



**The MODBUS RTU/ASCII, MODBUS/TCP plugin
PRINTED MANUAL**

MODBUS RTU/ASCII, MODBUS/TCP plugin

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1 Introduction

MODBUS is a serial communications protocol for use with its programmable logic controllers (PLCs). Simple and robust, it has since become a de facto standard communication protocol, and it is now a commonly available means of connecting industrial electronic devices.

Our MODBUS RTU/ASCII and MODBUS TCP plugin can work in two modes:

1. Data query and parser - the plugin sends MODBUS requests and process the responses. In this mode the program operates in the Master mode;
2. Data parser only - in this mode the plugin waits for responses only. For example, it can work in parallel with other MODBUS master or in the "Spy" mode.

This module has the following features:

- Can send valid data request to any MODBUS-compatible device;
- Can send request with any MODBUS function;
- CRC for each data packet will be calculated and verified automatically;
- Can request bytes, word, double words and single registers;
- Can poll MODBUS data by a custom interval;
- Can flexibly parse all received data packets and extract register's values.

2 System requirements

The following requirements must be met for "MODBUS RTU/ASCII, MODBUS/TCP" to be installed:

Operating system: Windows 2000 SP4 and above, including both x86 and x64 workstations and servers. A latest service pack for the corresponding OS is required.

Free disk space: Not less than 5 MB of free disk space is recommended.

Special access requirements: You should log on as a user with Administrator rights in order to install this module.

The main application (core) must be installed, for example, Advanced Serial Data Logger.

Notes for Microsoft Vista and above:

Since our software saves data to the registry and installs to the Program Files folder, the following requirements must be met:

1. You need Administrator rights to run and install our software
2. The shortcut icon of our software will be located on the desktop;
3. Windows Vista will ask for your confirmation to continue the installation.

NOTE: You can configure the user account only once in order not to see the above dialog box any more. Search Google for the solution of this problem.

3 Installing MODBUS RTU/ASCII, MODBUS/TCP

1. Close the main application (for example, Advanced Serial Data Logger) if it is running;
2. Copy the program to your hard drive;
3. Run the module installation file with a double click on the file name in Windows Explorer;
4. Follow the instructions of the installation software. Usually, it is enough just to click the "Next" button several times;
5. Start the main application. The name of the module will appear on the "Modules" tab of the "Settings" window if it is successfully installed.

If the module is compatible with the program, its name and version will be displayed in the module list. You can see examples of installed modules on fig.1-2. Some types of modules require additional configuration. To do it, just select a module from the list and click the "Setup" button next to the list. The configuration of the module is described below.

You can see some types of modules on the "Log file" tab. To configure such a module, you should select it from the "File type" list and click the "Advanced" button.

