



WRTU Client User Manual

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1. Introduction

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

WRTU 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 WRTU 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 WRTU 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 nanoWiPOM

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.

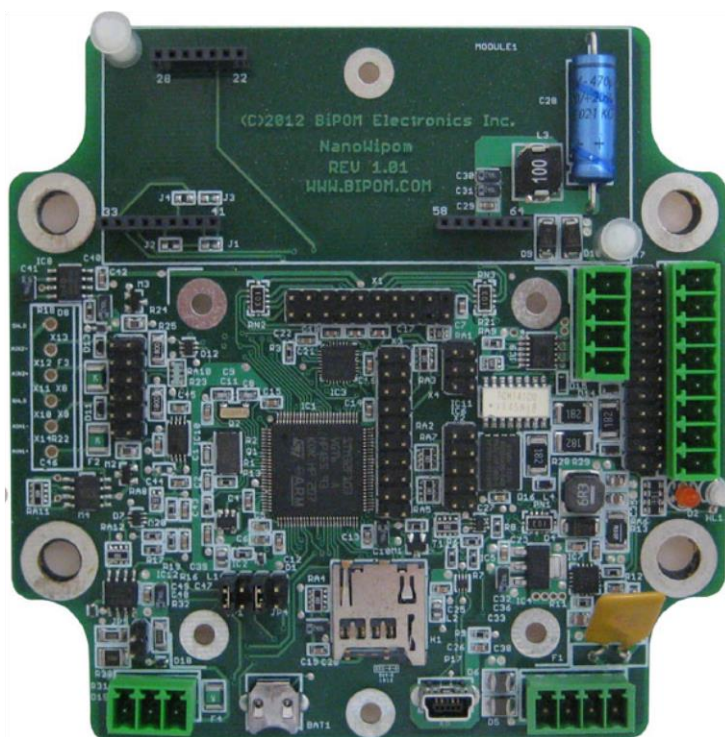


Figure 1 – Power nanoWiPOM with USB connection



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

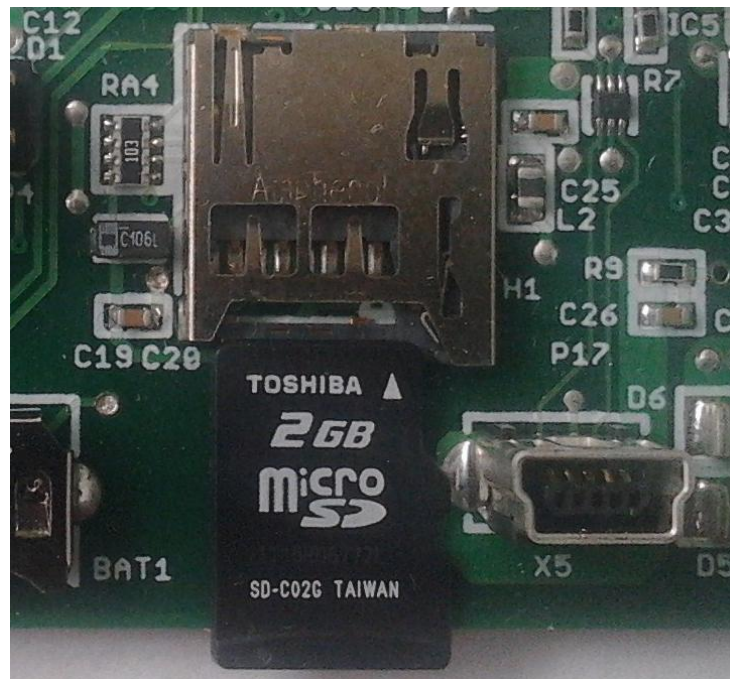


Figure 2 – Inserting MicroSD card

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.

2.2 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.

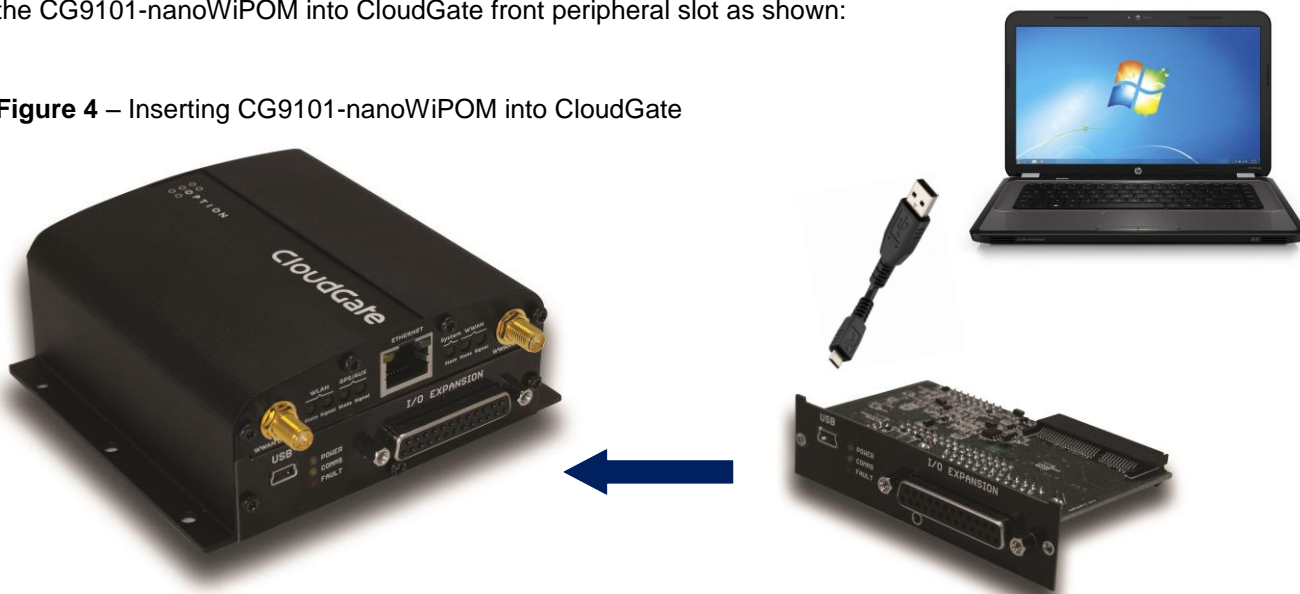
Insert the (optional) MicroSD card on the CG9101-nanoWiPOM:



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 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.

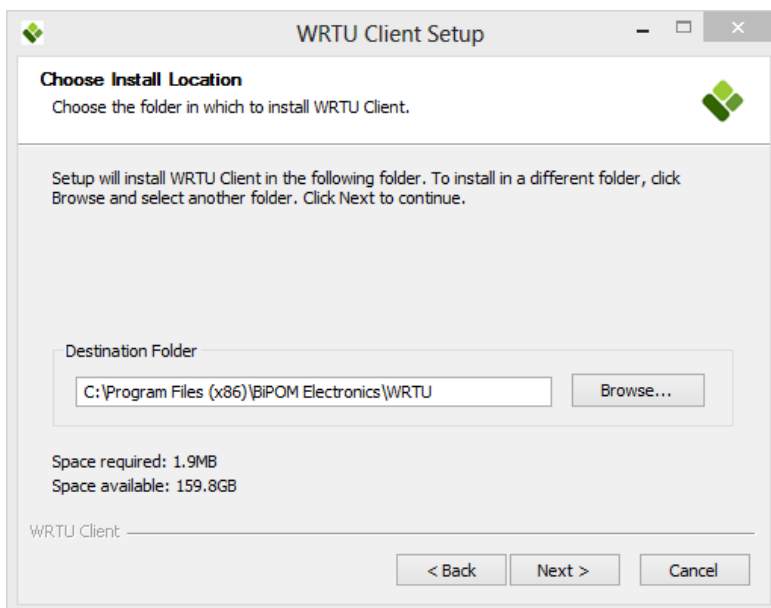
3. Software Setup

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

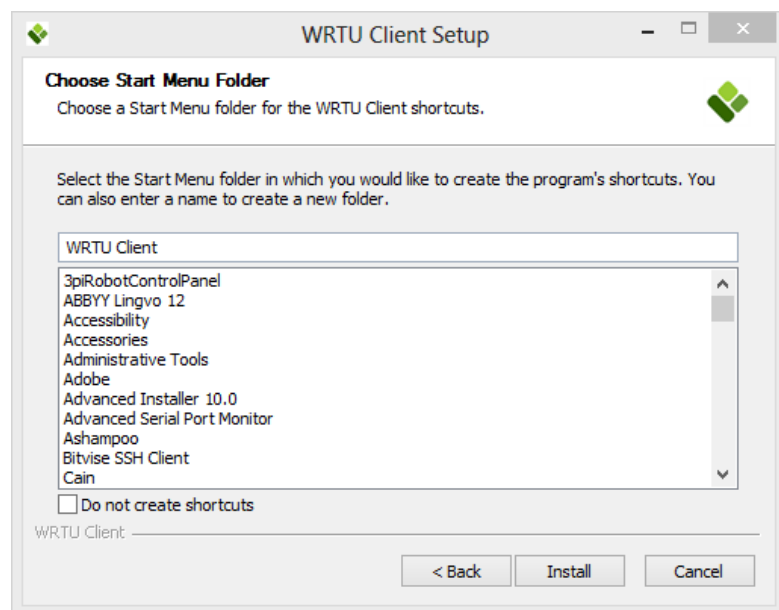
<http://www.bipom.com/files/wipom/WRTUClientSetup.exe>



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**.



