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Version 9.0

# VisSim/OPC User's Guide

By Altair Engineering, Inc.

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**Altair Engineering, Inc.**  
**Altair Engineering User's Guides for VisSim Products - Version 9.0**

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# Introduction

VisSim/OPC add-on is an OPC (OLE for process control) client that can be connected to any OPC server. Using VisSim/OPC, you can exchange data between VisSim and any OPC server using the OPC Read and OPC Write blocks. You can use the OPC Log block to log data exchanges, errors, and messages.

OPC servers implemented with compliance to OPC standards must provide, install, and register standard proxy/stub libraries. The servers must also register themselves with the Component Categories Manager.

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## The VisSim product family

The VisSim product family includes several base products and product suites, as well as a comprehensive set of targeted add-on modules that address specific problems in areas such as data communications, data acquisition, linearization and analysis, and digital signal processing.

### Base products and product suites

Product	Function
Professional VisSim	<p>Model-based design, simulation, testing, and validation of dynamic systems.</p> <p>A personal version, VisSim PE, is also available. VisSim PE limits diagram size to 100 blocks.</p>
VisSim/Comm Suite	<p>Simulates end-to-end communication systems at the signal level using 200+ communications, signal processing, and RF blocks.</p> <p>Includes Professional VisSim and VisSim/Comm blockset.</p> <p>A personal version, VisSim/Comm Suite PE, is also available. VisSim/Comm PE limits diagram size to 100 blocks and limits the Communication blockset. See the VisSim/Comm datasheet for details.</p> <p>VisSim/Comm Suite add-on modules are available for real-time data acquisition (Red Rapids digital tuner card); modeling PCCC turbo codes, including UMTS specification; and for support of Bluetooth, 802.11 a/b/g (Wi-Fi), and ultrawideband wireless designs.</p>

VisSim/Embedded Controls Developer Suite	<p>Rapidly prototypes and creates embedded controls for DSPs, DSCs, and MSP430 microcontrollers. You can simulate and generate scaled, fixed-point ANSI C code, as well as code for on-chip peripherals.</p> <p>Includes Professional VisSim, VisSim/C-Code, VisSim/Fixed-Point, and one user-specified target support.</p> <p>A personal version, VisSim/Embedded Controls Developer PE, is also available. VisSim/Embedded Controls Developer PE limits diagram size to 100.</p>
VisSim Viewer (free)	Lets you share VisSim models with colleagues and clients not licensed to use VisSim.

### Add-on modules

Add-On Module	Function
VisSim/Analyze	Performs frequency domain analysis of a linearized nonlinear subsystem.
VisSim/CAN	Interfaces with a USB CAN device to read and write CAN messages on the CAN bus.
VisSim/C-Code	Generates highly-optimized, ANSI C code that can be compiled and run on any platform that supports an ANSI C compiler.
VisSim/C-Code Support Library Source	Provides source code for the Support Library.
VisSim/Comm blockset	<p>Simulates end-to-end communication systems at the signal level using 200+ communications, signal processing, and RF blocks.</p> <p>A personal version, VisSim/Comm PE, is also available. VisSim/Comm PE is a subset of the Communication blockset. See the VisSim/Comm datasheet for details.</p> <p>You can purchase VisSim/Comm add-on modules for real-time data acquisition (Red Rapids digital tuner cards); for modeling PCCC turbo codes, including UMTS specification; for support of Bluetooth, 802.11 a/b/g (Wi-Fi), and ultrawideband wireless designs.</p>
VisSim/Digital Power Designer	Provides high-level blocks for simulation and code generation of power supply and digital power components and controls.
VisSim/Fixed-Point	Simulates the behavior of fixed-point algorithms prior to code generation and implementation of the algorithm on the fixed-point target.
VisSim/Knobs and Gauges	Provides dynamic gauges, meters, and knobs for process control, and measurement and validation systems.
VisSim/Model-Wizard	Generates transfer function model from historic or real-time data.
VisSim/Motion	Simulates motor control systems with customizable amplifiers, controllers, filters, motors, sensors, sources, tools, and transforms.
VisSim/Neural-Networks	Performs nonlinear system identification, problem diagnosis, decision-making prediction, and other

	problems where pattern recognition is important.
VisSim/OPC	Connects to any OPC server and log data or run a virtual plant in VisSim for offline tuning.
VisSim/OptimizePRO	Performs generalized reduced gradient method of parameter optimization.
VisSim/Real-TimePRO	Performs real-time data acquisition and signal generation using I/O cards, PLCs, and DCSs.
VisSim/Serial	Performs serial I/O with other computers.
VisSim/State Charts	Creates, edits, and executes event-based systems.
VisSim/UDP	Performs data exchange over the internet using UDP.
VisSim Viewer (free)	Lets you share VisSim models with colleagues and clients not licensed to use VisSim.

