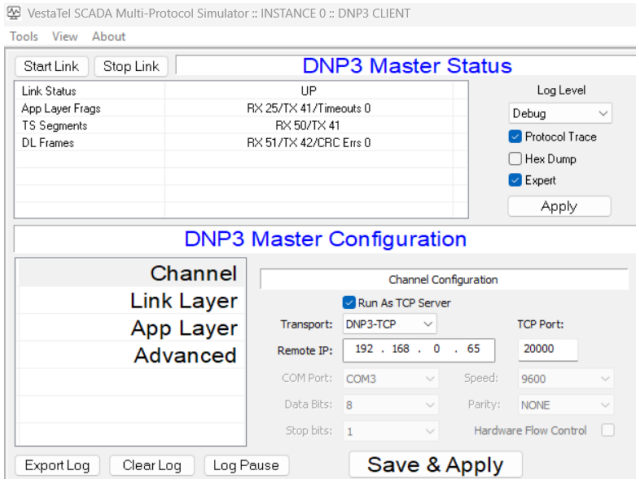
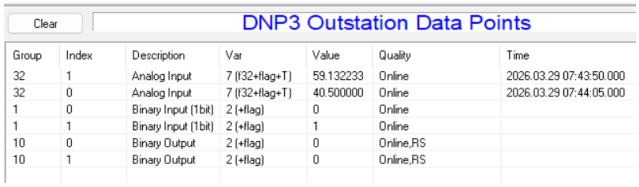
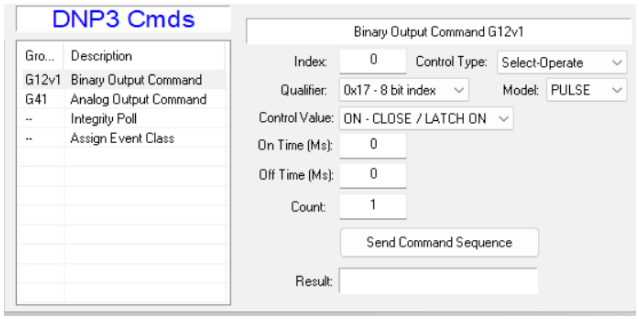
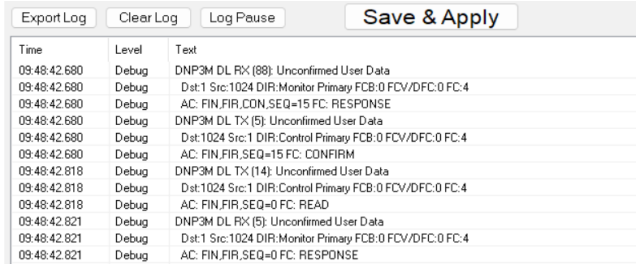








VestaTel SCADA Multi-Protocol Simulator runs on Windows and implements master / slave, client / server role of several SCADA protocols: IEC 60870-5-104, IEC 60870-5-101, IEC 61850/MMS, DNP3, MODBUS and HART.

Overview of Features:

DNP3 Protocol

- DNP3 Master / DNP3 Outstation, Dual-Endpoint (Client can accept TCP connection from Server)
- Runs over RS232 Serial and over TCP/IP
- Solicited (Polled) and Unsolicited Mode
- Initial and Periodic Time Synchronization
- Periodic and demand Integrity Poll, Event Poll
- Binary Output Command, Analog Output Command, Assign Event Classes

IEC 104 / IEC 101 Protocol

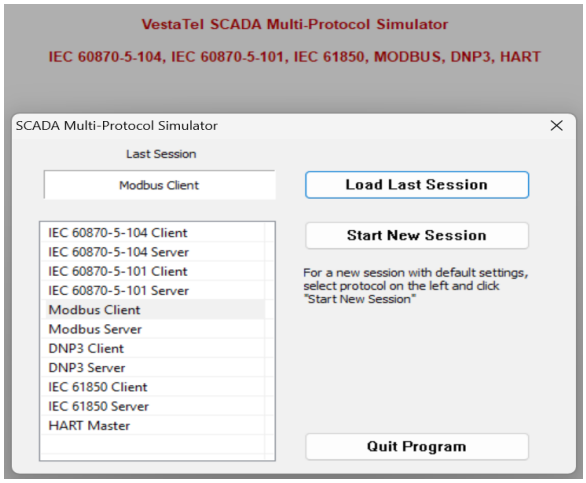
- IEC 60870-5-104 Master / IEC 60870-5-104 Slave
- IEC 60870-5-101 Master / IEC 60870-5-101 Slave
- IEC 104 Link Layer runs over TCPIP
- IEC 101 over RS232 Serial and over TCPIP
- IEC 101 Balanced / Unbalanced Link Mode
- Station Initialization, Clock Synchronization
- Data Acquisition, Events Acquisition
- Cyclic / Background / Spontaneous Transmission
- General Interrogation, Command Transmission
- Time Tagged and Time Untagged Commands

IEC 61850/MMS Protocol

- IEC 61850 IED Client / IEC 61850 Server
- Runs over TCPIP
- Supports edition 2 of the IEC 61850 standard
- Data model discovery, data object polling
- Control commands: Direct Operate, Select-Operate
- Supports all major MMS data types, bool, integer, float, string, etc
- Supports parsing and displaying Timestamps, quality

MODBUS Protocol

- MODBUS Master / MODBUS Slave
- MODBUS RTU over RS232 Serial
- MODBUS TCP mode over TCPIP
- Discreet Input Register, Coil Registers
- Holding Registers, Input Registers
- Write Single Coil, Write Multiple Coils
- Write Single Register, Write Multiple Registers



HART Protocol

HART Communication Protocol (Highway Addressable Remote Transducer) master side only is supported in the current version of software.

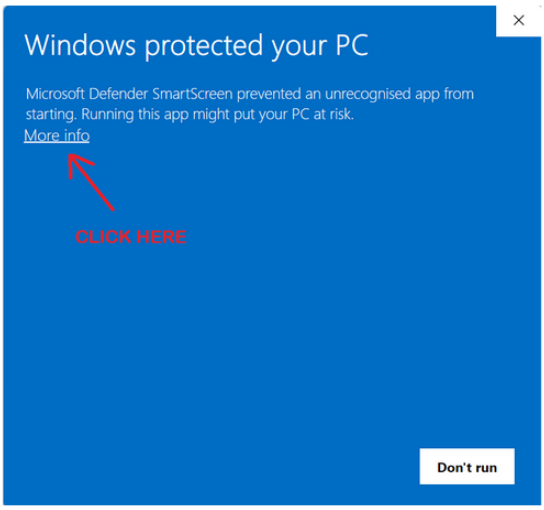
The simulator implements the physical layer over RS232 serial port, data link Layer and application layer.

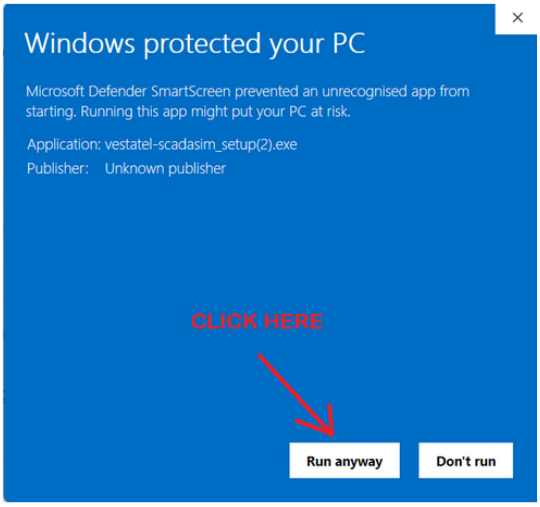
All device dynamic variables (PV, SV, TV and QV) are polled periodically and their value is displayed in the points view.

The implementation is done according to standards HCF_SPEC-127, Revision 7.1, (HART Communication Protocol, Universal Command Specification), HCF_SPEC-99, Revision 9.0 (HART Communication Protocol, Command Summary Specification)

Table of Contents

1 Installation Procedure





Downloading:

To download an installation package, please visit:

https://vestatel.eu/software.html#scadasim-download

Fill out the form and click “Continue to DOWNLOAD”

Click on the link shown in the next page. The installation executable will be saved to your PC (typically into Downloads)

Installing:

Run the installation executable:

vestatel-scadasim_setup.exe

Due to strict security policy Windows is going to display “Windows protected your PC” dialog.

Please click “More info” as shown in the screenshot on the left.

In the next dialog, please click “Run anyway”

After this step, please run the installation program, read and accept the Software License Agreement and click Next.

At the end of the installation click "Finish"

By default the files are installed into “c:\VestaTel-Scadasim” folder

2 Licensing

Evaluation Mode and Full Mode:

If you have not yet purchased the software and set the license key, the software shall run in evaluation mode

Evaluation Period is limited to 7 days. In other respects the software runs fully featured.

When the program starts you will see the dialog box shown on the left. To run in evaluation mode, click “Free Trial”

After the evaluation period of 7 days runs out, at program start you will see the second dialog shown on the right. To continue, you will need to set the license key.

You can also display the “Set License Key” dialog by clicking the programs menu bar “About” →Register / Buy Online.

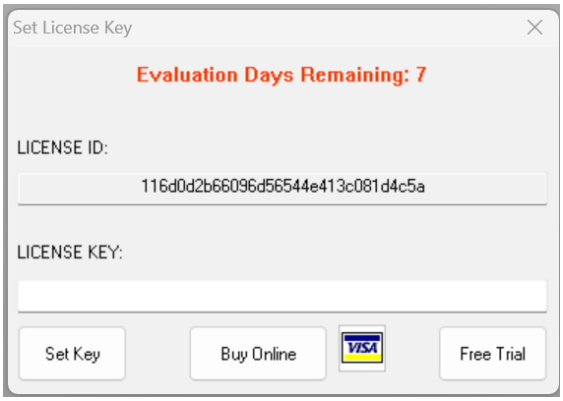
You receive the license key by email when you purchase the software. To purchase the software click "Buy Online" button in the same dialog window

There are three license types:
- Personal
- Professional (PC locked)
- Professional (USB dongle)

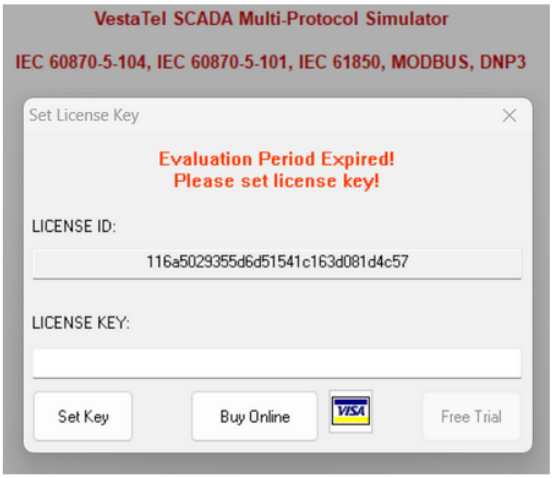
For the Personal and Professional (PC locked) the license key locks the license to the PC on which the program is installed.

Is there is a need to transfer the license to a different PC, please contact us.

For the Professoinal (USB Dongle) license type, we will ship the USB dongle and you will be able to run the application on any PC with the USB dongle installed. Once USB dongle is inserted, no license key is required.



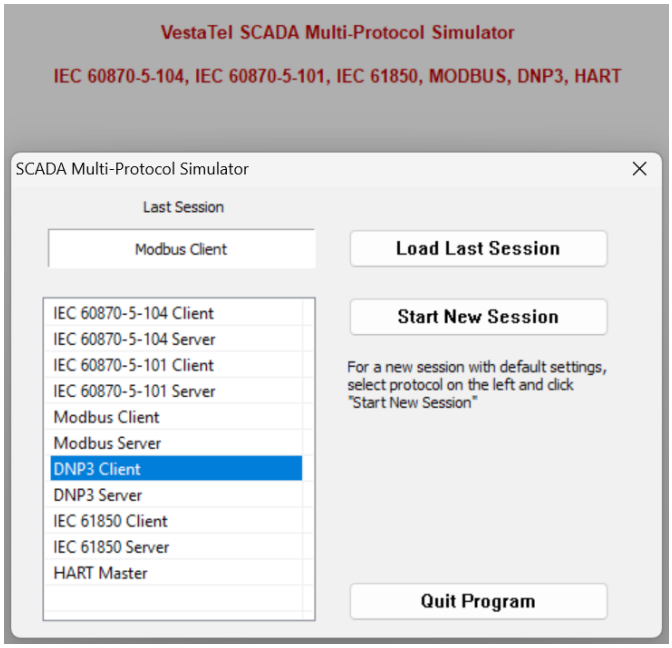
(To run in evaluation mode, click “Free Trial”)



(Set the license key to continue)

3 Quick Start

SCADA Protocol Selection



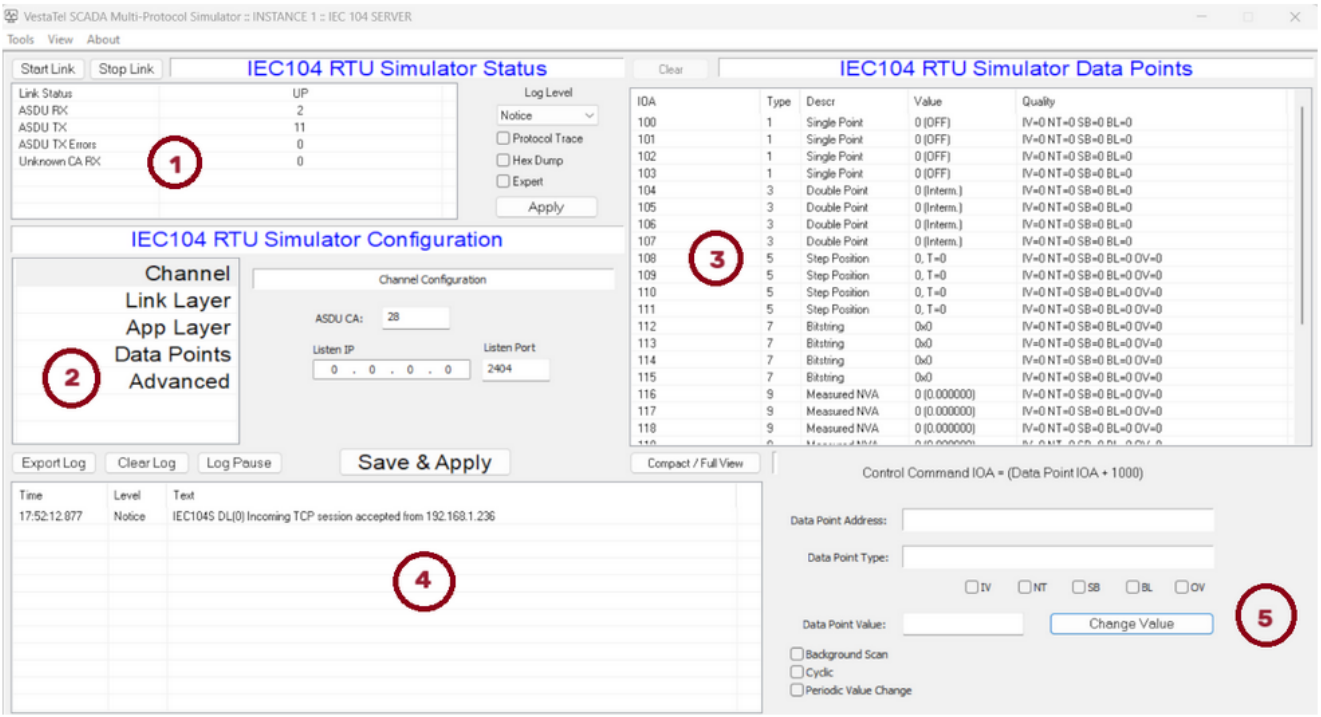
When you start the program it shows the protocol selection window

Unless the program is started for the first time, you can click "Load Last Session" to load the last used protocol configuration

Otherwise you can select and click on the required protocol and then click "Start New Session"

At run time you can bring up the same dialog window via main menu "Tools" -> "Select Protocol"