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

4. Windows WRTU Client

4.1 Run WRTU client

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

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

After WRTU client starts, System status window is displayed:

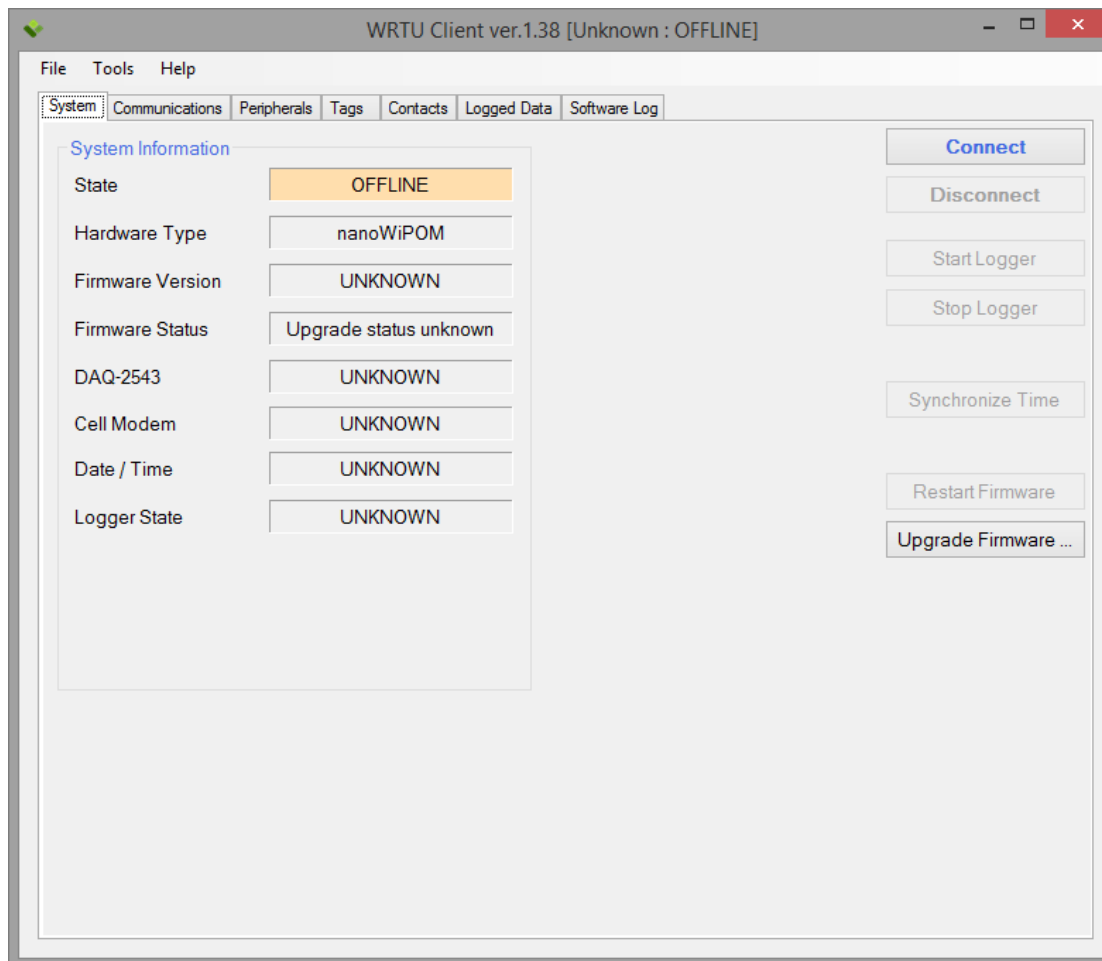


Figure 5 – Main window of WRTU Client in OFFLINE state

Power board

Connect USB cable from board to PC.

Click the Connect button on WRTU 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.

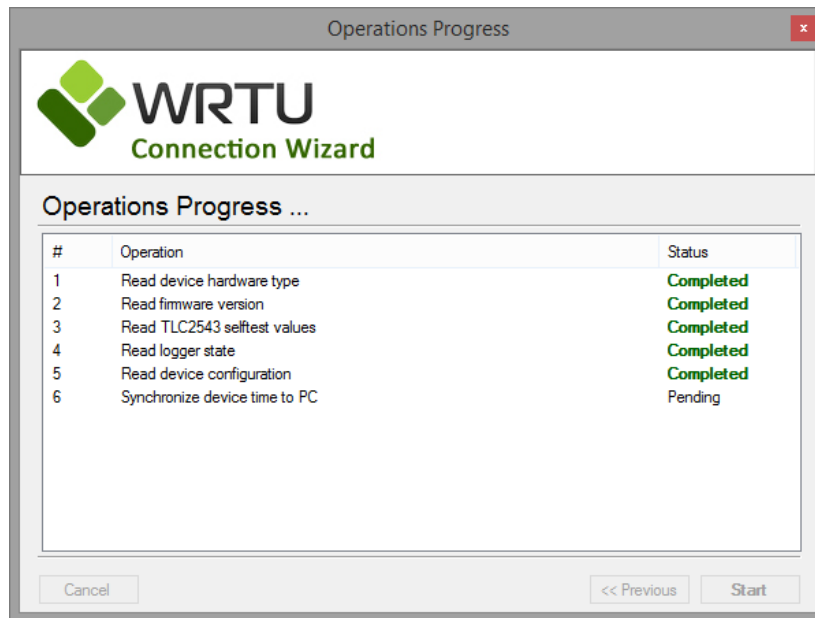


Figure 8 – Synchronization progress window

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

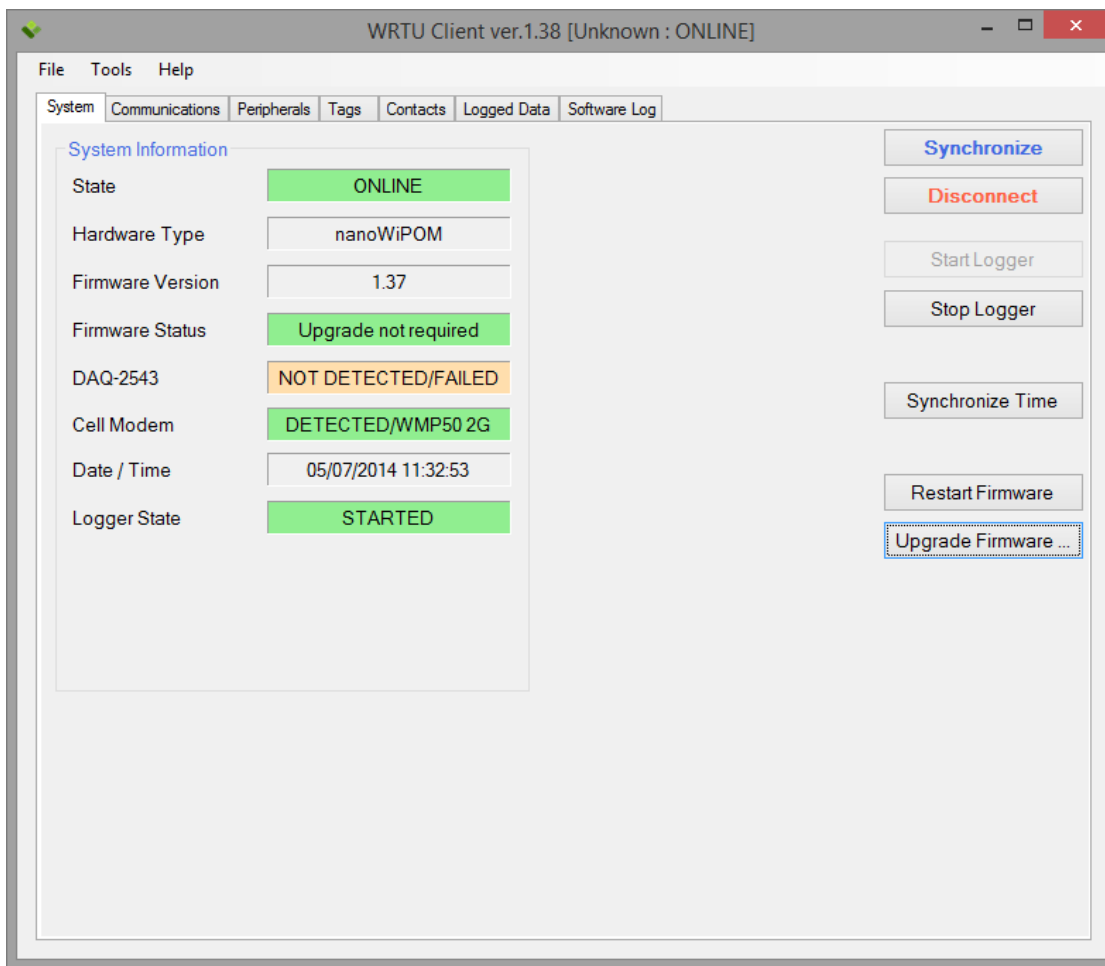


Figure 9 – WRTU Client in ONLINE state

4.2 WRTU Client Options

In order to change WRTU Client options do following steps:

- Run WRTU Client
- Go to main menu **Tools** and click **Options ...**

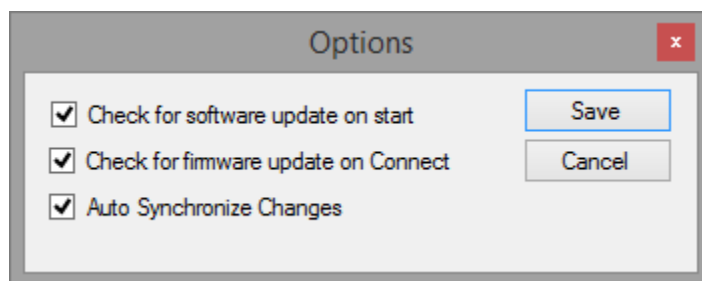


Figure 10 – WRTU Client Options

There are 3 options which can be enabled or disabled:

Check for software update on start:

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

Check for firmware update on Connect:

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

Auto Synchronize Changes

If this option is enabled, then all changes made by user in device configuration will be synchronized immediately with the connected board. The changes will be synchronized automatically only when WRTU Client is connected to the board (in ONLINE mode). If WRTU Client is not connected to the board (OFFLINE mode) then any changes will not be synchronized.

If this option is disabled then only way to write device configuration to the board – manually click **Synchronize** button on the main screen of WRTU Client when it is in ONLINE mode.



4.3 Online Help

In order to get help about WRTU Client online:

- Run WRTU 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 WRTU Client

To get information about WRTU Client installed on your PC:

- Run WRTU Client
- Go to main menu **Help** and click **About ...**



Figure 11 – WRTU 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, WRTU 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 WRTU Client
- Select **Help** menu and select **Check New Version**

WRTU Client then accesses BiPOM web site (www.bipom.com) and checks if a new version of WRTU Client is available. If there is no new version on the web, the following window is shown:

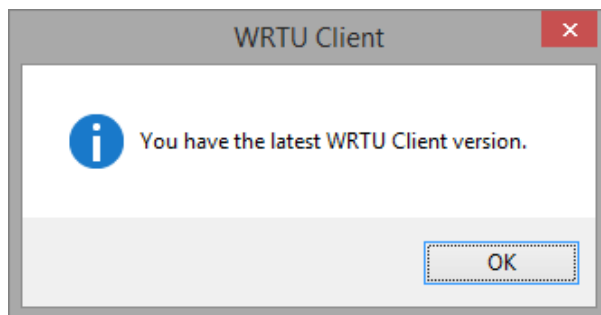


Figure 12 – Window when no software updates available

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

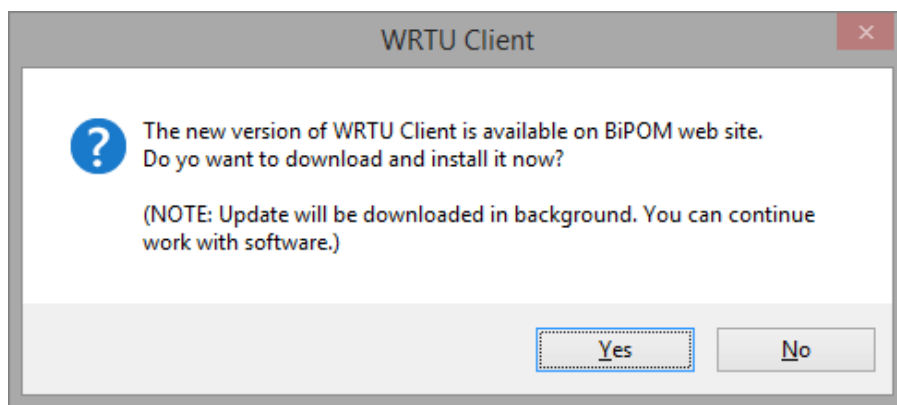


Figure 13 – Window when software updates are available

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

When the download completes, the following window is shown:

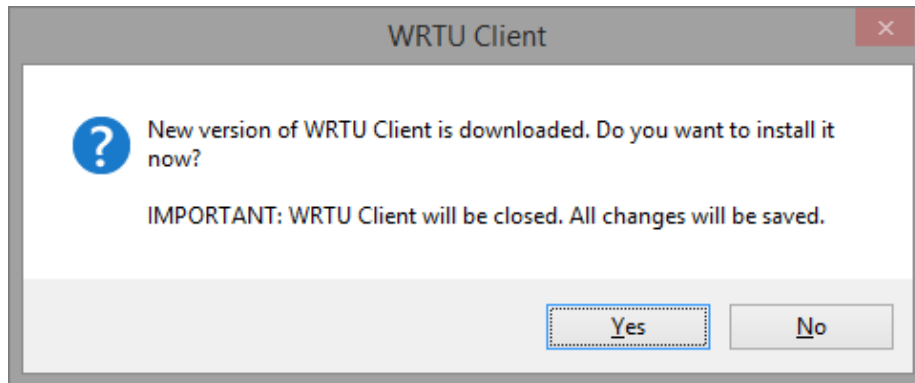


Figure 14 – Warning window when starting software update

If you click **Yes**, then current **WRTU 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 **WRTU 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 **WRTU 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 WRTU 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 **WRTU 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 WRTU 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 WRTU Client
- Go to **File** menu and click **Load Project**
- Select file in opened dialog and click **OK**

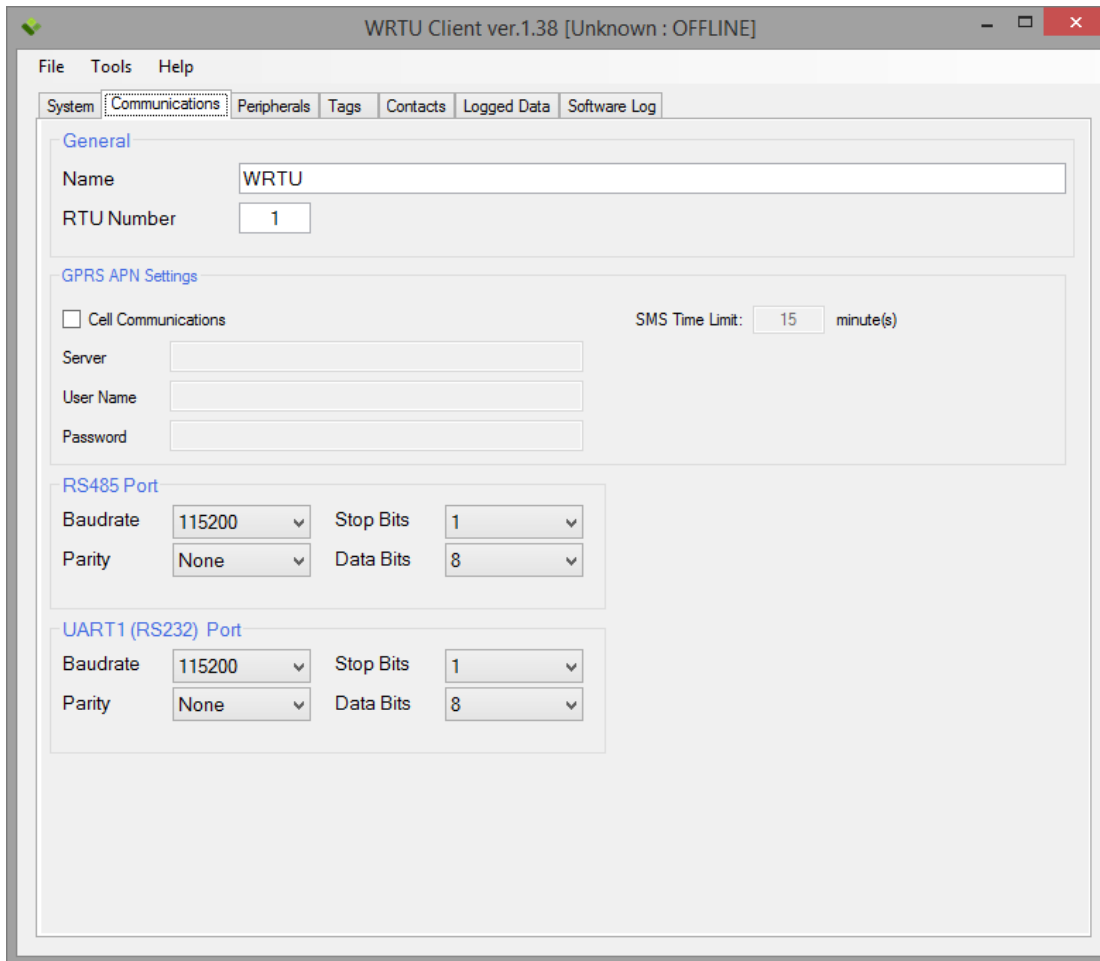
In order set default values to project:

- 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 are grouped on **Communications** tab:



WRTU Client ver.1.38 [Unknown : OFFLINE]

File Tools Help

System **Communications** Peripherals Tags Contacts Logged Data Software Log

General

Name

RTU Number

GPRS APN Settings

Cell Communications SMS Time Limit: minute(s)

Server

User Name

Password

RS485 Port

Baudrate Stop Bits

Parity Data Bits

UART1 (RS232) Port

Baudrate Stop Bits

Parity Data Bits

Figure 15 – Communications Settings

Name

The device name. Any text up to 31 characters.

RTU Number

A number from 1 to 255; this is used in MODBUS communication. Only requests with this RTU Number will be processed by the device.

Cell Communications

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



Server

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

Username / Password

These are username and password required by APN server. If they are not required, leave these fields blank.

RS485 Port Settings

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

UART1 (RS232) Port Settings

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

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

4.8 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 **Peripherals** tab.

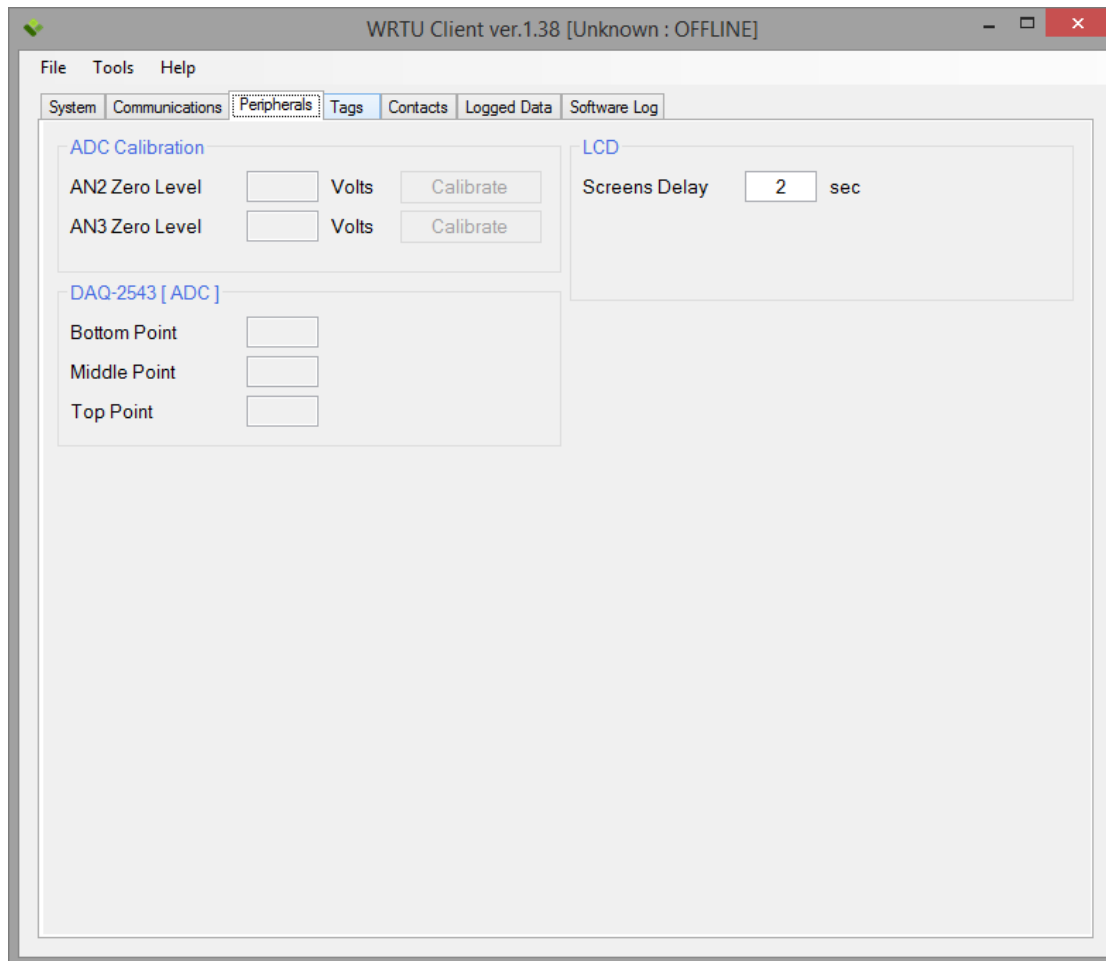


Figure 16 – Peripherals information

The current calibration levels is shown in read-only text fields (if calibration was done previously). In order to save new zero level the **WRTU 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.

4.9 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 **Peripherals** tab. Please see Figure 8.

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.



4.10 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.

