

FreyrSCADA



Embedded Solution

# **FreyrSCADA Embedded Solution**

**Software Document**

**DNP / IEEE1815 Client / Master Simulator User Manual**

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**Stack Version: 21.04.001**

**Document version: 16.08.28**

**Online**

**[Check the latest version](#)**

**[Distributed Network Protocol \(DNP3\) - IEEE 1815-2012 Product](#)**

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# 1. Introduction

Freyr SCADA DNP3 (IEEE 1815) – Master (Client) Simulator was originally developed to test the DNP3(IEEE 1815) stack.

We developed the stack to run multiple hardware platform (windows, linux, RTLinux, qnx..). So we had to test multiple platform. At that time, our engineers, developed the test simulation application.

We tested this simulator with multiple test software available in the market.

The interoperability list focused only for our Stack. If you have any specific requirement to implement new Data type, please contact us.

Our support team has young, dynamic and professional team of engineers. And they will provide the quick and accurate solution as per customer requirement.

support@freyrscada.com

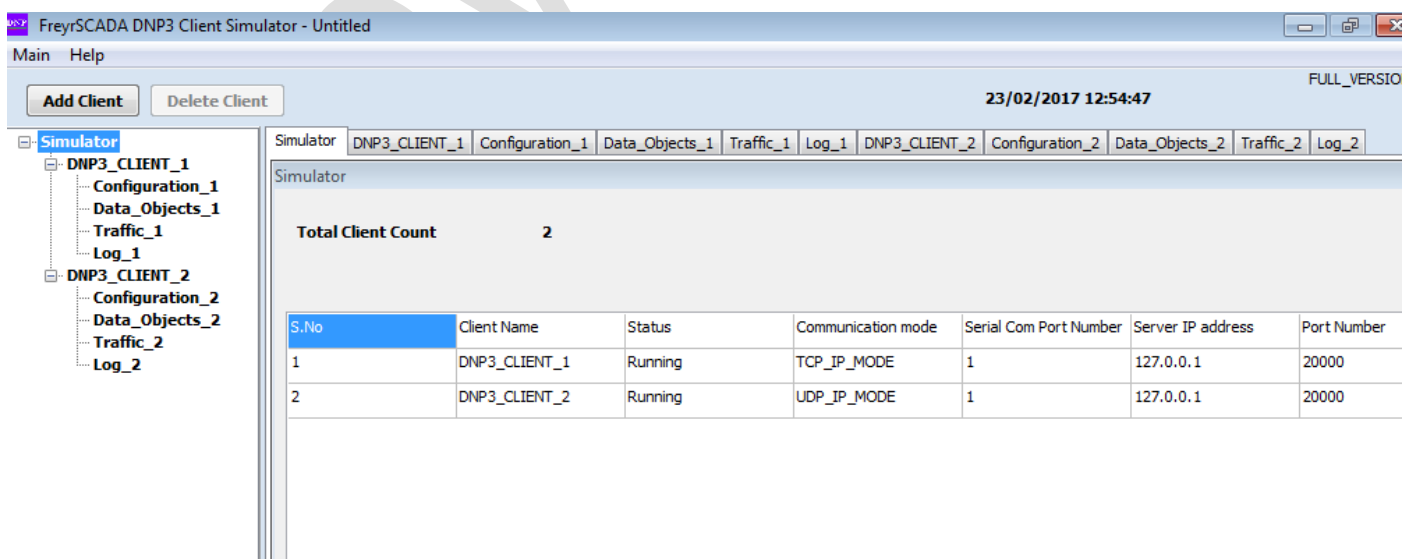
Thanks

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# 2. Add and Delete Client

We can add up to 50 Client node in the simulator. Every Client node will work independently.

And also we can delete the Client.