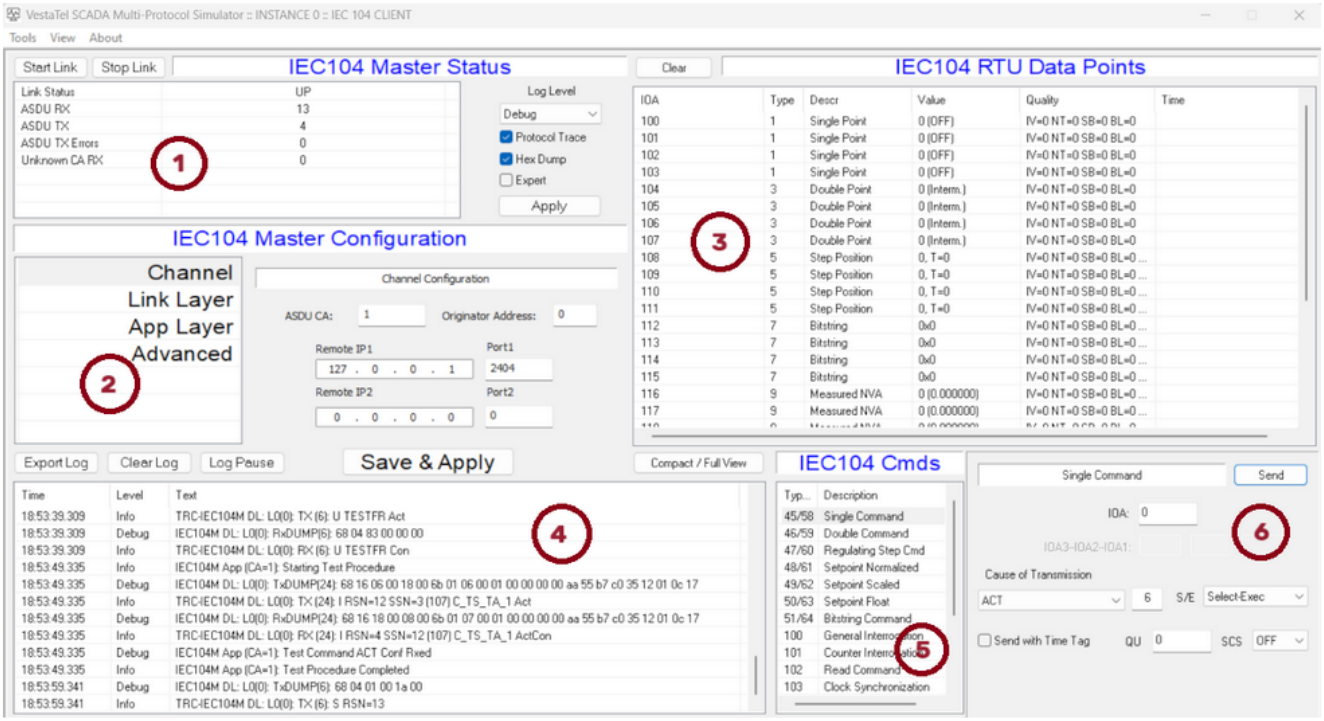
Main Program Screen



The example above shows the IEC 60 870-5-104 Slave Simulator screen

Description of main control areas (slave / server side protocols)

- (1) Link Status and Statistic counters
- (2) Protocol Configuration
- (3) Data Points Window
- (4) Log window
- (5) Selected Data Point Window



The example above shows the IEC 60 870-5-104 Master Simulator screen

Description of main control areas (master / client side protocols)

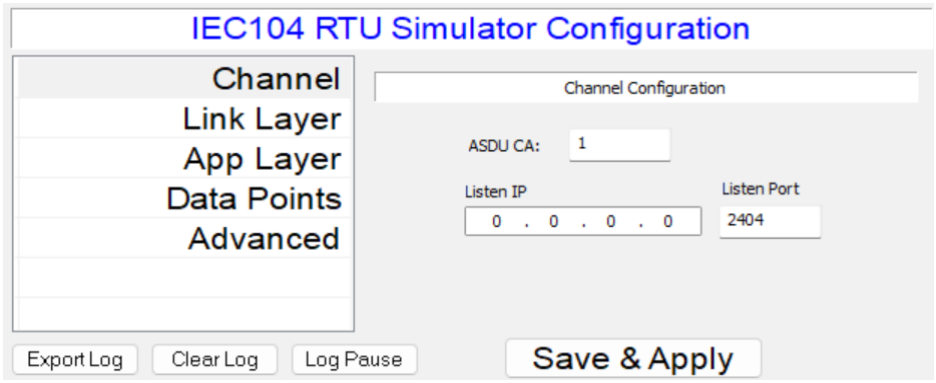
(1) Link Status and Statistic counters

- (2) Protocol Configuration
- (3) Data Points Window
- (4) Log window
- (5) Command Window
- (6) Selected Command details

Configure all required settings in the Protocol configuration tabs / sections on the left. Changing between tabs saves the settings. Every time you click "Save & Apply" configuration is saved and the protocol is re-started

4 IEC 60870-5-104 Slave (Controlled Station)

4.1 Channel Configuration

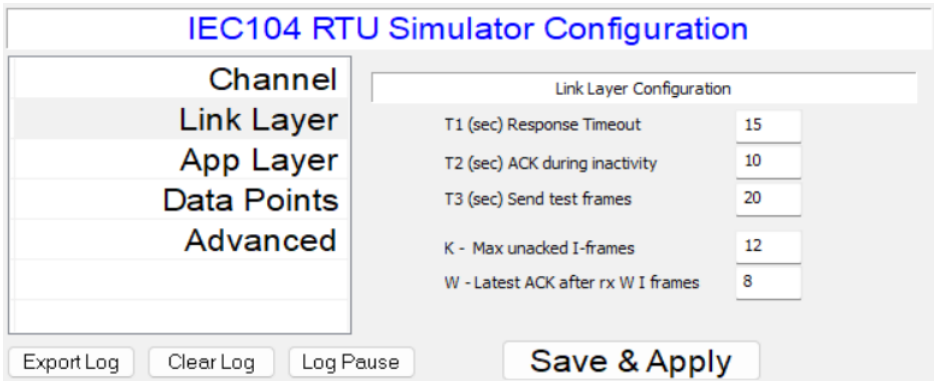


ASDU CA - Sets ASDU Common Address as specified in the IEC 60870-5-101. Acceptable values are from 1 to 65534. The same value must be configured in the IEC 104 master for successful communication

Listen IP - Local IP address on which the IEC104 slave shall accept incoming TCP connections from IEC104 Master

Listen Port - Local TCP port number on which the IEC104 slave shall accept incoming TCP connections from IEC104 Master. The same number must be configured in the corresponding IEC104 client parameter, default is 2404

4.2 Link Configuration



T1 - Time-out of send or test APDUs

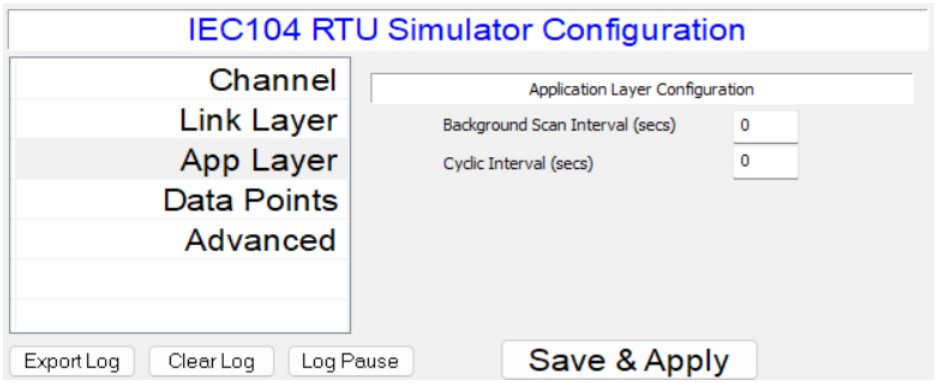
T2 - Time-out for acknowledges in case of no data messages t2 < t1

T3 - Time-out for sending test frames in case of a long idle state

K - Maximum difference receive sequence number to send state variable

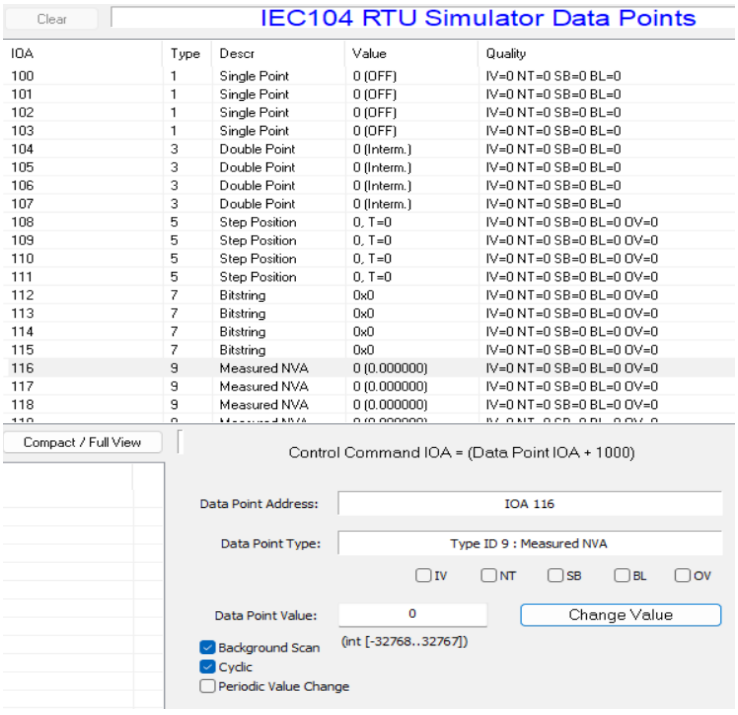
W - Latest acknowledge after receiving w I format APDUs

4.3 Application Layer Configuration

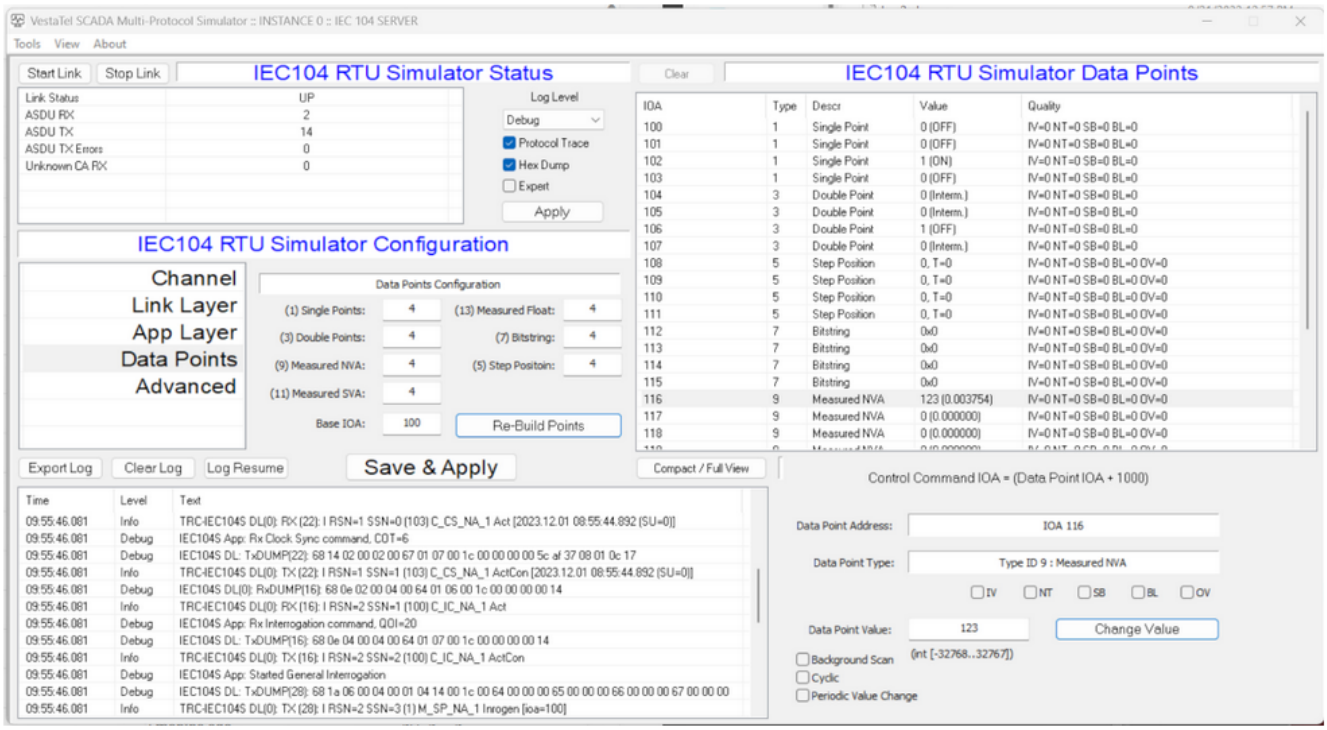


Background Scan Interval - sets the frequency in seconds of sending data point messages with cause of transmission 2 (Background Scan). When set to 0, background scan sending is disabled for all points. Only data points that are configured for sending Background Scan are sending these messages. To select a data point for background scan, first choose the required point in the Data Points window in the top right part of the main screen, then click on that point and check tickbox "Background Scan" in the data point window in the bottom right part of main screen

Cyclic Interval - sets the frequency in seconds for sending data point messages with cause of transmission 1 (Cyclic). When set to 0, cyclic transmission is disabled. Measured value data points can be sent periodically using this procedure. To select a data point for cyclic transmission, first choose the required point in the Data Points window in the top right part of the main screen, then click on that point and check tickbox "Cyclic" in the data point window in the bottom right part of main screen



4.4 Data Points Configuration

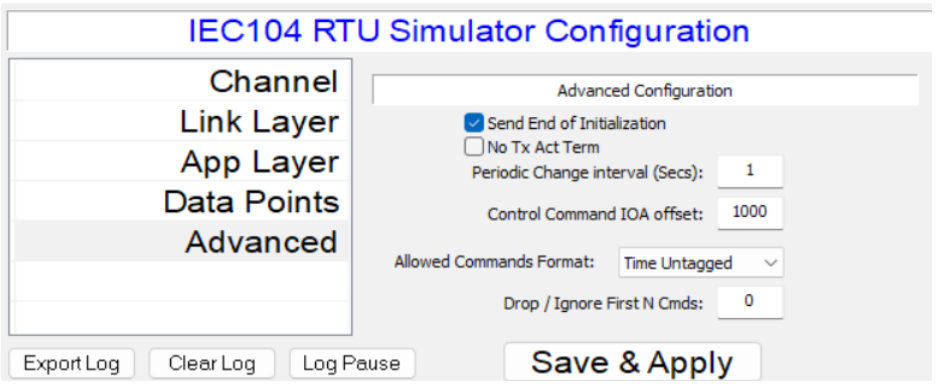


This tab contains configuration of the number of data points of specific type IDs that shall be emulated and that shall appear in the data points window on the right top of the screen.

Base IOA field defines the starting IOA (Information object address) for the first data point. Please note that the maximum total number of points currently supported is 1024

When the desired number of points of each type is set, click "Re-Build Points" to apply new configuration

4.5 Advanced Configuration



Send End of Initialization - Controls whether or not the slave simulator sends message type ID 70 (M_EI_NA_1) - End of Initialization after data link connection is established

Periodic Change Interval - sets the frequency at which the data point values change (increment) if selected for Periodic Value Change. When set to 0, no data points are changed periodically. To select a data point for peridic change, select it the data point list in the top right, then tick checkbox "Periodic Value Change" in the selected data point window in the right bottom of the main screen. When a point is changed periodically its value is incremented, written into configuration and an event message with cause of transmission Spontaneous is sent to the connected Master

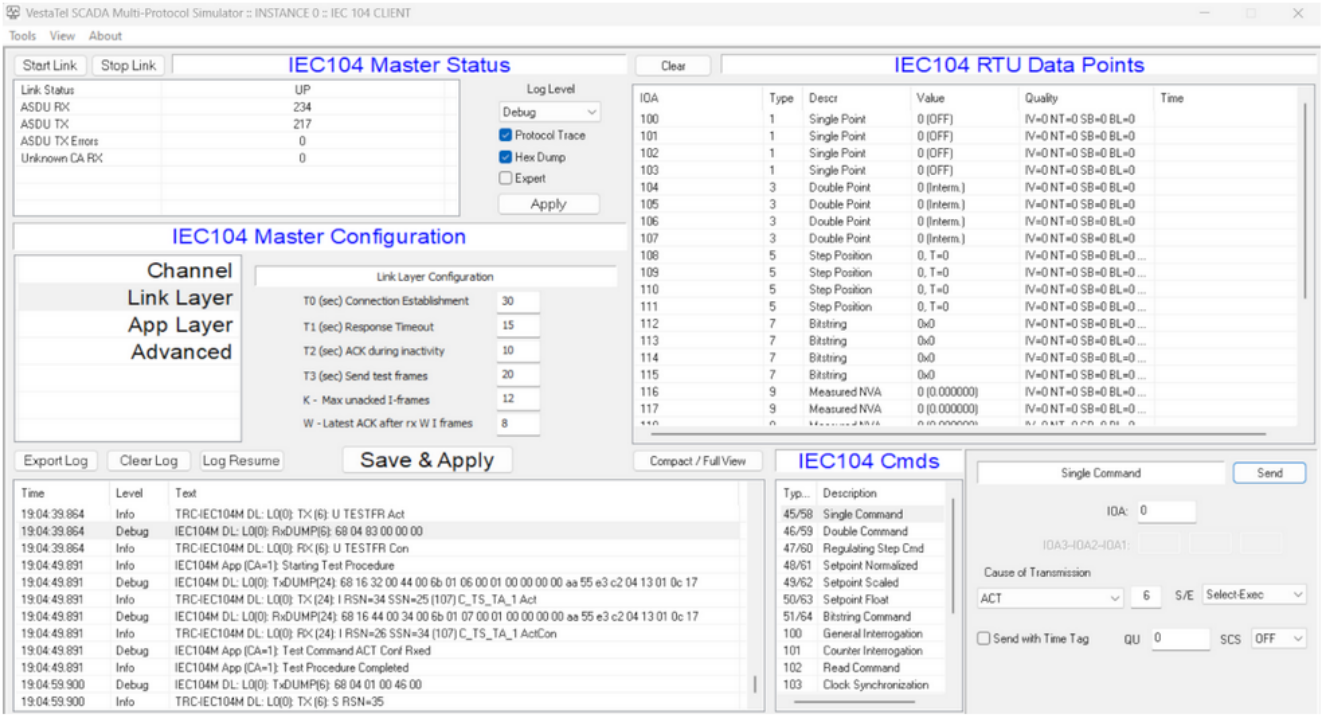
Control Command IOA offset - defines IOA (information object address) to which the connected Master can send a command to change the addressed data point value. For example to change a Single Point Information point at IOA 100, the Master should send the Single Command to IOA 1100 if the control offset is configured at 1000