4.11 System Information

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

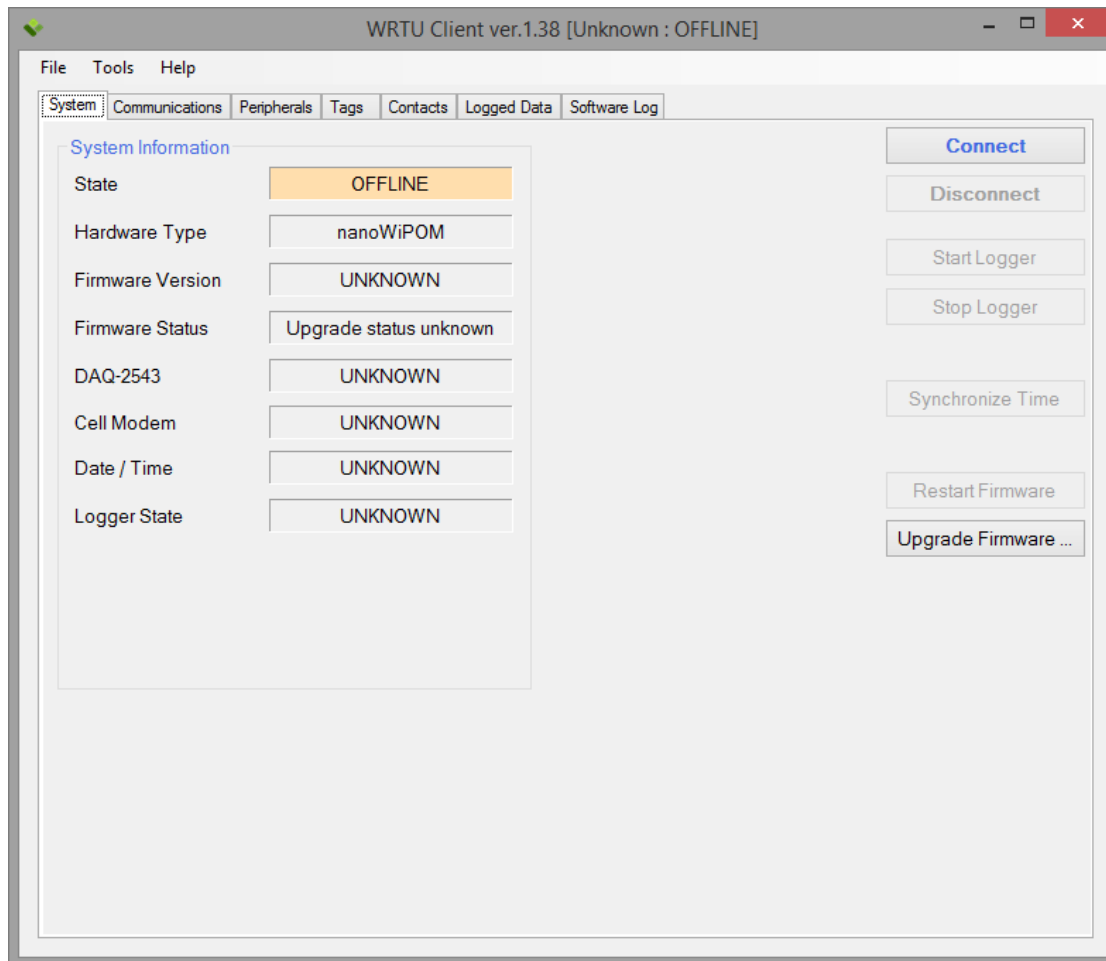


Figure 17 – System tab (Offline Mode)

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 **WRTU Client** will be switched to **Online Mode**.

Upgrade Firmware ...

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

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

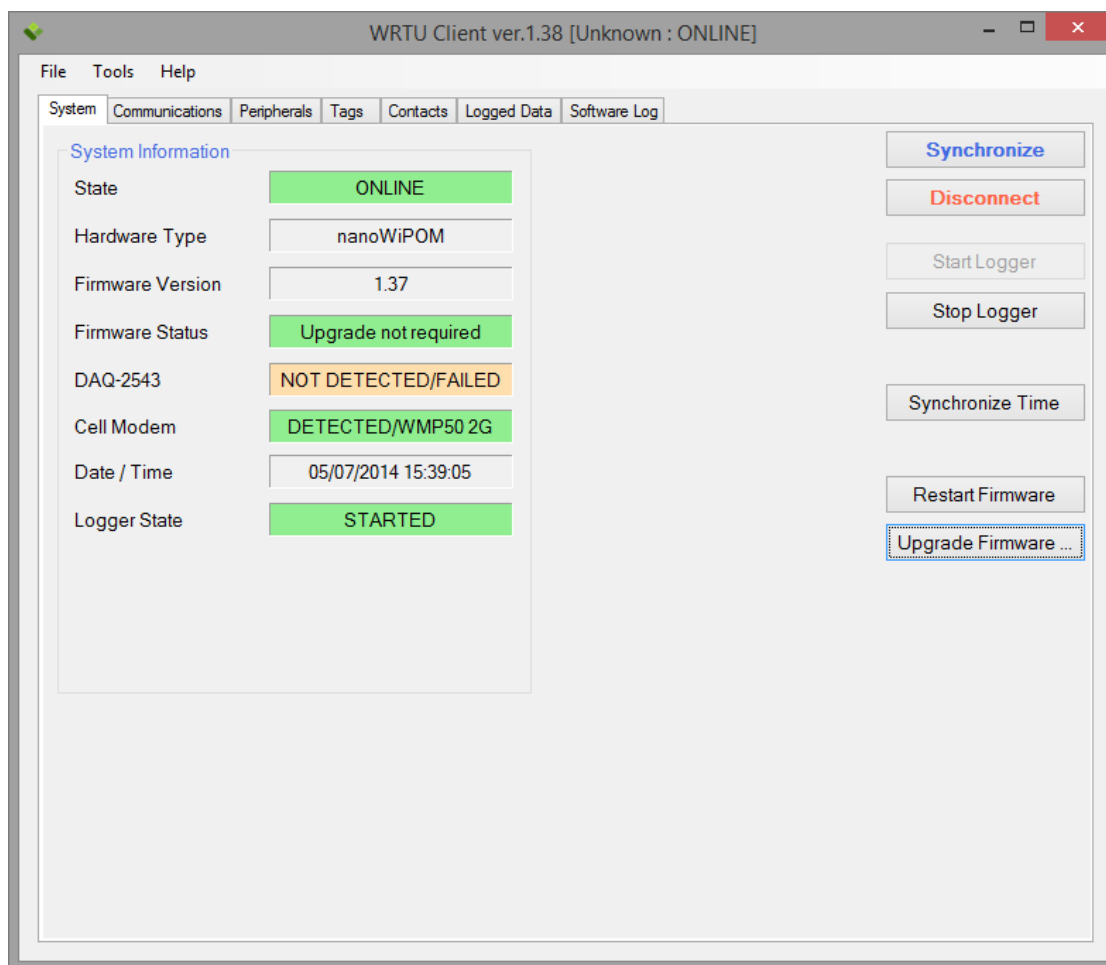


Figure 18 – System tab (Online Mode)

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

State

Current state of **WRTU 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, WRTU 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 WRTU 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. **WRTU 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 **WRTU Client** in Online Mode it can do following actions:

Synchronize

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



Disconnect

Switch WRTU 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. WRTU Client will be switched to offline mode automatically.

Upgrade Firmware

Start firmware upgrading.



4.12 Tags

WRTU 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:

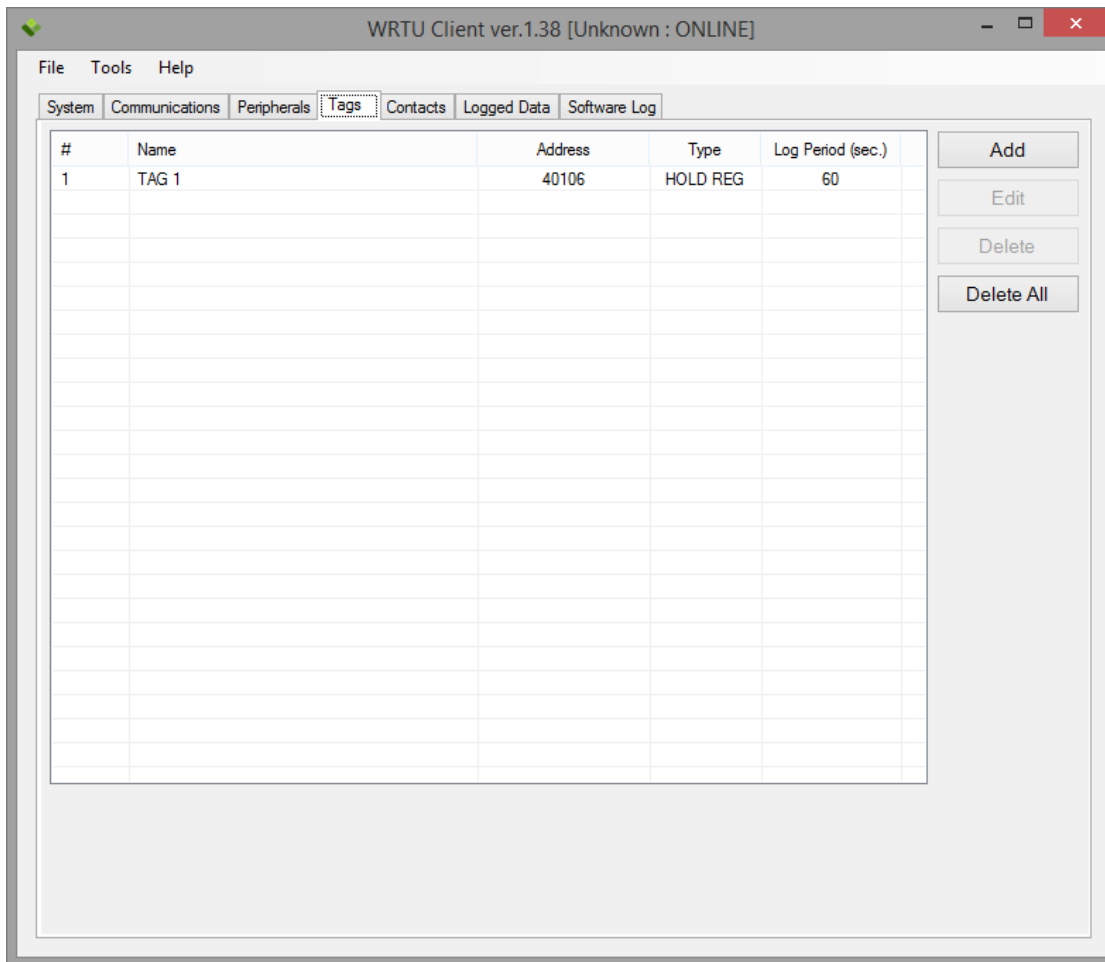


Figure 19 – Tags tab

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:

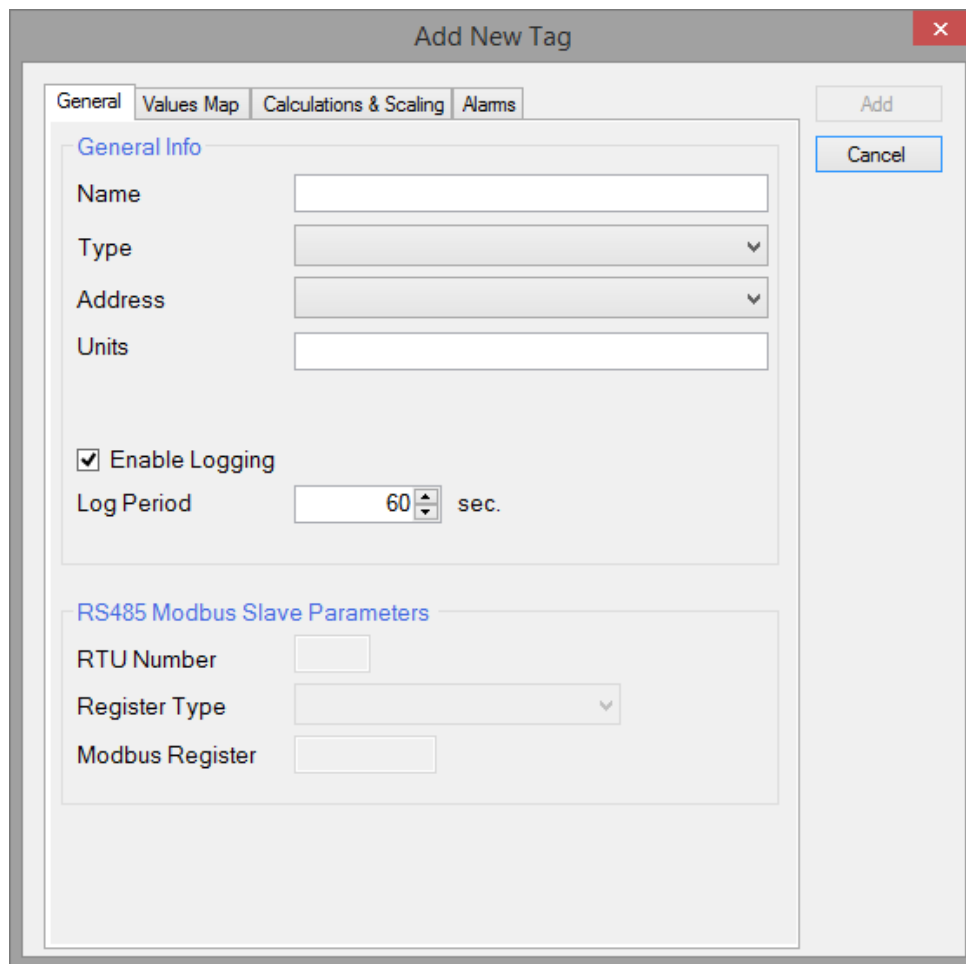


Figure 20 – Add New Tag Window

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

4.12.2 Adding New Tags: General Settings

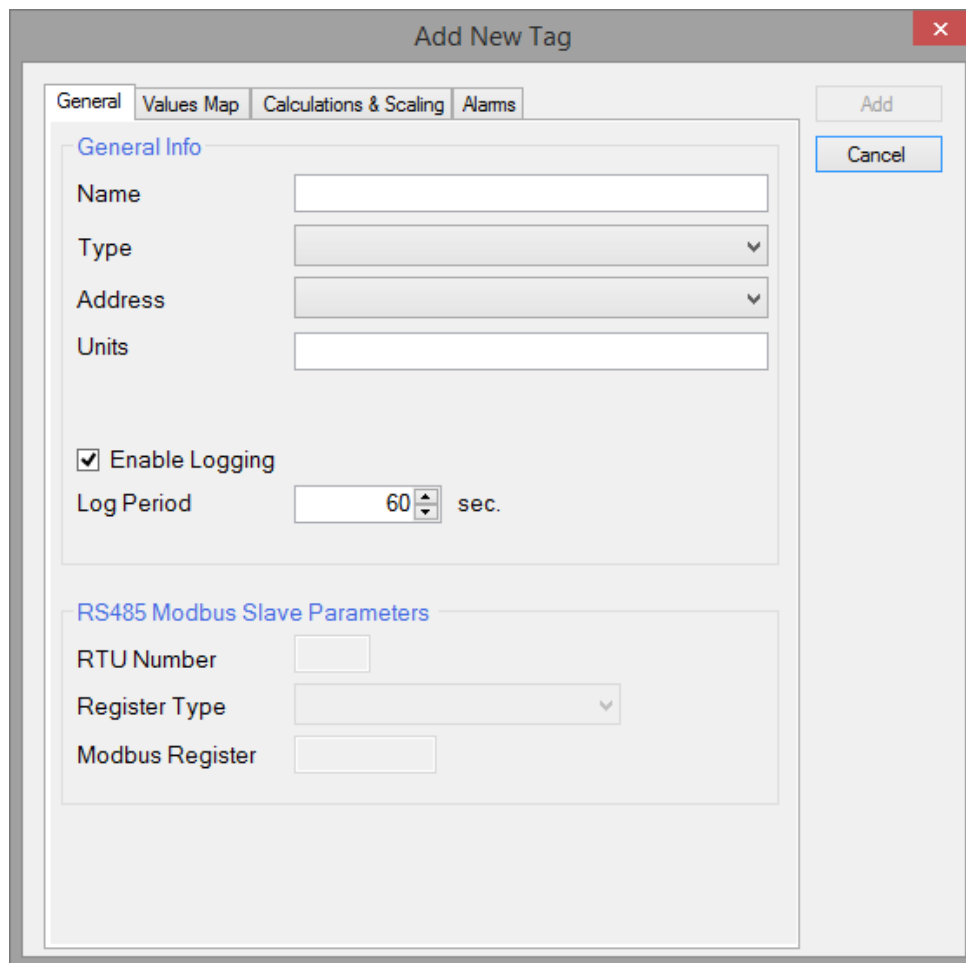


Figure 21 – Adding New Tags: General Settings

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 WRTU 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, WRTU 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. WRTU will check if the address is correct depending on the selected **Register Type**.

4.12.3 Adding New Tags: Values Map Settings

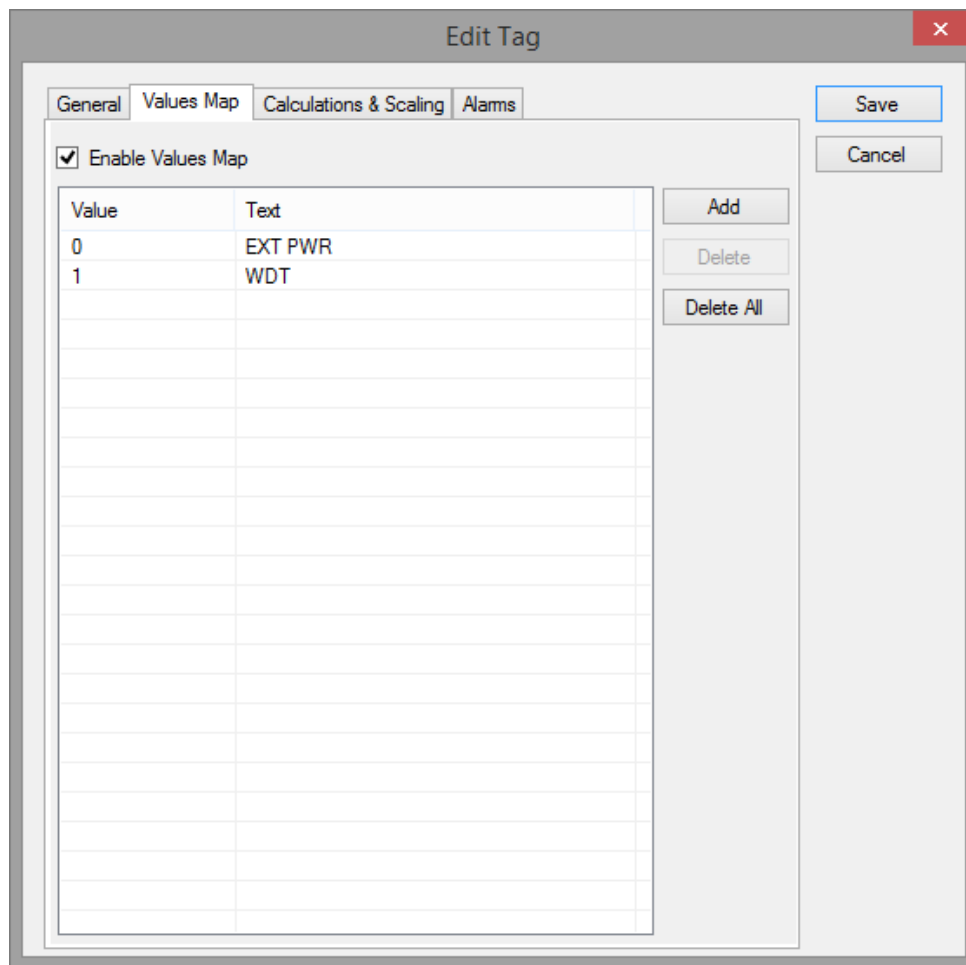


Figure 22 – Adding New Tags: Values Map Settings

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.

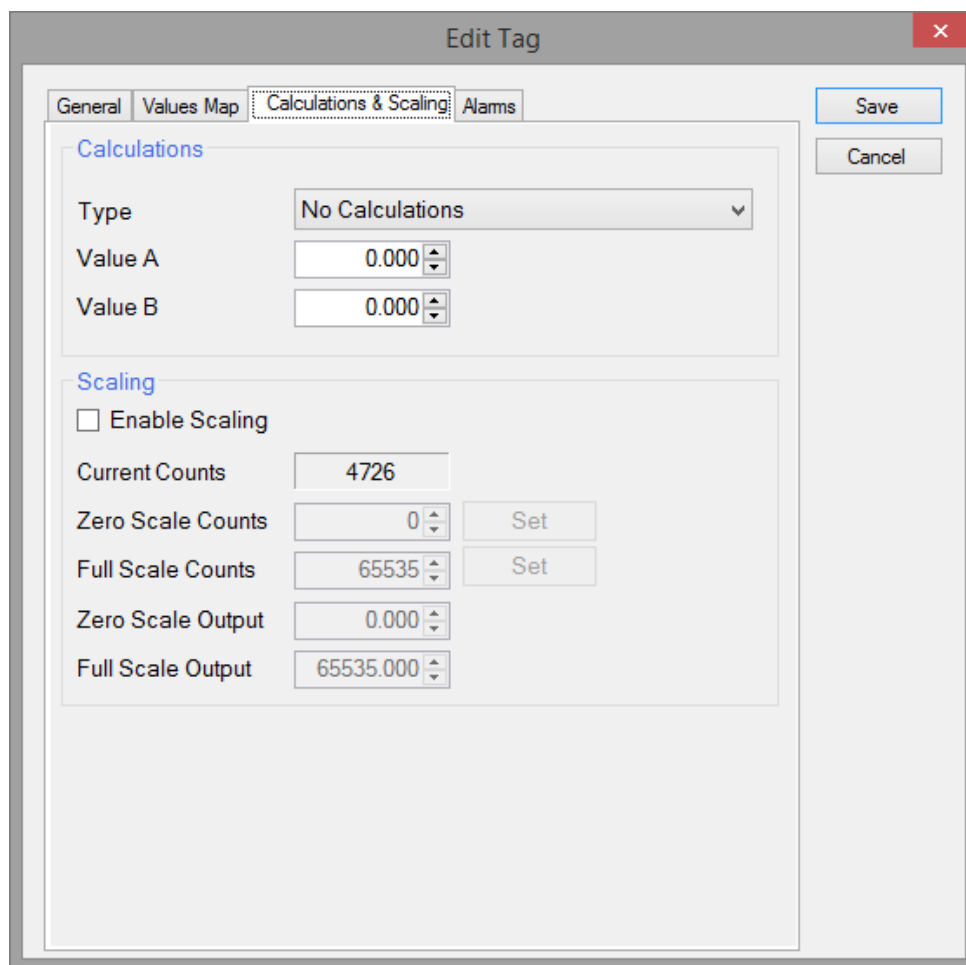
Delete

Deletes the selected entry

Delete All

Deletes all entries

4.12.4 Adding New Tags: Calculations & Scaling



Edit Tag [X]

General | Values Map | **Calculations & Scaling** | Alarms

Calculations

Type: No Calculations

Value A: 0.000

Value B: 0.000

Scaling

Enable Scaling

Current Counts: 4726

Zero Scale Counts: 0 [Set]