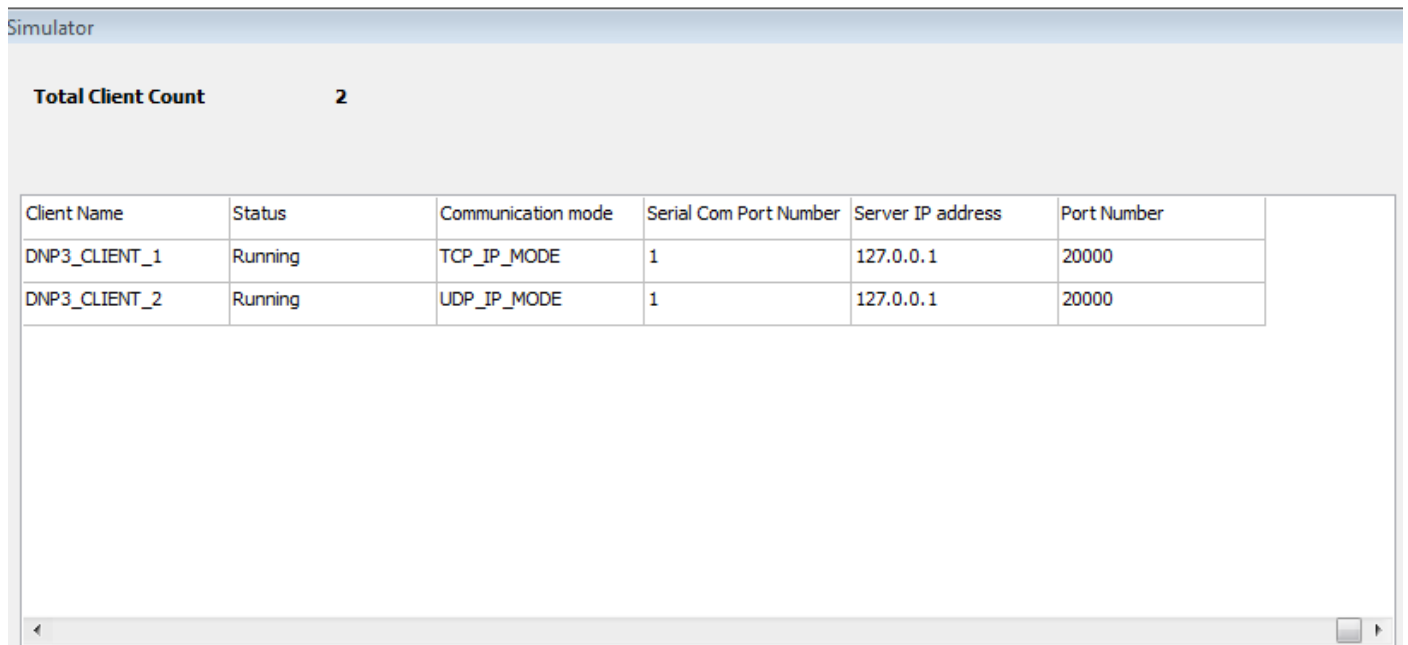


Simulator window shows the status & connected Communication channel

TCP – IP Address, Port Number

UDP – IP Address, Port Number

Serial – Com Port Number

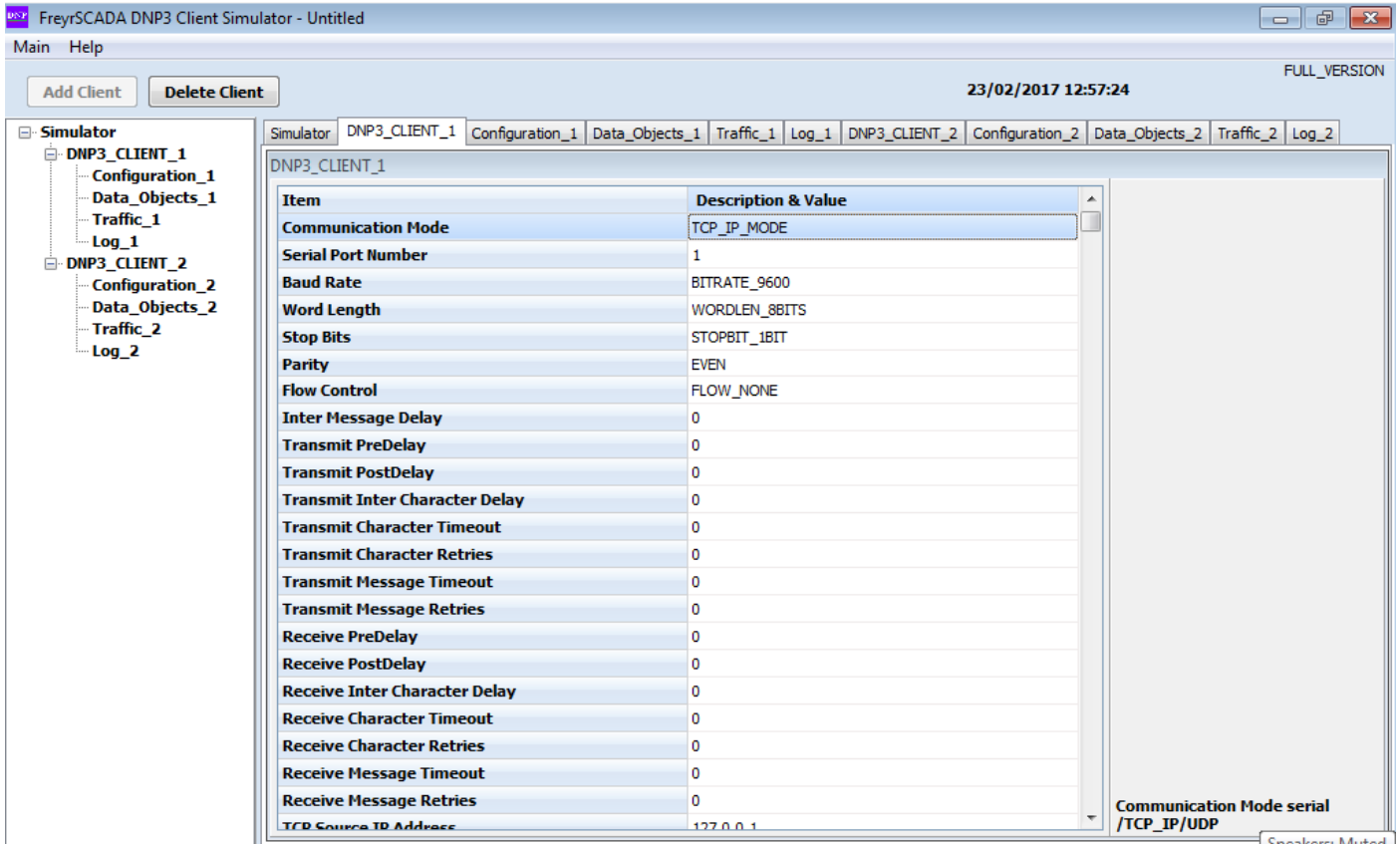


The screenshot shows a window titled "Simulator" with a header area displaying "Total Client Count" as 2. Below this is a table with the following data:

Client Name	Status	Communication mode	Serial Com Port Number	Server IP address	Port Number
DNP3_CLIENT_1	Running	TCP_IP_MODE	1	127.0.0.1	20000
DNP3_CLIENT_2	Running	UDP_IP_MODE	1	127.0.0.1	20000

### 3. Client Configuration

Client Protocol Configuration window shows the actual protocol settings.



Configuration Parameters as follows:

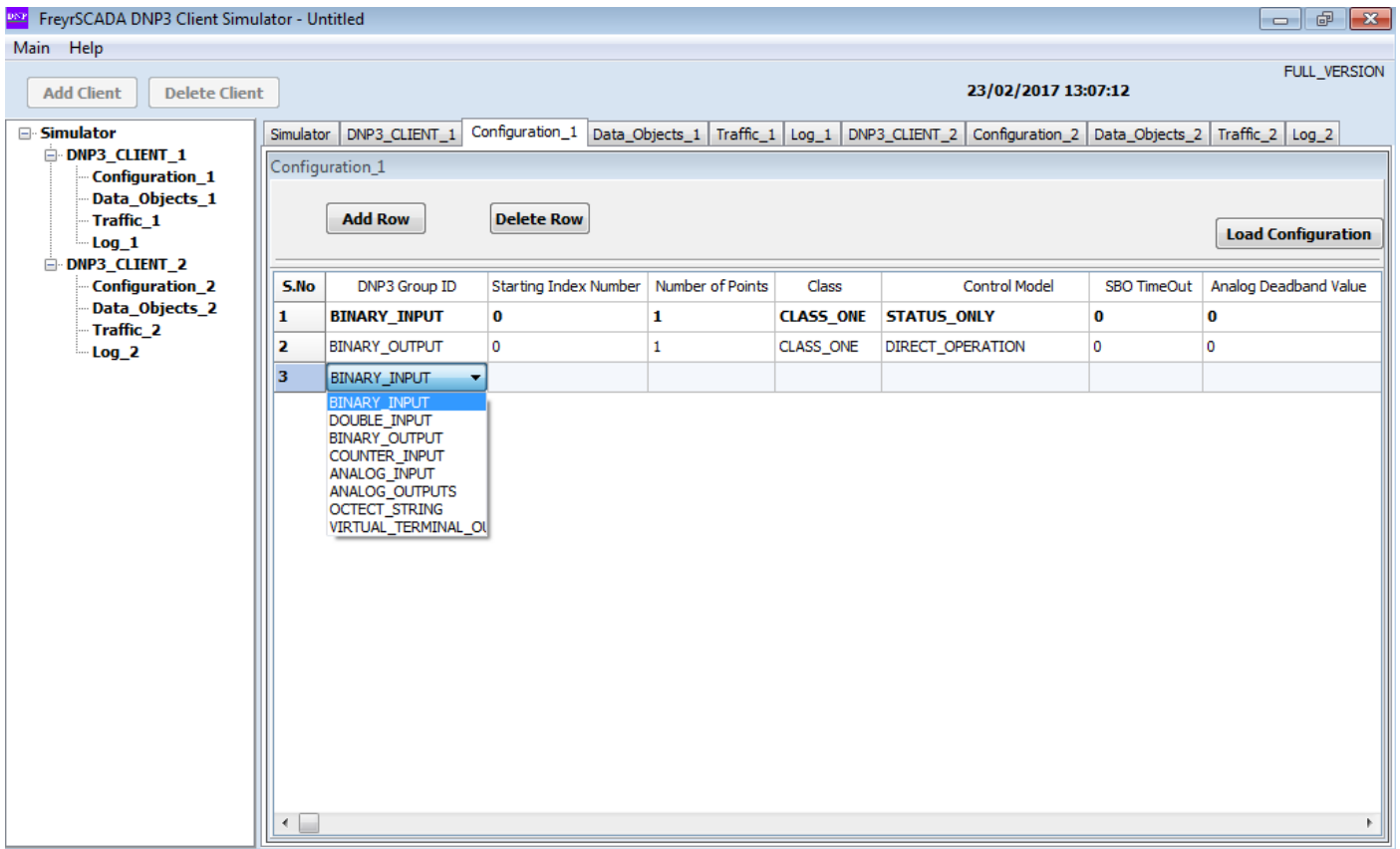
- 1) **Communication Mode** - Communication Mode serial /TCP\_IP/UDP
- 2) **Serial Port Number** - Serial COM port number
- 3) **Baud Rate** - Serial Bit/Baud Rate
- 4) **Word Length** - Serial Word Length
- 5) **Stop Bits** - Serial Stop Bits
- 6) **Parity** - Serial Parity
- 7) **Flow Control** - Flow Control
- 8) **Inter Message Delay** - Time between sending and receiving of message only applies after transmitting the message
- 9) **Transmit PreDelay** - Transmit Delay before send
- 10) **Transmit PostDelay** - Delay after send
- 11) **Transmit Inter Character Delay** - Delay between characters during send
- 12) **Transmit Character Timeout** - Timeout if the character is not being sent
- 13) **Transmit Character Retries** - Number of retries to send
- 14) **Transmit Message Timeout** - Message Timeout if entire message is not sent
- 15) **Transmit Message Retries** - Transmit - Message Retries to retry the entire message

- 16) **Receive PreDelay** - Delay before receive
- 17) **Receive PostDelay** - Delay after receive
- 18) **Receive Inter Character Delay** - Delay between characters during receive
- 19) **Receive Character Timeout** - Timeout if the character is not being received
- 20) **Receive Character Retries** - Number of retries to receive a character
- 21) **Receive Message Timeout** - Message Timeout if entire message is not received
- 22) **Receive Message Retries** - Receive - Message Retries to retry the entire message
- 23) **TCP Source IP Address** - TCP, Client, ip address to bind the socket
- 24) **TCP Port Number** - TCP, Client, port to bind the socket
- 25) **UDP Source IP Address** - UDP, Client, ip address to bind the socket
- 26) **UDP Port Number** - UDP, Client, port to bind the socket
- 27) **Master Address** - Expected Master / Client address range 0 to 65519
- 28) **Outstation / Slave Address** - CIsave/Outstation address range 0 to 65519
- 29) **Link Layer Timeout** - Link layer time out in milliseconds (minimum 1000ms - to max)
- 30) **Application Layer Timeout** - application layer timeout in millisecond 5 \* Linklayer timeout
- 31) **Poll Interval - class 1,2,3** - CLASS 123 poll interval in milliseconds (minimum 1000ms - to 2,147,483,000ms)
- 32) **Integrity Poll Interval - class 0,1,2,3** - CLASS 0123 poll interval in milliseconds (minimum 1000ms - to 2,147,483,000ms)
- 33) **Poll Interval - class 0** - CLASS 0 poll interval in milliseconds (minimum 1000ms - to 2,147,483,000ms)
- 34) **Poll Interval - class 1** - CLASS 1 poll interval in milliseconds (minimum 1000ms - to 2,147,483,000ms)
- 35) **Poll Interval - class 2** - CLASS 2 poll interval in milliseconds (minimum 1000ms - to 2,147,483,000ms)
- 36) **Poll Interval - class 3** - CLASS 3 poll interval in milliseconds (minimum 1000ms - to 2,147,483,000ms)
- 37) **Enable UTC time** - enable utc time/ local time
- 38) **Unsolicited - Enable Responses on Startup** - enable to Client send unsolicited message on startup
- 39) **Enable Frozen Analog Input Support** - False- stack will not create points for frozen analog input
- 40) **Enable FileTransfer** - Enable File Transfr Support
- 41) **FileOperation Timeout** - file read/write timeout in milliseconds, minimum 10000 ms
- 42) **Call Update Callback even Timestamp changes** - if it true ,the timestamp change also create the updatecallback
- 43) **Command Timeout** - Command timeout in milliseconds, minimum 3000ms