Allowed Command Format - Sets the format of control commands accepted by the slave simulation to Time Tagged or Time untagged

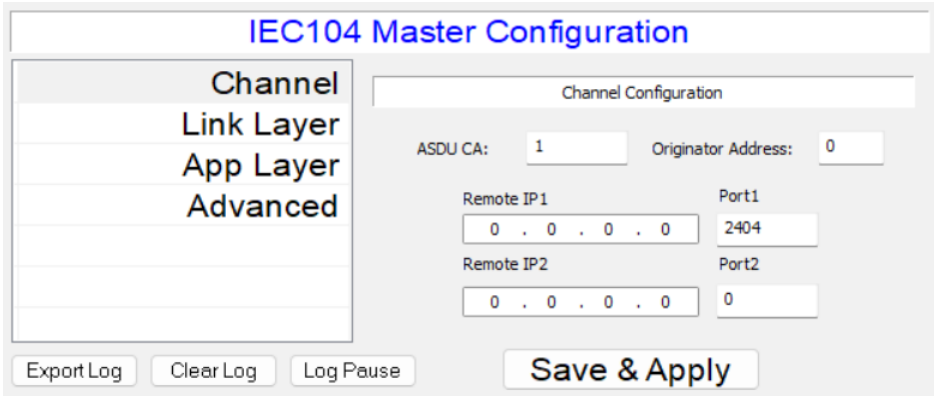
No Tx Act Term – skip sending Activation Termination during General Interrogation Procedure

Drop / Ignore First N Cmds – makes the simulator drop first specified number of received application layer PDUs

5 IEC 60870-5-104 Master (Controlling Station)



5.1 Channel Configuration



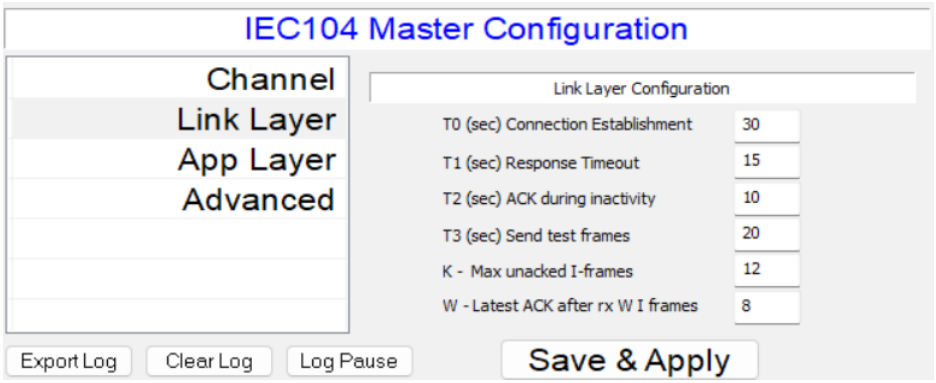
ASDU CA - Sets ASDU Common Address as specified in the IEC 60870-5-101. Acceptable values are from 1 to 65534. The same value must be configured in the IEC 104 server for successful communication

Originator Address - Sets the OA (originator address) field that is the second byte of the cause of transmission part in the IEC104 ADSU packets

Remote IP1 - Remote IP address to which the IEC104 master shall connect, Remote IP2 can be used for redundancy

Port1 - Remote TCP port number to which the IEC104 master shall connect. The same number must be configured in the corresponding IEC104 server parameter, default is 2404. Port2 can be used for redundancy

5.2 Link Configuration



T0 – Connection Establishment Timeout

T1 - Time-out of send or test APDUs

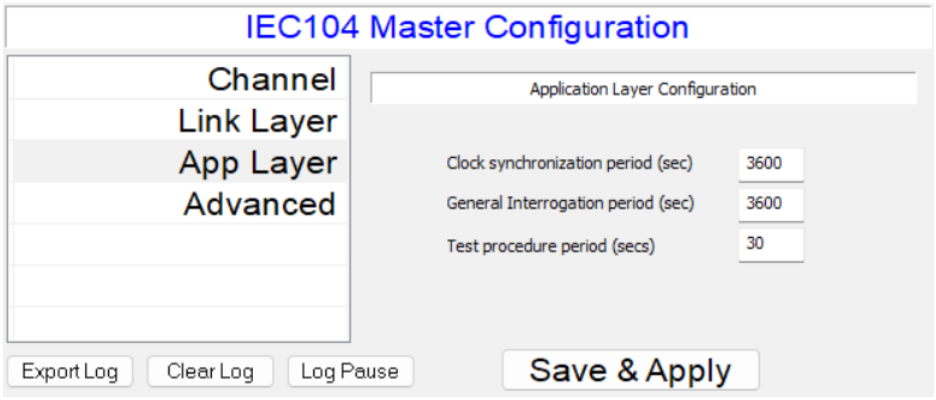
T2 - Time-out for acknowledges in case of no data messages t2 < t1

T3 - Time-out for sending test frames in case of a long idle state

K - Maximum difference receive sequence number to send state variable

W - Latest acknowledge after receiving w I format APDUs

5.3 Application Layer Configuration

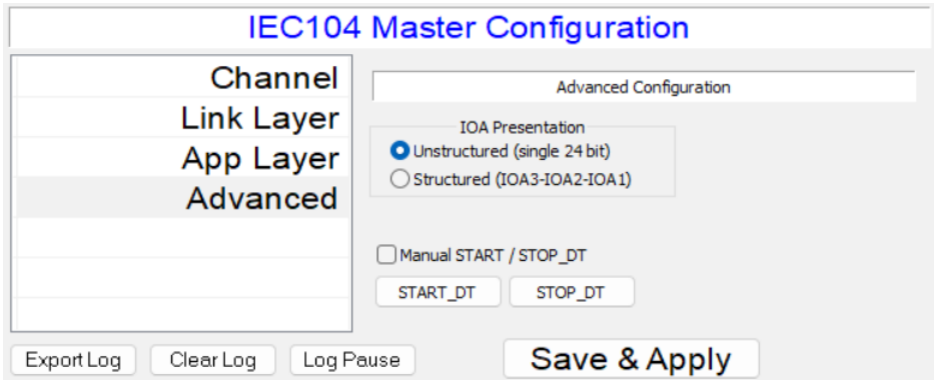


Clock synchronization period - sends the frequency in seconds of performing periodic clock synchronization procedure

General interrogation period - sets the frequency in seconds of performing periodic general interrogation procedure

Test procedure period - sets the frequency in seconds of performing test procedure

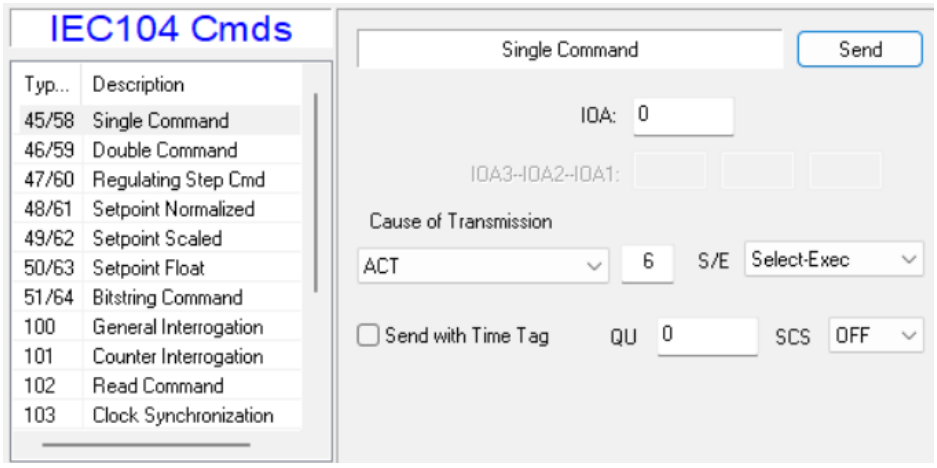
5.4 Advanced Configuration



IOA Presentation - sets the view (structured as 3 bytes or unstructured as 24 bit integer) of IOA (information object addresses in the IOA column in the data points list and in the commands

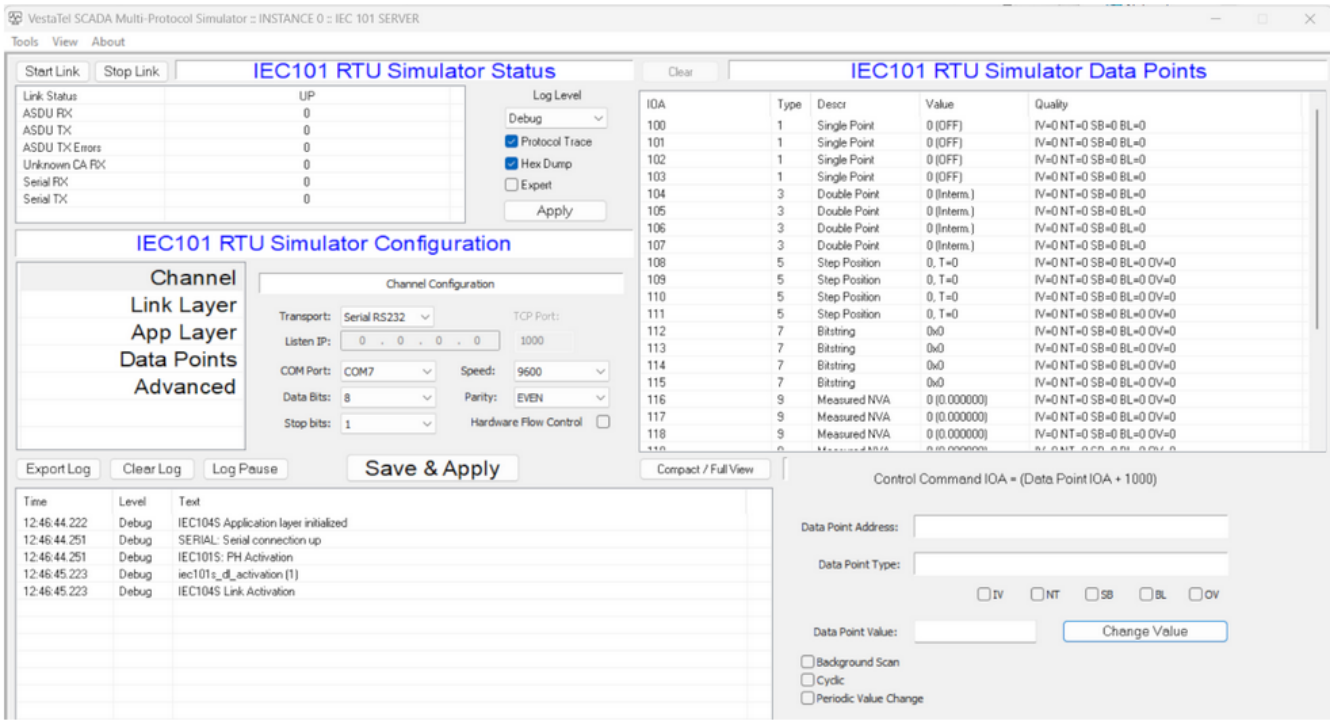
Start DT - Stop DT - Allows manual sending of START DT and STOP DT packets to the slave station

5.5 IEC 104 Commands



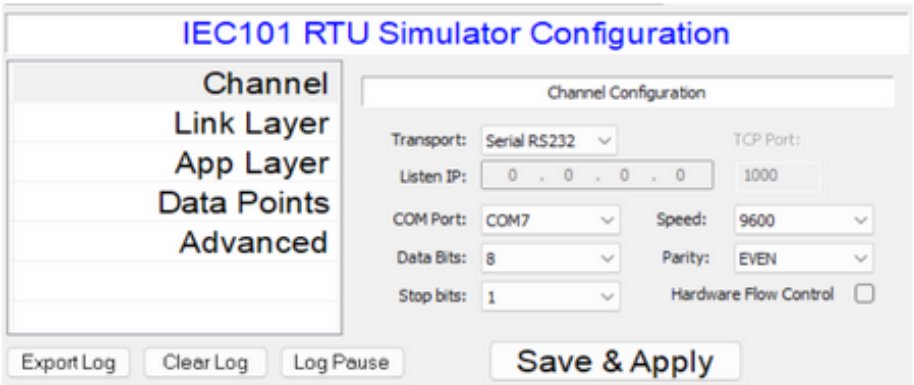
To send the required command, select one from the IEC104 Cmds list in the bottom right of the screen, then setup the IOA and value fields and click Send button

6 IEC 60870-5-101 Slave (Controlled Station)



6.1 Channel Configuration

VestaTel SCADA Multi-Protocol Simulator in IEC101 slave mode can operate over RS232 serial interface or over TCP/IP. To select / switch between serial and TCP/IP choose Transport selector as required. Note that when COMx ports are present they are shown in the COM Port selector. If no serial interfaces are detected that list is empty

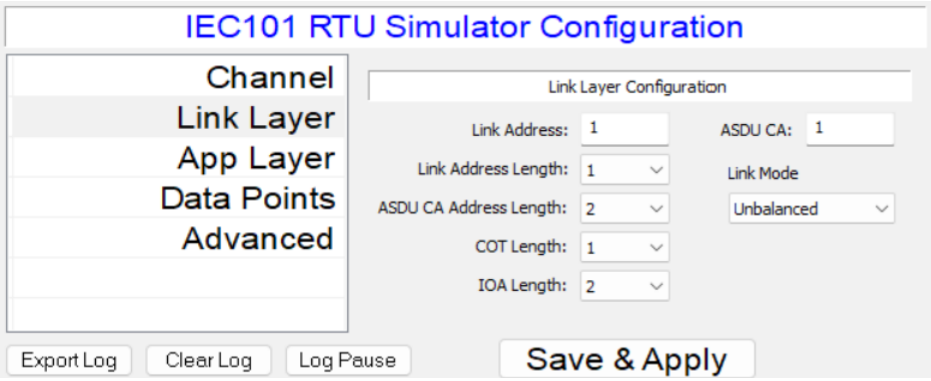


Transport: Selects Seral RS232 or TCP/IP transport for IEC 60870-5-101 protocol
Listen IP: When TCP/IP transport is selected, sets the listening IP address
TCP Port: When TCP/IP transport is selected, sets the listening TCP port

COM Port: Sets the COM port number for operation over RS232

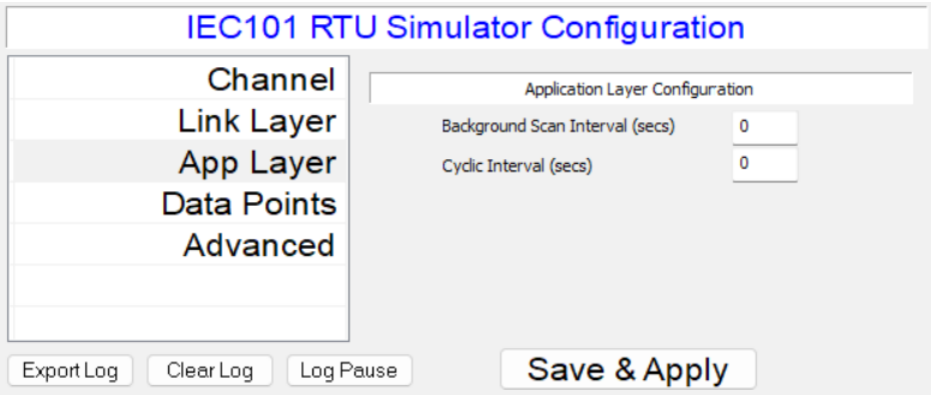
Data Bits: Sets number of serial data bits
Stop Bits: Sets number of serial stop bits
Speed: Sets serial interface speed
Parity: Sets serial interface parity
Hardware Flow Control: Enables RTS/CTS flow control