Full Scale Counts: 65535 [Set]

Zero Scale Output: 0.000

Full Scale Output: 65535.000

[Save] [Cancel]

Figure 23 – Adding New Tags: Calculations & Scaling Settings

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

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

Zero Scale Counts

Tag's raw value for bottom/zero level
To simplify the calibration, WRTU 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, WRTU 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

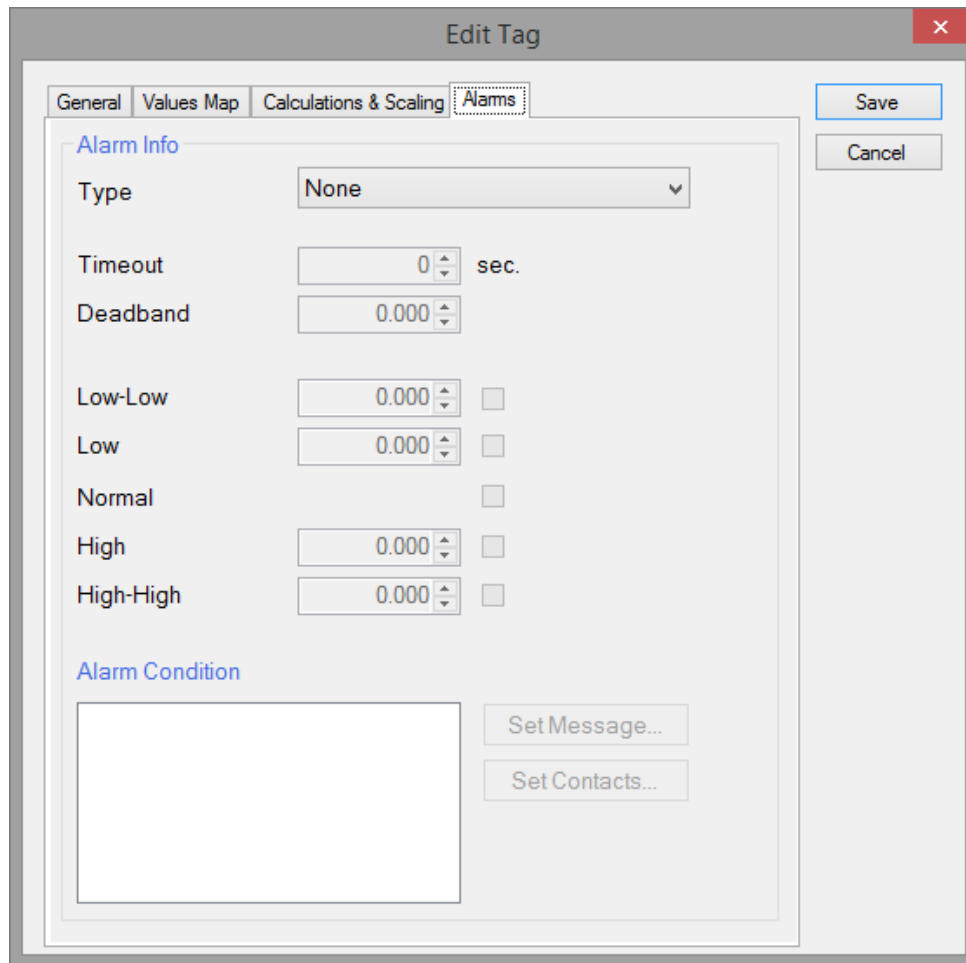


Figure 24 – Adding New Tags: Alarm Settings

This tab allows configuring alarm conditions for a tag. Each tag can have an alarm condition and WRTU will check the tag's value to see if it matches the configured alarm condition. When an alarm condition is detected, WRTU 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, WRTU 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.

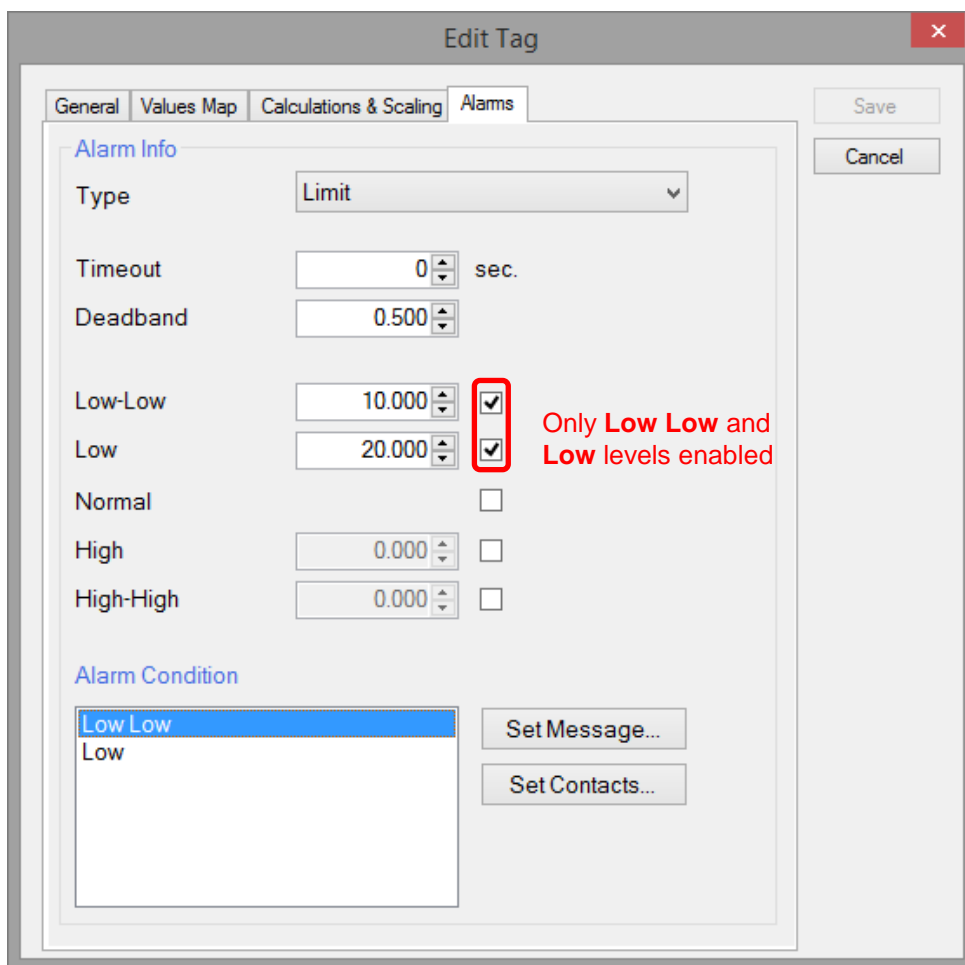


Figure 25 – Adding New Tags: Enabling Alarm Levels

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

$$\text{Low Low} < \text{Low} < \text{High} < \text{High High}$$

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

$$\text{Low Low} + \text{Deadband} < \text{Low}$$

$$\text{Low} + \text{Deadband} < \text{High}$$

$$\text{High} + \text{Deadband} < \text{High High}$$

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:

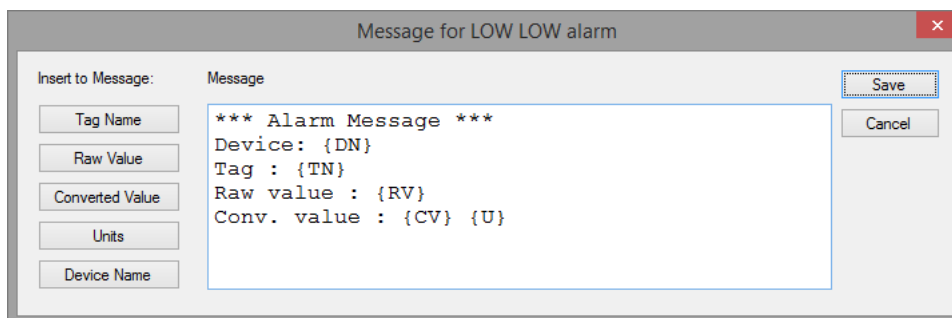


Figure 26 – Adding New Tags – Message Window

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:

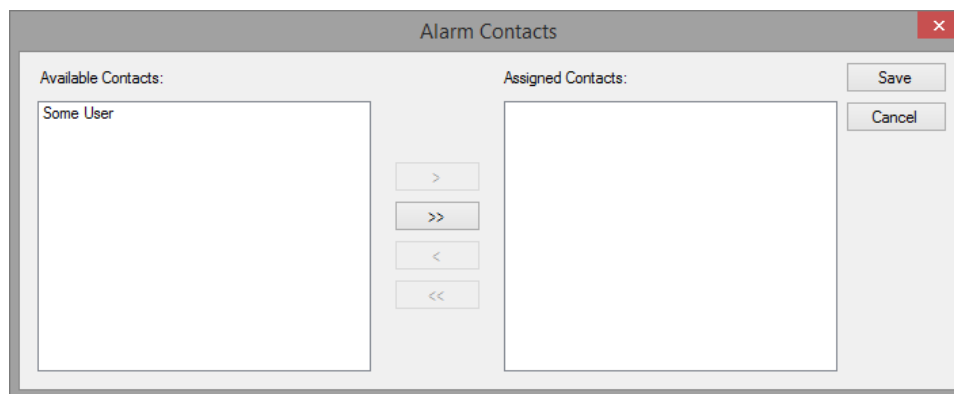


Figure 27 – Adding New Tags – Contacts Window

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**

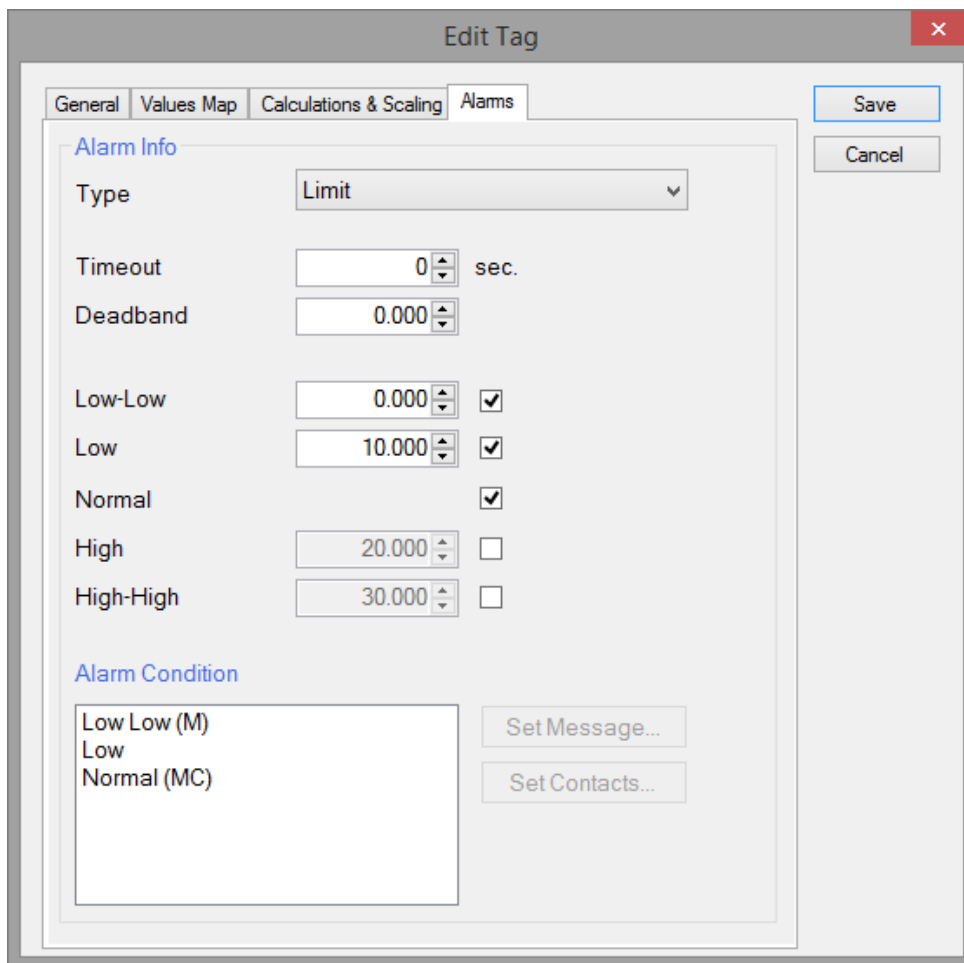
< : Moves the selected contact from **Assigned Contacts** to **Available Contacts**

<< : 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:



Edit Tag

General Values Map Calculations & Scaling **Alarms**

Alarm Info

Type: Limit

Timeout: 0 sec.