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## **4. Client Data Configuration**

Client Data Configuration window shows the point list configuration.



## DNP Group to choose

BINARY\_INPUT - Binary Input (DNP3Group 1)

DOUBLE\_INPUT - Double-bit Binary Input (DNP3Group 3)

BINARY\_OUTPUT - Binary Output (DNP3Group 10)

COUNTER\_INPUT - Counter Input (DNP3Group 20)

ANALOG\_INPUT - Analog Input (DNP3Group 30)

ANALOG\_OUTPUTS - Analog output (DNP3Group 40)

OCTECT\_STRING - Octect String (DNP3Group 110)

VIRTUAL\_TERMINAL\_OUTPUT - virtual terminal String (DNP3Group 112)



## 5. Station Commands

In the Data object window, plain space, just right click , the station command window will open,

Data\_Objects\_1

Start Communication Stop Communication

S.No	DNP3 Group Id	Index Number	Value		Time Stamp	Class	
1	BINARY_INPUT	0	0	COMM_LOST	13:20:24 23/02/2017	CLASS_ONE	STA
2	BINARY_INPUT	1	0	COMM_LOST	13:20:24 23/02/2017	CLASS_ONE	STA
3	BINARY_INPUT	2	0	COMM_LOST	13:20:24 23/02/2017	CLASS_ONE	STA
4	BINARY_INPUT	3	0	COMM_LOST	13:20:24 23/02/2017	CLASS_ONE	STA
5	BINARY_INPUT	4	0	COMM_LOST	13:20:24 23/02/2017	CLASS_ONE	STA
6	BINARY_OUTPUT	0	0	COMM_LOST	13:20:24 23/02/2017	CLASS_ONE	DIF
7	BINARY_OUTPUT	1	0	COMM_LOST	13:20:24 23/02/2017	CLASS_ONE	DIF
8	BINARY_OUTPUT	2	0	COMM_LOST	13:20:24 23/02/2017	CLASS_ONE	DIF
9	BINARY_OUTPUT	3	0	COMM_LOST	13:20:24 23/02/2017	CLASS_ONE	DIF
10	BINARY_OUTPUT	4			13:20:24 23/02/2017	CLASS_ONE	DIF

Station Commands

- Point Command
- Read Scan Class Command
- Freeze and Clear
- Clock sync
- Spontaneous Command
- Special DNP3 Command

Station Commands

Read Command

Server Address : 1

Master Address : 2

Read

- Read Class 0123 Scan
- Read Class 0 Scan
- Read Class 1 Scan
- Read Class 2 Scan
- Read Class 3 Scan
- Read Class 123 Scan
- Read Class 0123 Scan