6.2 Link Configuration



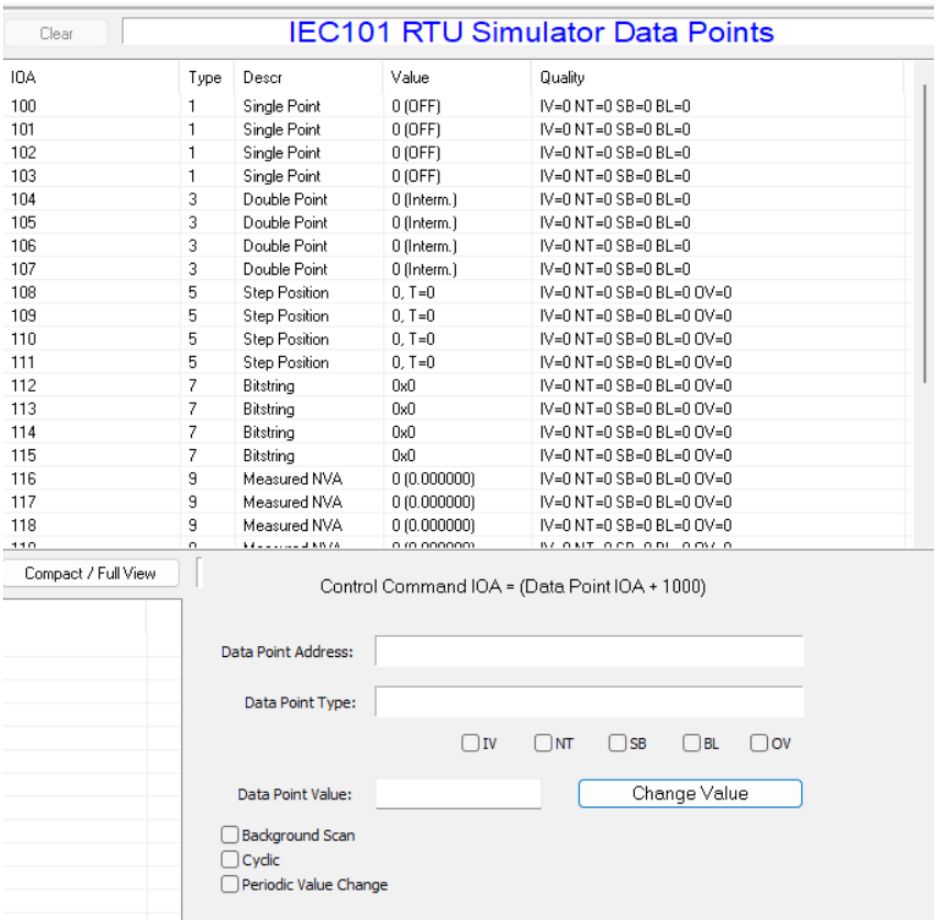
Link Address: Sets IEC 60870-5-101 Link address value
ASDU CA: Sets IEC 60870-5-101 ASDU Common Address value
Link Address Length: Sets IEC101 link address length
ASDU CA Length: Sets IEC101 ASDU Common Address length
COT length: Sets cause of transmission length
IOA Lenth: Sets information object address length
Link Mode: Sets IEC101 link mode (currently only Unbalanced is supported)

6.3 Application Layer Configuration

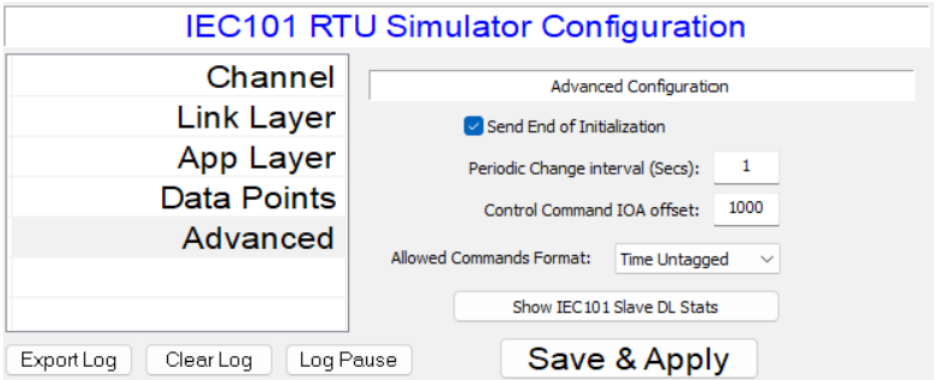


Background Scan Interval - sets the frequency in seconds of sending data point messages with cause of transmission 2 (Background Scan). When set to 0, background scan sending is disabled for all points. Only data points that are configured for sending Background Scan are sending these messages. To select a data point for background scan, first choose the required point in the Data Points window in the top right part of the main screen, then click on that point and check tickbox "Background Scan" in the data point window in the bottom right part of main screen

Cyclic Interval - sets the frequency in seconds for sending data point messages with cause of transmission 1 (Cyclic). When set to 0, cyclic transmission is disabled. Measured value data points can be sent periodically using this procedure. To select a data point for cyclic transmission, first choose the required point in the Data Points window in the top right part of the main screen, then click on that point and check tickbox "Cyclic" in the data point window in the bottom right part of main screen



6.4 Advanced Configuration



Send End of Initialization - Controls whether or not the slave simulator sends message type ID 70 (M_EI_NA_1) - End of Initialization after data link connection is established

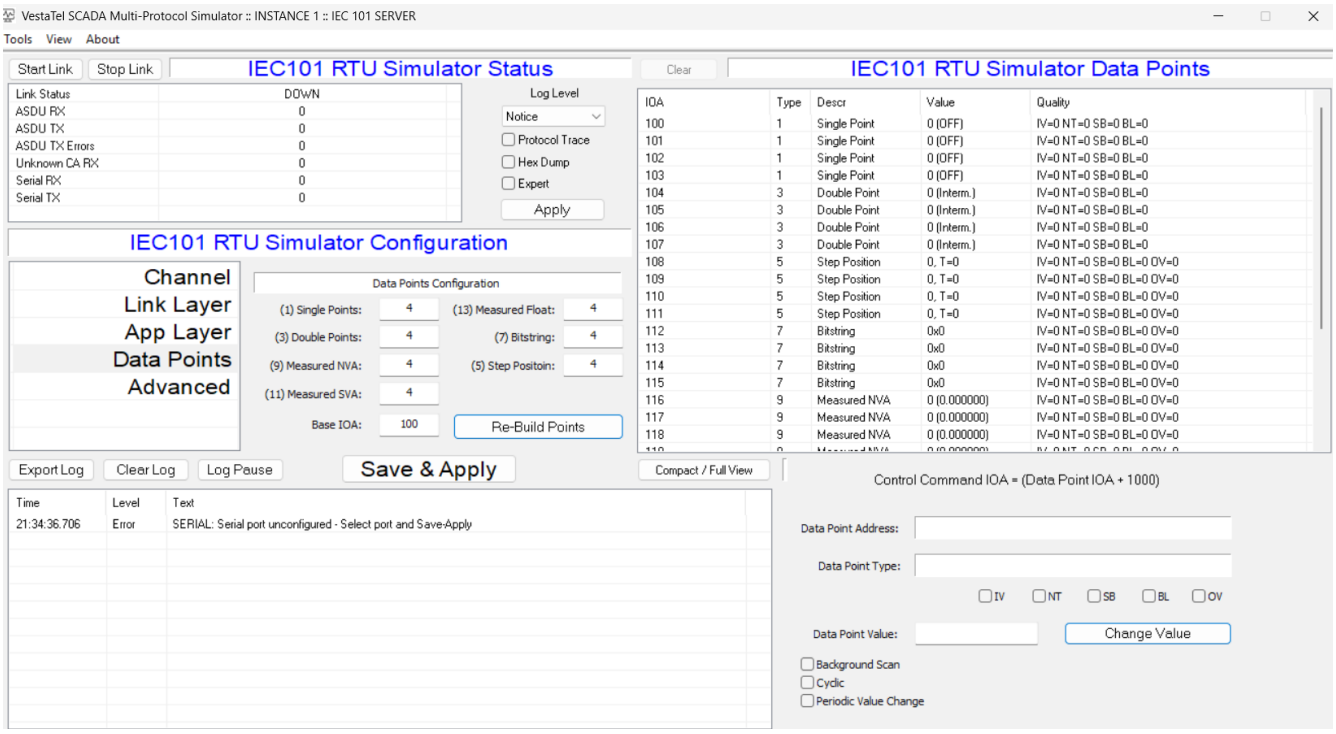
Periodic Change Interval - sets the frequency at which the data point values change (increment) if selected for Periodic Value Change. When set to 0, no data points are changed periodically. To select a data point for peridic change, select it the data point list in the top right, then tick checkbox "Periodic Value Change" in the selected data point window in the right bottom of the main screen. When a point is changed periodically its value is incremented, written into configuration and an event message with cause of transmission Spontaneous is sent to the connected Master

Control Command IOA offset - defines IOA (information object address) to which the connected Master can send a command to change the addressed data point value. For example to change a Single Point Information point at IOA 100, the Master should send the Single Command to IOA 1100 if the control offset is configured at 1000

Allowed Command Format - Sets the format of control commands accepted by the slave simulation to Time Tagged or Time untagged

Show IEC101 DL Stats – displays IEC 101 data link statistic counters in the event log

6.5 Data Points Configuration

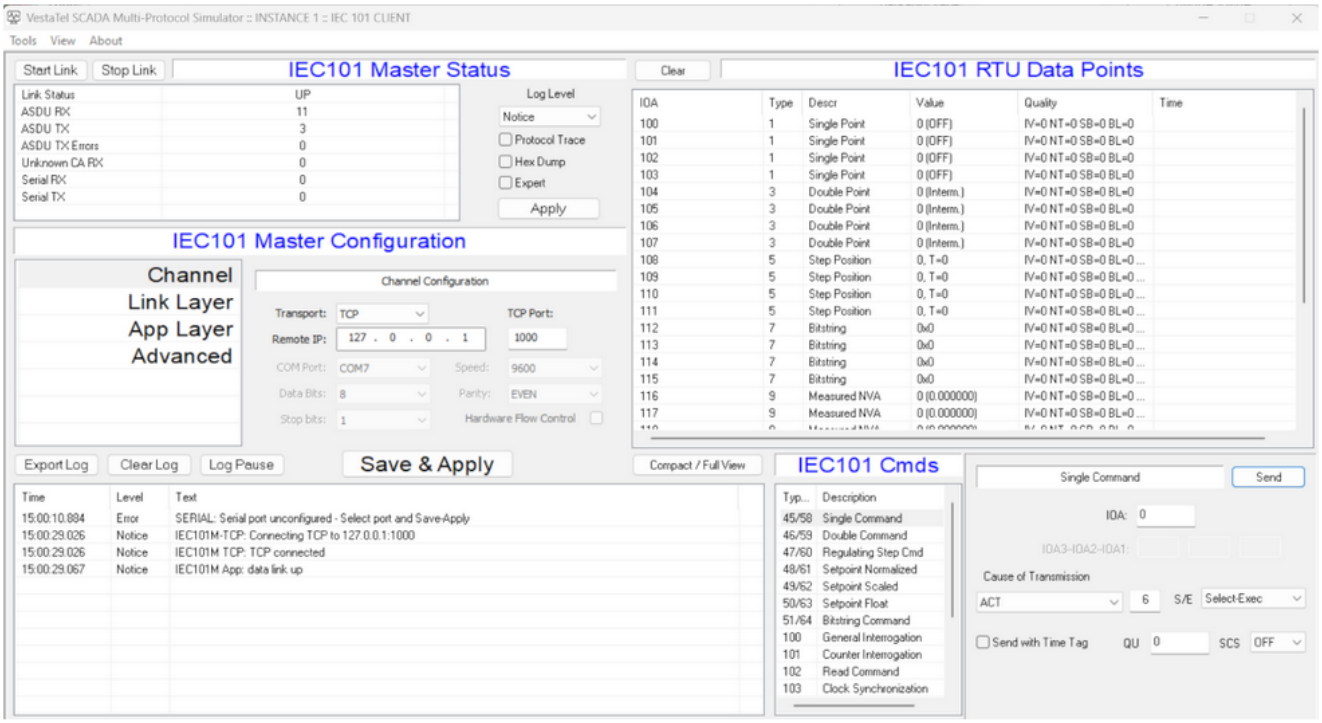


This tab contains configuration of the number of data points of specific type IDs that shall be emulated and that shall appear in the data points window on the right top of the screen.

Base IOA field defines the starting IOA (Information object address) for the first data point. Please note that the maximum total number of points currently supported is 1024

When the desired number of points of each type is set, click "Re-Build Points" to apply new configuration

7 IEC 60870-5-101 Master (Controlling Station)



7.1 Channel Configuration

VestaTel SCADA Multi-Protocol Simulator in IEC101 master mode can operate over RS232 serial interface or over TCP/IP. To select / switch between serial and TCP/IP choose Transport selector as required. Note that when COMx ports are present they are shown in the COM Port selector. If no serial interfaces are detected that list is empty

Transport: Selects Seral RS232 or TCP/IP transport for IEC 60870-5-101 protocol

Remote IP: When TCP/IP transport is selected, sets the remote IP address

TCP Port: When TCP/IP transport is selected, sets the remote TCP port

COM Port: Sets the COM port number for operation over RS232

Data Bits: Sets number of serial data bits

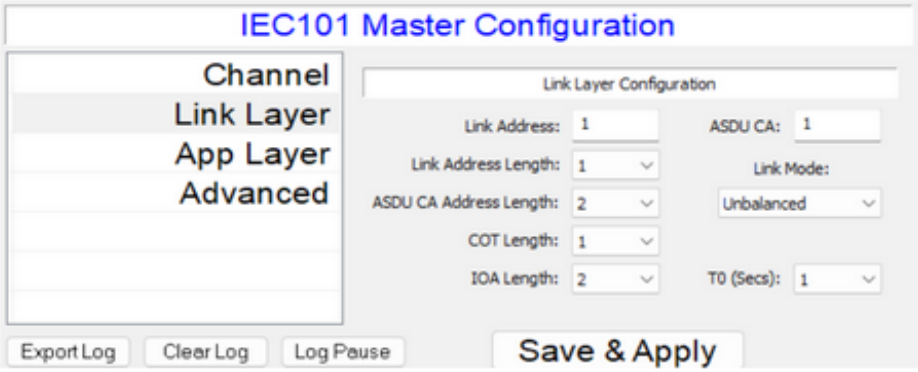
Stop Bits: Sets number of serial stop bits

Speed: Sets serial interface speed

Parity: Sets serial interface parity

Hardware Flow Control: Enables RTS/CTS flow control

7.2 Link Configuration



Link Address: Sets IEC 60870-5-101 Link address value

ASDU CA: Sets IEC 60870-5-101 ASDU Common Address value

Link Address Length: Sets IEC101 link address length

ASDU CA Length: Sets IEC101 ASDU Common Address length

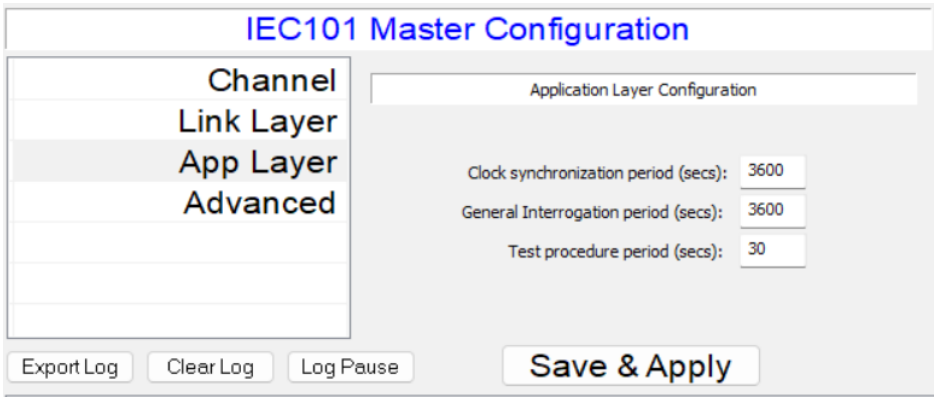
COT length: Sets cause of transmission length

IOA Lenth: Sets information object address length

Link Mode: Sets IEC101 link mode to Balanced or Unbalanced

T0 Secs: Sets IEC101 link layer timer T0 value

7.3 Application Layer Configuration

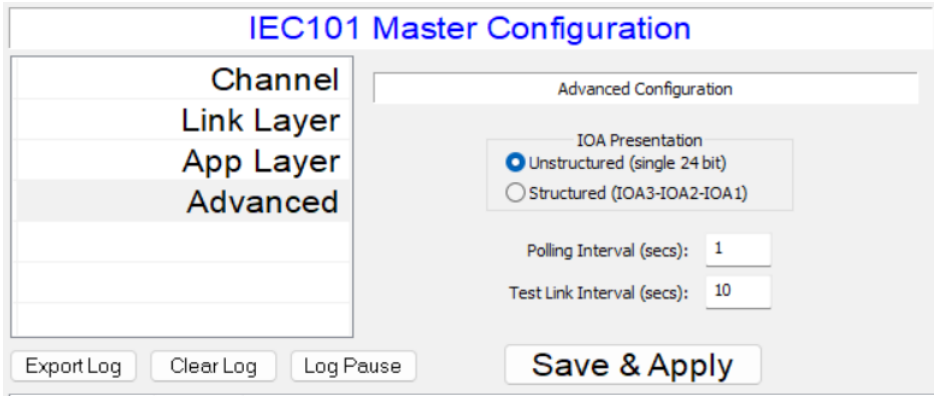


Clock synchronization period - sends the frequency in seconds of performing periodic clock synchronization procedure

General interrogation period - sets the frequency in seconds of performing periodic general interrogation procedure

Test procedure period - sets the frequency in seconds of performing test procedure