Deadband: 0.000

Low-Low: 0.000

Low: 10.000

Normal:

High: 20.000

High-High: 30.000

Alarm Condition

Low Low (M)

Low

Normal (MC)

Set Message...

Set Contacts...

Save

Cancel

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, WRTU Client detects this as incorrect configuration and shows a warning:

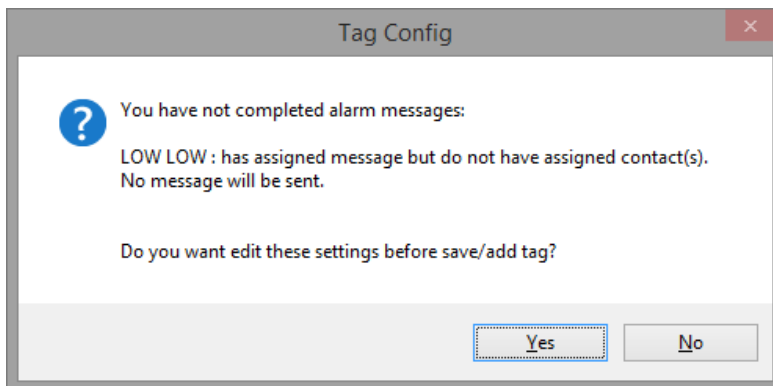


Figure 29 – Warning message when alarm condition configuration is not completed

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

WRTU 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:

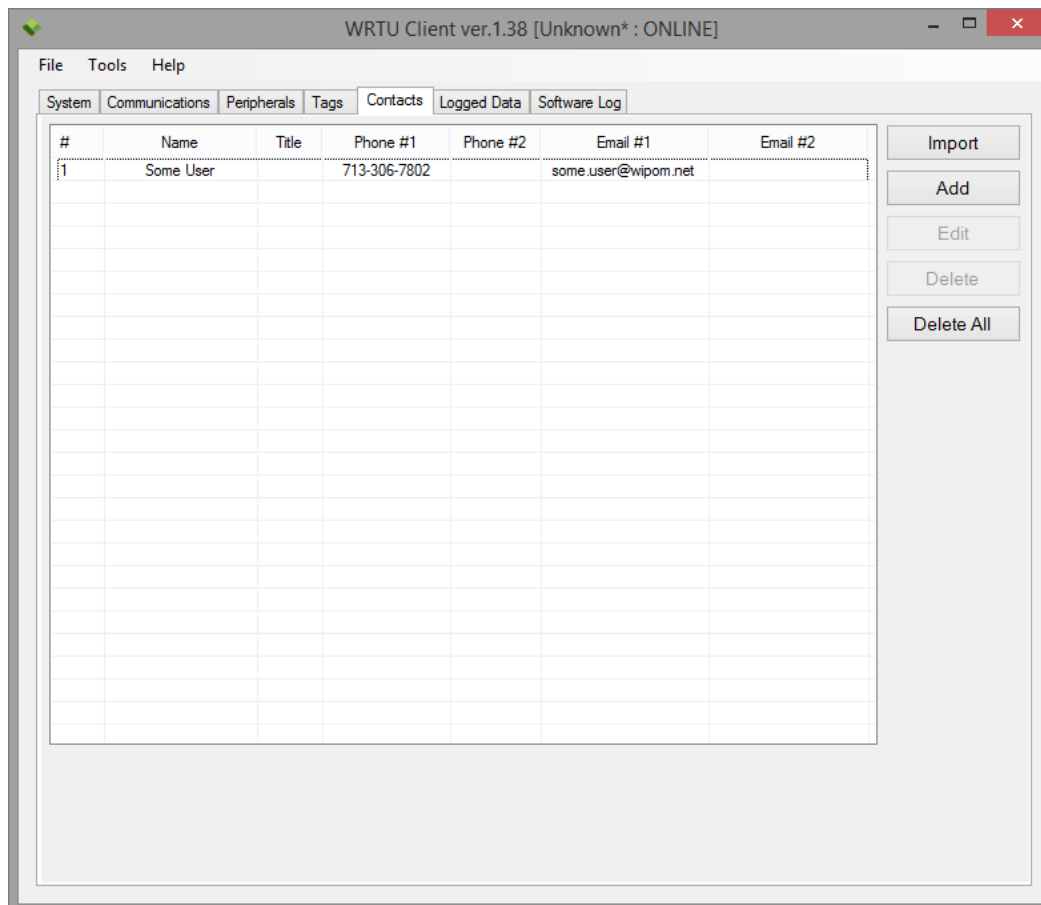


Figure 30 – Contacts Tab

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:

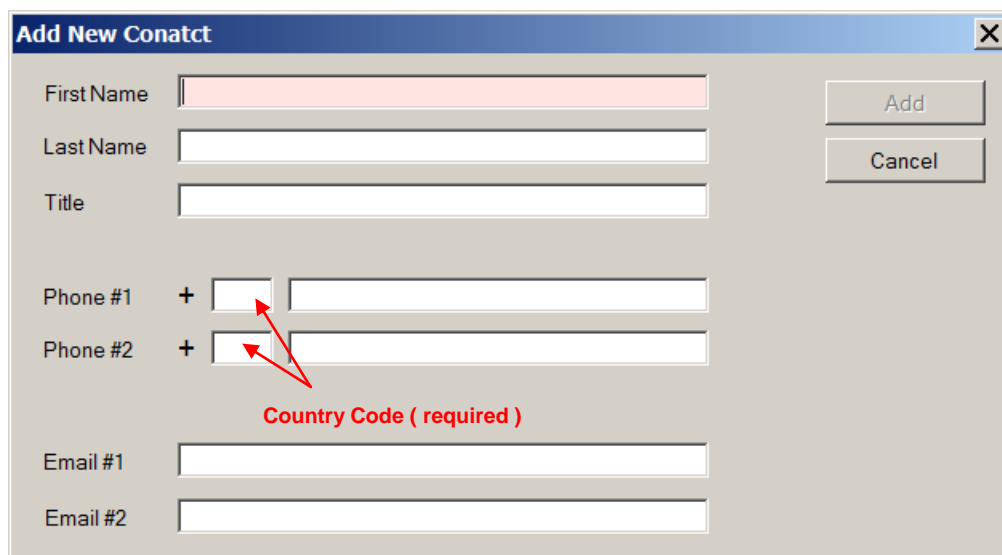


Figure 32 – Adding New Contacts

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

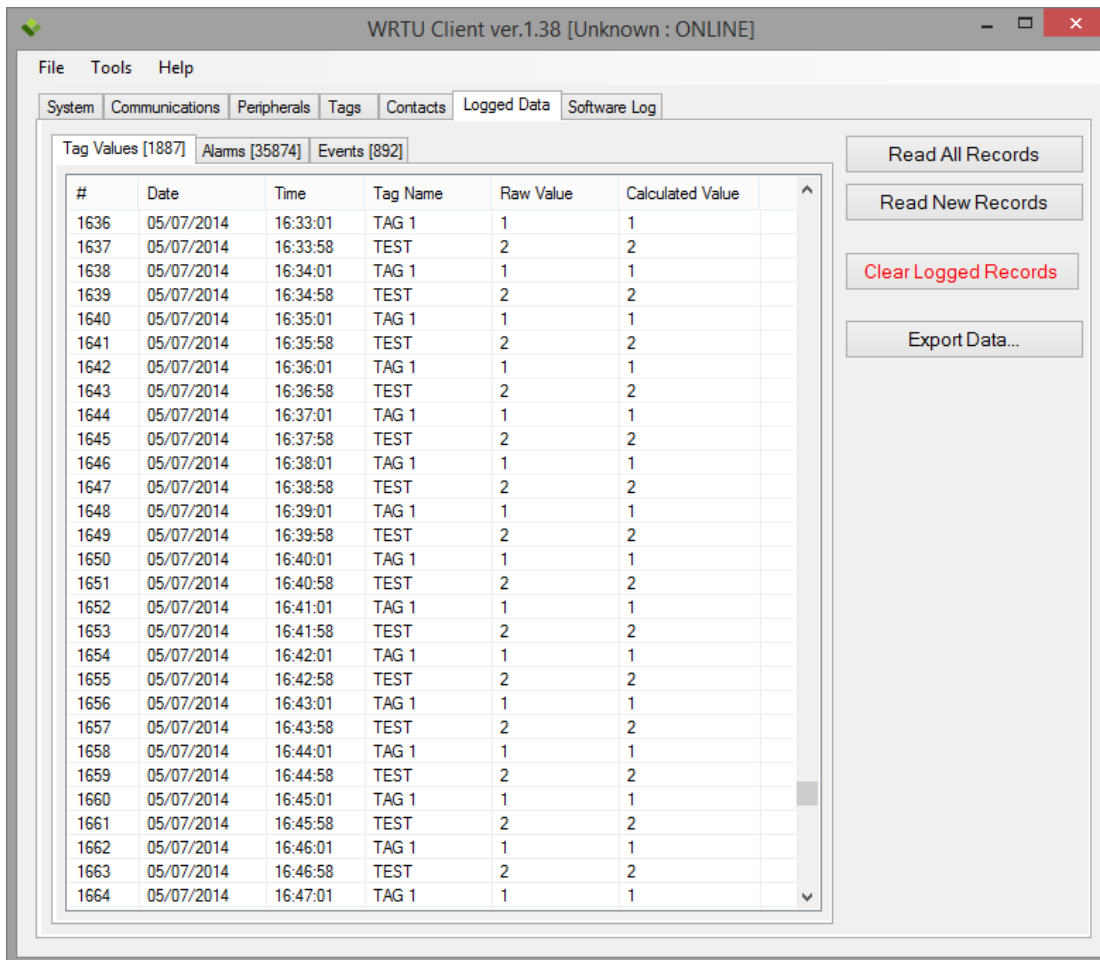
Only the **First Name** field is mandatory; other fields can be blank.

