The DNP3 plugin
PRINTED MANUAL

DNP3 plugin

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Table of Contents

1   Introduction

DNP3 (Distributed Network Protocol) is a set of communications protocols used between components in process automation systems. Its main use is in utilities such as electric and water companies. Our plugin allows to read data from the wide range of devices that use the DNP3 data exchange protocol.

This module has the following features:

- Can send data request to any DNP3-compatible device;
- CRC for each data packet will be calculated and verified automatically;
- Can poll devices data by a custom interval;
- Can flexibly parse all received data packets and extract register's values.
- Can read binary inputs and outputs, analog inputs and outputs, counters, Class 0, Class 1, Class 2, Class 3 data, frozen and changed data.

2   System requirements

The following requirements must be met for "DNP3" to be installed:

Operating system: Windows 2000 SP4 and above, including both x86 and x64 workstations and servers. The 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.

3   Installing DNP3

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

Main program - it is the main executable of the application, for example, Advanced Serial Data Logger and asdlog.exe. It allows you to create several configurations with different settings and use different plugins.

Plugin - it is the additional plugin module for the main program. The plugin module extends the functionality of the main program.

Parser - it is the plugin module that processes the data flow, singling out data packets from it, and then 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.
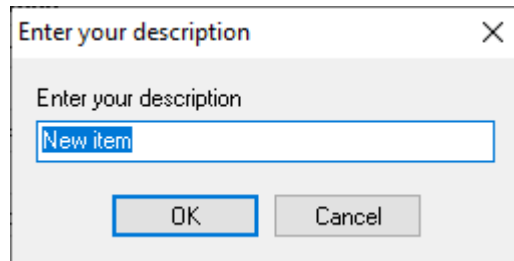

Fig.1. Name dialog

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

- **Target address** - the address of a slave device in a network (1-65530);
- **Memory** - a object type and variation. Please, look at a DNP profile of your device to find list of supported objects and variations;
- **Qualifier code** - the read mode. Please, note that the device may not support some qualifier codes;
- **Request timeout** - this is the time interval for which the program is sending request to a 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.
- **Response item names** - list of names that will be assigned for returned values. For example, you read all analog values from the device. If you'll specify names like VALUE1, VALUE2, then the first analog value in an answer will have the "VALUE1" name, second - the "VALUE2" name, etc. If the name for a value was not defined, then the name will be generated automatically:

    1. AI0,AI1,AI2..AIn - for analog inputs;
    2. AO0,AO1,AO2..AOn - for analog outputs;
    3. CNT0,CNT1,CNT2...CNTn - for counters;
    4. DI0,DI1,DI2..DIn - binary inputs;
    5. DO0,DO1,DO2..DOn - binary outputs;

Note: the plugin does not check memory ranges and number of bytes to read. You need to configure requests according to this note.

Fig.2. Request

5.2 Request method

The plugin can send requests in two modes:

Once, on program startup - the program will send a request once when the program starts.

Polling - the program will send a 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 the time for each request will be larger and vice versa. Because the program executes all requests in the queue one by one, the time between requests depends on the number of requests in the queue.

Fig. 2. Request methods

If you have added several requests to the queue, you can move them up or down. To do it, select a request, click the "Action" button, and select an action ("Move up" or "Move down").

You can also click this button to change a request's description or remove a request from the queue.

You can also perform the same actions by using the context menu that pops up when you right-click items in the request tree.

6   Troubles?

6.1   Possible problems

No data for publication/exporting - no data is passed for export. Solution: configure the parser and make sure that one or more variables are defined 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 match source data.

Unable to disconnect from the database [%s] and **Unable to connect to a database [%s]** - it is impossible to connect or disconnect form 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 the "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 execution of 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.