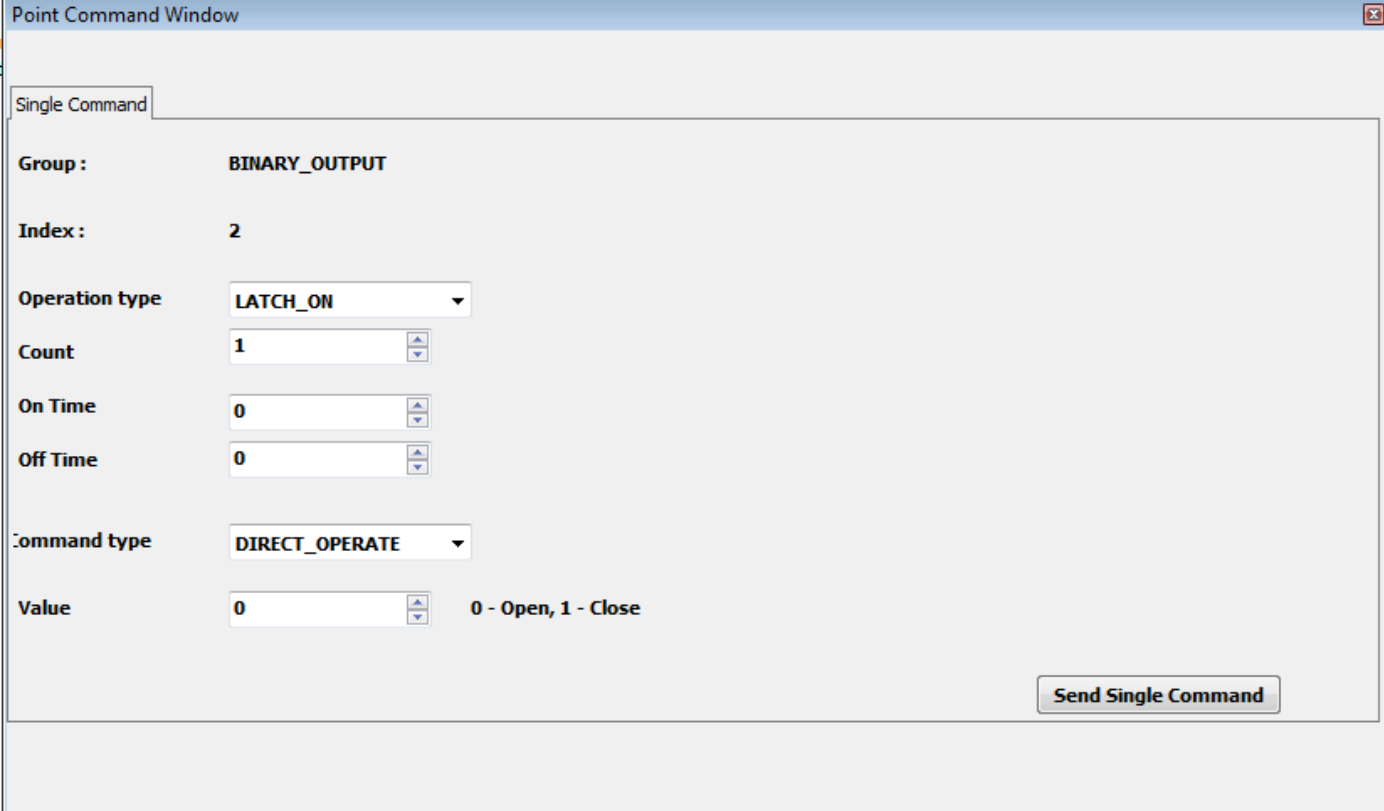
Send Read Command

The command window will show the result also, the send command success or fail.

## 6. Point Command

The individual command has point command.

