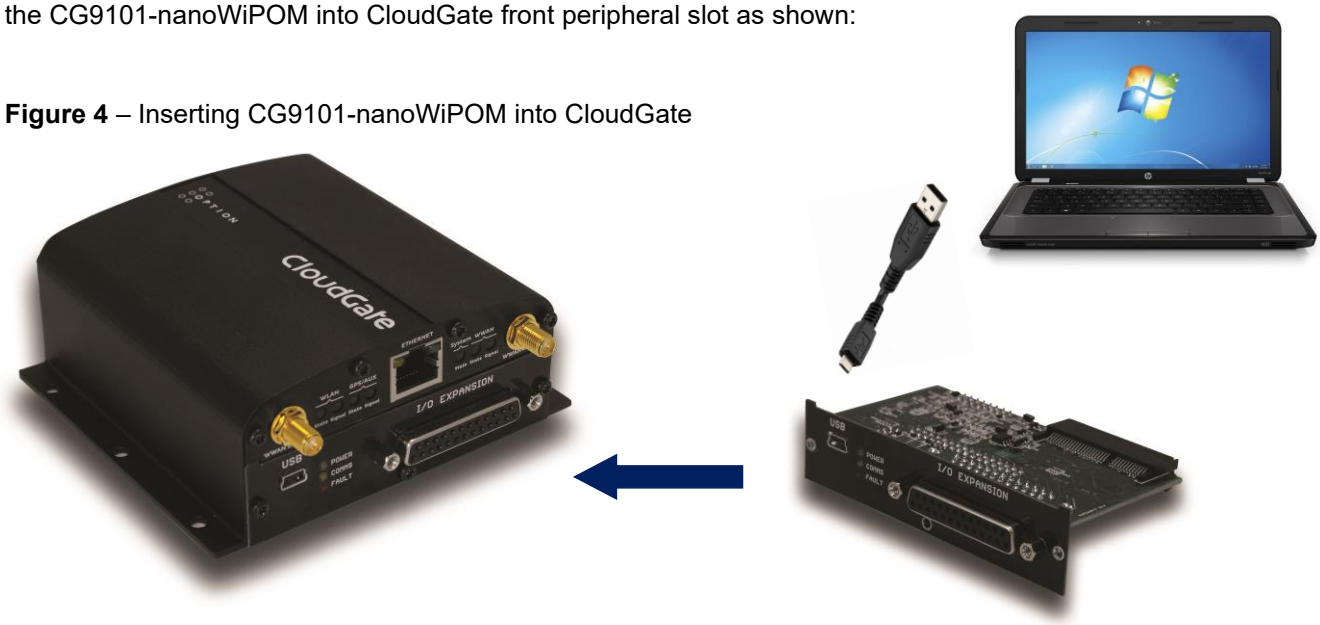


Figure 3 – Inserting MicroSD card

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 LED's should both turn on and then **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 power level is good and nanoWiPOM is ready for use.

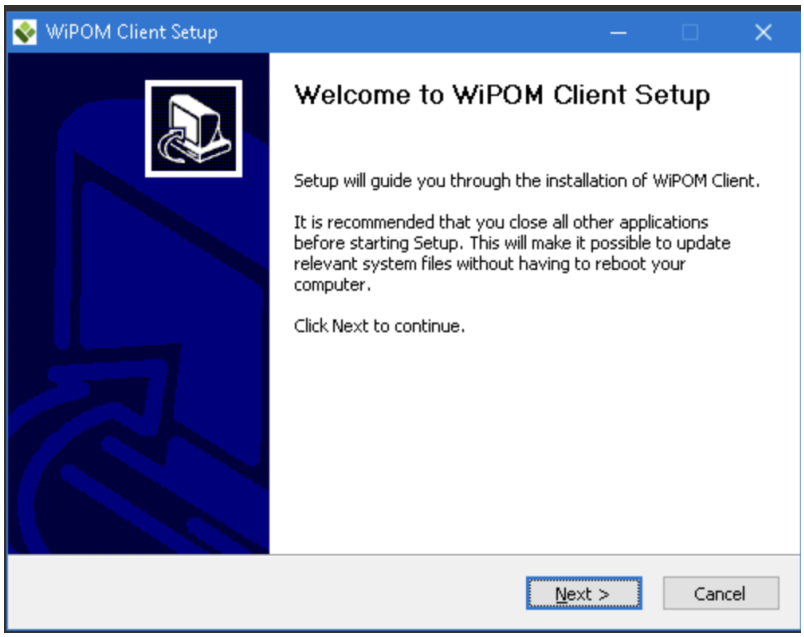
Orange LED shows communications. Blinking **Orange LED** indicates that CG9101-nanoWiPOM is trying to establish +communications. Solid **Orange LED** indicates that the communications is established.

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

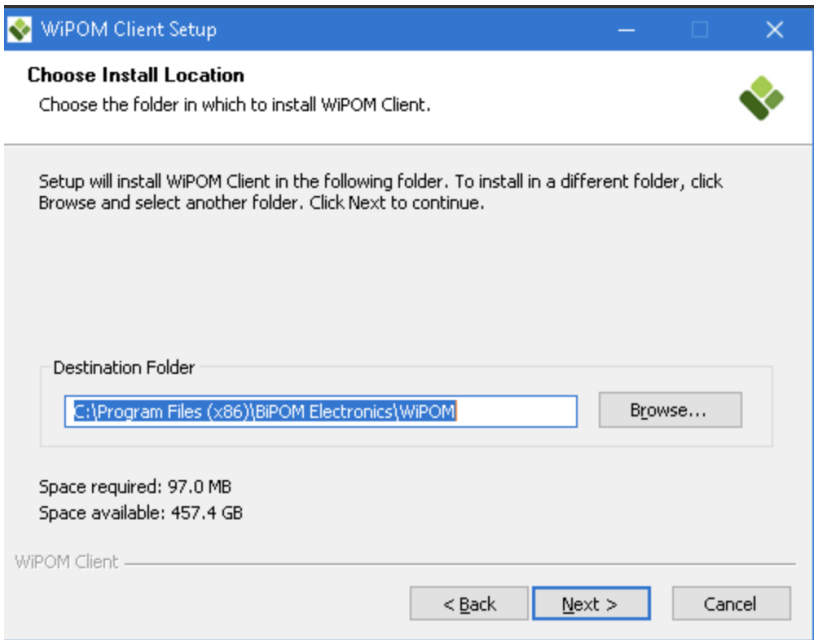
3. Software Setup

Download and run the latest WiPOMsoftware setup from BiPOM web site:

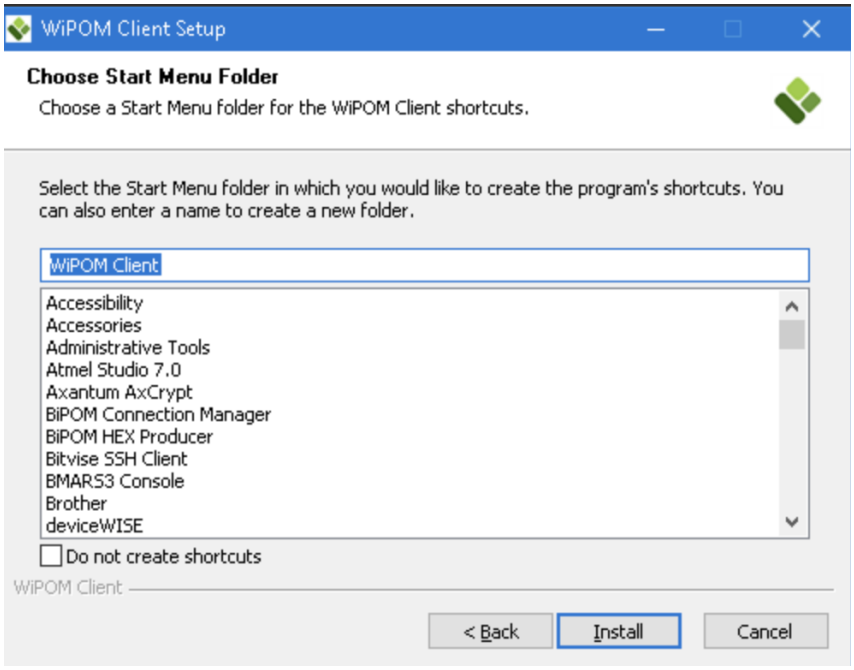
http://www.bipom.com/files/wipom/WiPOMClientSetup.exe



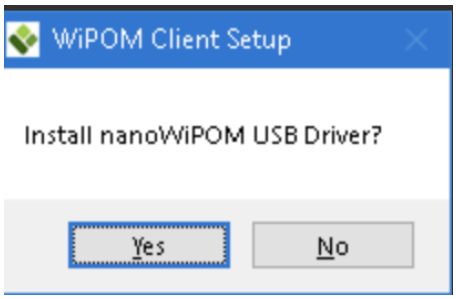
Click **Next** on Welcome window.



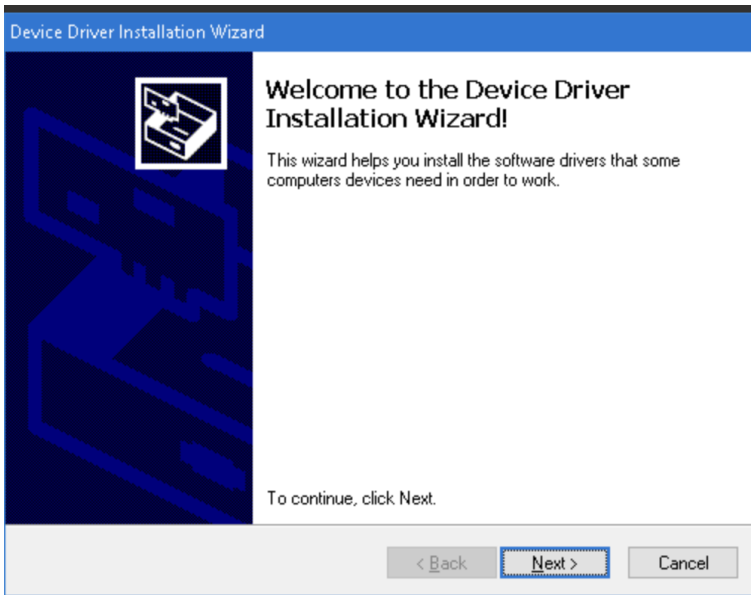
Either use default install location or chose a different location and click **Next**.

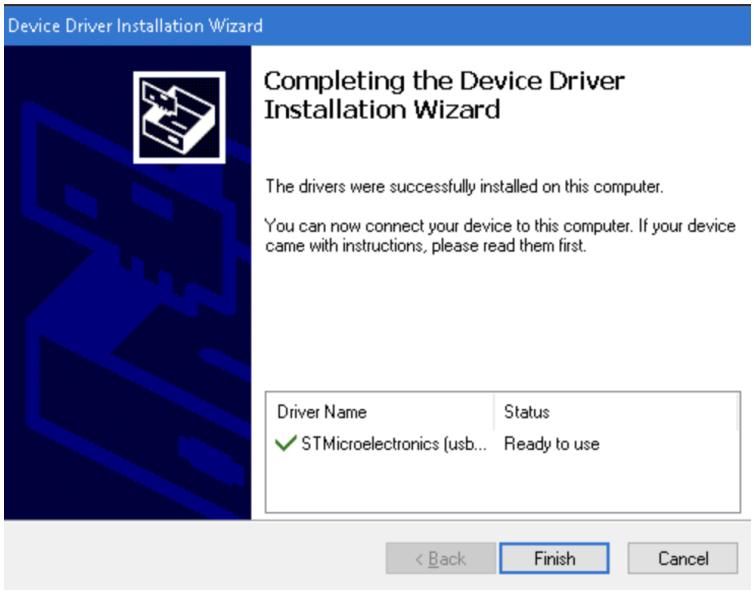


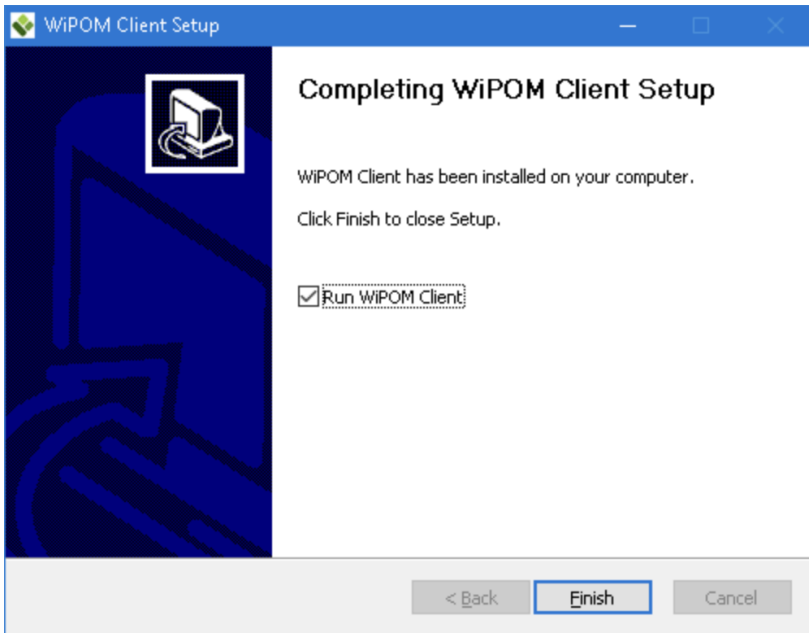
Use the default **Start Menu Folder** name and click **Install**.



Press Yes to install the USB driver


Device Driver Installation Wizard
Welcome to the Device Driver Installation Wizard!
This wizard helps you install the software drivers that some computers devices need in order to work.
To continue, click Next.
< Back
Next >
Cancel


Device Driver Installation Wizard
Completing the Device Driver Installation Wizard
The drivers were successfully installed on this computer.
You can now connect your device to this computer. If your device came with instructions, please read them first.
Driver Name
Status
STMicroelectronics (usb...
Ready to use
< Back
Finish
Cancel



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. WiPOM Client will be installed on your PC.

4. Windows WiPOM Client

4.1 Run WiPOM client

On Windows XP and 7, go to **Start Menu**, open **All Programs →WiPOM Client → WiPOM Client.**

On Windows 8, open **Start Screen** and click **WiPOM Client** icon.

After WiPOM client starts, System status window is displayed:

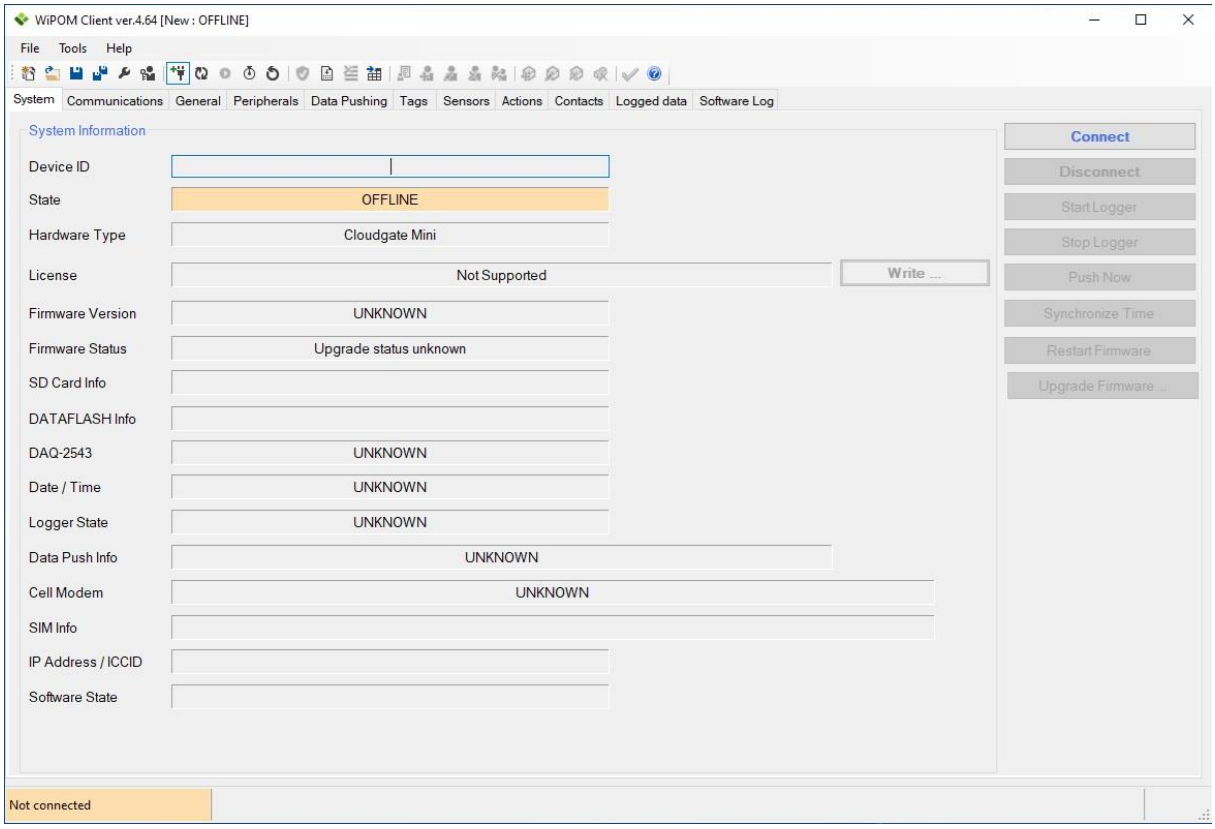


Figure 5 – Main window of WiPOM Client in OFFLINE state

Power board

Connect USB cable from board to PC.

Click the Connect button on WiPOM client System tab.