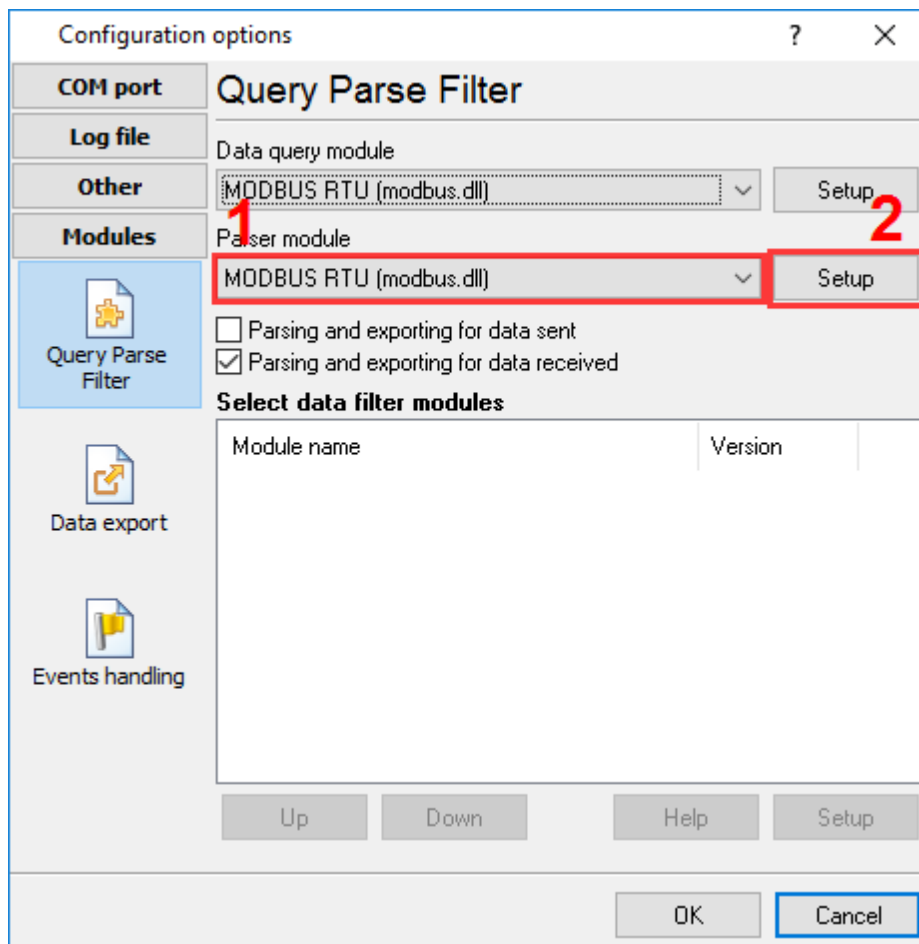


Fig.1. Example of installed module

4 Glossary

Plug-in - module

Main program – the program shell that uses this module. For example: Advanced Serial Data Logger

Parser – the module that processes the data flow singling out data packets from it and variables from data packets. These variables are used in data export modules after that.

Core - see "Main program".

5 User Manual

5.1 Data query

To add new item click "Actions->Add new request". The dialog window will be shown (fig.1). Enter a request description, that can contain any characters and click the "OK" button.

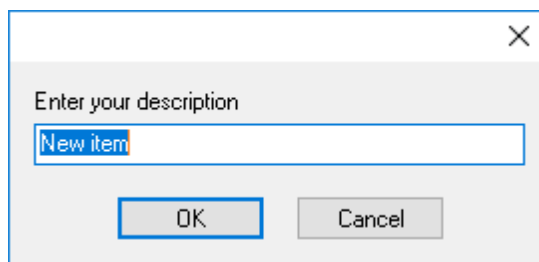


Fig.1. Name dialog

New MODBUS request will appear in the requests tree (fig.2). Each MODBUS request has few important options:

- **Device address** - your hardware device address in the RS232 or RS485 network. By MODBUS protocol specification this address can be from 0 to 255. If you'll specify 0 as a device address, then all devices in the network should answer to this request;
- **Function** - the MODBUS protocol function number. Usually, this value is 3 for reading holding registers or 4 for reading input registers;
- **First register** - it's register address. This value is zero-based (by MODBUS protocol specification). If you want to read a register with number 100, then specify 99 here;
- **Registers to read** - please, specify number of consistent registers in the device memory;
- **Request timeout** - It is the time interval for which the program is sending request to a MODBUS device. After reaching the timeout limit the program will automatically cancel current request and execute next request in the queue. The timeout value depends on the network on which master (program) and slave (device) is running. If the network is slow then timeout value should be larger and if network is fast then timeout value can be small.

MODBUS RTU 4.0.33 build 1103

Requests queue

Property	Value
Request #1	
<input checked="" type="checkbox"/> Send requests, otherwise parse response only	
Device address	1
Function	3
Data address	
<input type="radio"/> Address (e.g. 4XXXX)	
<input checked="" type="radio"/> First register (e.g. 0000)	
Value	1
Registers to read	8
Request timeout (ms)	1500
Request method	
<input type="radio"/> Once, on program startup	
<input checked="" type="radio"/> Polling	
Interval (ms)	5000
Interval units	Millisecond
Response items	
Voltage Va-n (V)	
Name	VOLTAGE_VA_N
Offset	0
Count	1
<input type="checkbox"/> Append counter to name	
Data type	Single precision float, 32 bit
<input type="checkbox"/> Little endian, otherwise Big endian (numbers only)	
<input type="checkbox"/> Unsigned, otherwise Signed (decimal numbers only)	
<input checked="" type="checkbox"/> Swapped (most significant register first) (32 and 64 bit numbers only)	
Action	<input type="checkbox"/> Export data for all requests at once
Minimal interval between data packets (ms)	0


OK Cancel

Fig.2. MODBUS request

5.2 Request method

The plugin can send requests in two modes:

- **Once, on program startup** - the program will send request once, when the program starts.
- **Polling** - the program will be sending request periodically based on an interval specified. The interval between requests depends on the network on which master (program) and slave (device) is running. If the network is slow then time for each request will be larger and vice versa. Because, the program are executing all requests in the queue one by one, then time between requests depends on the number of requests in the queue.



The screenshot shows a dialog box titled "Request method". It contains two radio buttons: "Once, on program startup" (unselected) and "Polling" (selected). Below the radio buttons is a table with two rows and two columns. The first row has "Interval (ms)" in the left column and "5000" in the right column. The second row has "Interval units" in the left column and "Millisecond" in the right column.