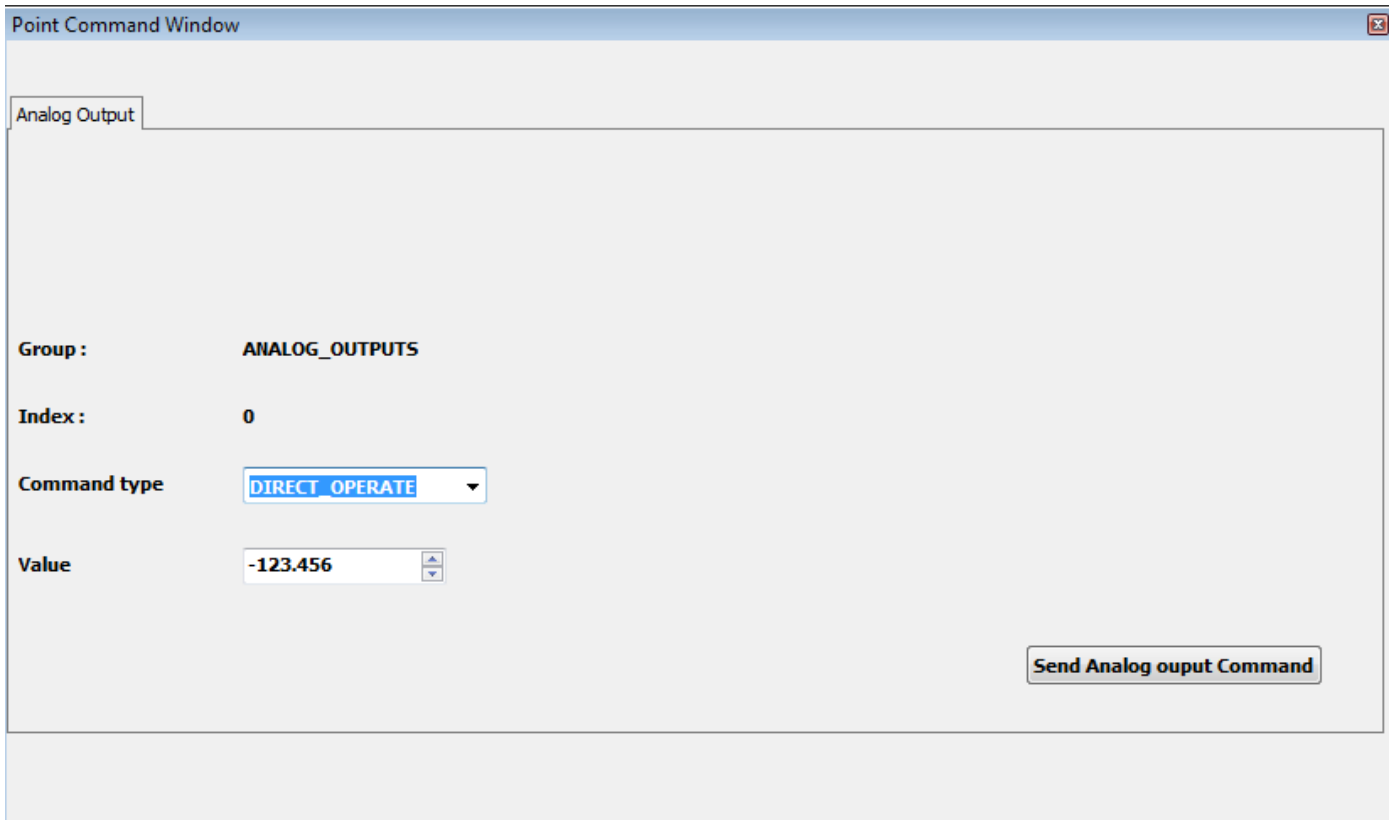
Just right click the command point in the data object window,



The screenshot shows a software window titled "Point Command Window". Inside the window, there is a tab labeled "Single Command". Below the tab, the following fields are visible:

- Group:** BINARY\_OUTPUT
- Index:** 2
- Operation type:** LATCH\_ON (dropdown menu)
- Count:** 1 (spin box)
- On Time:** 0 (spin box)
- Off Time:** 0 (spin box)
- Command type:** DIRECT\_OPERATE (dropdown menu)
- Value:** 0 (spin box) with a legend "0 - Open, 1 - Close" to its right.

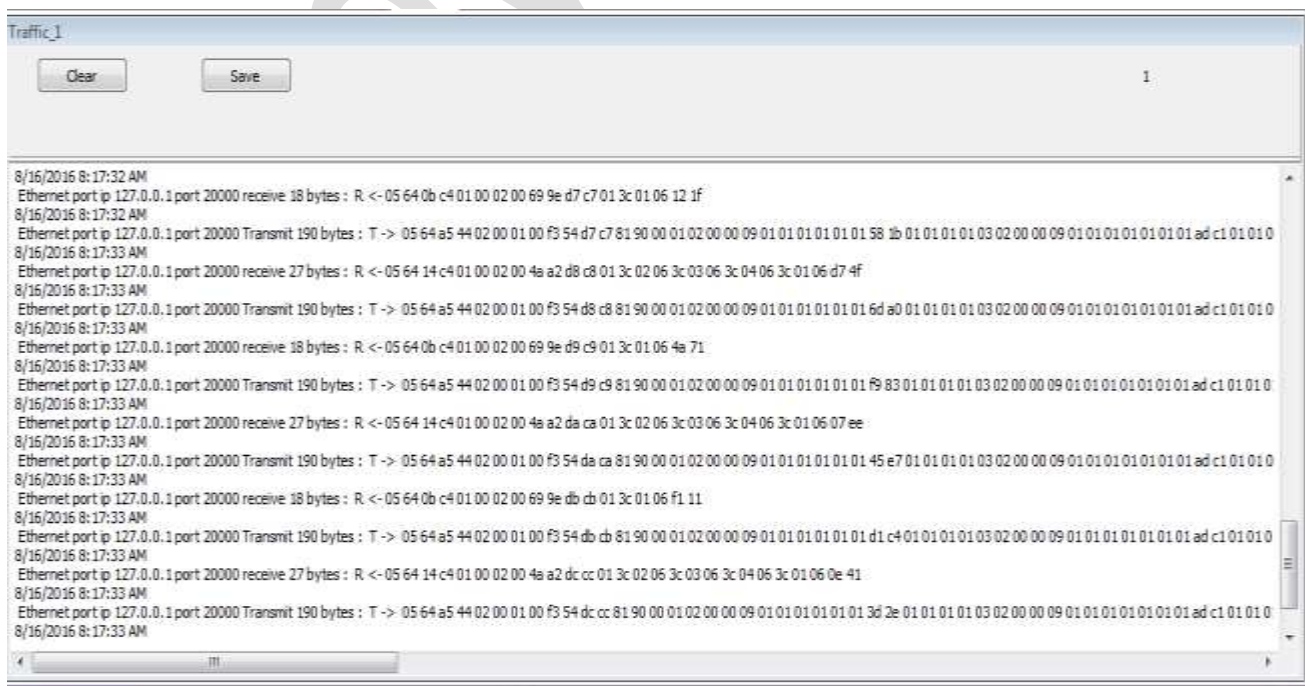
A "Send Single Command" button is located in the bottom right corner of the window.