Select COM port for USB. nanoWiPOM USB port appears as a serial (COM) port to Windows. It is typically a higher port number such as COM27.

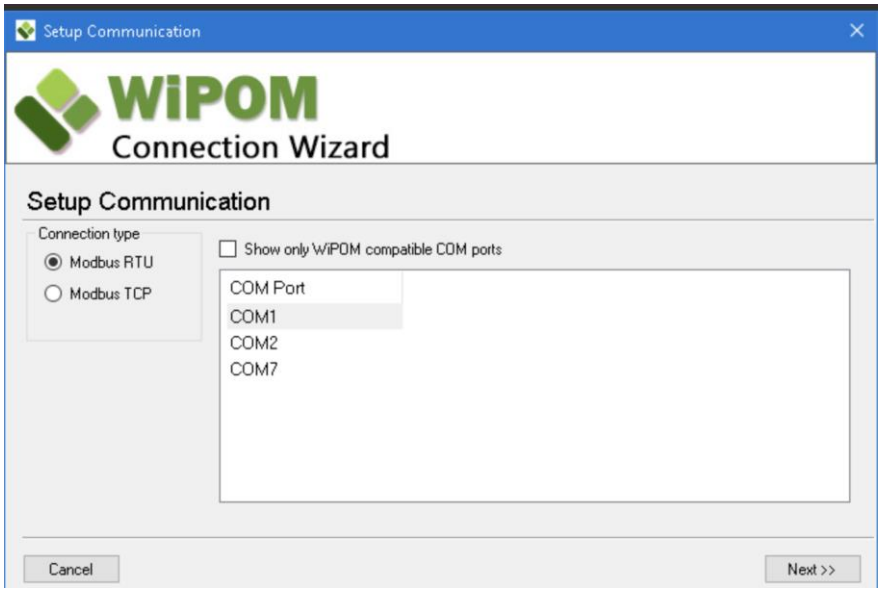


Figure 6 – Selecting COM port window

Click Next.

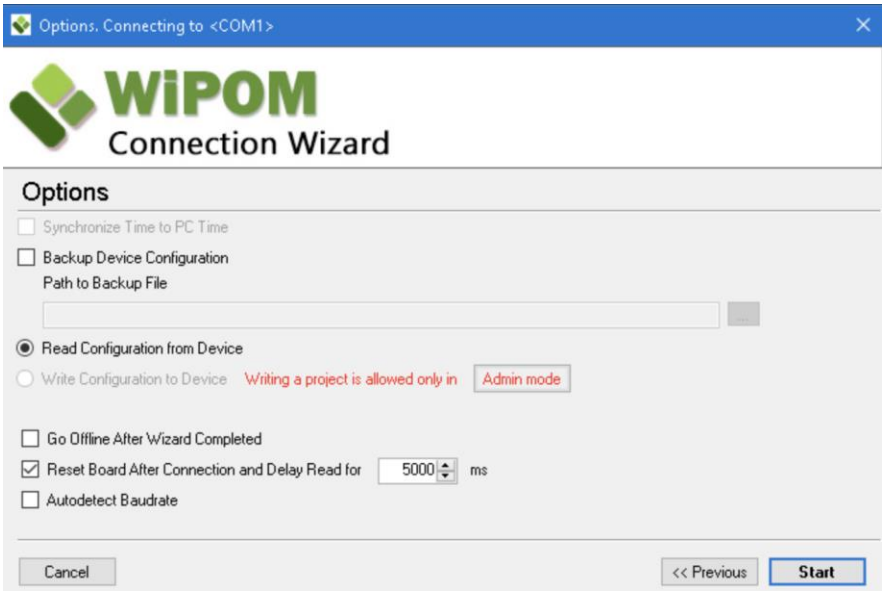


Figure 7 – Set synchronization options

Click Start.

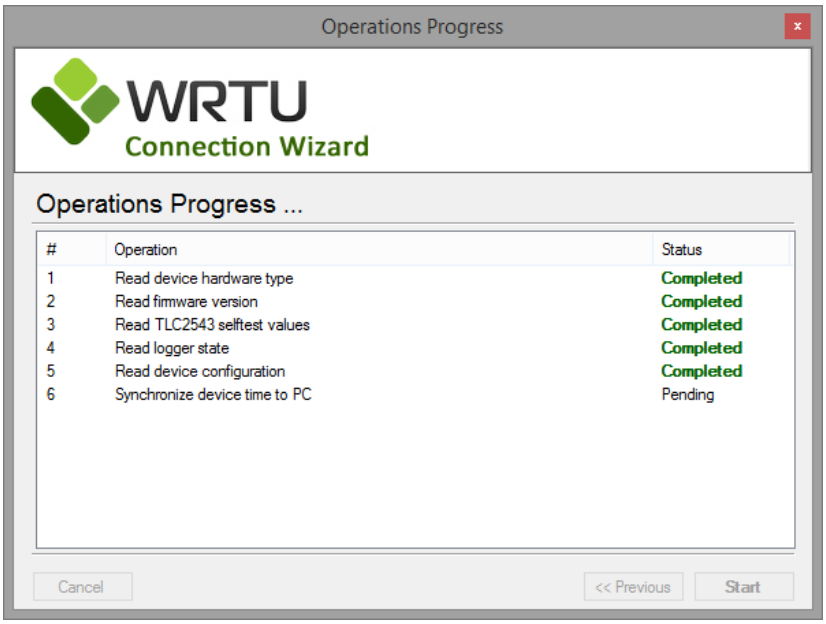


Figure 8 – Synchronization progress window

When software read all information from the board it will show current status of device on main window.

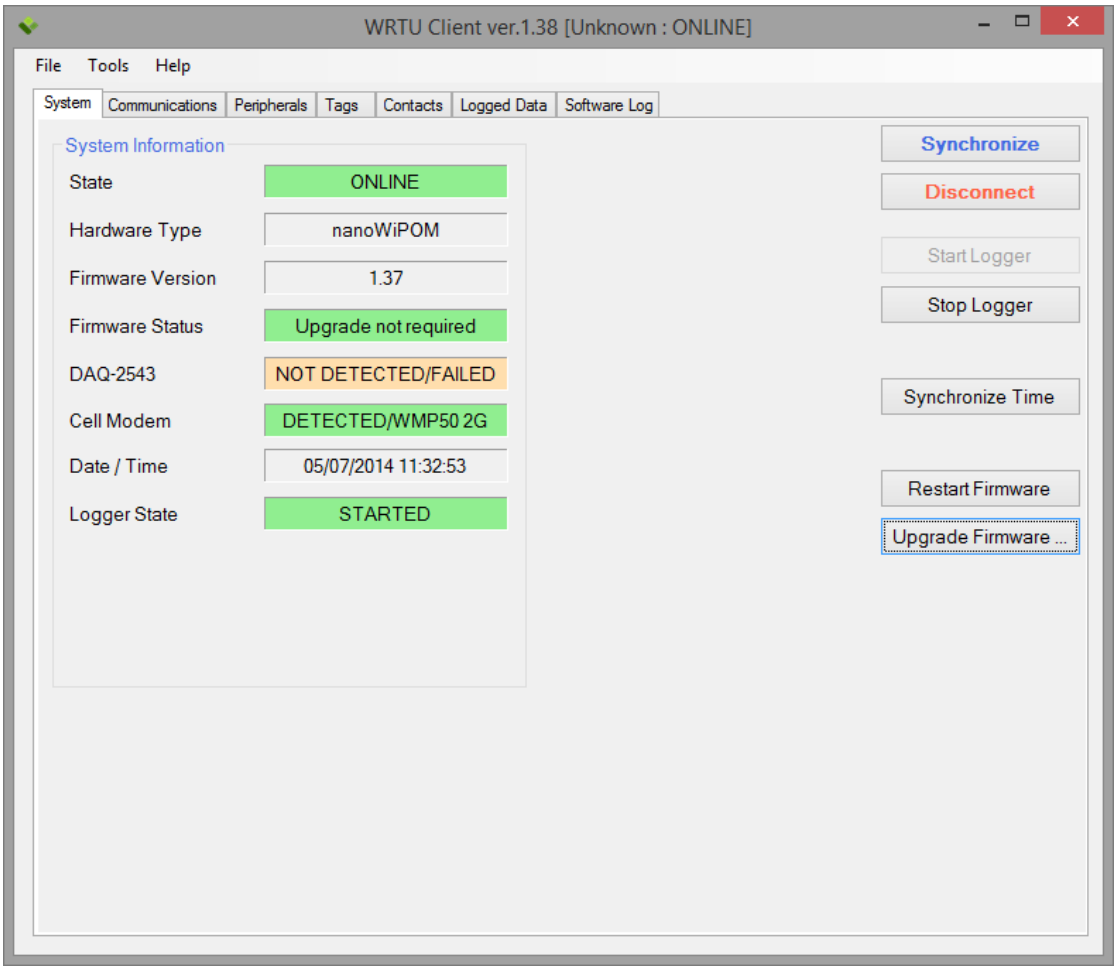


Figure 9 – WiPOM Client in ONLINE state

4.2 WiPOM Client Options

In order to change WiPOM Client options do following steps:

- Run WiPOM Client
- Go to main menu **Tools** and click **Options …**

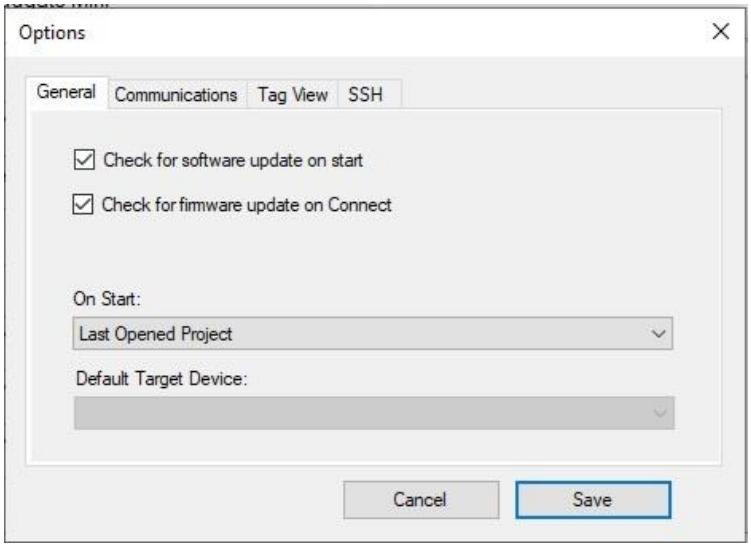


Figure 10.1 – WiPOM Client Options- General

4.2.1 **General** options

There are following general options which can be configed:

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:

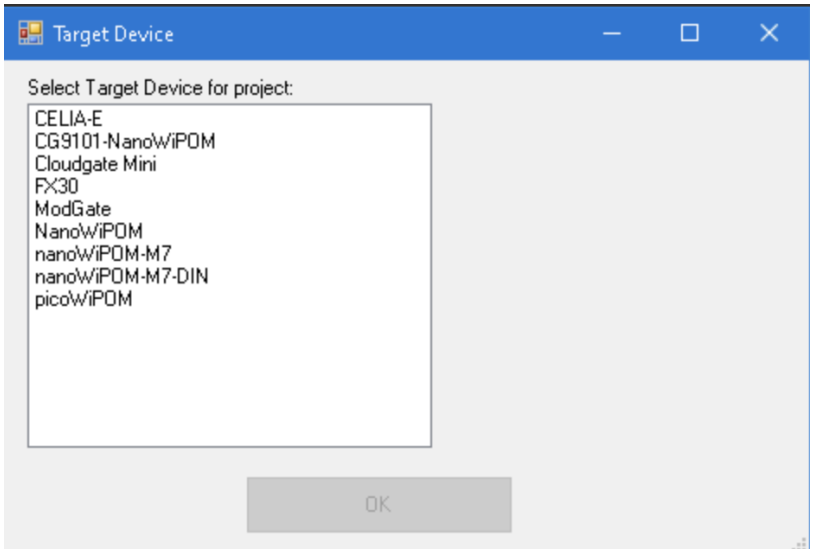
If this option is enabled then WiPOM Client checks if the firmware on the connected nanoWiPOM board is older than the firmware available in WiPOM Client setup. If the board has old firmware, WiPOM Client will prompt to upgrade the firmware to the latest one.

On Start task:

Here list what should automatically be done when WiPOM Client application start. User can choose:

- Last Opened Project
- Show Target Device Window
- Create new default project

If “Last Opened Project” is chosen, then the application will start last opened project when next time start.
If “Show Target Device Window” is chosen, then when next time start, the application will open following dialog to let user to select target device at first.



If “Create new default project” is chosen, then when next time start, the application will create new default project.

Default Target Device:

This drop list will be enabled only if On Start - “Create new default project” is chosen. Thus when application create new default project on start, it can know which target device should be used.

4.2.1 **Communications** options

There are following communications options:

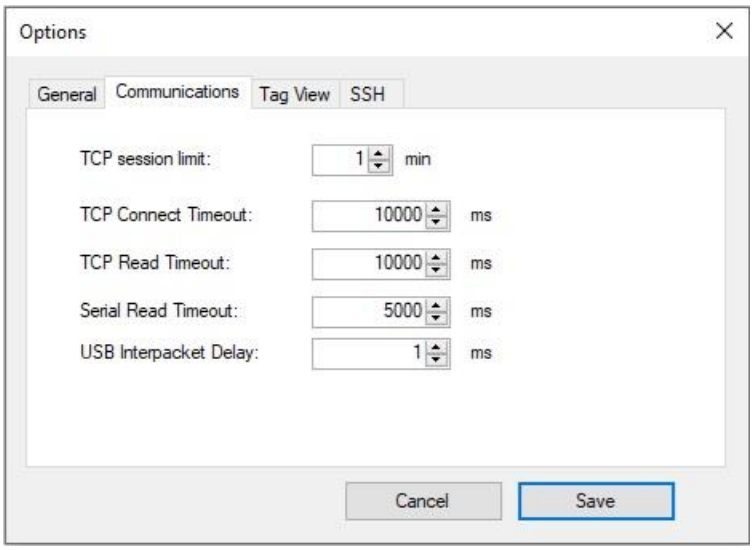


Figure 10.2 – WiPOM Client Options - Communications

TCP Session Limit:

Total minutes a TCP session could be maintained.
* When this application launches a TCP session to connect device to synchronize configuration / data, the TCP connection will not always be kept. Connection will be released after this setting time.

TCP Connect Timeout:

Timeout milliseconds when try to establish a TCP connection.

TCP Read Timeout:

Timeout milliseconds when try to read from a TCP socket.

Serial Read Timeout:

Timeout milliseconds when try to read through a serial port (e.g. COM1).

USB Interpacket Delay:

Interval milliseconds between 2 times packet exchange with a serial-connecting device.
* Since PC side serial ports are always virtual USB serial ports. We just call it USB Interpacket Delay. This is different from the **Modbus RTU Interpacket Delay** and **Modbus TCP Interpacket Delay** configuration for device.

4.2.2 **Tag View** options

User can set which columns need to be shown in the Tags view (See 4.12)

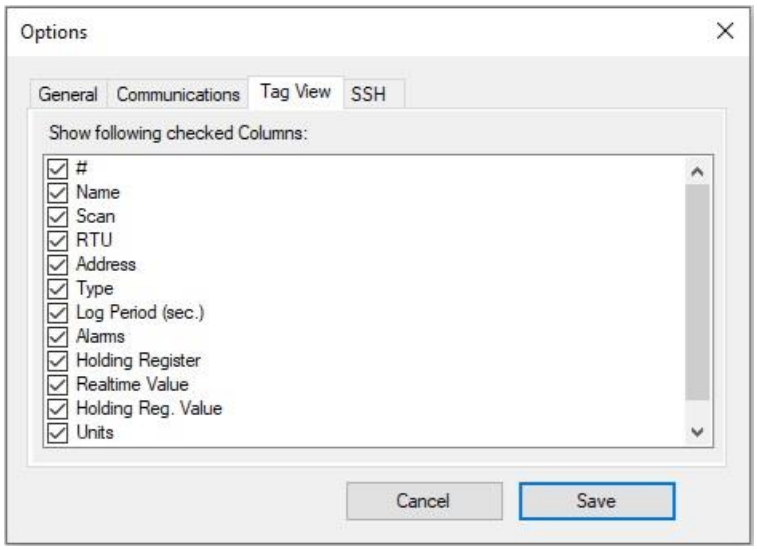


Figure 10.3 – WiPOM Client Options – Tag View

4.2.3 **SSH** options

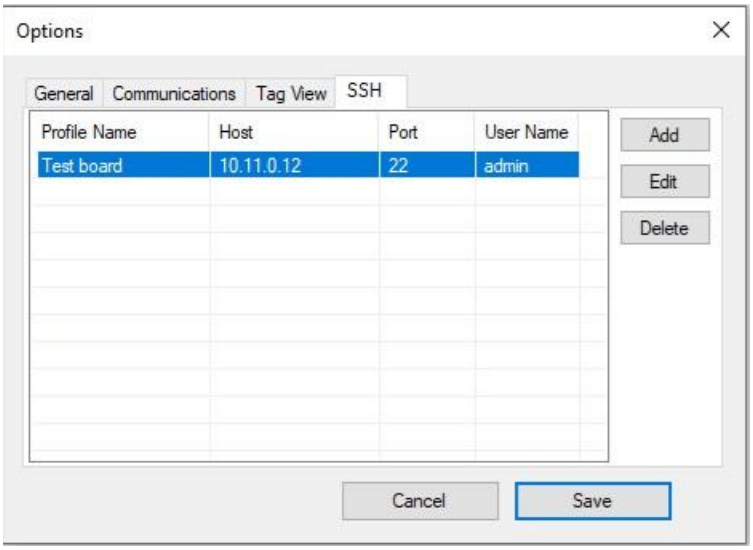


Figure 10.4 – WiPOM Client Options – Tag View

Here user can config some SSH login information which can be used on “Initial setup” for CELIA-E and FX30 type device boards.