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:



#	Date	Time	Tag Name	Raw Value	Calculated Value
1636	05/07/2014	16:33:01	TAG 1	1	1
1637	05/07/2014	16:33:58	TEST	2	2
1638	05/07/2014	16:34:01	TAG 1	1	1
1639	05/07/2014	16:34:58	TEST	2	2
1640	05/07/2014	16:35:01	TAG 1	1	1
1641	05/07/2014	16:35:58	TEST	2	2
1642	05/07/2014	16:36:01	TAG 1	1	1
1643	05/07/2014	16:36:58	TEST	2	2
1644	05/07/2014	16:37:01	TAG 1	1	1
1645	05/07/2014	16:37:58	TEST	2	2
1646	05/07/2014	16:38:01	TAG 1	1	1
1647	05/07/2014	16:38:58	TEST	2	2
1648	05/07/2014	16:39:01	TAG 1	1	1
1649	05/07/2014	16:39:58	TEST	2	2
1650	05/07/2014	16:40:01	TAG 1	1	1
1651	05/07/2014	16:40:58	TEST	2	2
1652	05/07/2014	16:41:01	TAG 1	1	1
1653	05/07/2014	16:41:58	TEST	2	2
1654	05/07/2014	16:42:01	TAG 1	1	1
1655	05/07/2014	16:42:58	TEST	2	2
1656	05/07/2014	16:43:01	TAG 1	1	1
1657	05/07/2014	16:43:58	TEST	2	2
1658	05/07/2014	16:44:01	TAG 1	1	1
1659	05/07/2014	16:44:58	TEST	2	2
1660	05/07/2014	16:45:01	TAG 1	1	1
1661	05/07/2014	16:45:58	TEST	2	2
1662	05/07/2014	16:46:01	TAG 1	1	1
1663	05/07/2014	16:46:58	TEST	2	2
1664	05/07/2014	16:47:01	TAG 1	1	1

Figure 33 – Logged Data Tab

Note: WRTU 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:

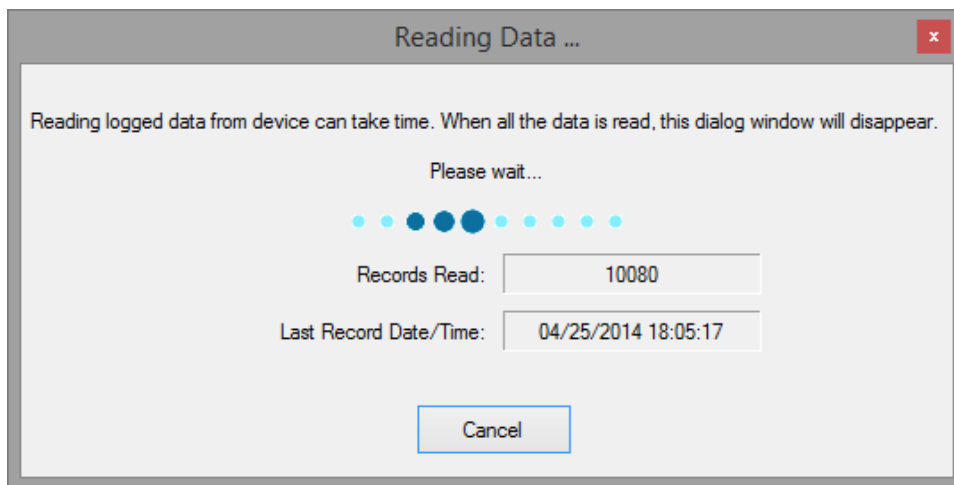


Figure 34 – Reading Data Window

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:

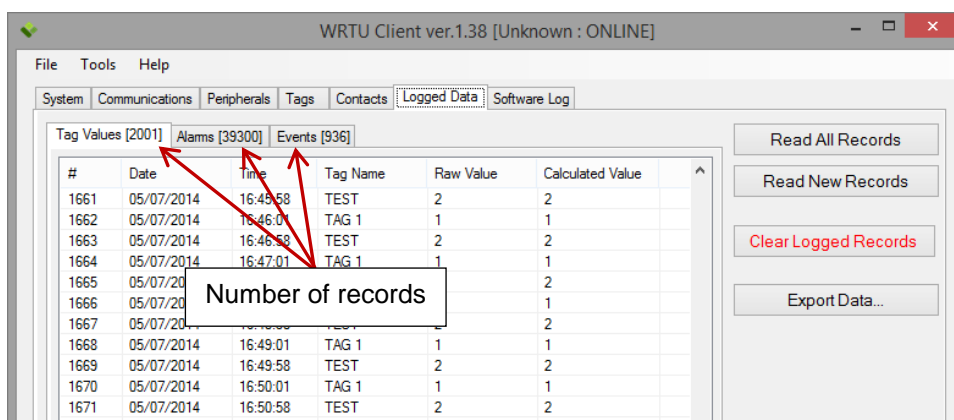


Figure 35 – Number of records in tab titles

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:

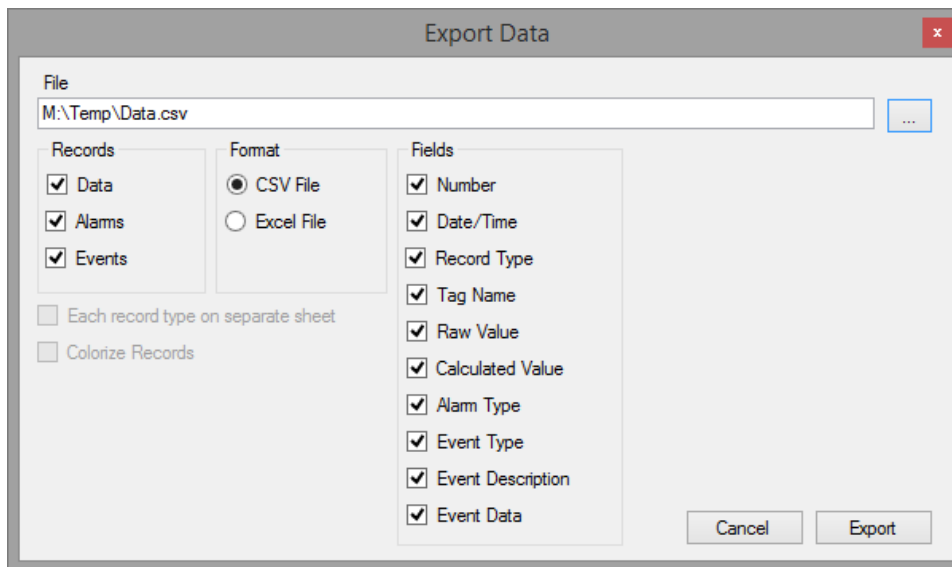


Figure 36 – Export Data Window

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 placed on the same Excel sheet.

4.15 Software Log

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

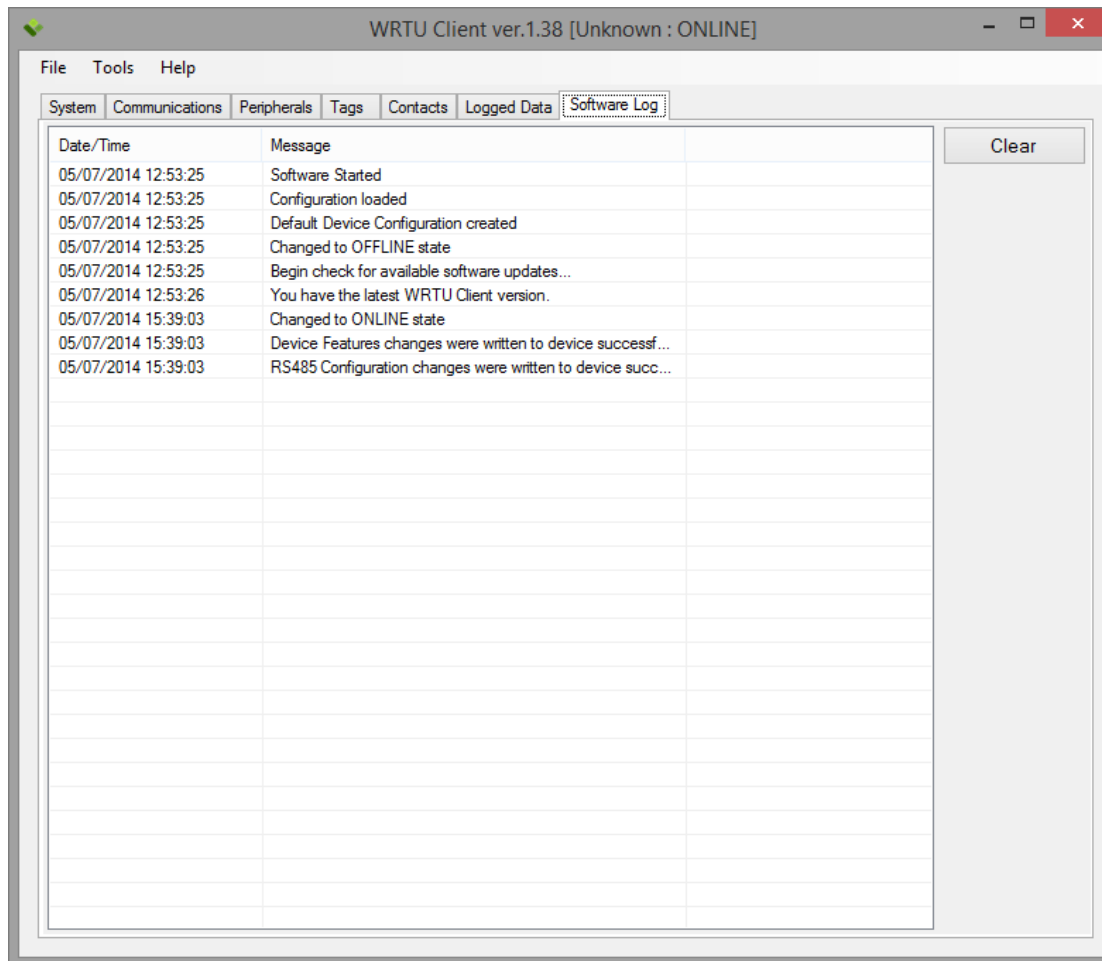


Figure 37 – Software Log tab

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

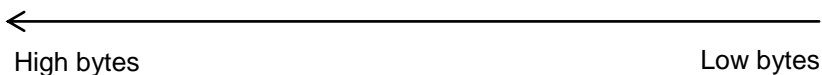
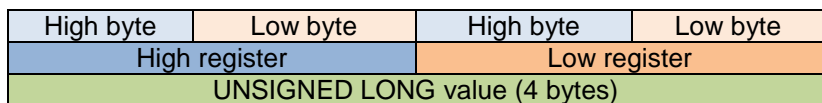
Digital Inputs (Frequency Counter)

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