7.4 Advanced Configuration

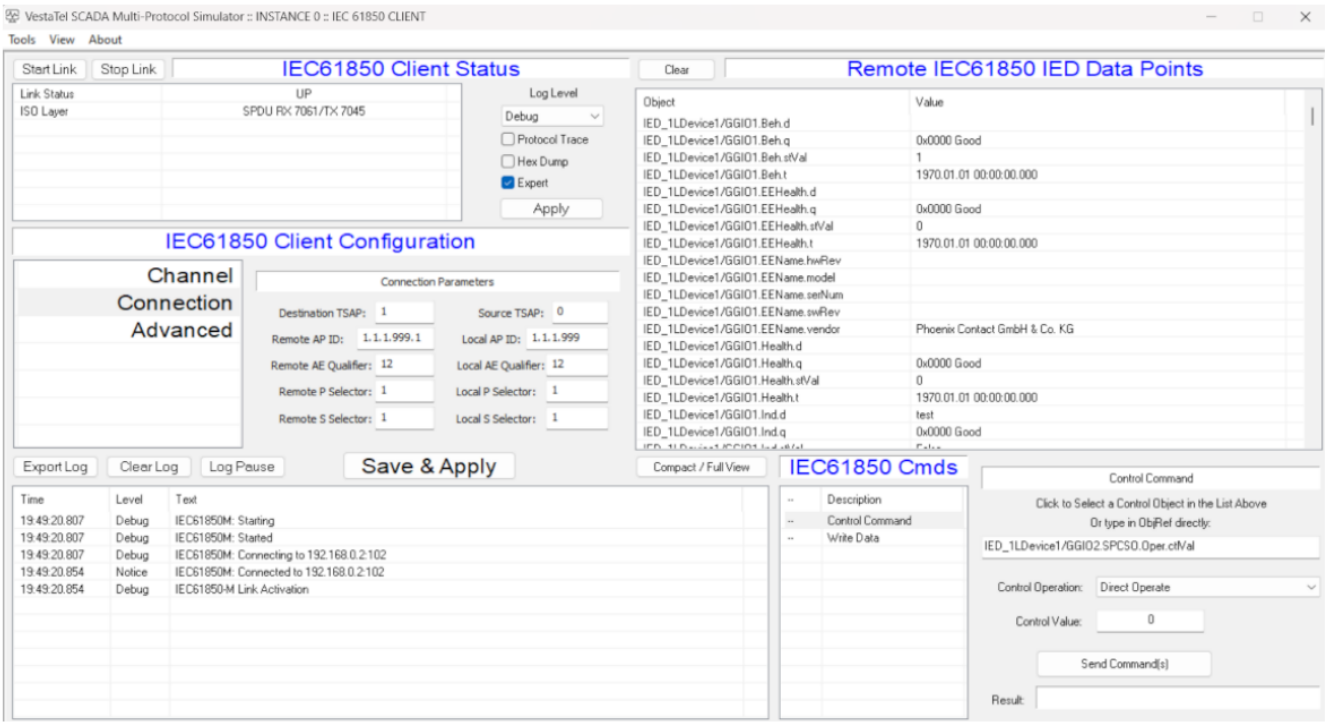


IOA Presentation - sets the view (structured as 3 bytes or unstructured as 24 bit integer) of IOA (information object addresses in the IOA column in the data points list and in the commands

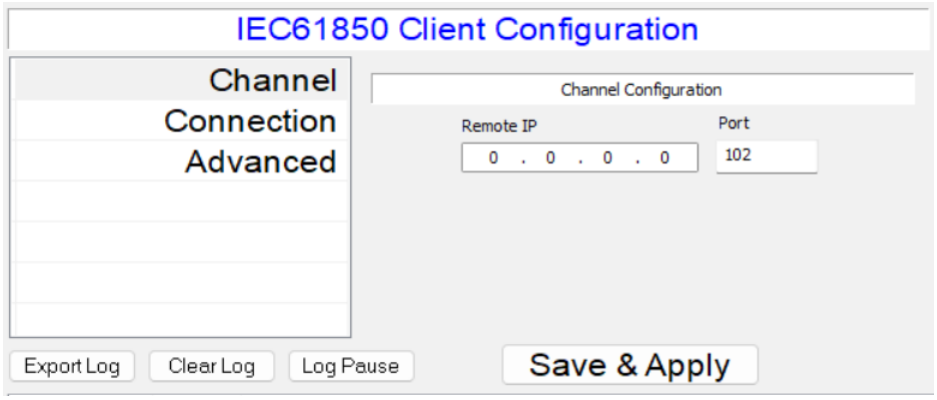
Polling Interval: Interval at which the master station polls the slave station for CLASS data

Test Link Interval: Interval at which the master station sends out link test frames during inactivity

8 IEC 61850 Client



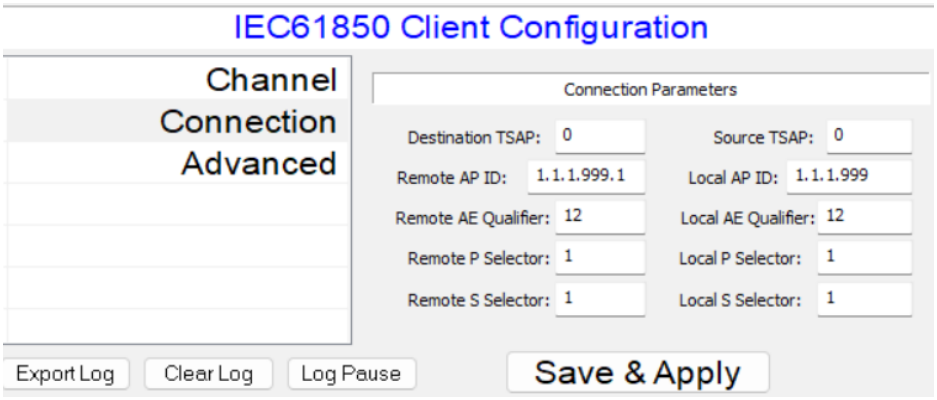
8.1 Channel Configuration



Remote IP: sets the remote IP address to connect to

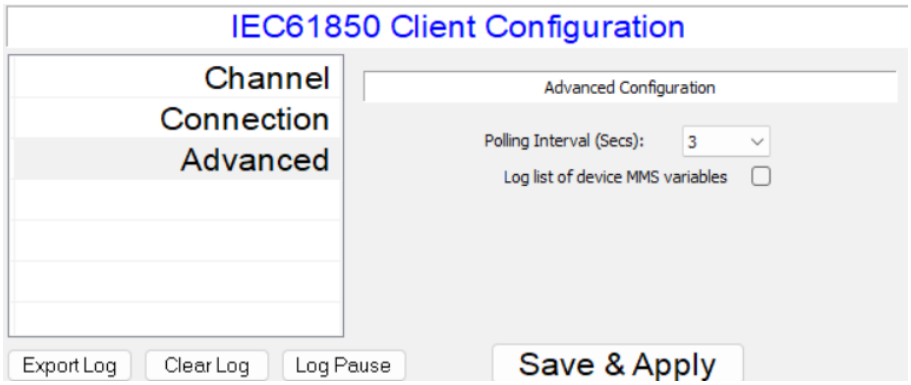
Port: sets the remote TCP port to connect to

8.2 Connection Configuration



Destination TSAP: Destination transport access point number
Source TSAP: Source transport access point number
Remote AP ID, Local AP ID: Local and remote Access Point ID
Remote AE Qualifier, Local AE Qualifier:
Remote P Selector, Local P Selector, Remote S Selector, Local S Selector: IEC 61850 / MMS connection parameters.

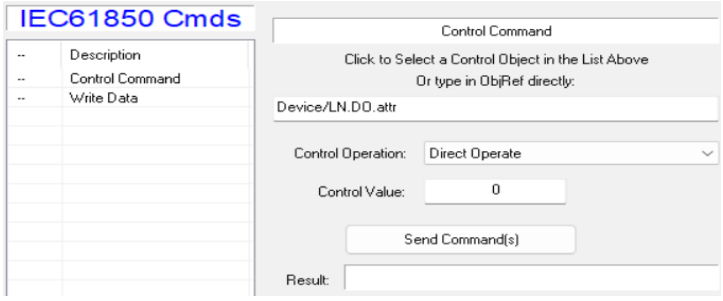
8.3 Advanced Configuration



Polling Interval – MMS / IEC 61850 data objects polling interval

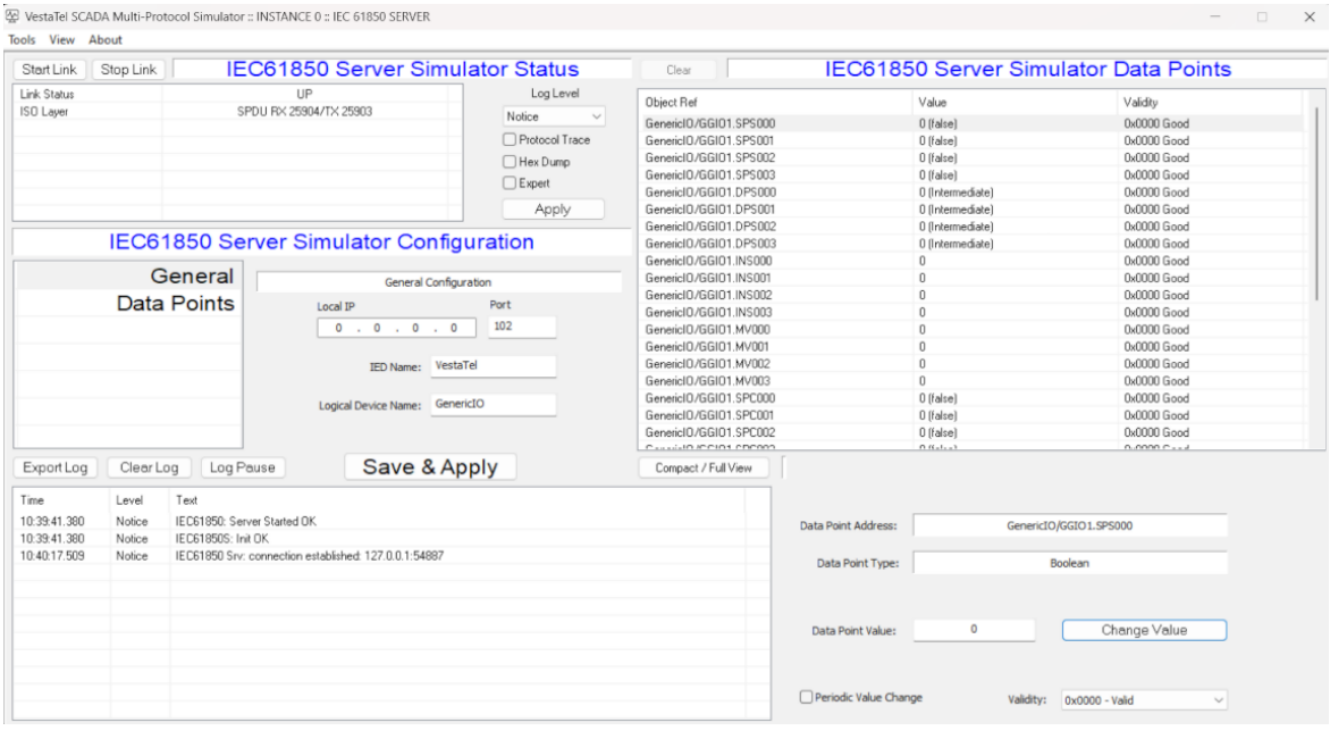
Log list of device MMS variables – dumps the list of variables to event log

8.4 IEC 61850 Commands

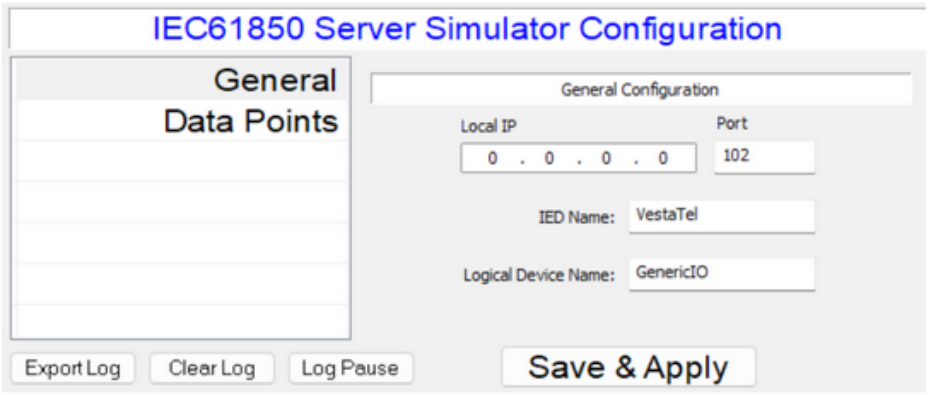


Currently Control Command and Write Data commands are supported, Select the required command in the list on the left, configure command parameters, e.g. (Object reference, Control Operation, control value, and click “Send Commands”. The result of operation shall be displayed in the “Result” field

9 IEC 61850 Server



9.1 General Configuration

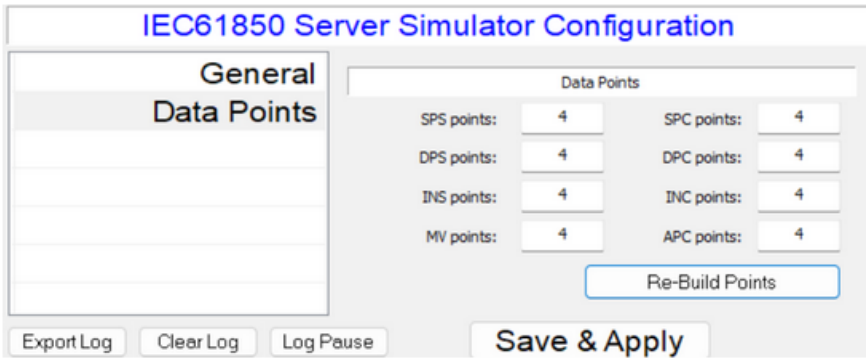


Local IP: sets the local IP address on which IEC 61850 server listens for incoming connections

Port: sets the local TCP port on which IEC 61850 server listens for incoming connections

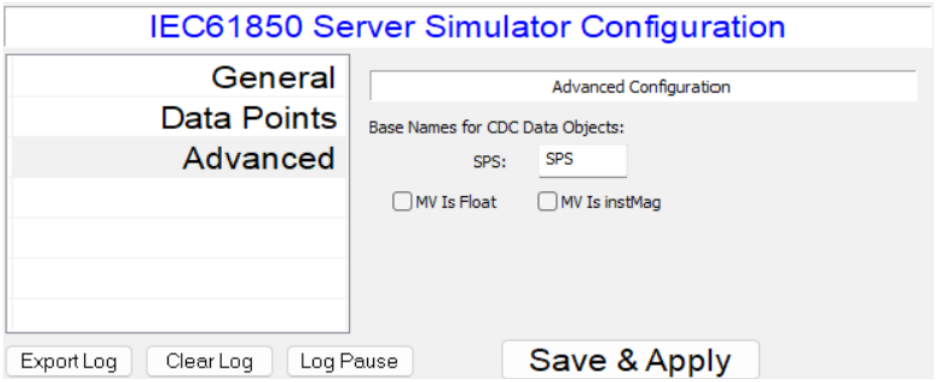
IED Name and Logical Device name are self-explanatory

9.2 Data Points Configuration



- SPS points: Sets number of Single Point Status data points
- DPS points: Sets number of Double bit Point Status data points
- INS points: Sets number of Integer Status data points
- MV points: Sets number of Measured Value data points
- SPC points: Sets number of Single Point Controllable Status data points
- DPC points: Sets number of Double bit Controllable Status data points
- INS points: Sets number of Controllable Integer Status data points
- APC points: Sets number of Controllable Analog Points