Add button: add a new SSH server information, include Host, Port, User Name, Password.

Edit button: edit selected SSH server information.

Delete button: delete selected SSH server information.

4.3 Online Help

In order to get help about WiPOM Client online:

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

This will open online help in default Internet browser.

Online help available at the web address:

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

4.4 Information about WiPOM Client

To get information about WiPOM Client installed on your PC:

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

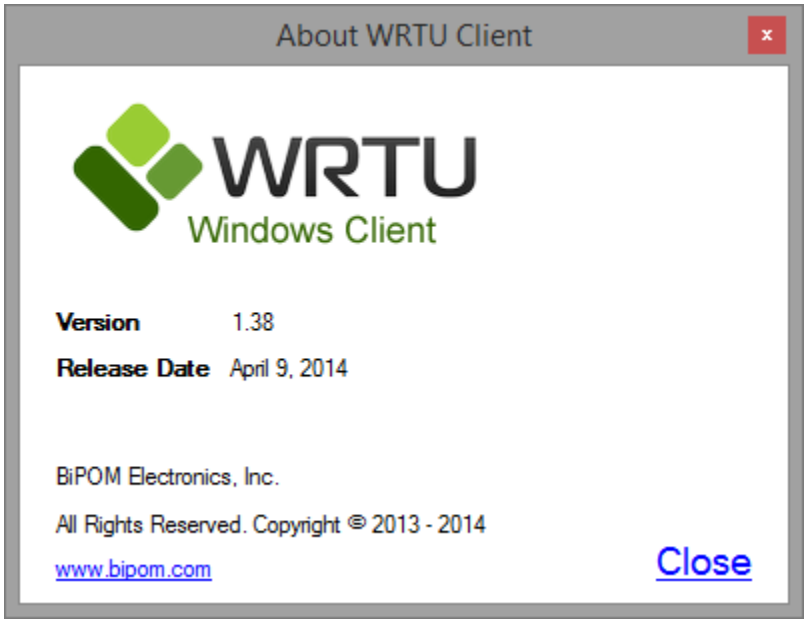


Figure 11 – WiPOM Client About Dialog

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

4.5 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. In order to check for new updates:

- Start WiPOM Client
- Select ***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:

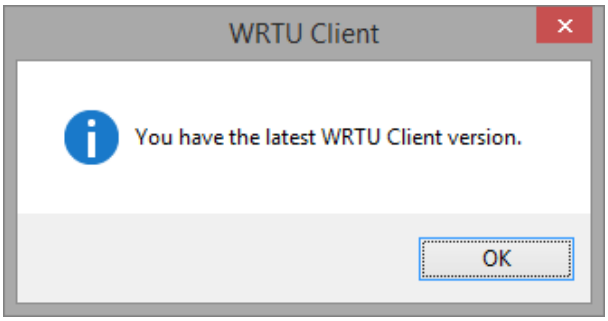


Figure 12.1 – Window when no software updates available

If a new version of WiPOM Client exists on BiPOM web, the following window is shown:

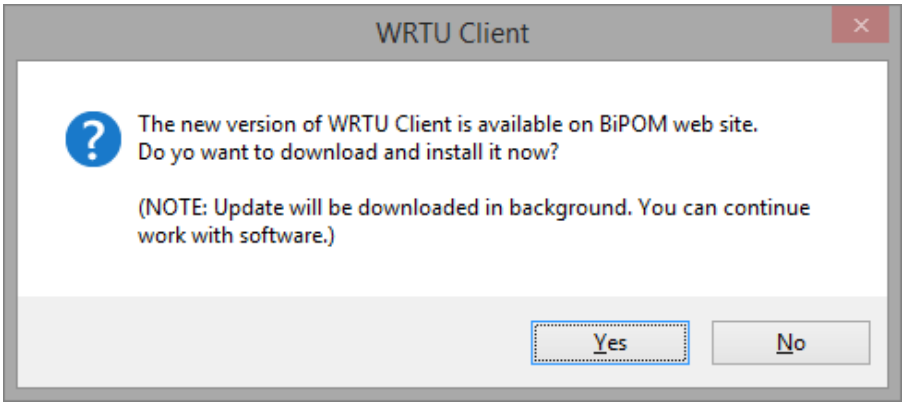


Figure 12.2 – Window when software updates are available

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

When the download completes, the following window is shown:

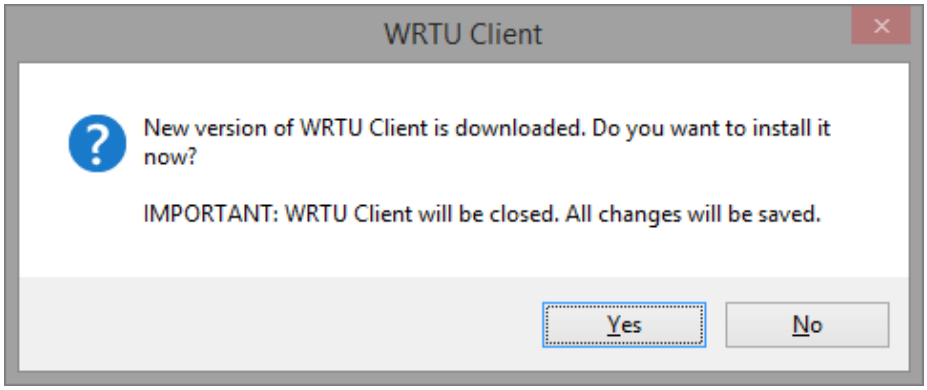


Figure 12.3 – Warning window when starting software update

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

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

4.6 Save / Load Project

All changes in device configuration can be saved as a **Project**. This is helpful for creating a configuration once and using it for several devices.

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

File menu has all the operations related to project management:

Load Project – Opens dialog to select previously saved project file and load it into WiPOM Client
Save Project – Saves changes to the project
Save Project As … - Allows saving the project using a different file name
Reset Project – Resets the configuration to its default values

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

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

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

- Logged data is also not saved.

In order to save a project:

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

In order to load a project:

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

In order set default values to project:

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

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

4.7 Communications settings

All communications options for target device are grouped on **Communications** tab:

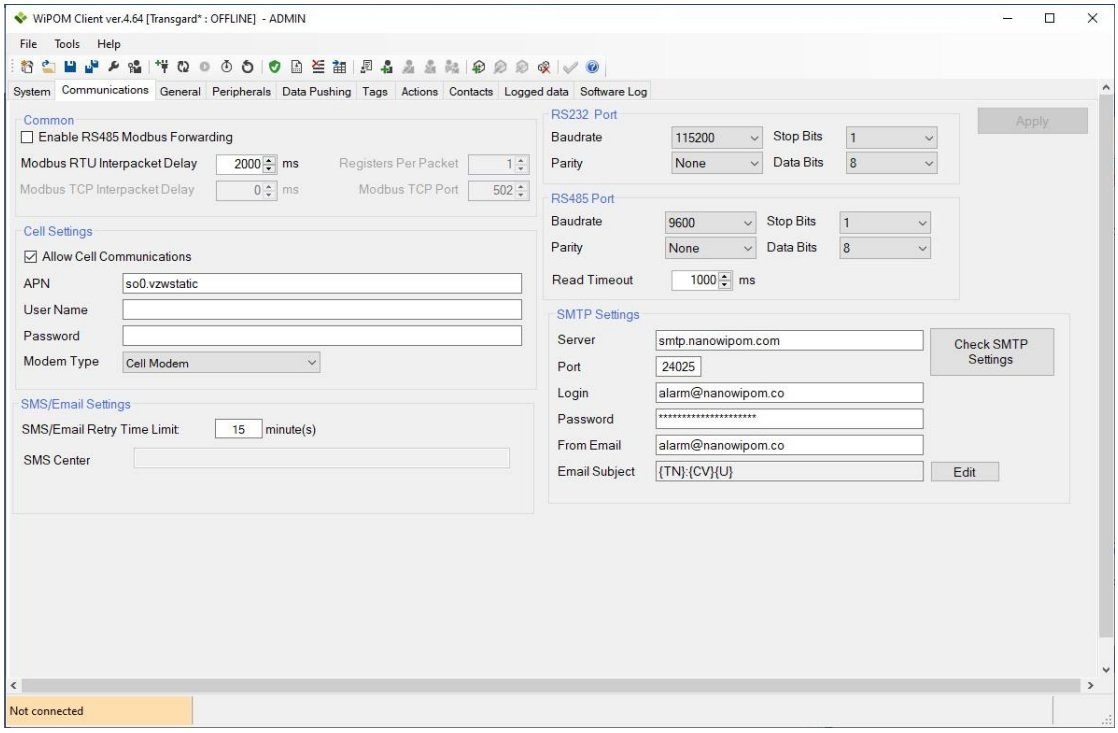


Figure 13 – Communications Settings

Common settings:

Enable RS485 Modbus Forwarding: Enable RS232 - RS485 Brdige Mode. Not applicable for ModGate LP type devices.

Modbus RTU Interpacket Delay: Interval milliseconds between 2 times serial packet exchange.

ModbusTCP Interpacket Delay: Interval milliseconds between 2 times TCP packet exchange. Applicable only for Cloudgate Mini, CELIA-E and FX30 type devices.

Registers Per Packet: Applicable only for Cloudgate Mini, CELIA-E and FX30 type devices.

ModbusTCP Port: TCP port of the device. Applicable for Cloudgate Mini, CELIA-E, FX30 and those NanoWiPOM type devices.

Cell settings: These settings not applicable for Cloudgate Mini and CELIA-E type devices.

Allow Cell Communications: Uncheck this to turn off Cell communication features for the device. If this option is disabled, no SMS alarms or request through GPRS will be processed.

APN: APN server name. Used for initializing cell modem GPRS internet. This comes from SIM card plan.

User Name / Password: These are username and password required by APN server. If they are not required, leave these fields blank.

Modem Type: Not applicable for NanoWiPOM_M7, NanoWiPOM_M7_DIN and Prometheus type devices.

SMS/Email settings: These settings not applicable for FX30 and CELIA-E type devices.

SMS/Email Retry Time Limit: Wait minutes when retry send SMS/Email.
SMS Center: Number of SMS service center. Applicable for Cloudgate Based devices.

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

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

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

SMTP settings:

Server / Port / Login / Password: These are general parameters to be used for login to SMTP server.

From Email: The from email address when send notification email from WiPOM Client.

Email Subject:
The subject of email when send notification email from WiPOM Client.
Following macros can be used in this subject setting:
{TN} – Involved Tag Name.
{RV} – Raw value of the Tag.
{CV} – Calculated value of the Tag.
{U} – Units of the Tag.
{DN} – Device Name.
{TS} – Timestamp when sending the notification.
{MB} – Alarm email body.

Check SMTP Settings button: click this button to check validation of entered SMTP settings.
Edit button: click this button to edit email subject.

4.8 Peripherals settings

4.8.1 Peripherals settings for nanoWiPOM device

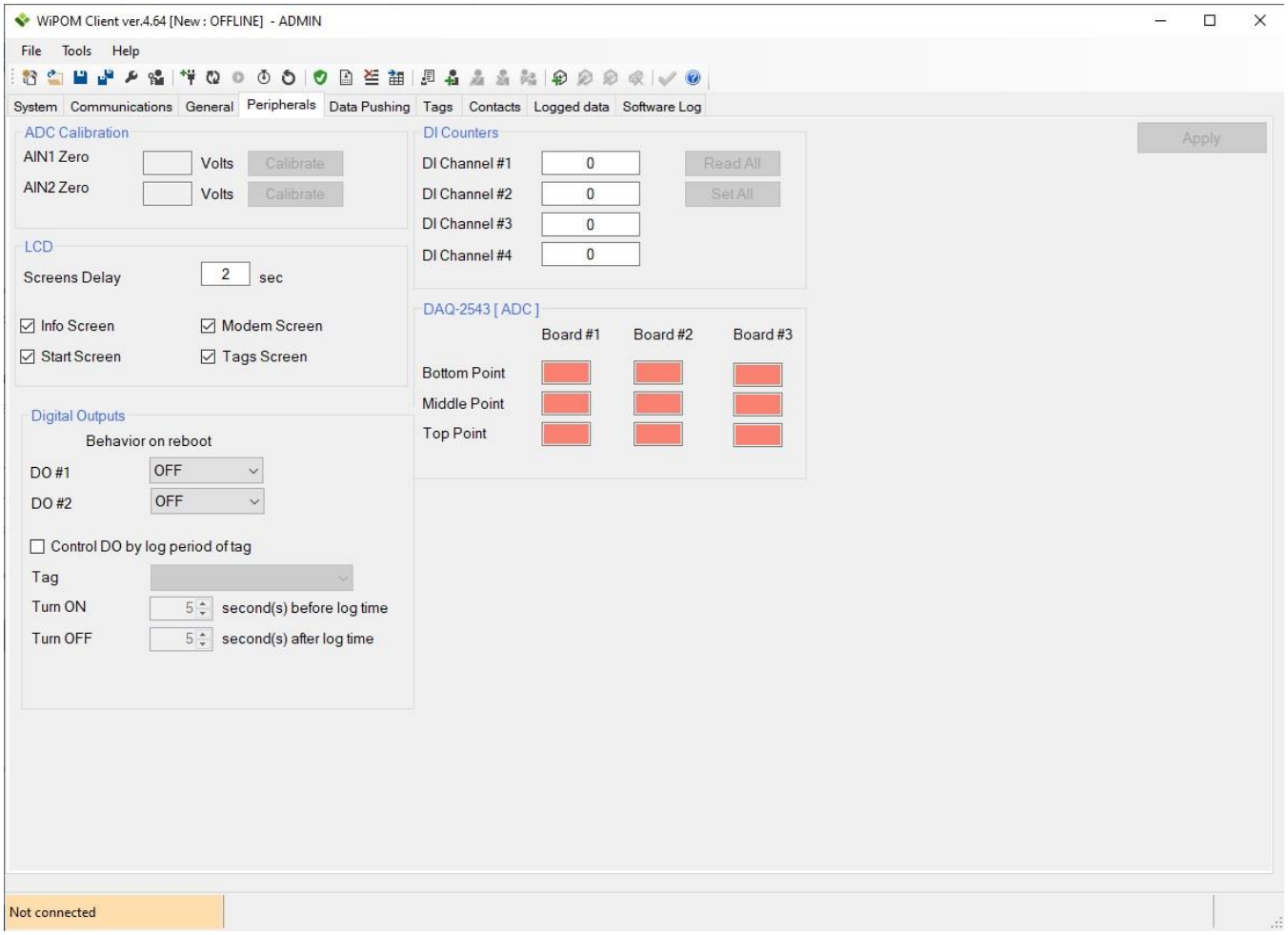


Figure 14.1 – Peripherals information for nanoWiPOM device

ADC Calibration

When tags with types **Voltage RMS** are used, it is recommended to calibrate zero level on AN2 and AN3 ADC inputs to minimize errors. These options are under the **ADC Calibration** group.

The current calibration levelsis shown in read-only text fields (if calibration was done previously). In order to save new zero level the **WiPOM Client** must be in **Online mode**. After this, apply zero level signals to ADC input and when signal is stabilized click **Calibrate** button. This will force hardware read current ADC input value and save it as **Zero Level** in configuration on 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 **DAQ-2543[ADC]** group.

If **DAQ2543** board is installed and accessible, then these values should be very close to 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 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 information on several screens:

Main screen – show general information about 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)

Screens Delay option allows you change delay between screens. Than larger delay – than longer each screen will be presented on LCD.

Digital Outputs

Behavior on reboot – set DO#1 and DO# on/off status when device reboot.

Control DO by Tag:
Set if and when to turn on/off DO - how many seconds before/after log time of which tag.

DI Counters

DI Channel #1 / DI Channel #2 / DI Channel #3 / DI Channel #4 – counters of each channel.