## 7. Traffic window

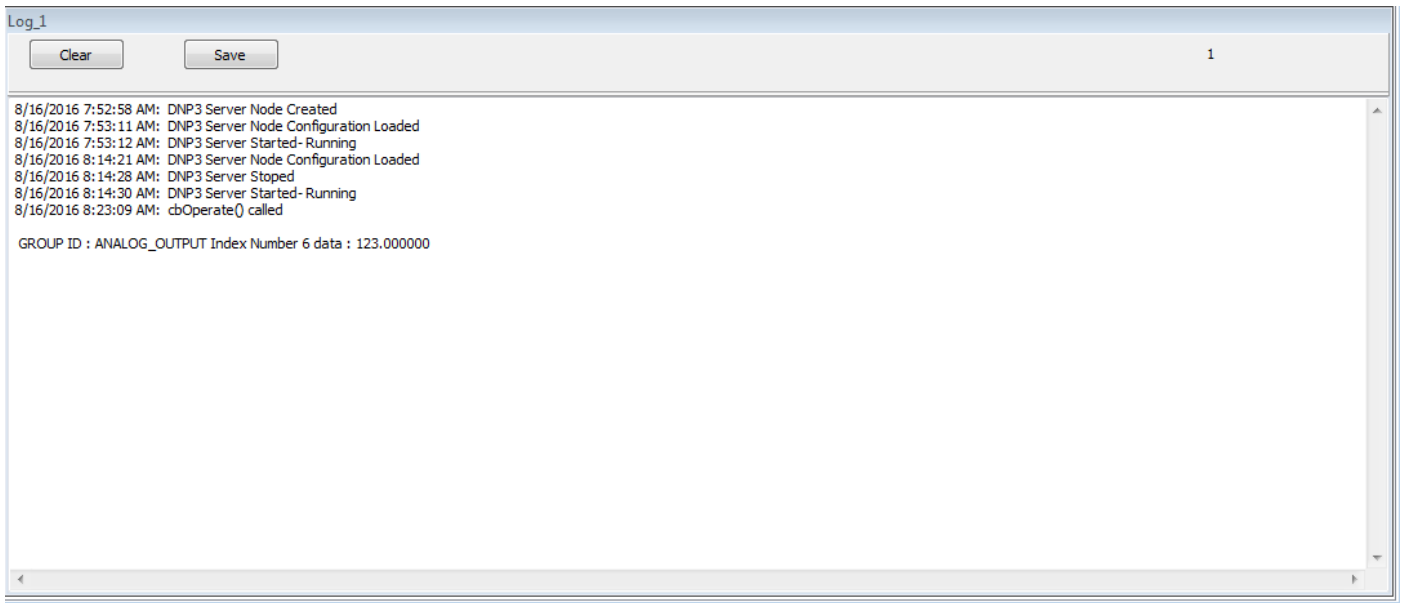
In this we can monitor the traffic of DNP, TCP, UDP, Serial communication.

In this we can save the traffic, and clear the traffic



## 8. Log Window

Log window for internal reference



In the log, we can monitor the command exchange between Client & master, and there is an option to save the log & clear log.

For more information, just drop a mail to [support@freyrscada.com](mailto:support@freyrscada.com)