9.3 Advanced Configuration

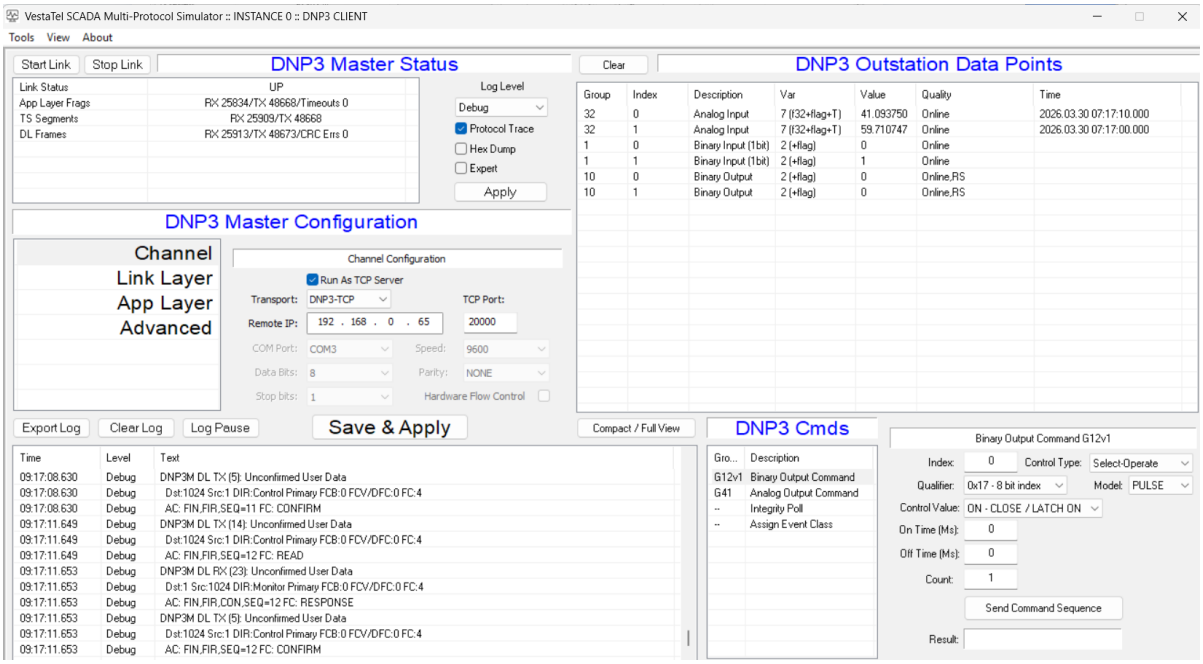


SPS: configures the base name for SPS data objects

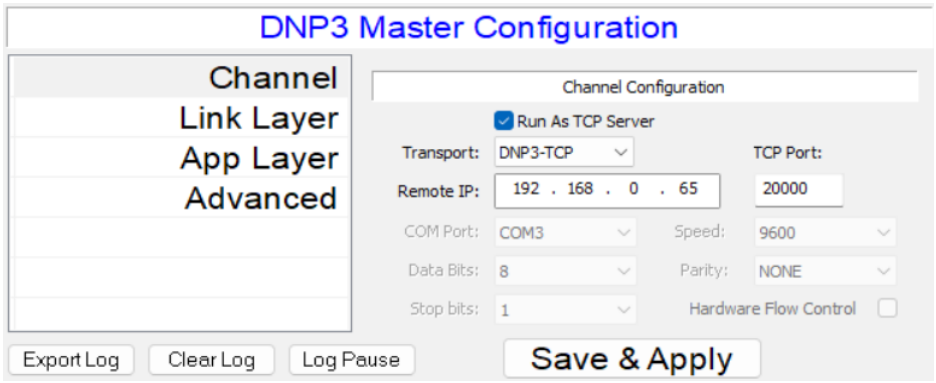
MV Is Float: 1=Measured values are Floats, 0=Measured values are integers

MV is instMag: Report instMag component of the measured values

10 DNP3 Master



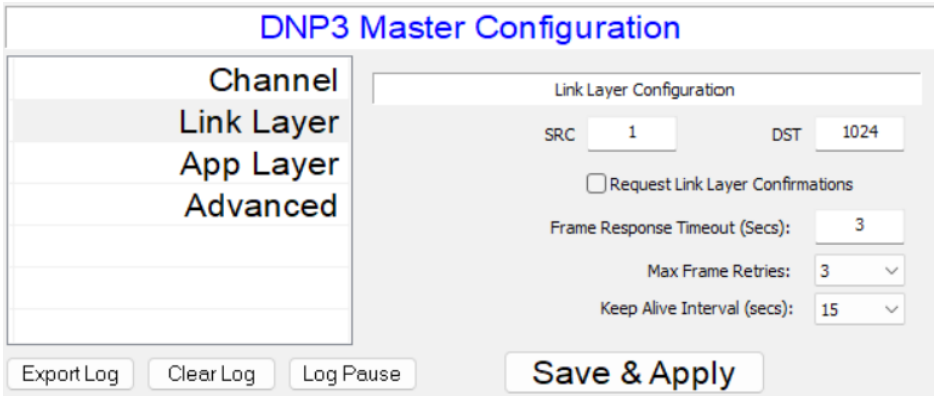
10.1 Channel Configuration



- Run as TCP Server: the DNP3 client accepts connections from DNP3 master – for testing of “Dual Endpoint” mode
- Transport: Selects Serial RS232 or TCP/IP transport for DNP3 protocol
- Remote IP: When TCP/IP transport is selected, sets the remote IP address
- TCP Port: When TCP/IP transport is selected, sets the remote TCP port
- COM Port: Sets the COM port number for operation over RS232
- Data Bits: Sets number of serial data bits
- Stop Bits: Sets number of serial stop bits
- Speed: Sets serial interface speed
- Parity: Sets serial interface parity

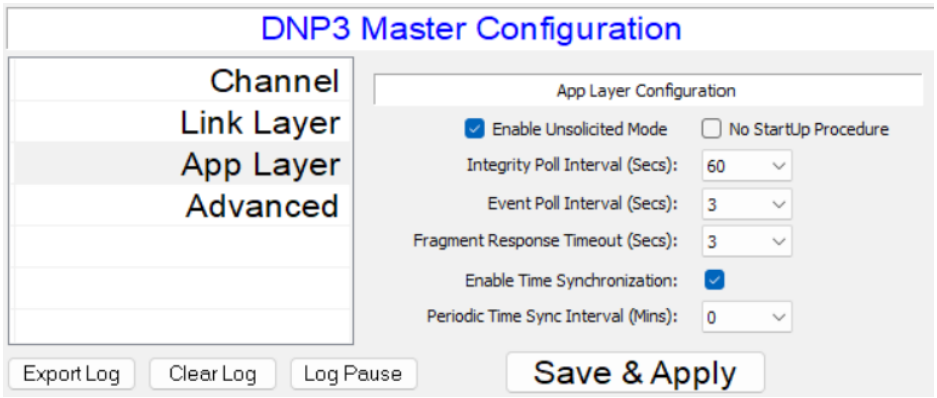
- Hardware Flow Control: Enables RTS/CTS flow control

10.2 Link Configuration



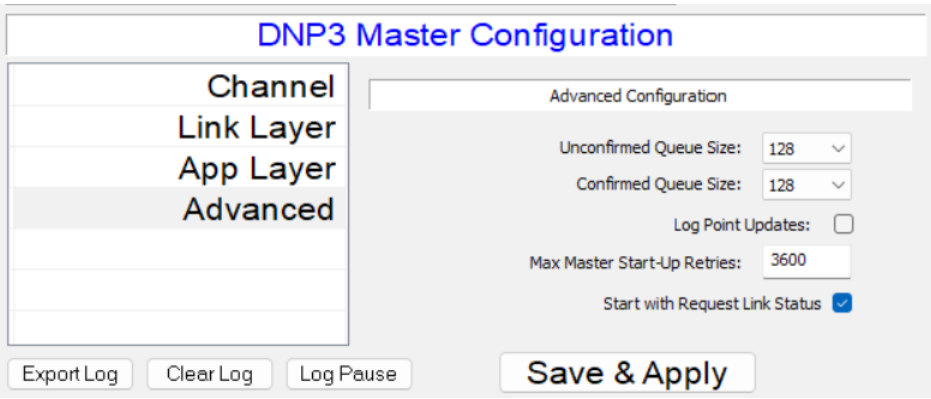
- SRC ADDRESS: DNP3 link source address
- DST ADDRESS: DNP3 link destination address
- Keep Alive Interval: DNP3 link keep alive timeout
- Frame Reply Timeout: DNP3 link frame reply timeout
- Max Frame Retries: Maximum number of DNP3 link frame re-transmits
- Request Link Layer Confirmations: Enables or Disables link layer confirmations

10.3 Application Layer Configuration



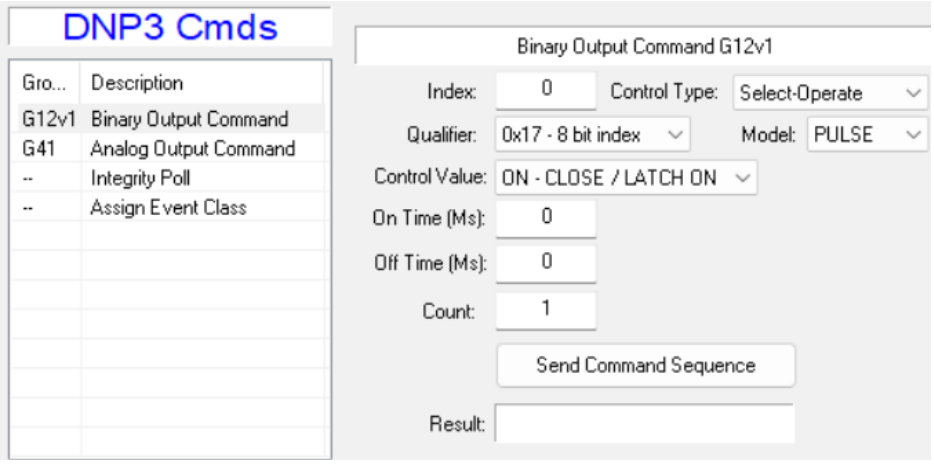
- Enable Unsol Mode: Enables or disables unsolicited response mode in the DNP3 slave
- Integrity Poll Interval: Sets interval in seconds for sending integrity poll to DNP3 slave
- Event Poll Interval: Sets interval in seconds for sending periodic event polls to DNP3 slave
- Fragment Response Timeout: Sets response timeout in seconds for receiving response fragments from DNP3 slave
- Enable Time Synchronization: Enables or disables time synchronization procedure
- Periodic Time Synchronization Interval: Sets periodic time synchronization interval in seconds, 0=periodic time synchronization off.

10.4 Advanced Configuration



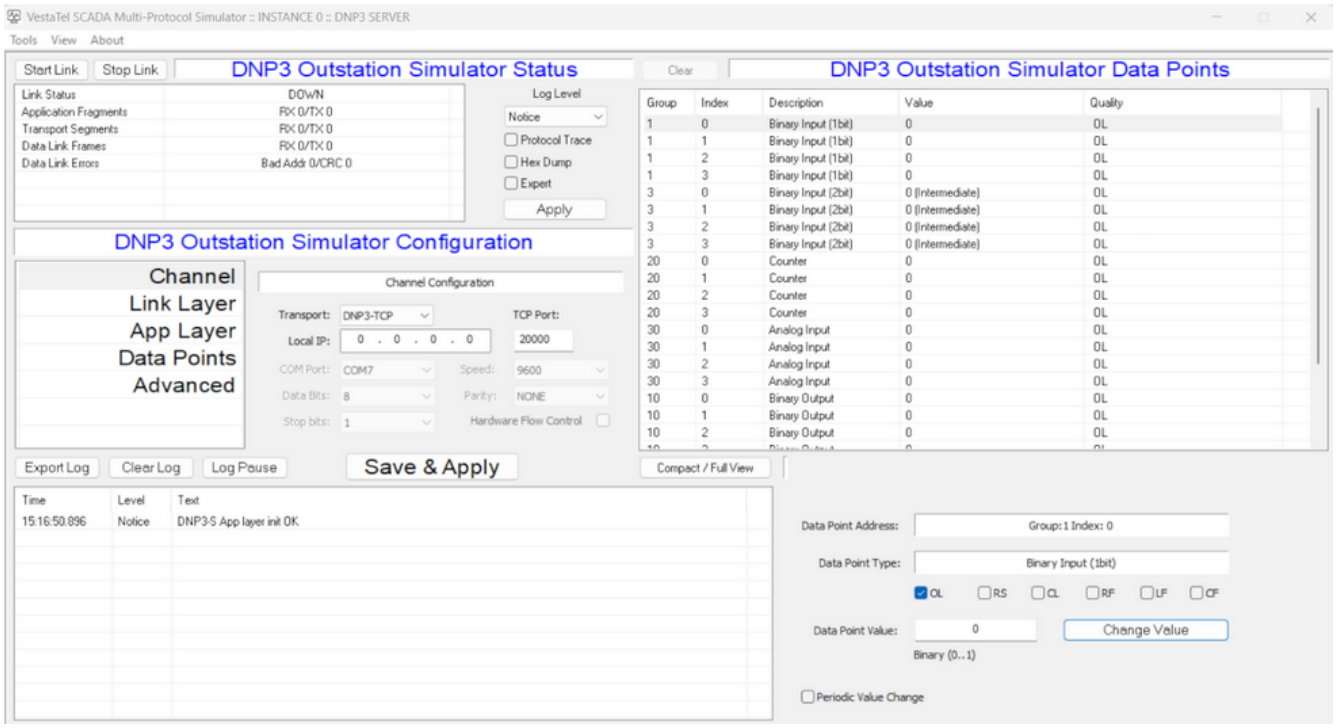
- Unconfirmed Queue Size: Sets the frame queue size for unconfirmed transmit fragments
- Confirmed Queue Size: Sets the frame queue size for confirmed transmit fragments
- Log Point Updates: Enables or disables logging data point updates
- Start with Request Status of Link: when enabled Request Status of Link is the first messages sent to server
- Master startup retries: Sets the maximum number of times to re-try failed Master startup procedure

10.5 DNP3 Commands

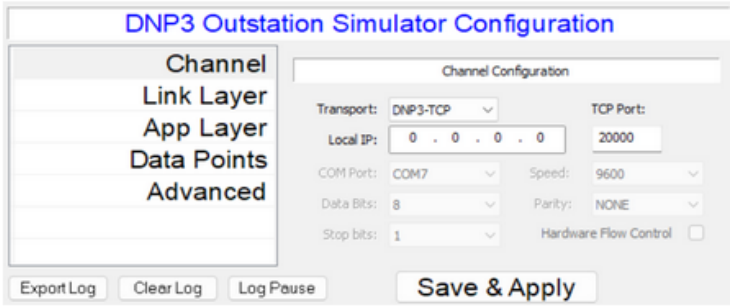


This view contains a list of supported commands. To run a desired command, select in the the list on the left, configure the necessary fields and click “Send Command”

11 DNP3 Server

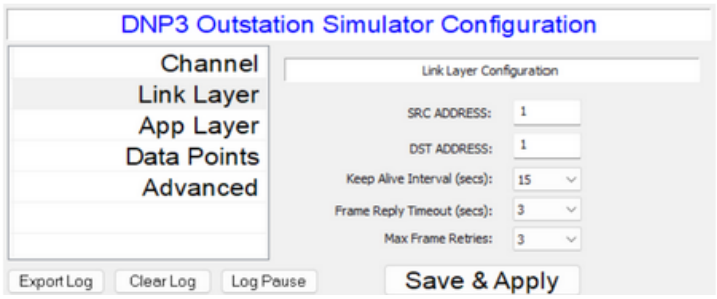


11.1 Channel Configuration



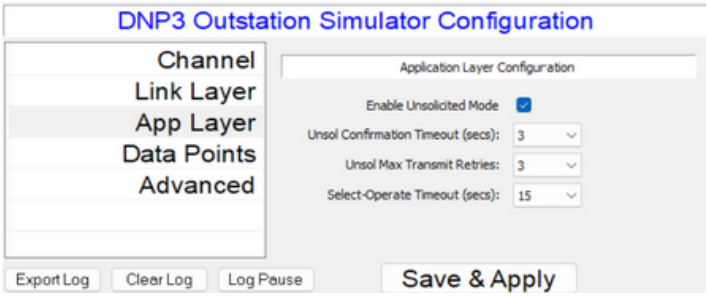
- Transport: Selects Seral RS232 or TCP/IP transport for DNP3 protocol
- Local IP: When TCP/IP transport is selected, sets the local IP address
- TCP Port: When TCP/IP transport is selected, sets the local TCP port
- COM Port: Sets the COM port number for operation over RS232
- Data Bits: Sets number of serial data bits
- Stop Bits: Sets number of serial stop bits
- Speed: Sets serial interface speed
- Parity: Sets serial interface parity
- Hardware Flow Control: Enables RTS/CTS flow control

11.2 Link Configuration



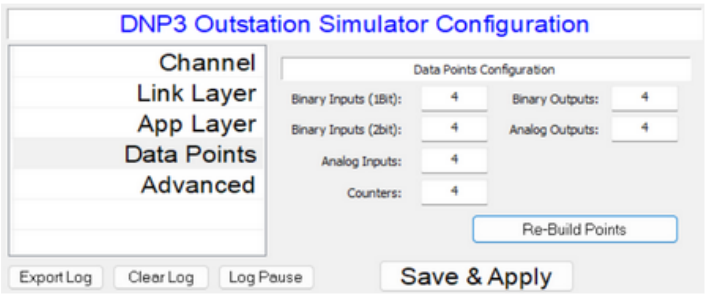
- SRC ADDRESS: DNP3 link source address
- DST ADDRESS: DNP3 link destination address
- Keep Alive Interval: DNP3 link keep alive timeout
- Frame Reply Timeout: DNP3 link frame reply timeout
- Max Frame Retries: Maximum number of DNP3 link frame re-transmits

11.3 Application Layer Configuration



- Enable Unsolicited Mode: Enables or disables Unsolicited Response Mode
- Unsol Confirmation Timeout: Timeout value for waiting for unsolicited confirmations
- Unsol Max transmit retries: Maximum number of re-transmit attempts for unsolicited mode
- Select Operate Timeout: Sets maximum time allowed between Select and Operate commands

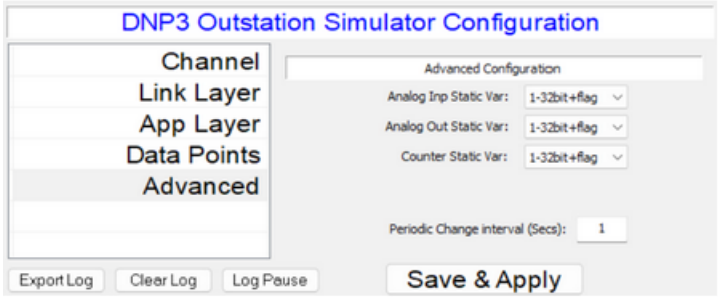
11.4 Data Points Configuration



This tab contains configuration for the number of DNP3 Slave simulator data points of different types: Binary Inputs (single and double bit), Analog Inputs, Binary Outputs and Analog Outputs.