4.8.2 Peripherals settings for picoWiPOM device

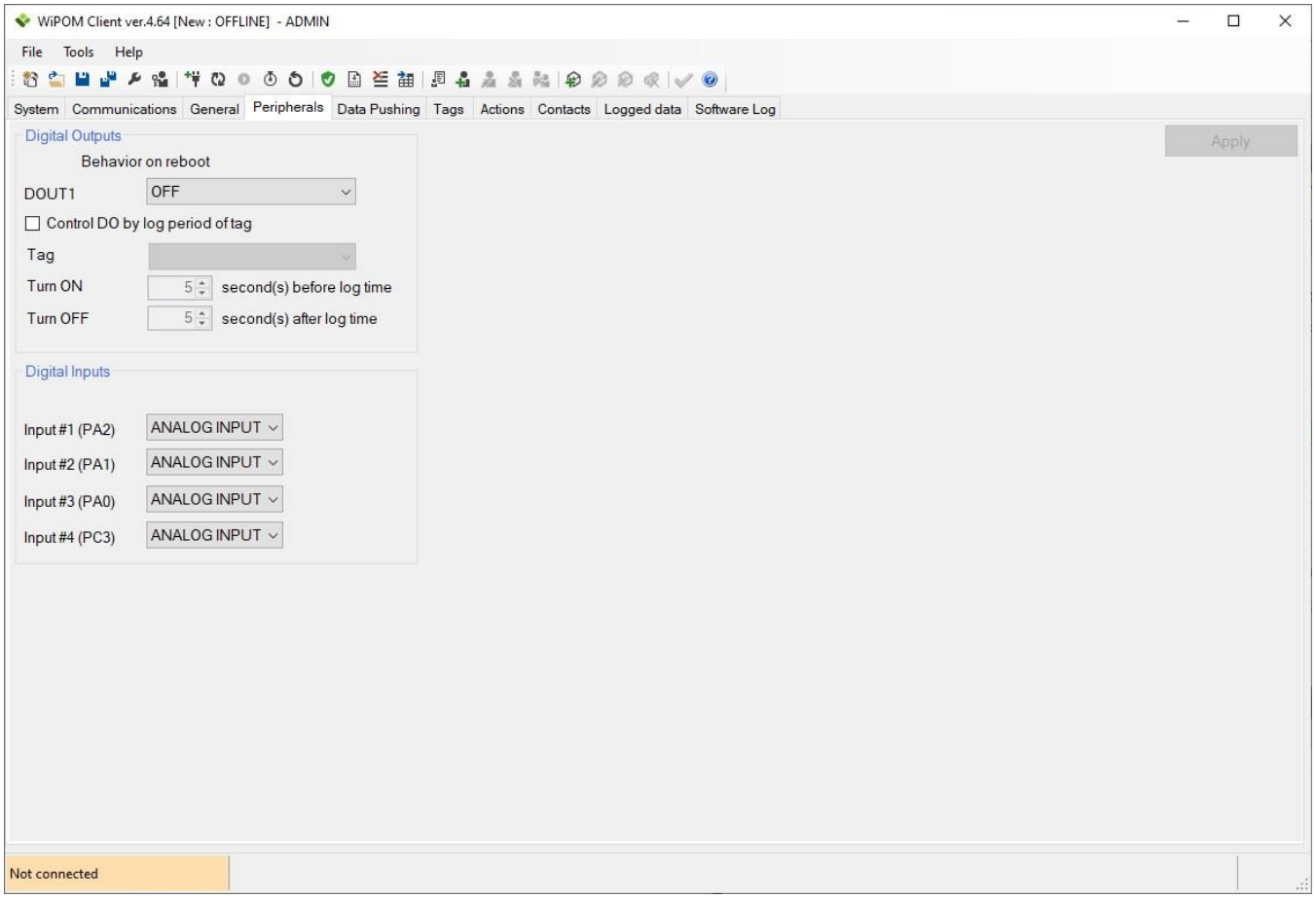


Figure 14.2 – Peripherals information for picoWiPOM device

Digital Outputs

Similar as above Peripherals settings for nanoWiPOM device, only DO #1 applicable.

Digital Inputs

Set input mode (analog or digital) of each input pin.

4.8.3 Peripherals settings for Prometheus device

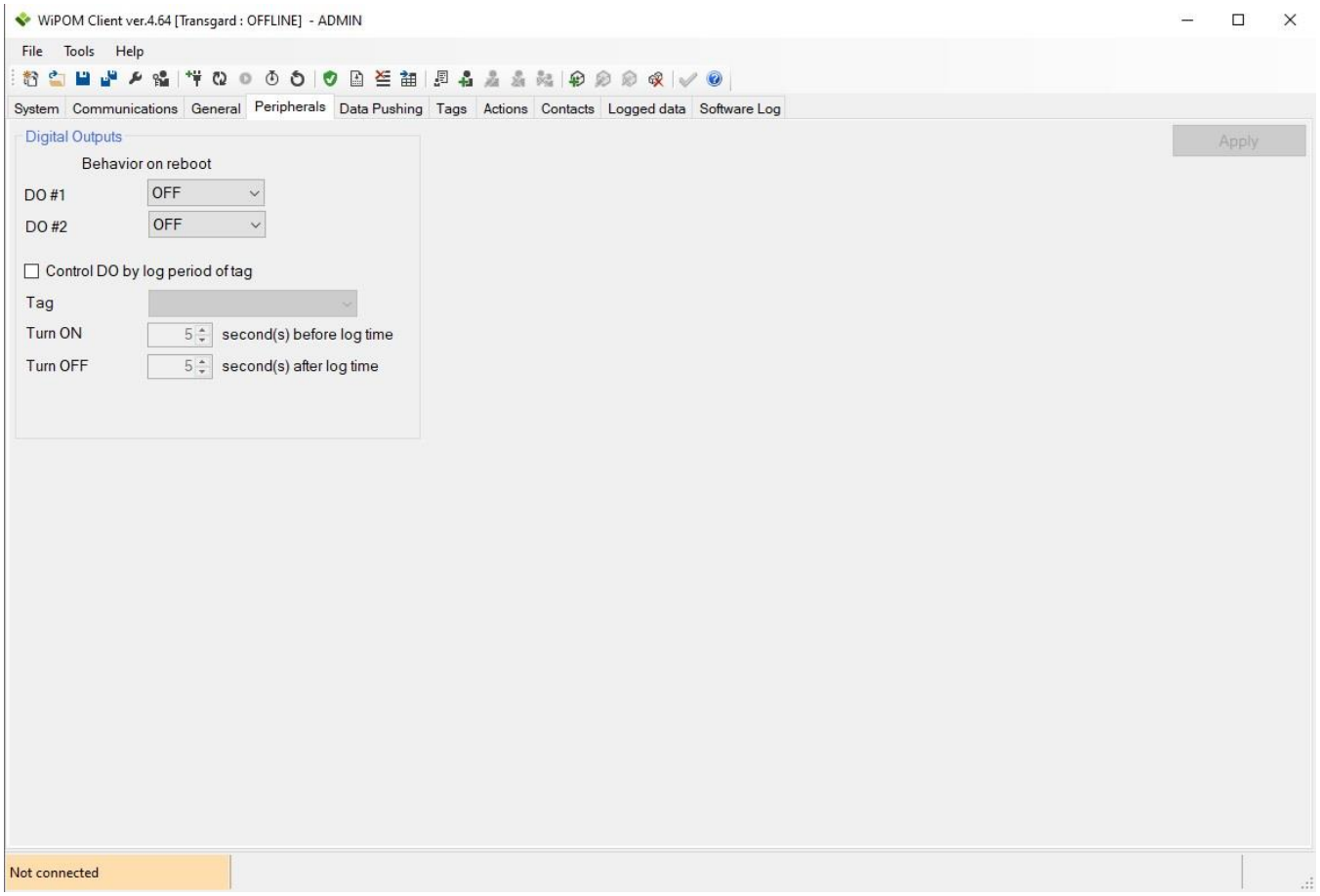


Figure 14.3 – Peripherals information for Prometheus device

Digital Outputs

Same as above Peripherals settings for nanoWiPOM device.

4.8.4 Peripherals settings for CloudgateMini device

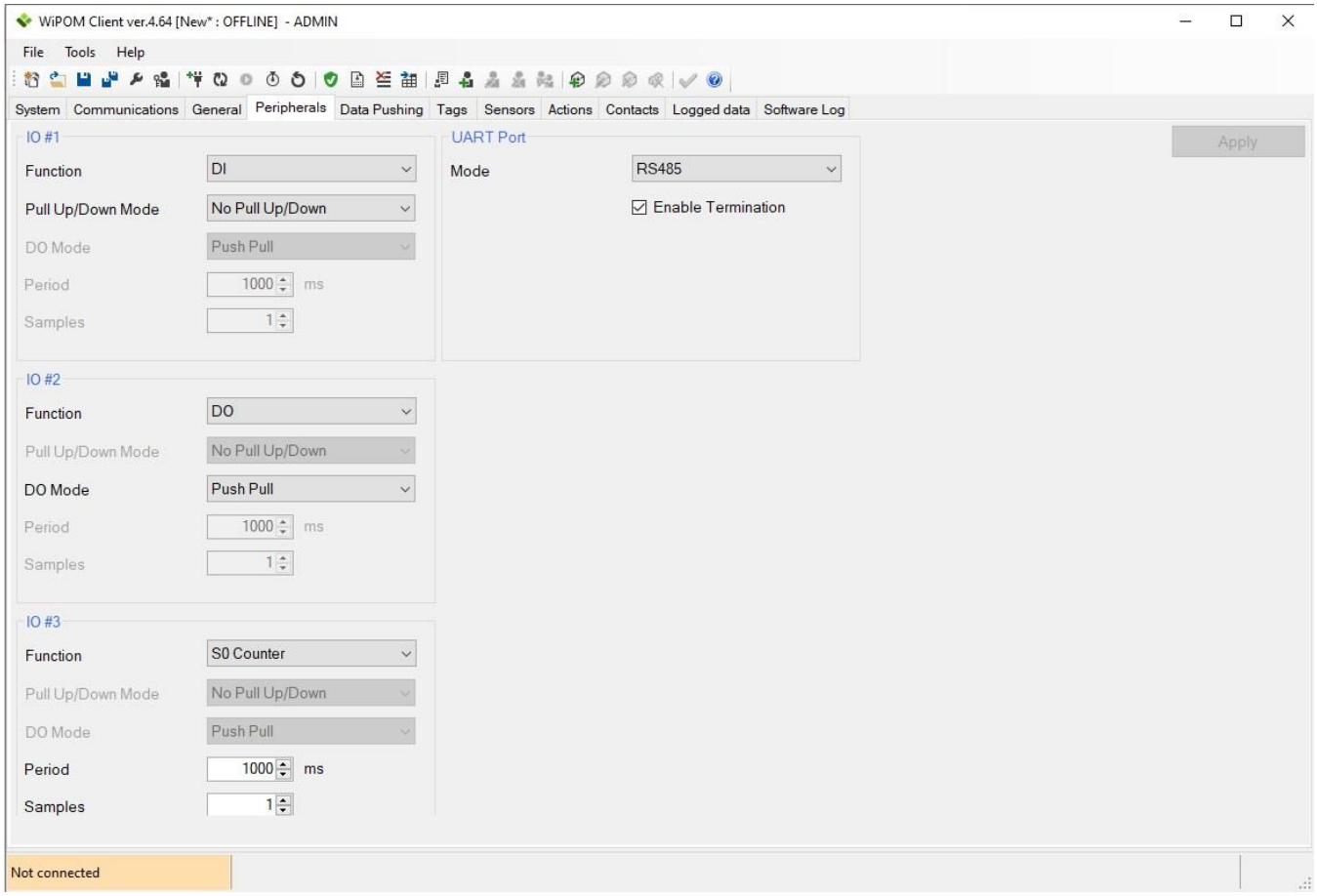


Figure 14.4 – Peripherals information for CloudgateMini device

IO #1 / IO #2 / IO #3

Function – set function of each IO pin: DI, DO, AI, S0 Counter or Current Loop.

Pull Up/Down Mode – Pull Up, Pull Down or Null. Applicable for DI function.

DO Mode – Push Pull or Open Drain. Applicable for DO function.

Period – S0 Counter period (milli seconds). Applicable for S0 Counter function.

Samples – S0 Counter samples. Applicable for S0 Counter function.

UART Port

Mode – RS485 or RS232.

Enable Termination – Applicable for RS485 mode.

4.8.5 Peripherals settings for FX30 device

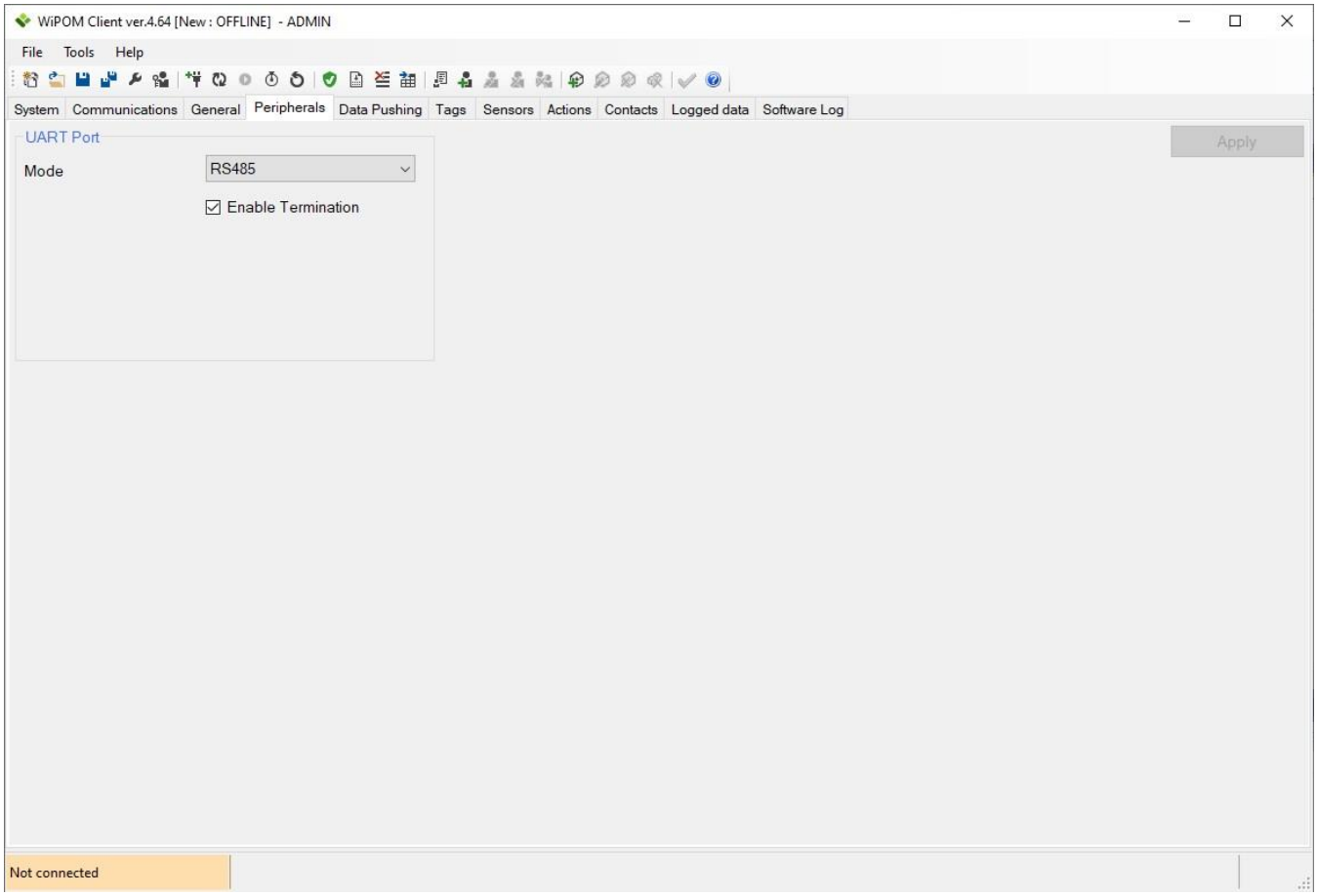


Figure 14.5 – Peripherals information for FX30 device

UART Port

Same as above Peripherals settings for CloudgateMini device.

4.9 Data Pushing settings

4.9.1 Data Pushing profile – WiPOM JSON HTTP(S)

This profile is available for any device type.

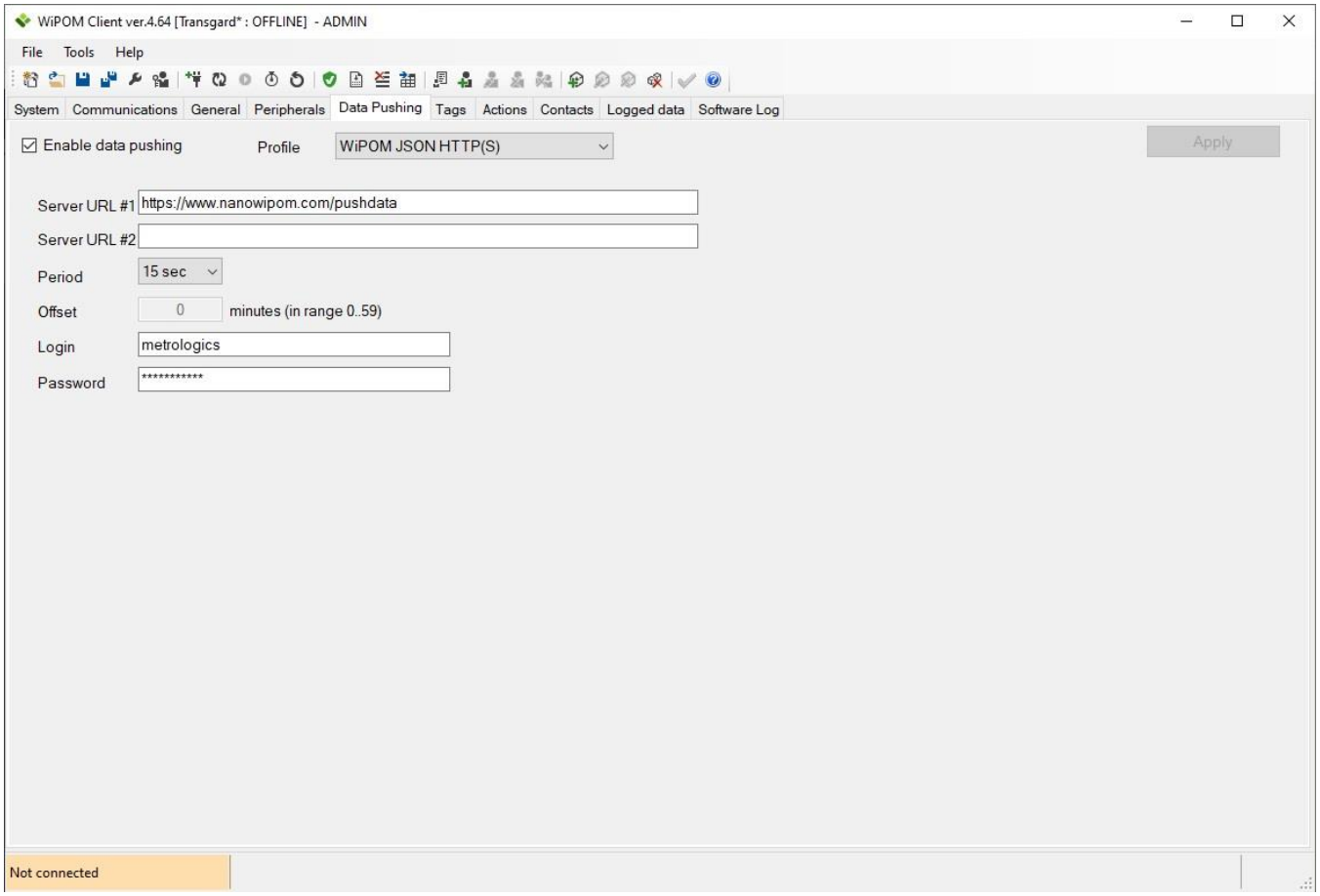


Figure 15.1 – WiPOM JSON HTTP(S) Data Pushing

Server URL #1:

The main URL used for WiPOM JSON HTTP(S) Data Pushing. It will be https://www.nanowipom.com/pushdata by default.