Interval (ms)	5000
Interval units	Millisecond

Fig.3. Request methods

If you added few requests to the queue, then you can move it up and down. Select a request title and execute a corresponding menu item by clicking the "Actions" button. With help of this button you can change an item description and delete requests.

You can access all actions through the popup menu in the request tree.

5.3 Data parser

All data publication modules uses variables parsed. The parser should pick out significant data blocks (data packets) from the common data flow. Our MODBUS RTU/ASCII, MODBUS/TCP module can do it. This module analyze data flow and control data packets integrity by CRC (cyclical redundancy check). All parser items assigned with a corresponding request in the queue. You can assign one or more parser items (variables) to one request. Typically, each request has one parser item.

You can add new parser item (variable) to the request by clicking "Actions -> Add response item". Before, you should select a caption of the corresponding request. New parser item (variable) will appear in the "Response items" group (fig.4).

[-] Response items	
[-] Voltage Va-n (V)	
Name	VOLTAGE_VA_N
Offset	0
Count	1
<input type="checkbox"/> Append counter to name	
Data type	Single precision float, 32 bit
<input type="checkbox"/> Little endian, otherwise Big endian (numbers only)	
<input type="checkbox"/> Unsigned, otherwise Signed (decimal numbers only)	
<input checked="" type="checkbox"/> Swapped (most significant register first) (32 and 64 bit numbers only)	

Fig.4. Data parser items.

Each response item has few important options:

- **Name** - the of the parser variable. This name you'll bind with fields in data publication modules.
- **Offset** - the device can response few data bytes, but you need only some of them. The "Offset" field contains a byte offset of the data from the beginning of the data block. This value is zero-based. If first byte of your value located at the begin of data block, then this value should be 0. You can specify -1 here, then the program will automatically calculate the value offset;
- **Count** - the number of values (nor bytes) with same parameters (data type and default value), that located one after another since the offset. If you specify more than one here, then a value index (1, 2, 3 etc) will be added to the parser item name;
- **Data type** - data type of the value. Each value can utilize one (for byte data type) or more bytes;
- **Default value** - this value will be used if the parser can't parser data block for this parser item. For example, if the data block has a small size or offset is too large.

6 Troubles?

6.1 Possible problems

No data for publication/exporting – no data is passed for exporting. Solution: configure the parser, make sure that one or more variables are declared in the parser.

Error on binding variable with name %s [%s] – the error usually occurs if data does not correspond to the specified format. For example, the date and time format does not correspond to the data.

Unable to disconnect from the database [%s] and **Unable to connect to a database [%s]** – it is impossible to connect/disconnect to/from the database. You should check the parameters of the database connection. The analysis of the additional information will help you locate the error.

Database access error [%s]. Stop operations with the database? – the message appears if an error occurs during an attempt to execute an SQL query if the second variant of reacting to errors is selected. The message implies a "Yes" or "No" answer. The analysis of the additional information will help you locate the error.

Unable to verify your SQL script [%s] – the message appears when an attempt to analyze your SQL query fails. Check if the syntax of your SQL query is correct.

Tested successfully – the message appears if your database connection is successfully tested. It requires no additional actions.

Database isn't used – the message appears if the module is temporarily disabled (the "Temporarily disabled" check box is selected) or the database name field is empty. Check the connection parameters.

Database isn't selected - the message appears if the database type is not selected. Check the connection parameters.

Database: %s – %s contains the database name. The message appears if the database connection is successful. Usually, you see it when you call the module for the first time. It requires no additional actions.

Invalid data block length (columns=%d,length=%d) – an internal application error. It means that the data sent by the parser is in an invalid format. Perhaps, you are using the module incompatible with the version of the Advanced Serial Data Logger kernel. Update the versions of both the kernel and the module.

The time of connection is not due yet (%d,%d) – the message appears during an attempt to connect to the database after the connection to it has been lost and the "Reconnect after" option is enabled. No additional actions are required.

Invalid procedure call. Bad arguments – an attempt to call the module using invalid parameters. Perhaps, you are using the module incompatible with the version of the Advanced Serial Data Logger kernel. Update the versions of both the kernel and the module.

Writing to the database is complete - the message appears if your queue of SQL queries is successfully executed. It requires no additional actions.

Writing to the database is complete with errors – the message appears if the executing your queue of SQL queries was interrupted by an error. It requires no additional actions.

Your SQL is empty. Please, specify some SQL text first – the message appears if you do not enter the text for your SQL query. Check if the options on the "SQL queue" tab are configured correctly.

Invalid temporary path – the path to the temporary file specified by you does not exist. Enter a new path in the "Temporary folder" field on the "Errors handling" tab.

%s, %d – will be replaced by additional information.