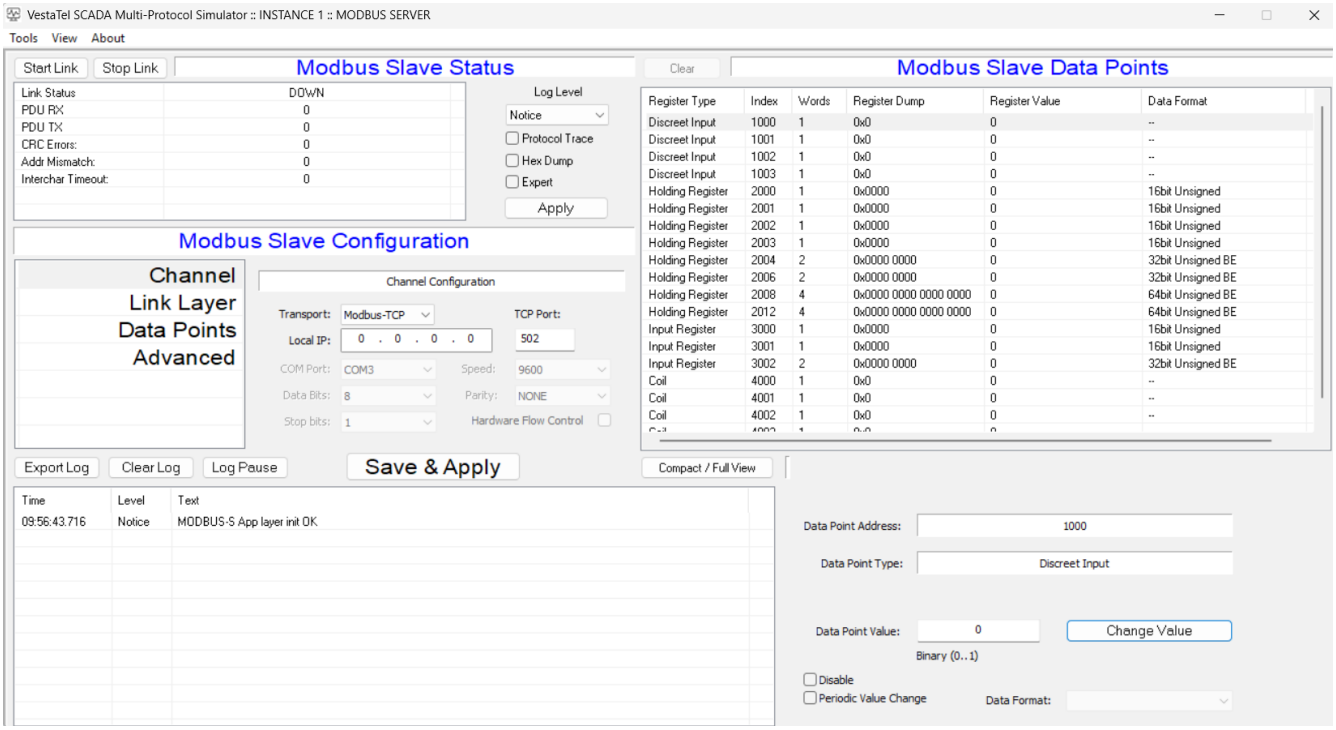
To change the default data point setup, change the number of points as needed and click "Re-Build Points". Note that the total maximum number of data points supported is 1024.

11.5 Advanced Configuration

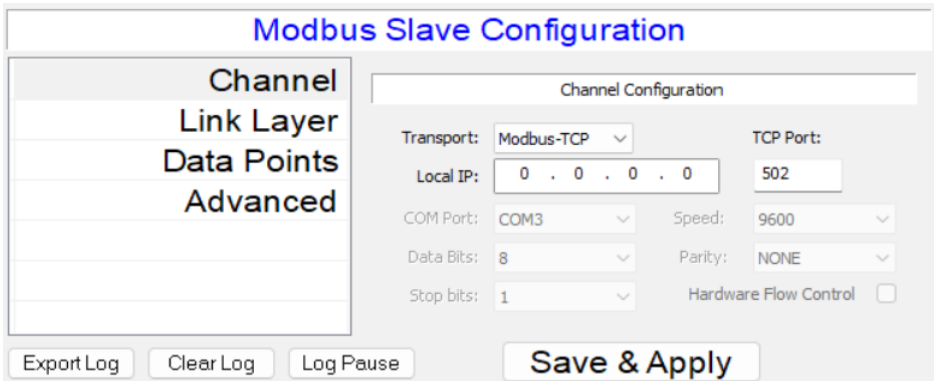


- Analog Inp Static Var: Sets the variation number used for static DNP3 Inputs
- Analog Out Static Var: Sets the variation number used for static DNP3 Outputs
- Counter Static Var: Sets the variation number used for static Counters
- Periodic Change Interval: Sets the interval in seconds for generating periodic change (incrementation) in the selected data points

12 Modbus Server



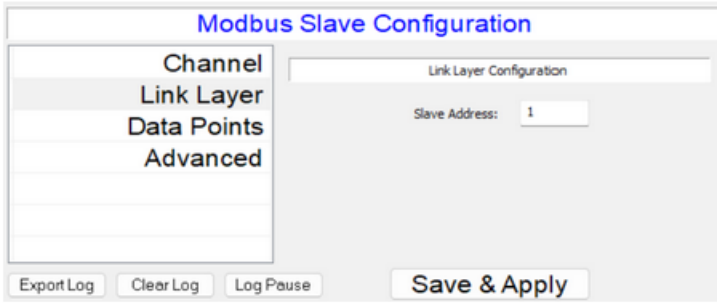
12.1 Channel Configuration



- Transport: Selects Seral RS232 or TCP/IP transport for Protocol protocol
- Local IP: When TCP/IP transport is selected, sets the local IP address
- TCP Port: When TCP/IP transport is selected, sets the local TCP port
- COM Port: Sets the COM port number for operation over RS232
- Data Bits: Sets number of serial data bits
- Stop Bits: Sets number of serial stop bits
- Speed: Sets serial interface speed

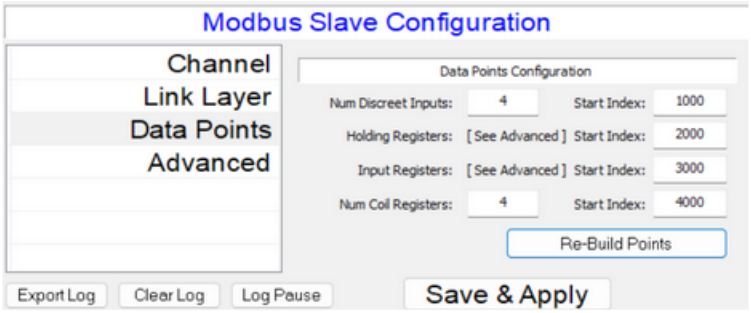
- Parity: Sets serial interface parity
- Hardware Flow Control: Enables RTS/CTS flow control

12.2 Link Configuration



Slave Address: Sets the Modbus slave address

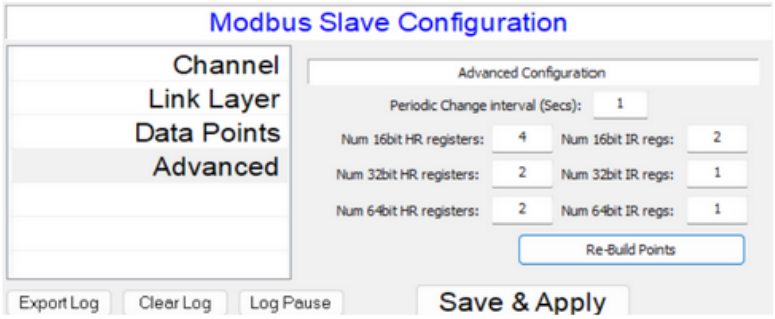
12.3 Data Points Configuration



This configuration tab contains the configuration fields that define the number of Modbus data points emulated in Modbus slave simulator mode by the application

Set the required number of registers of each type and their start index and click Re-Build Points when done. The total number of points supported is 1024

12.4 Advanced Configuration

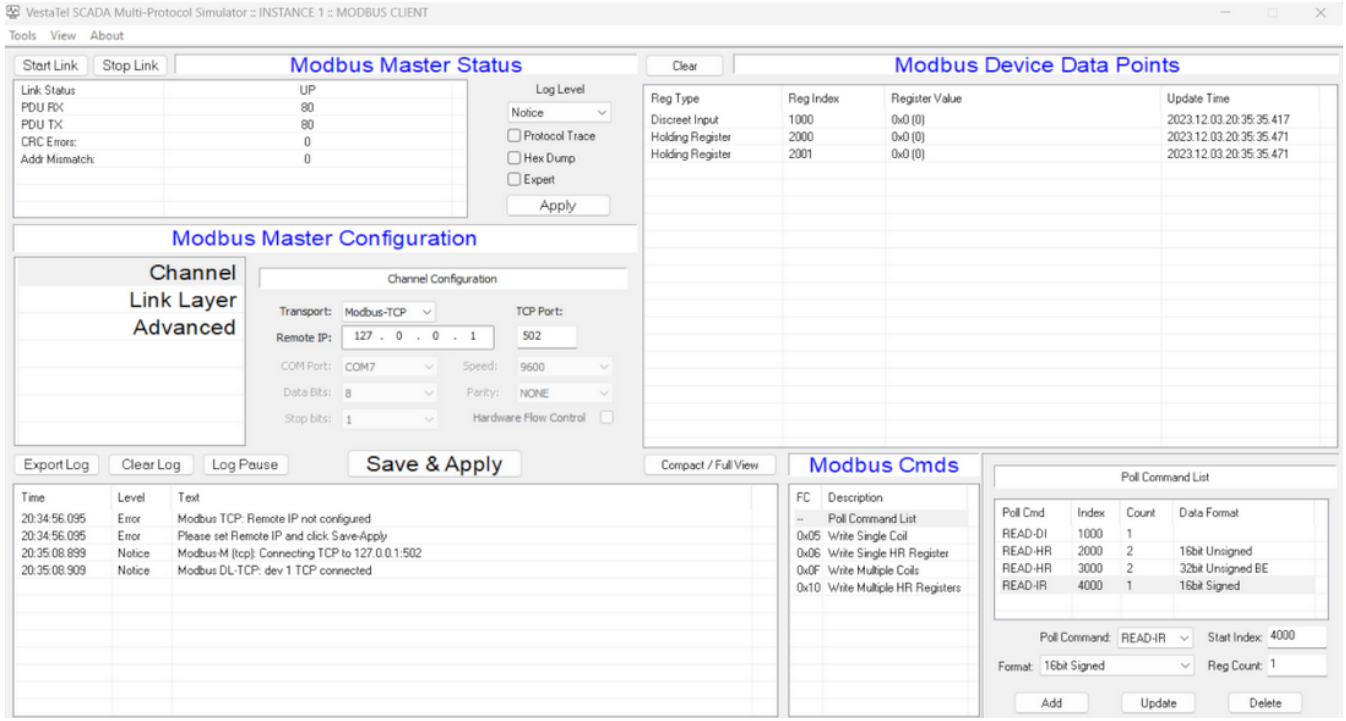


This configuration tab contains the configuration fields that define the number of Modbus data points and specific data formats of HR and IR registers emulated in Modbus slave simulator mode by the application

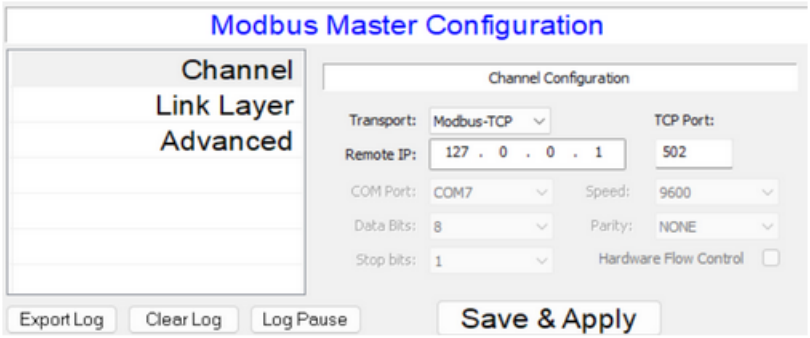
16, 32 and 64 bit sized registers can be defined here. Once defined the format can be further changed for each register in the data points list as signed, unsigned, little Endian, big Endian, integer or float, etc.

Set the required number of registers of each type and their start index and click Re-Build Points when done. The total number of points supported is 1024

13 Modbus Client

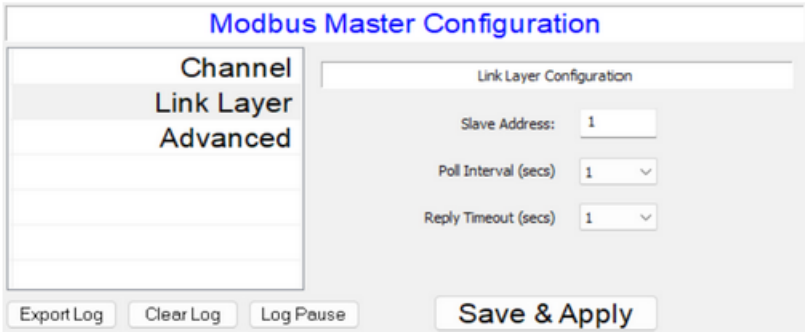


13.1 Channel Configuration



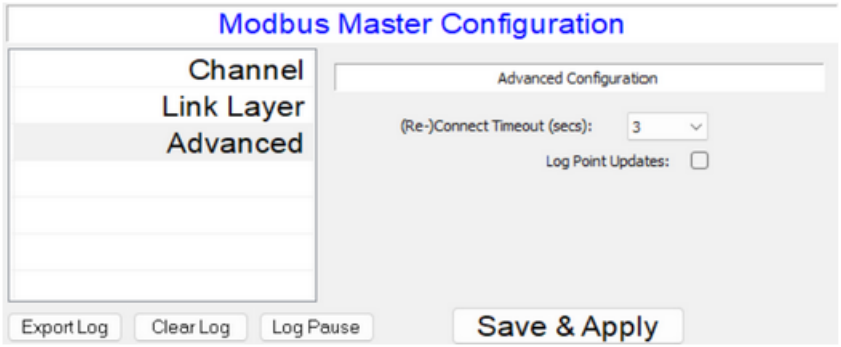
- Transport: Selects Serial RS232 or TCP/IP transport for Modbus protocol
- Remote IP: When TCP/IP transport is selected, sets the remote IP address
- TCP Port: When TCP/IP transport is selected, sets the remote TCP port
- COM Port: Sets the COM port number for operation over RS232
- Data Bits: Sets number of serial data bits
- Stop Bits: Sets number of serial stop bits
- Speed: Sets serial interface speed
- Parity: Sets serial interface parity
- Hardware Flow Control: Enables RTS/CTS flow control

13.2 Link Configuration



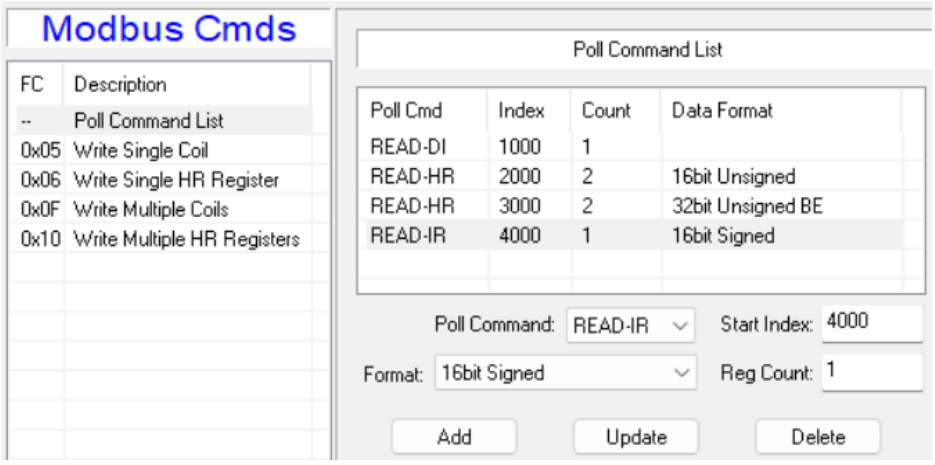
- Slave Address: Sets the Modbus slave address
- Poll interval: Sets the slave polling interval in seconds
- Reply Timeout: Sets the reply timeout in seconds