Server URL #2: URL2 is just backup for URL1.In case of URL1 doesn't work software try URL2.

Period: How long device will repeat this data pushing action.

Offset:

Login / Password: The user name and Password used to login on nanowipom.com

4.9.2 Data Pushing profile – Custom HTTP(S)

This profile is available for Linux based device type.

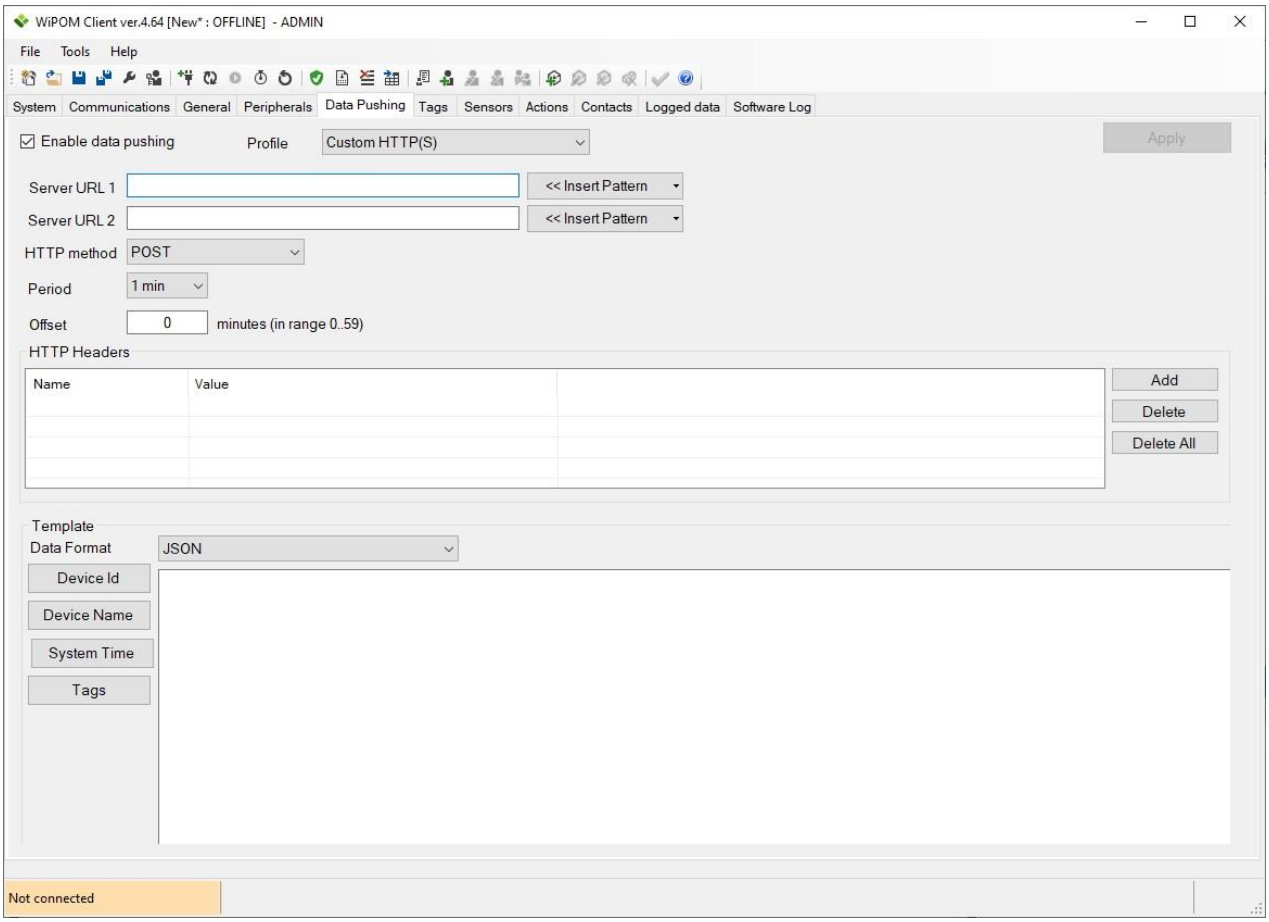


Figure 15.2 – Custom HTTP(S) Data Pushing

Server URL #1: The main URL used for Custom HTTP(S) Data Pushing.

Server URL #2: URL2 is just backup for URL1.In case of URL1 doesn't work software try URL2.

HTTP method: Available HTTP methods: GET and POST.

Period / Offset: Same as above.

HTTP Headers

Many services required special values inside HTTP headers
For example Ubidots required access token added as HTTP Header

X-Auth-Token: <token>

User will be able to add new items to the list with Add button, edit it with Edit button and delete selected items with Delete button. Also:
- double click on empty line allow add new header item (directly in view list no need extra dialog)
- click on existing item allow to edit it.

Template

POST payload Template. It is available only if POST method is selected.
Also, User can select payload format: Text or JSON
Inside payload we will support patterns like following:

$device_name$

And $device_name$ will be replaced with real device name when post data.

Supported patterns:
device_name
device_serial
tag_name
tag_value
tag_units
tag_id
tag_value_time
system_time

4.9.3 Data Pushing profile – WiPOM MQTT

This profile is available for Linux based device type and STM32F7 based device type.

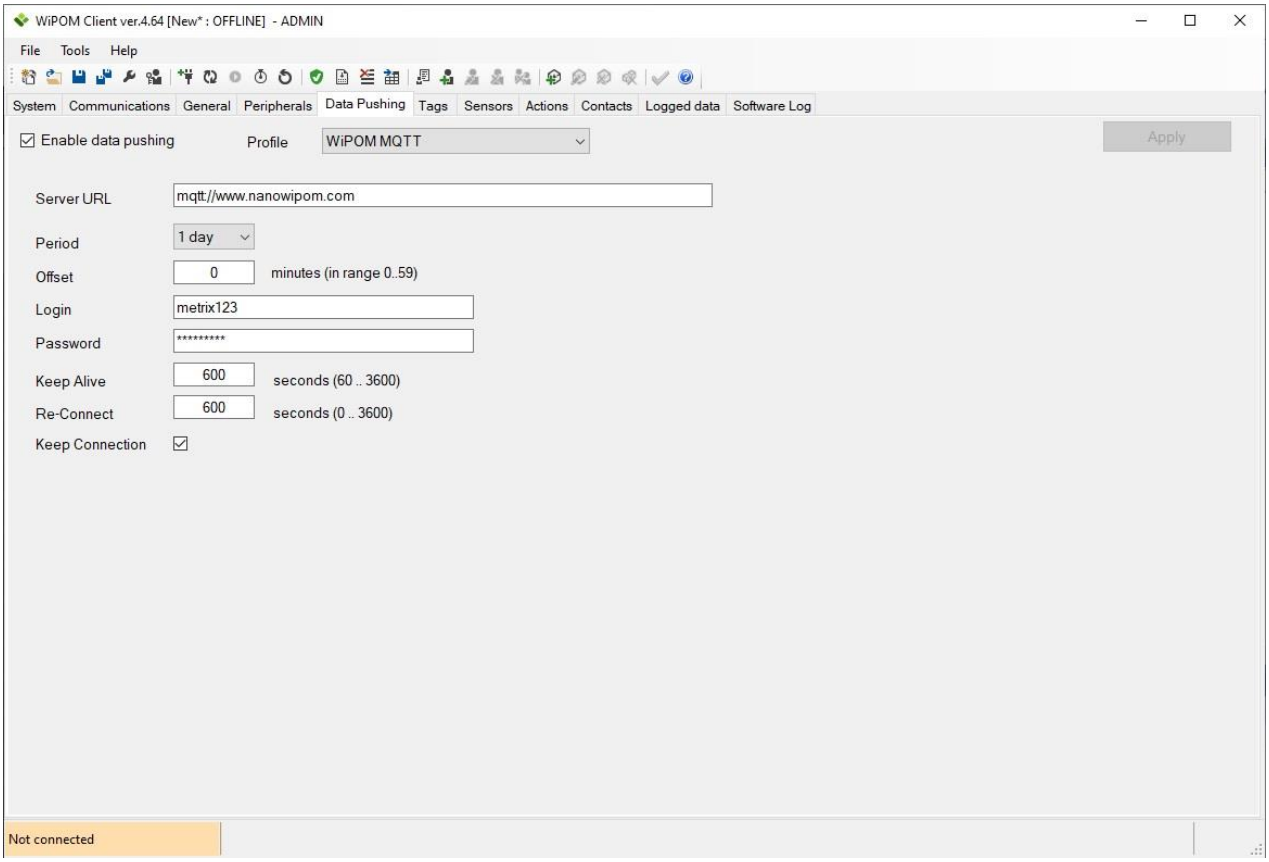


Figure 15.3 – WiPOM MQTT Data Pushing

Server URL: The URL used for WiPOM MQTT Data Pushing. It will be mqtt://www.nanowipom.com/ by default.

Period / Offset / Login / Password: Same as above.

Keep Alive: MQTT connection Keep Alive seconds.

Re-Connect: Auto re-connect seconds after disconnected.

Keep Connection: If keep MQTT connection when idle.

4.9.4 Data Pushing profile – Custom MQTT

This profile is available for Linux based device type.

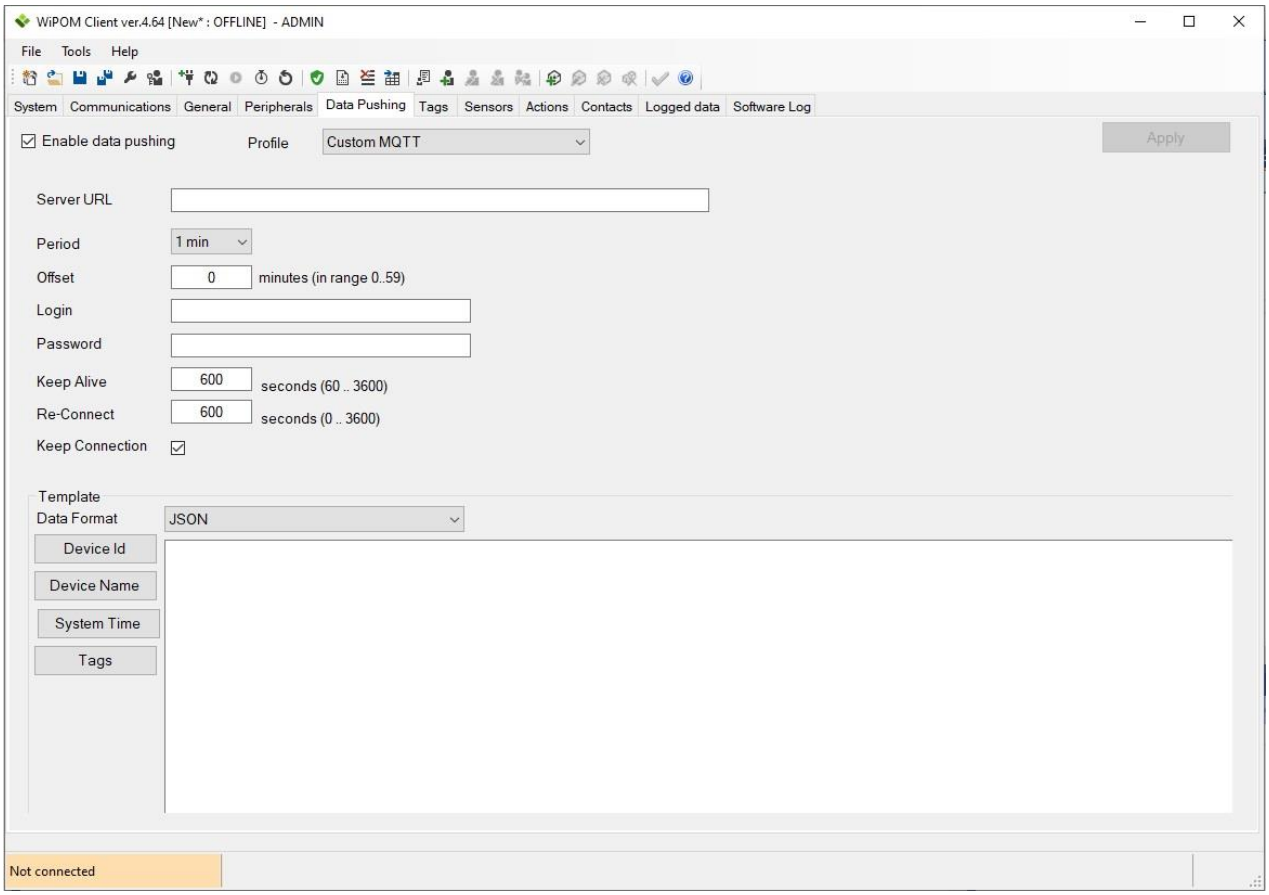


Figure 15.4 – Custom MQTT Data Pushing

Server URL: The URL used for Custom MQTT Data Pushing.

Period / Offset / Login / Password: Similar as above.

Keep Alive / **Re-Connect** / **Keep Connection**: Similar as above.

Template: Similar as above Custom HTTP(S) Data Pushing.

4.11 System Information

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

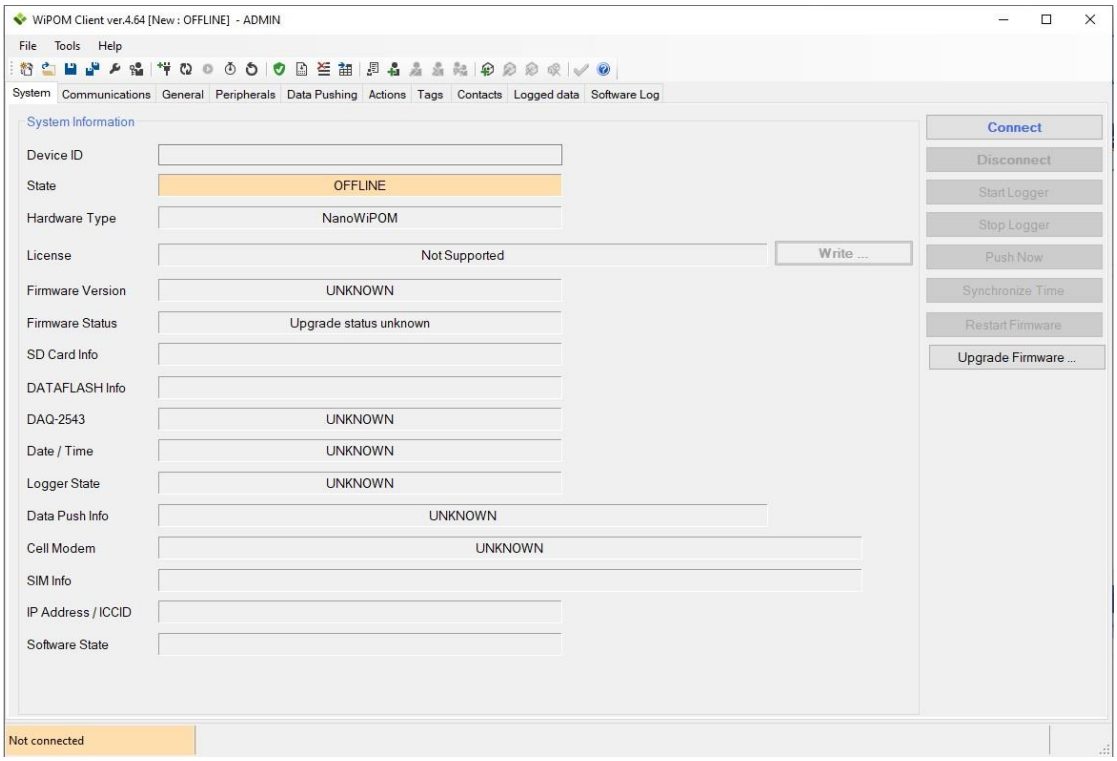


Figure 17 – System tab (Offline Mode)

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

Connect
When you click **Connect** button you run **Connection Wizard** which help connect to the board and switch 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**.

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

The System tab in Online Mode is shown on Figure 18:

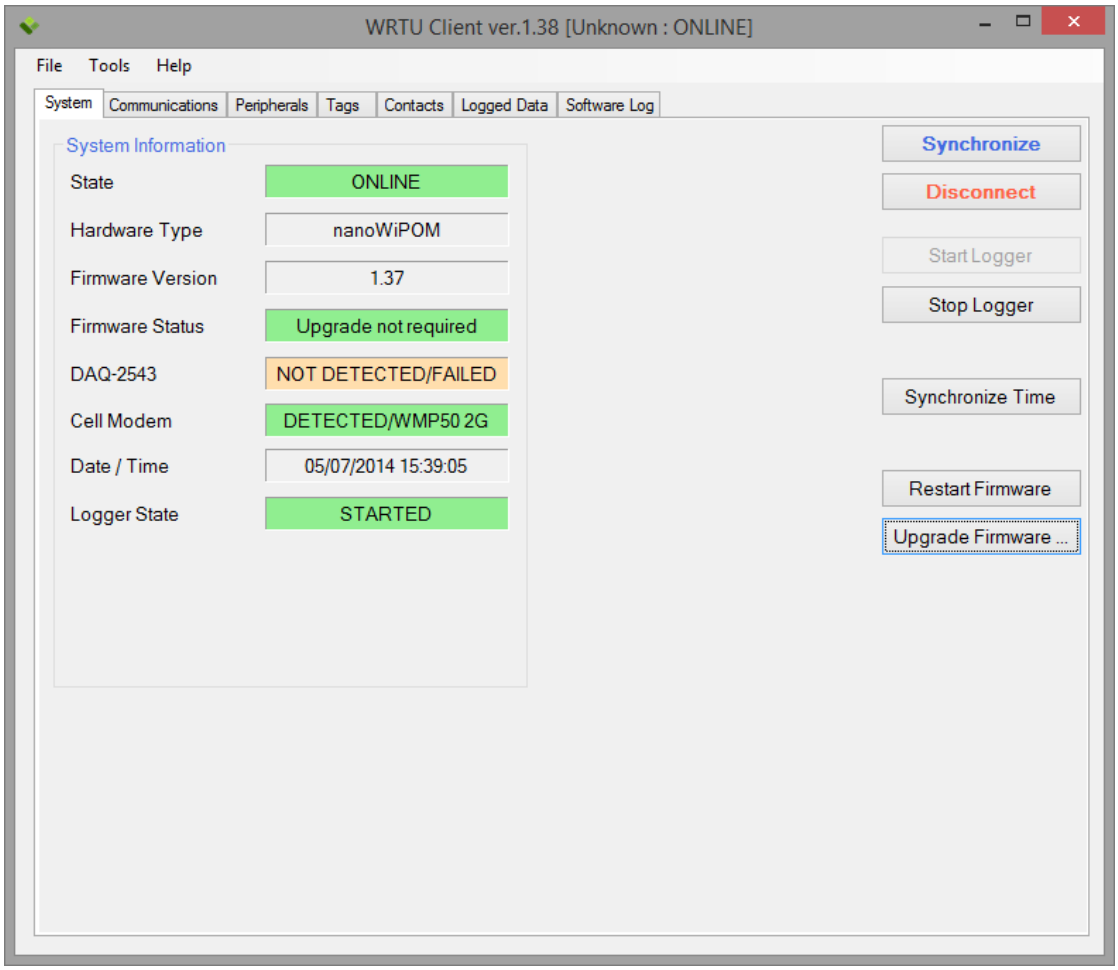


Figure 18 – System tab (Online Mode)

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

State
Current state of **WiPOM Client**: it can be ONLINE or OFFLINE

ONLINE – client is connected to device
OFFLINE – client is not connected to 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, nanoWiPOM, CG9101-nanoWiPOM

UNKNOWN - hardware type is unknown.is shown when client not connected to hardware
WiPOM - hardware has installed **WiPOM** board
nanoWiPOM - hardware has installed **nanoWiPOM** 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

More information about **CG9101-nanoWiPOM** board: http://www.bipom.com/products/us/4380902.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 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. 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. 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 latest firmware. Also, latest firmware may include bug fixes and other improvements.

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

Cell Modem
This status field shows information about **Cell Modem**. If firmware detected the modem then text will be **DETECTED**. If firmware didn't detect the modem then text will be **NOT DETECTED/FAILED**.
Also it shows 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 data logger state. The data logger state can be in 2 modes: started and stopped. If data logger is started, then device shows text **STARTED**. Also when data logger is stopped it shows text **STOPPED**.

When **WiPOM Client** in Online Mode it can do 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 connected device. This means that device will watch inputs, log data and generate alarms.

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

Synchronize Time
Set current PC time to RTC on device

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

Upgrade Firmware
Start firmware upgrading.

4.12 Tags

WiPOM uses tags to monitor inputs, control outputs and to 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:

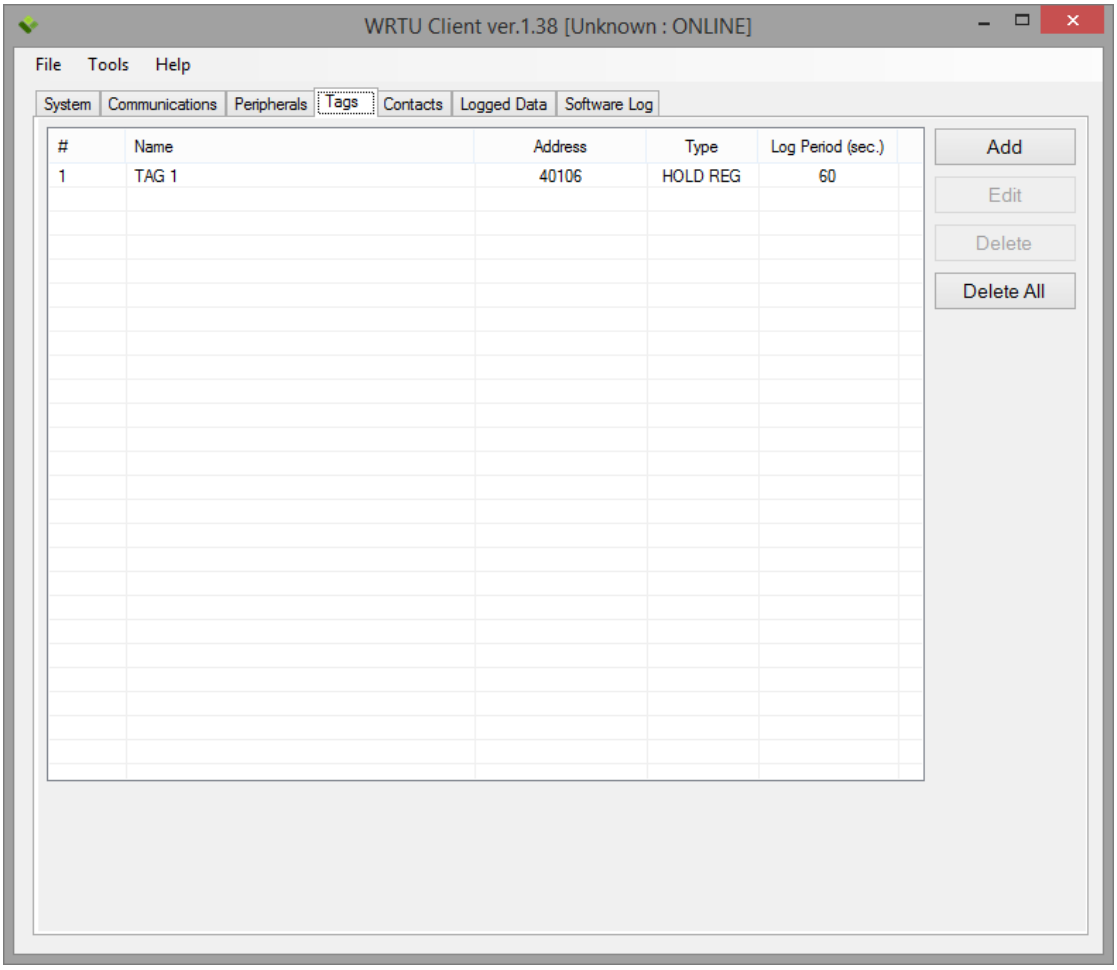


Figure 19 – Tags tab

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

Delete
This button deletes all the selected tags from the project.

Delete All
This button deletes all the tags from the project.

4.12.1 Adding New Tags

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

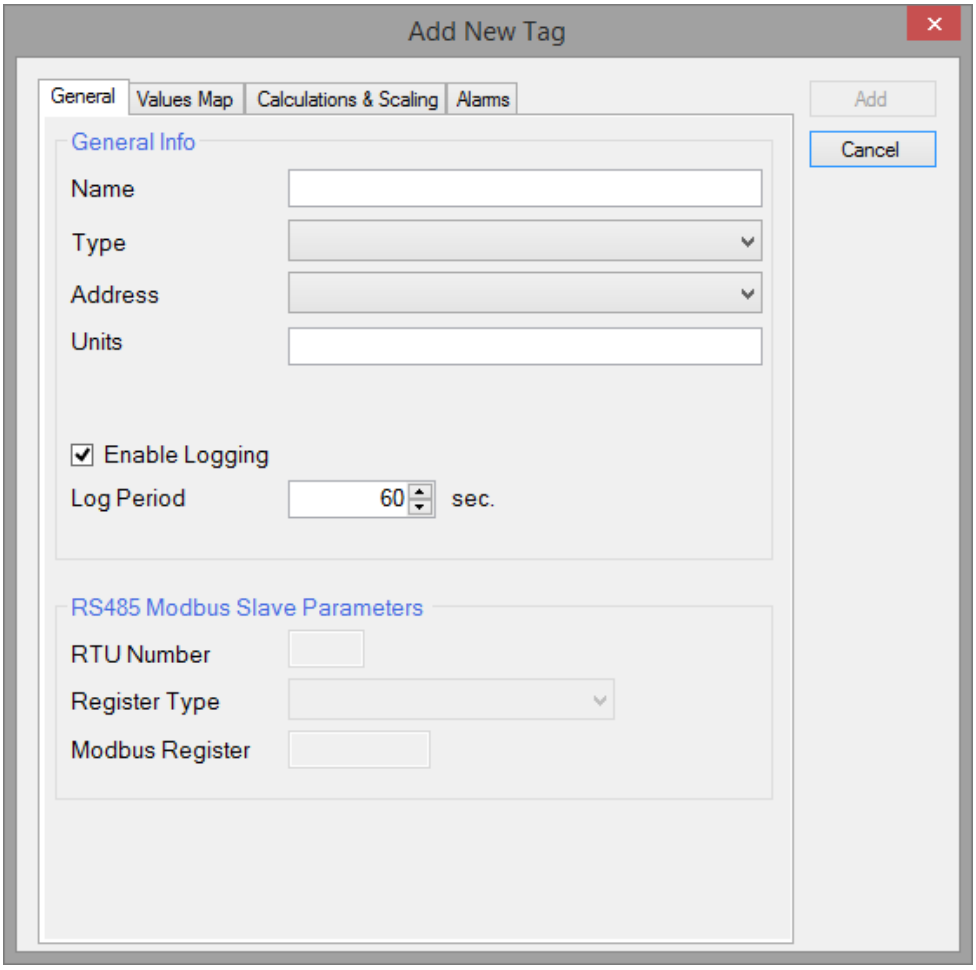


Figure 20 – Add New Tag Window

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

4.12.2 Adding New Tags: General Settings

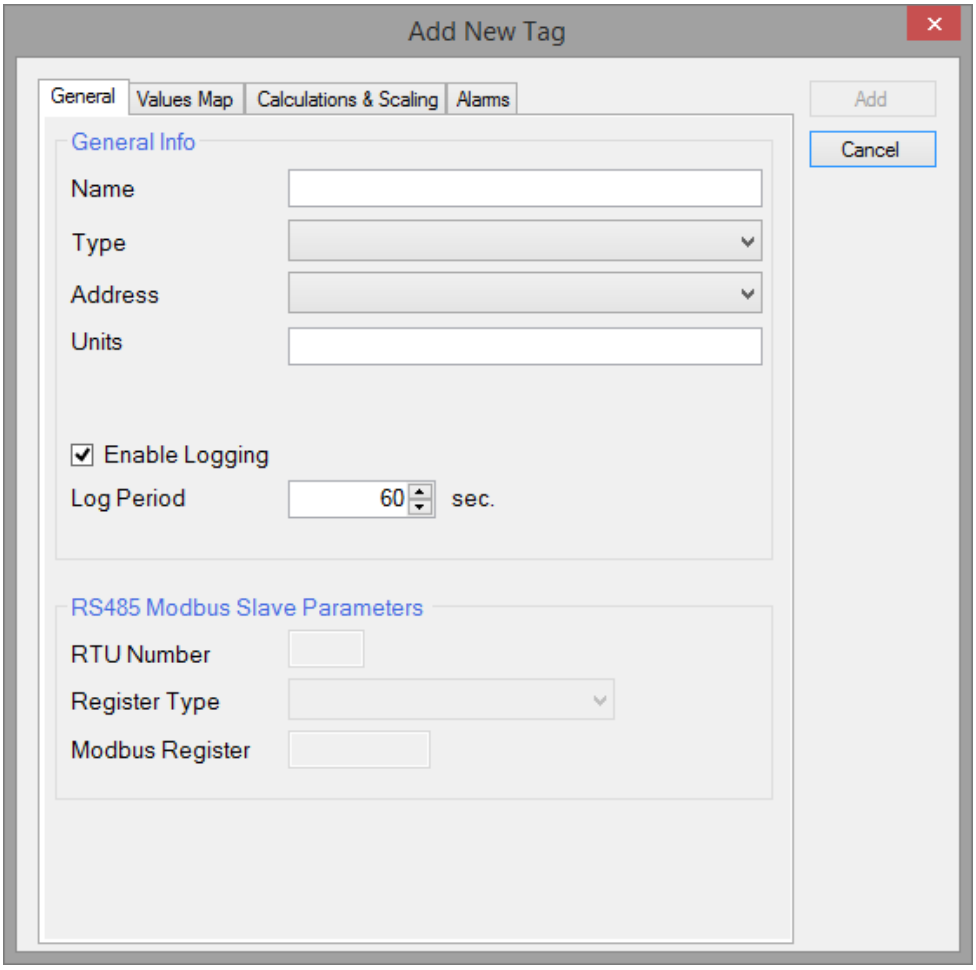


Figure 21 – Adding New Tags: General Settings

This tab provides general information about 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 alarm(s) and there is no need to log the data for the tag.

Log Period
Data logging period (in number of seconds) for the tag.
0 means log data as fast as possible.

RS485 MODBUS Slave Parameters

If tag's **Type** is selected as **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 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 MODBUS register address.

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

RTU Number
RTU Number of slave device

Register Type
The type of target MODBUS register. This helps to accurately check if register 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**.

4.12.3 Adding New Tags: Values Map Settings

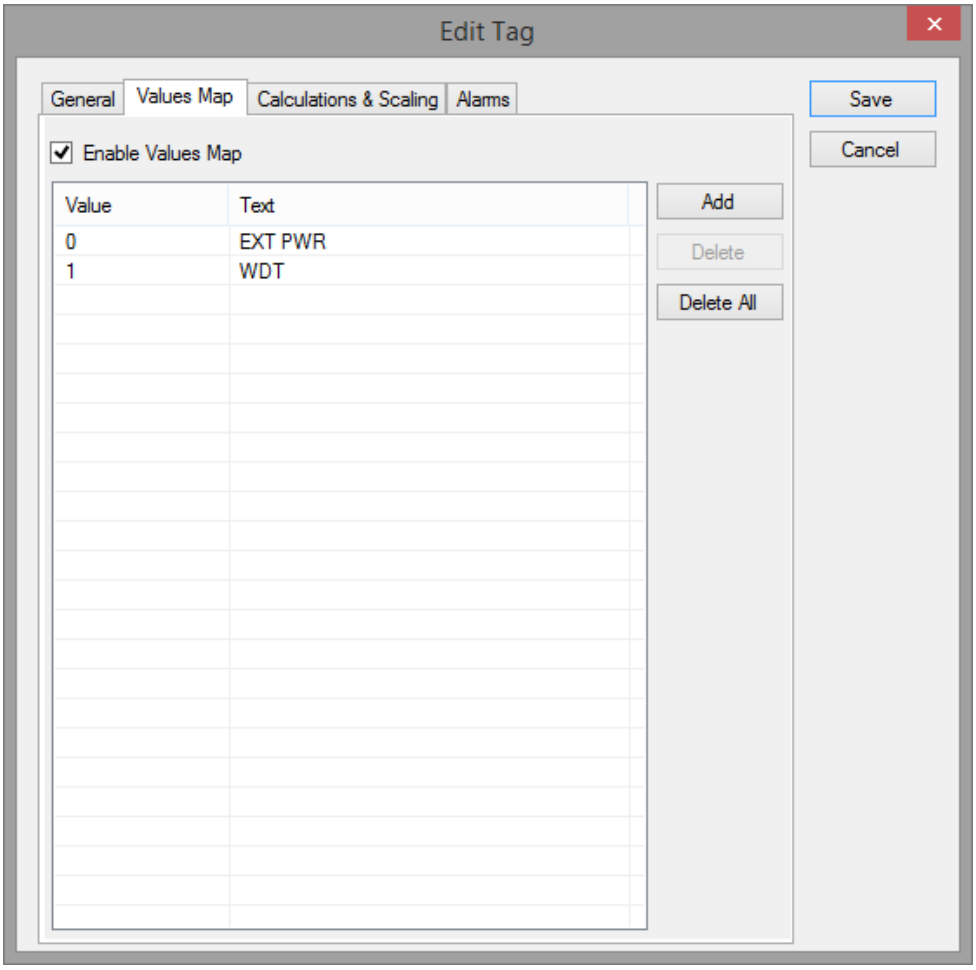


Figure 22 – Adding New Tags: Values Map Settings

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 which 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 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 which will be shown instead of the number in value column.