13.3 Advanced Configuration



- Re-Connect timeout: Sets TCP or serial re-connect timeout in seconds
- Log point updates: Enables or disables logging of data point updates

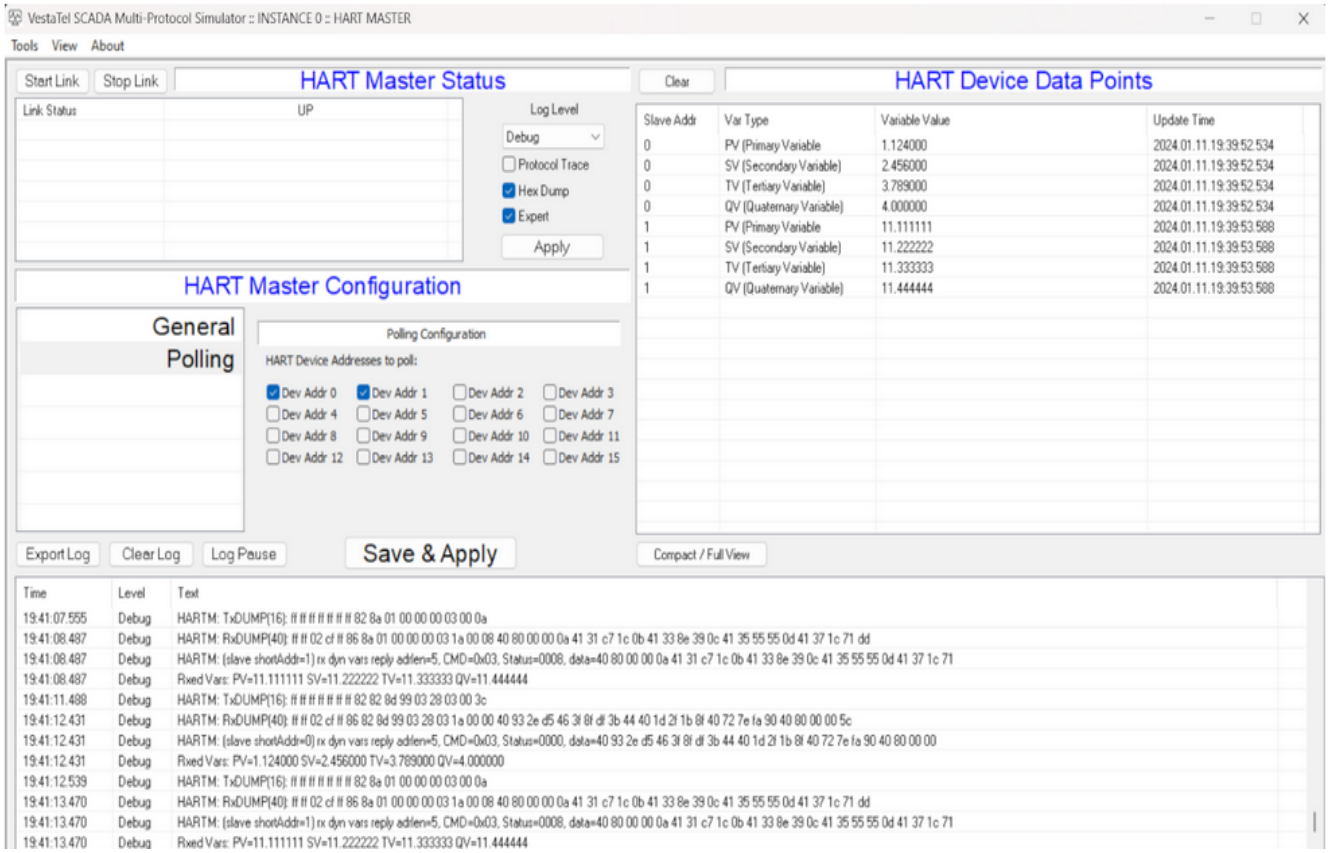
13.4 Modbus Commands



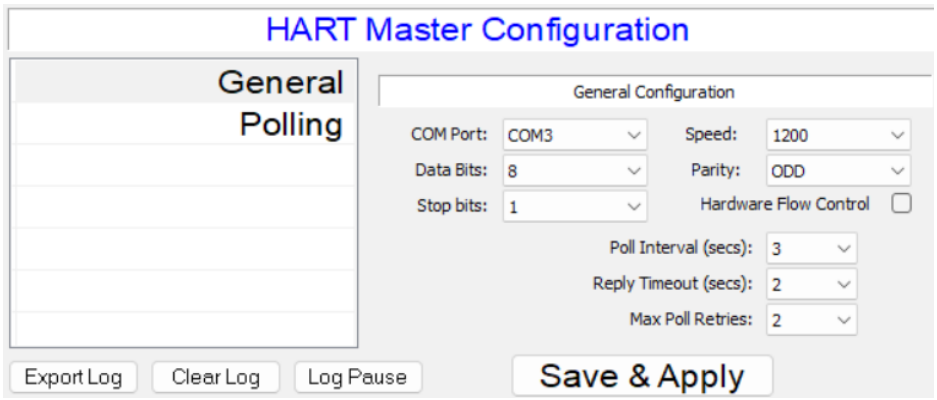
This window is used to build a polled command list – a series of polled command that are periodically sent to the modbus server to poll it for data. Select Poll Command List on the left, then use Add, Udpate, Delete buttons on the right to build the poll list. Use Poll Command, Format, Reg Count, and Start Index fields to setup each poll command.

This view is also used to select and set Write commands to the modbus server (Coils and HR registers)

14 HART Master



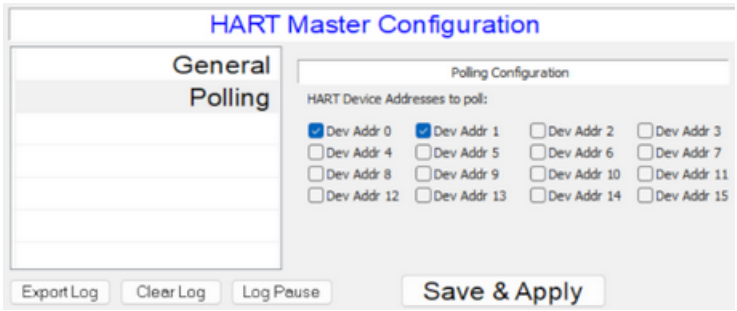
14.1 General Configuration



- COM Port: Sets the COM port number for operation over RS232
- Data Bits: Sets number of serial data bits

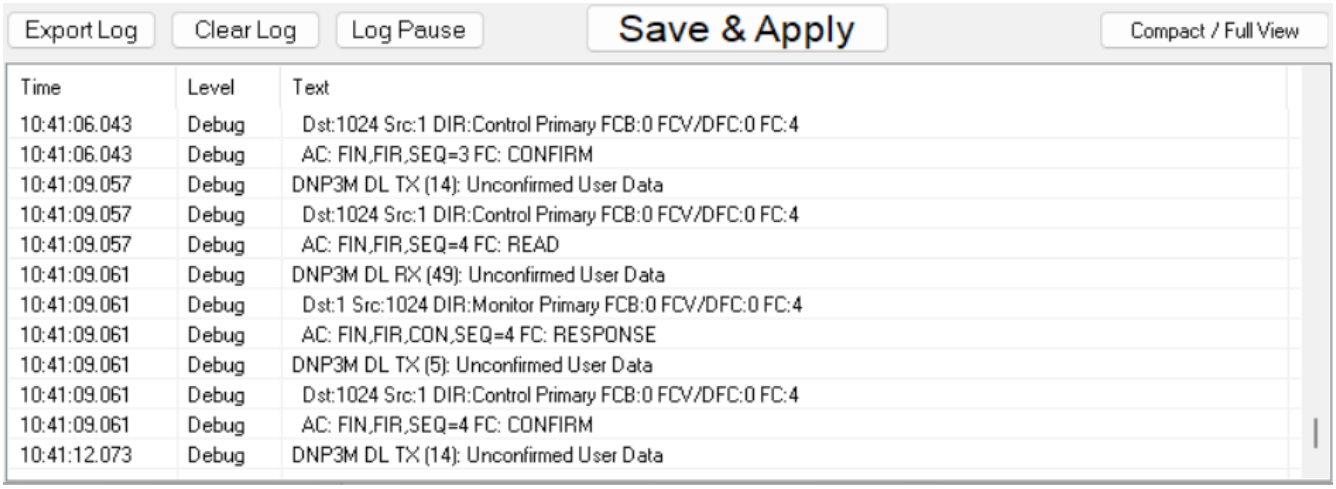
- Stop Bits: Sets number of serial stop bits
- Speed: Sets serial interface speed
- Parity: Sets serial interface parity
- Hardware Flow Control: Enables RTS/CTS flow control
- Poll Interval: Sets the device polling interval
- Reply timeout: Sets the maximum time to wait for poll reply
- Max poll retries: Sets the maximum number of times to retries polling

14.2 Polling Configuration



Dev Addr 0 to 15 – Configures the set of device addresses to poll

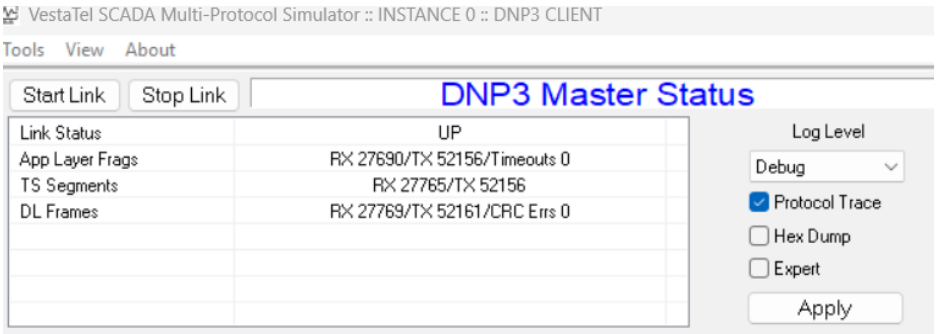
15 Event Log



This view area displays the event log which holds protocol transmit / receive messages and internal software events
Control buttons:

- Export Log: exports the content of the log to a text file
- Clear Log: clears the content of the log
- Pause Log: temporarily pauses logging
- Log Resume: resumes logging
- Compact / Full view: toggles the application windows from “Tall mode” where more of the event log is shown or “compact mode” (default)

The log severity and what is exactly logged in the the event log is controlled in the main screen area group of controlls shown below



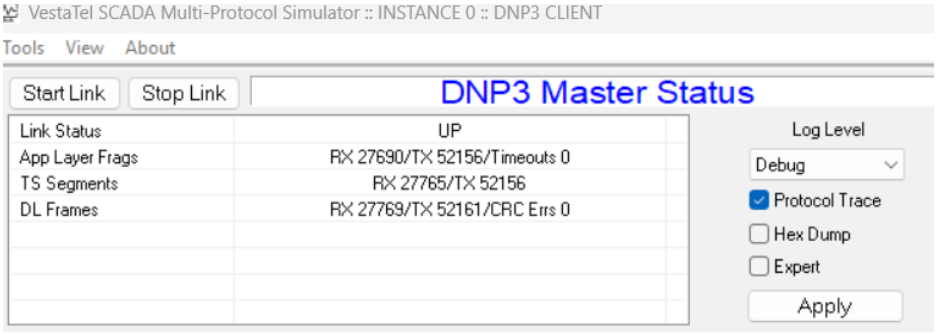
Log level: selects the maximum displayed severity

Protocol trace: log protocol decoded messages into event log

Hex Dump: logs the hex dump of received and transmitted protocol messages

Expert: maximum level of logging (system internal events, state transitions, etc)

16 Diagnostic Counters



This area of the program screen displays various protocol diagnostic counters that get updated during the operation, the content of the view changes depending on selected protocol.

17 Automation Features

There are two automation features that may be useful in testing that SCADA Multi-Protocol Simulator supports:

17.1 Running multiple instances from a script

It is possible to launch multiple instances of the simulator application in server or client mode from a Windows bat file (script). An example script called multiserv.bat is provided with the installation (which by default can be found in c:\VestaTel-Scadasim folder.

Currently running up to :

- 100 instances simultaneously is supported when running under Professional License

- 10 instances are supported for Trial / Evaluation mode

- 4 Instances are supported for Personal License

Example multiserv.bat starts 100 instances giving the base TCP listening port 2404 which increments for each instance.

A prepared base configuration file (IEC104 server mode) should be located in the running directory (scada-sim.cfg).

You can use the following procedure:

1. Start the appliction normally and select the required protocol, click save apply – that will be your base configuration
In case of IEC104 the TCP server port is 2404 which shall be your base TCP listening port

2. Copy cfgX/scada-sim.cfg .. (X depends on which instance was started, could be 0, 1 etc.)

3. Edit multiserv.bat for your needs – adjust N to the number of instances required, etc.

4. Run multiserv.bat from command line (cmd.exe) – you must be in the working folder (C:\VestaTel-Scadasim)

Content of multiserv.bat:

```
@echo off
setlocal enabledelayedexpansion

REM === USER CONFIGURATION ===
set N=100
set BASE_CFG=scada-sim.cfg
set EXE=scadasim.exe
set BASE_PORT=2404
```

```
set DELAY_SEC=1

for /L %%i in (0,1,%N%-1) do (

set CFG_DIR=cfg%%i

if not exist "!CFG_DIR!" (
    mkdir "!CFG_DIR!"
)

copy /Y "%BASE_CFG%" "!CFG_DIR!\%BASE_CFG%" >nul

set /A PORT=%BASE_PORT% + %%i

echo Launching instance %%i on port !PORT! ...

start "" "%EXE%" ^
    -i %%i ^
    -p !PORT!

REM === Delay between launches ===
timeout /t %DELAY_SEC% /nobreak >nul

)

echo All instances launched.
```

The multiserv.bat calls the scadasim.exe in “batch mode” passing the command line arguments to it. The following command line arguments are supported:

Argument	Examples	Comment
-i <instance number>	scadasim.exe -i 0 scadasim.exe -i 56	Causes the application to run a specific instance (numbered from 0 to Max)

		where Max is 100 for Professional license, 4 for the Personal License and 10 for Evaluation / Trial mode.
- p <TCP port>	scadasim.exe -i 3 -p 2404 scadasim.exe -i 4 -p 2405 scadasim.exe -i 5 -p 2406	Override the TCP listening port in configuration with the given port If the base configuration file is a SCADA Master / Client, then this is a remote TCP port
-I <IP address>	scadasim.exe -i 3 -p 2404 -I 0.0.0.0	This allows binding the instance to a specific local IP address or in case of the client, this overrides the configured remote IP address.

17.2 Command line interface

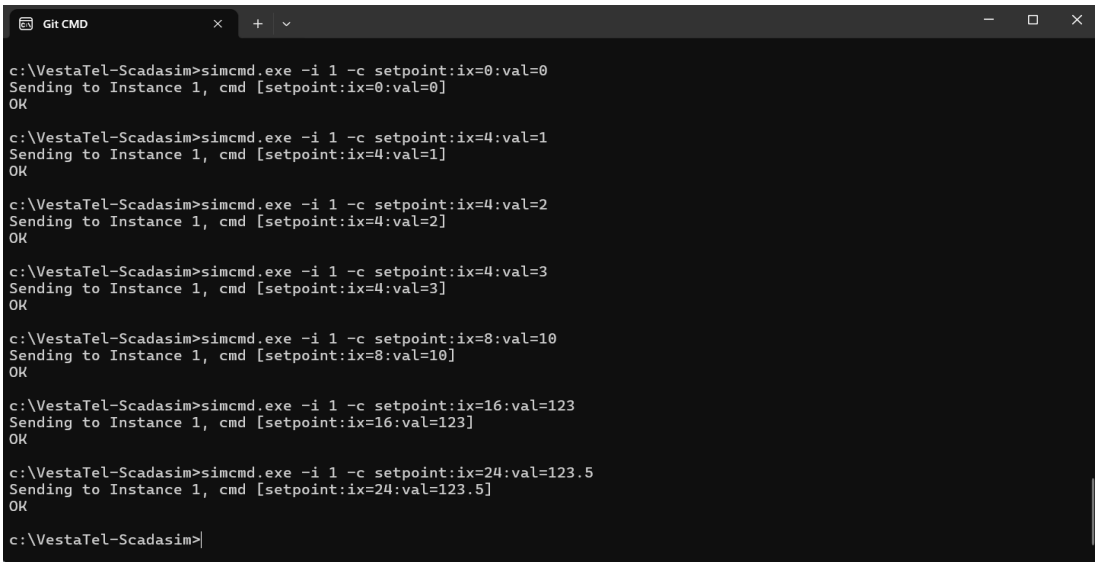
While running, VestaTel SCADA Multi-Protocol Simulator supports accepting commands from a command line application called simcmd.exe (found in the installation directory).

Command syntax: simcmd.exe <arguments>

Currently the following commands arguments are supported:
-i <instance> - directs the command to a specific running instance of the application
-c <command> - send the command to the specified running instance

Currently <command> must be in the following format:
setpoint:ix=<point index>:val=value

This command changes the data point value of the application running in server mode. Point index starts from 0 and runs to the last data point displayed in the application data points window.
Examples:



18 VENDOR INFORMATION

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