Delete

Deletes the selected entry

Delete All

Deletes all entries

4.12.4 Adding New Tags: Calculations & Scaling

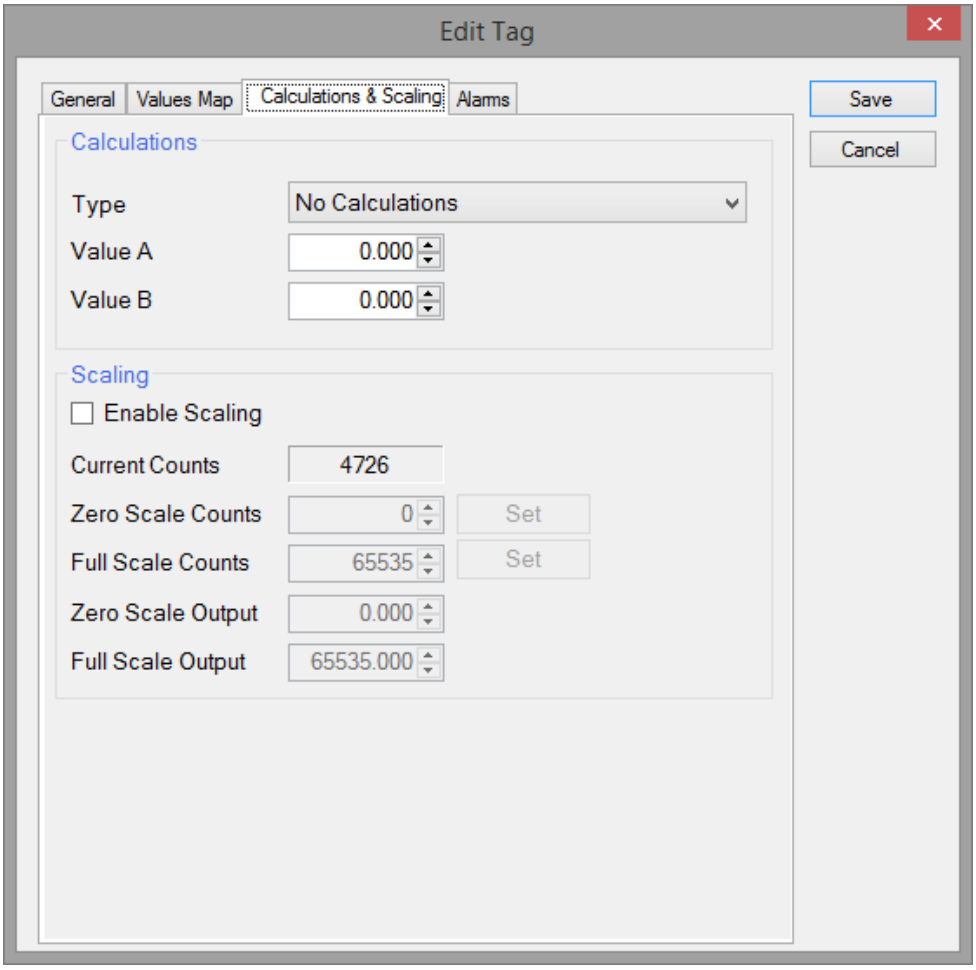


Figure 23 – Adding New Tags: Calculations & Scaling Settings

This tab provides controls to configure Calculations and Scaling rules on 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's data can be converted using one of 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 result if the tag has a raw value of 5000, the converted value will be 5.0 after the calculations.

Scaling

Scaling allows scale raw tag value 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, 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, 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 of possible application is converting pressure sensor raw value to PSI, Bars or other values.

4.12.5 Adding New Tags: Alarm Settings

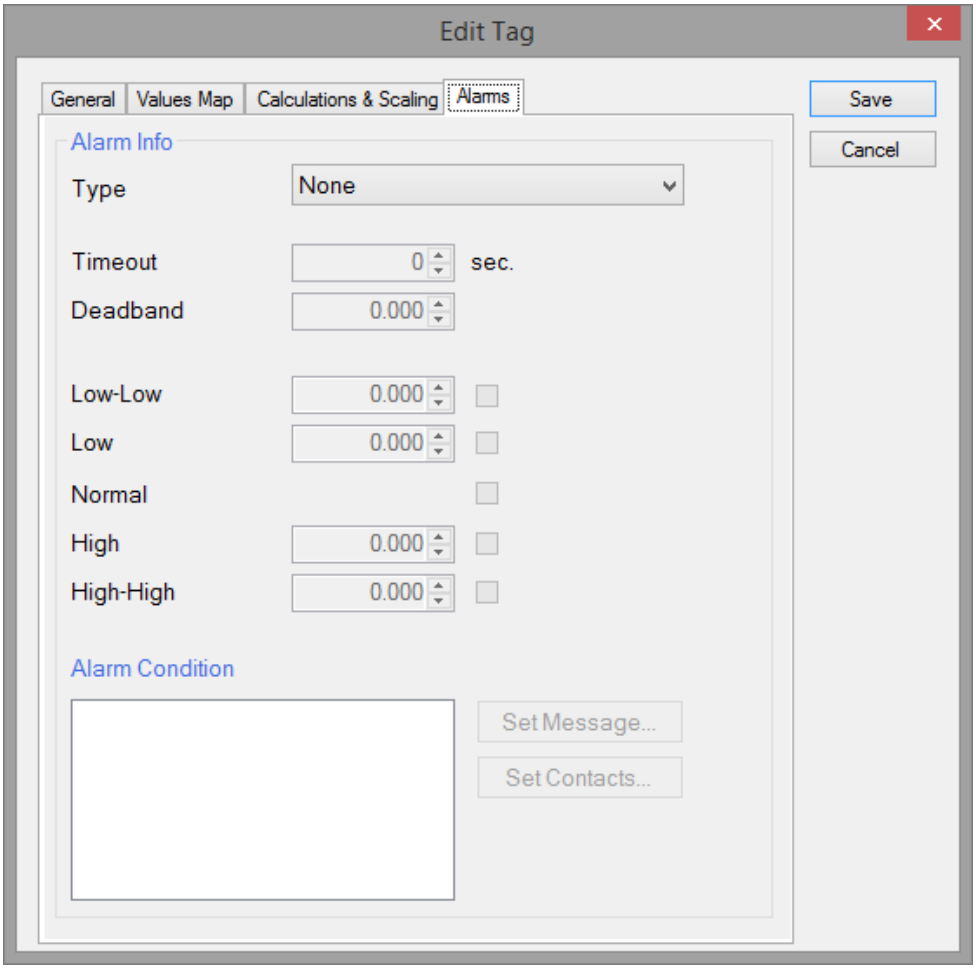


Figure 24 – Adding New Tags: Alarm Settings

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 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

Tag's value should cross the Deadband zone before 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 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.

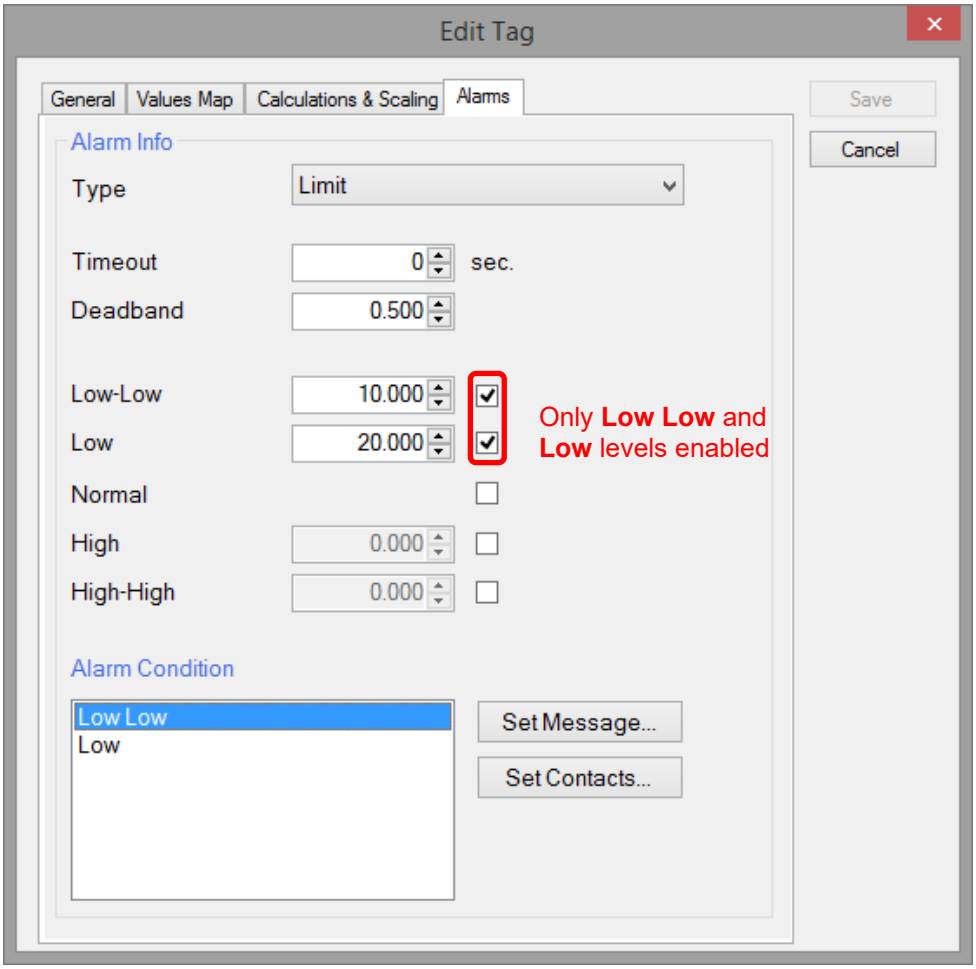


Figure 25 – Adding New Tags: Enabling Alarm Levels

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:

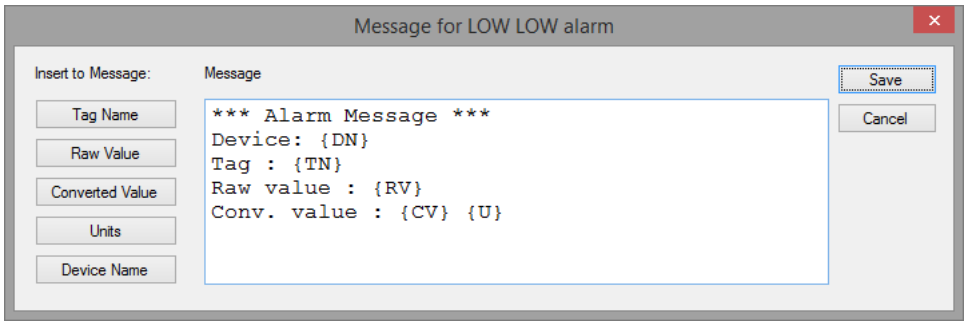


Figure 26 – Adding New Tags – Message Window

Using the Message window, enter the desired text that will be sent out when alarm the condition is detected. Note that the message can contain some embedded keywords for substitution:

{DN} : Substituted with device name
{TN} : Substituted with 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 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)

In order to assign Contact(s) to the alarm condition:

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

This opens Alarm Contacts window:

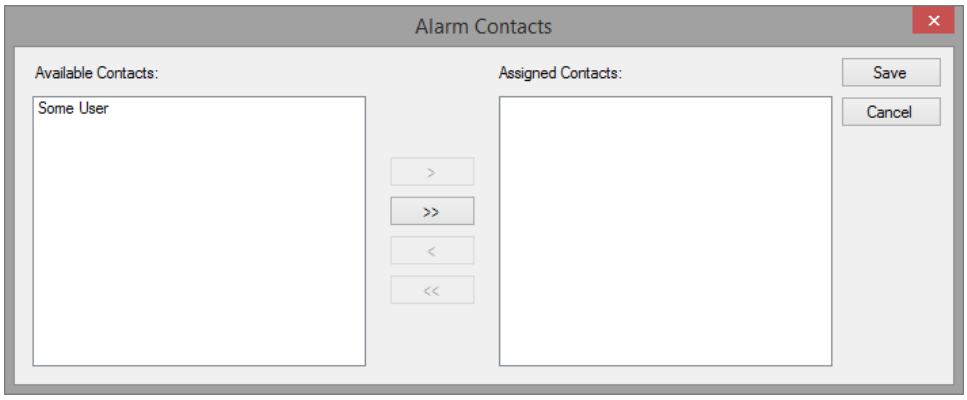


Figure 27 – Adding New Tags – Contacts Window

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 **Assigned Contacts** list.

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

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

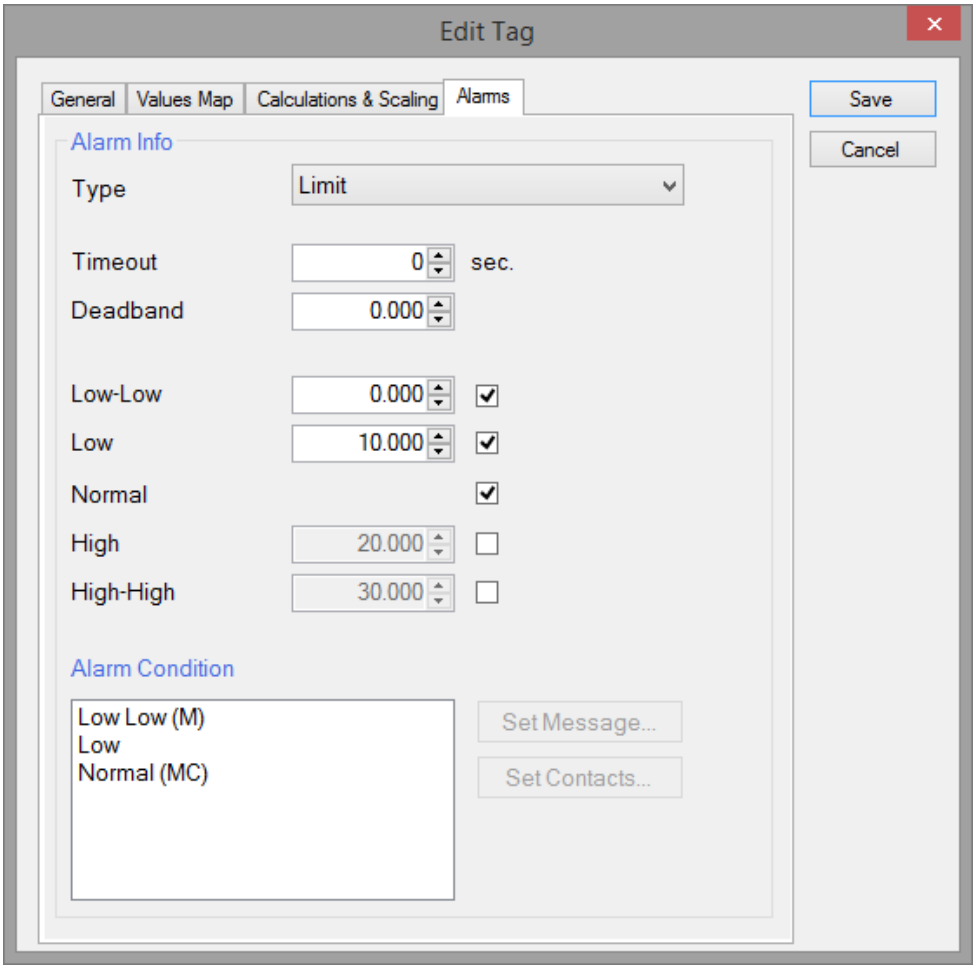


Figure 28 – Adding New Tags – Alarm Condition List

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:

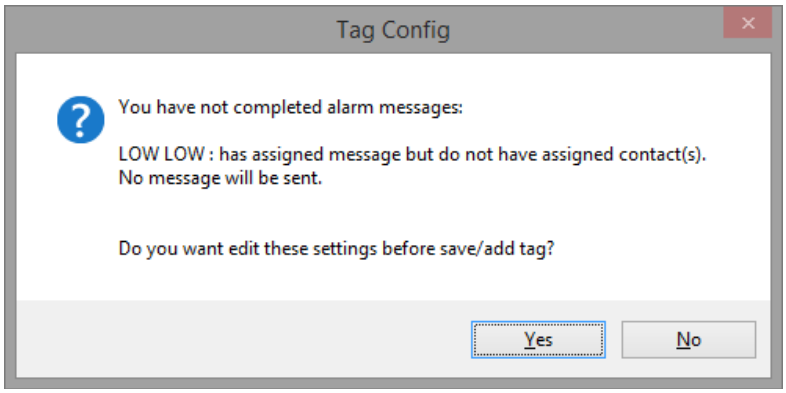


Figure 29 – Warning message when alarm condition configuration is not completed

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

4.12.6 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 **4.12.1 Adding New Tags** topic for more information about tag window controls.

4.13 Contacts

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:

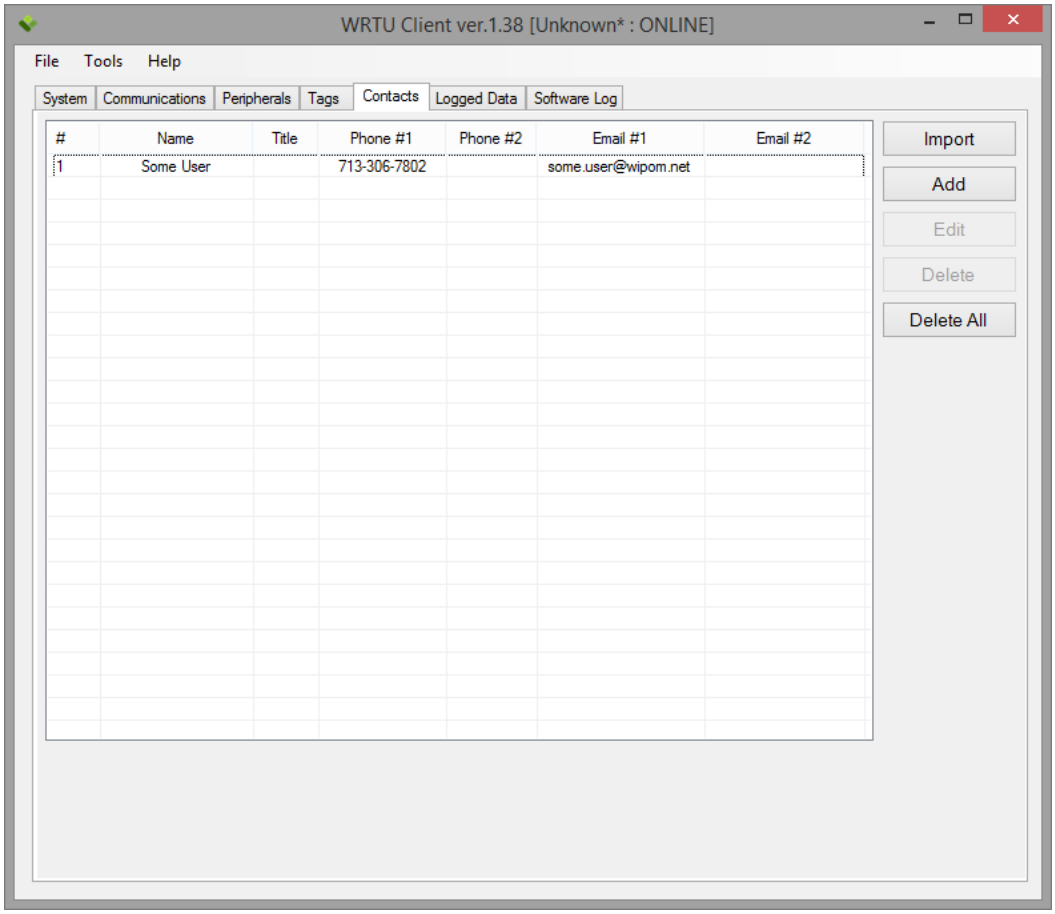


Figure 30 – Contacts Tab

Import

Imports contacts from an Excel file

Add

Adds a new contact

Edit

Edits the selected contact

Delete

Deletes the selected contacts from the project

Delete All

Deletes all contacts from the project

4.13.1 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 31 – Contacts Excel File Sample

4.13.2 Adding New Contacts

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

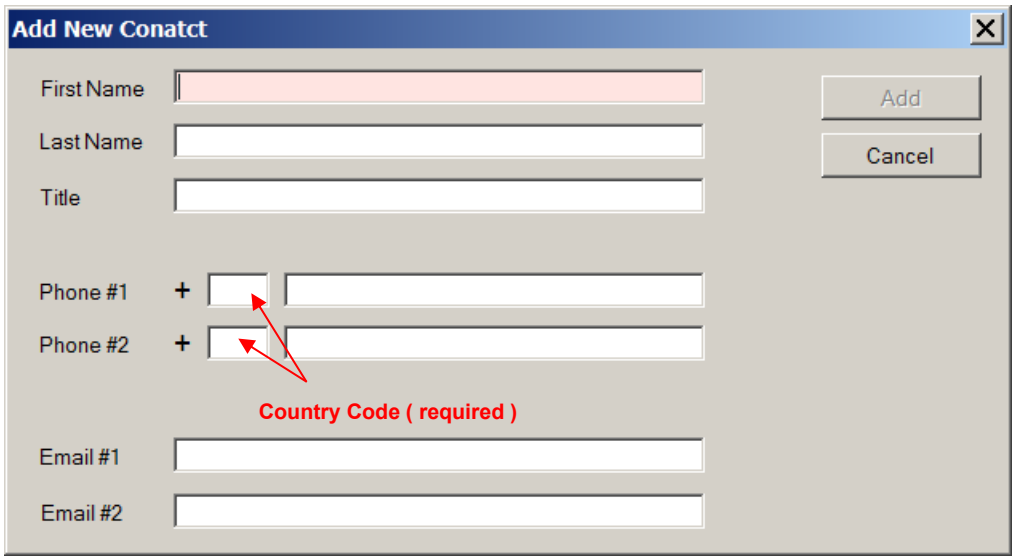


Figure 32 – Adding New Contacts

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

Phone number can contain only digits and dashes. Phone number cannot have dashes at the beginning or at the end.

4.14 Logged Data

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

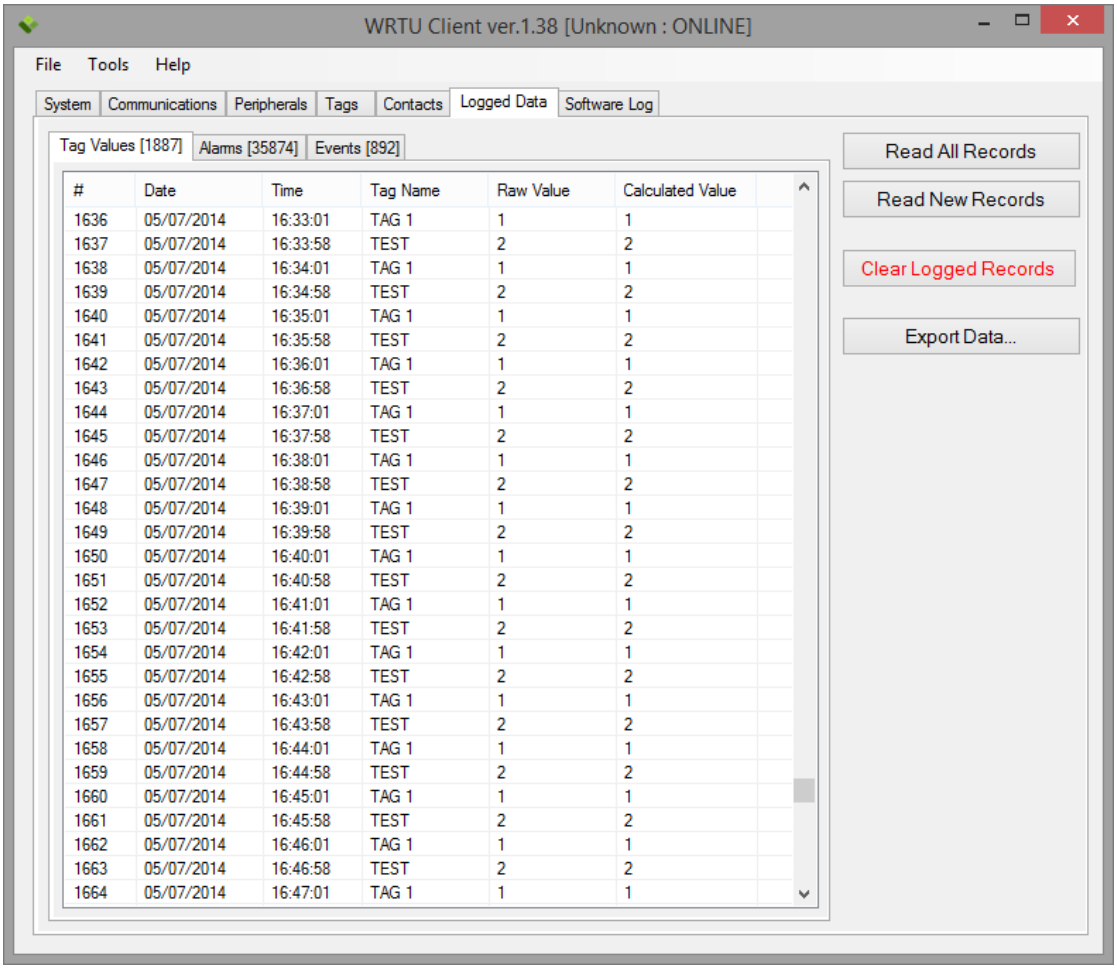


Figure 33 – Logged Data Tab

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

Read All Records
Read all logged records from device

Read New Records
Read only new records, added from last time the records were read

Clear Logged Records
Clear all logged records on device

Export Data
Export read records to Excel or CSV (comma delimited) file

Read All Records

Click **Read All Records** button to start reading log records from device. While records are being read, **Reading Data** window is shown:

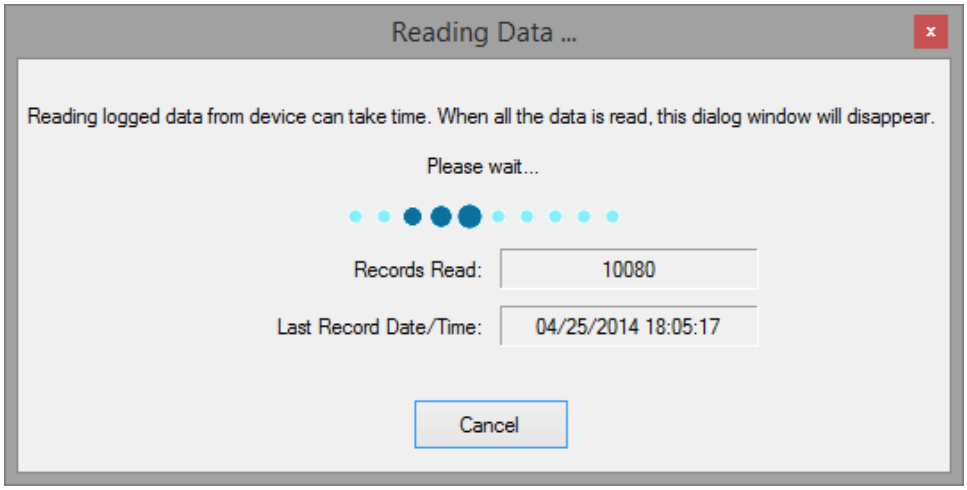


Figure 34 – Reading Data Window

Reading Data window shows current status of data reading operation: Number of read 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:

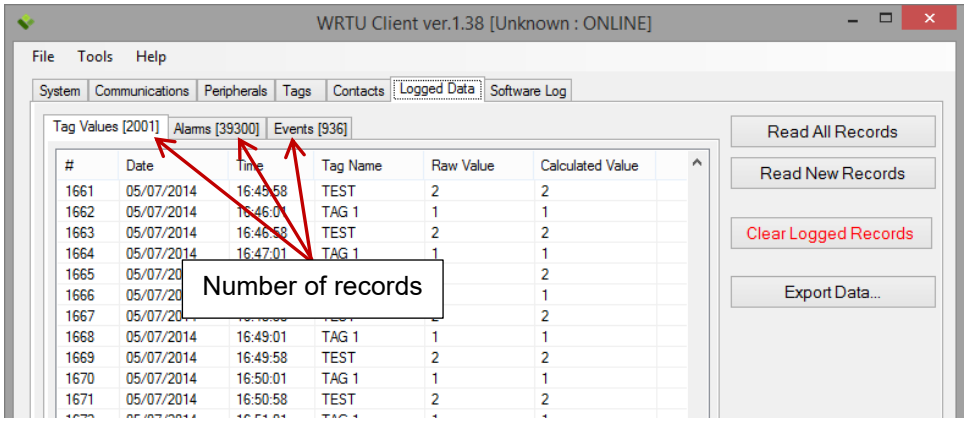


Figure 35 – Number of records in tab titles

Export Data

All read log records can be exported to an Excel or a CSV (comma delimited) file.
Click **Export Data** button to open the **Export Data** Window:

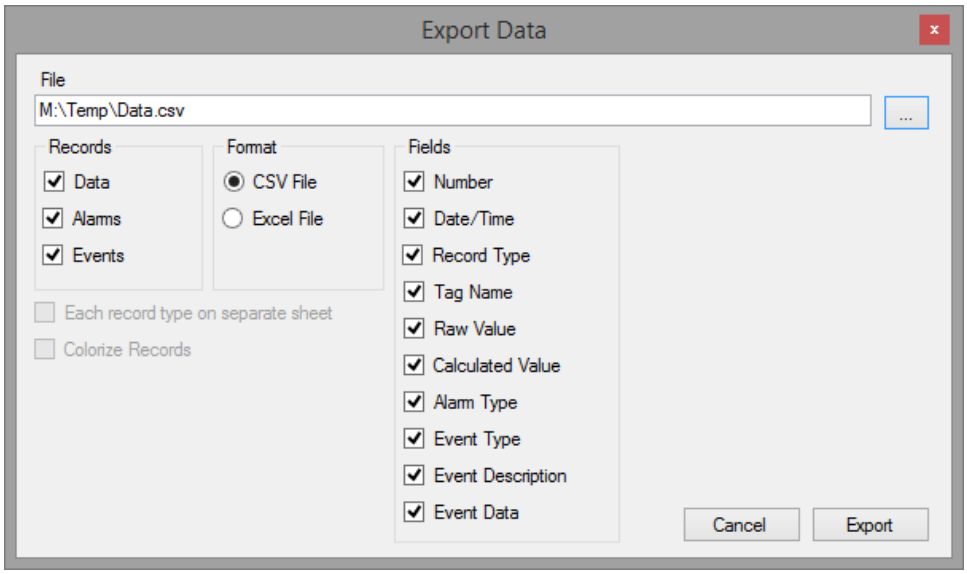


Figure 36 – Export Data Window

File
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 2010 file format
CSV – Comma delimited text CSV file format

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

Each record type on separate sheet
This option is available only for 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 for 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 places on the same Excel sheet.

4.15 Software Log

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

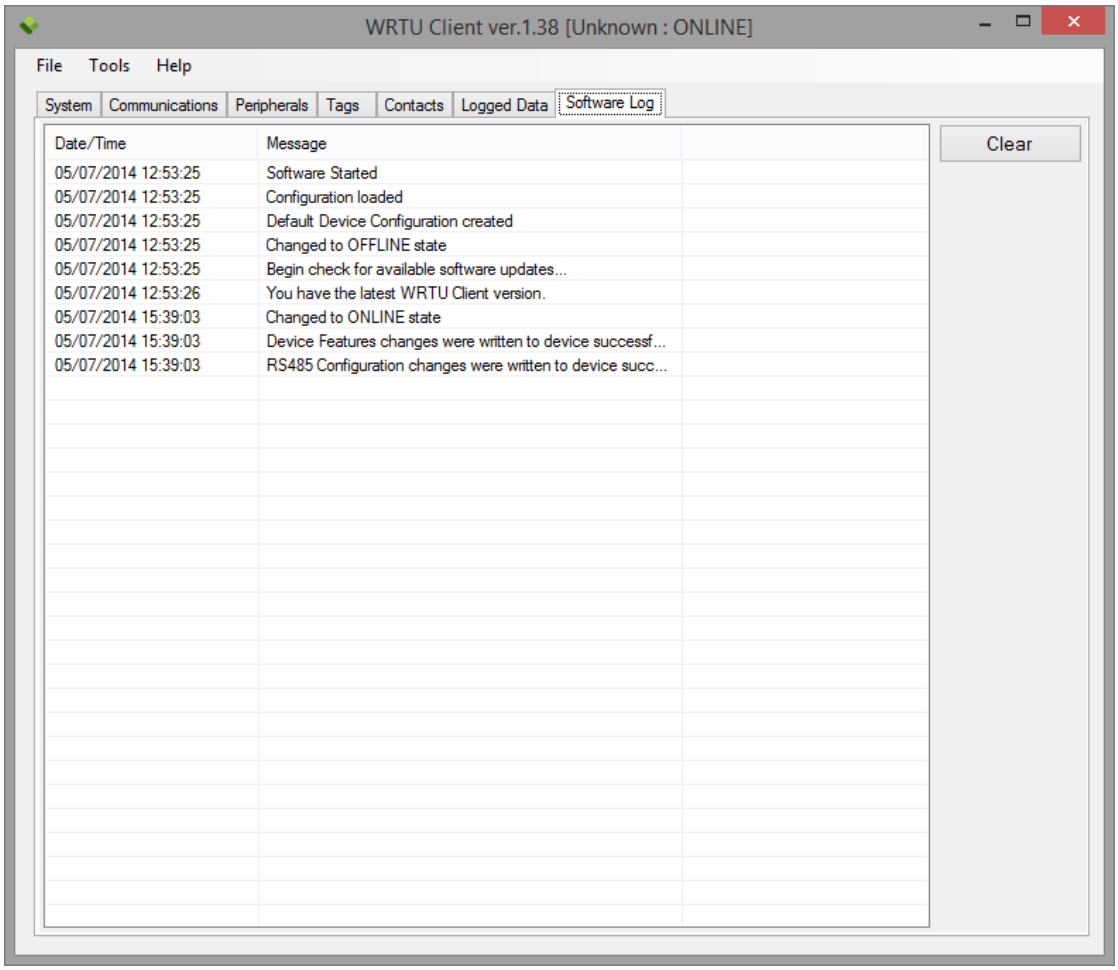


Figure 37 – Software Log tab

Clear button removes all messages from the list.

In this window, a right-click menu is also 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 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 function received wrong input data.
2	Queue is empty when trying to read next alarm/event from queue
3	Alarm/event queue is locked
4	Timeout on wait operation

Application Subsystem

Code	Description
101	Starting 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 new contact record
205	Invalid contact record ID
206	Invalid contact record index
207	Unsupported version of contact record
208	Load contact records failed
209	Load message records failed
210	No space for new message record
211	Invalid message record ID
212	Invalid message record index
213	Unsupported version of 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 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 wrote data)
1009	Read operation failed
1010	Write operation failed
1011	Find structure not initialized
1012	Search action already started
1013	Find end of log records
1014	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

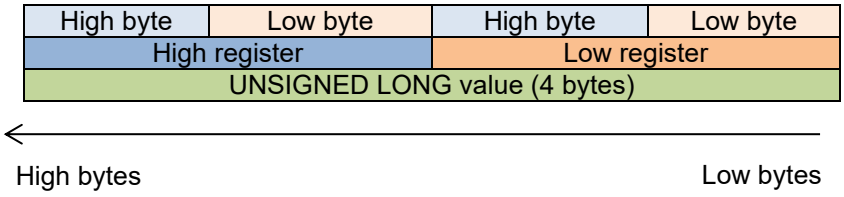
Digital Inputs (Frequency Counter)

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 following order:



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 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

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

To get 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