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## Resources for learning VisSim/OPC

For those of you that are new to VisSim, we have provided several free services to make your transition to VisSim fast, smooth, and easy:

### Interactive webinars

Interactive webinars offer you the opportunity to meet with Altair product specialists who will introduce and demonstrate our software products live on your computer and answer any questions you have. Each webinar is approximately 45 minutes long. To learn more about our interactive webinars, go to <http://www.vissim.com/webinars/webinars.html>.

### Sample diagrams

VisSim 9.0 includes a directory of fully documented sample diagrams. These diagrams illustrate both simple and complex models spanning a broad range of engineering disciplines, including aerospace, biophysics, chemical engineering, control design, dynamic systems, electromechanical systems, environmental systems, HVAC, motion control, process control, and signal processing.

#### To access sample diagrams

Click on the **Diagrams** menu in VisSim.

Click on **Examples > Applications**.

### Training

Altair offers training sessions for learning and gaining expertise in VisSim and the VisSim family of add-on products. Training sessions are conducted at Altair training facility in Westford, MA, as well as at customer sites and as online webinars.

For information on setting up a training session, contact [sales@vissol.com](mailto:sales@vissol.com).





# Installing VisSim/OPC

The Install program that comes on your VisSim/OPC disk installs the VisSim/OPC program and other utility files on your hard disk.

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## Installation requirements

VisSim/OPC runs on personal computers using the Intel 80286 or higher processor, including the IBM Personal System/2 Series, the IBM PC AT, and 100% compatibles. To use VisSim/OPC, your computer must have the following components:

- VisSim 9.0+
- 3MB of free hard disk space

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## Installation procedure

When the installation is complete, the VisSim/OPC add-on will appear in the Addons window for the Edit > Preferences > Addons command. An OPC category will appear under the Blocks menu.

### To install VisSim/OPC

1. After you download the setup program from [www.vissim.com](http://www.vissim.com), run the program.
2. Follow the on-screen instructions.



# Using VisSim/OPC

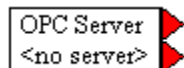
This section contains...

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## VisSim OPC block set

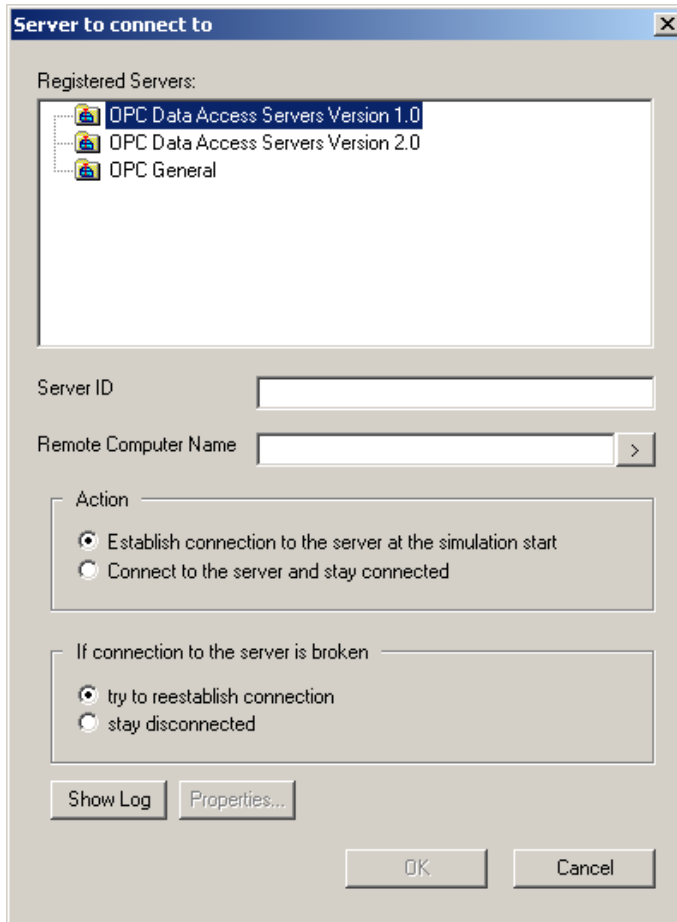
The OPC block set consists of the OPC Server, OPC Read, OPC Write, and OPC Log blocks.

### OPC Server block



The OPC Server block is used to establish a connection with the OPC server. There should be one OPC Server block for each OPC server. There might be many OPC Server blocks if the connection to many OPC servers is required.

The OPC Server block has two outputs. When the value of the top output is 1, the block is connected to a server; when the value is 0, it is not connected. The bottom output indicates the number of errors.

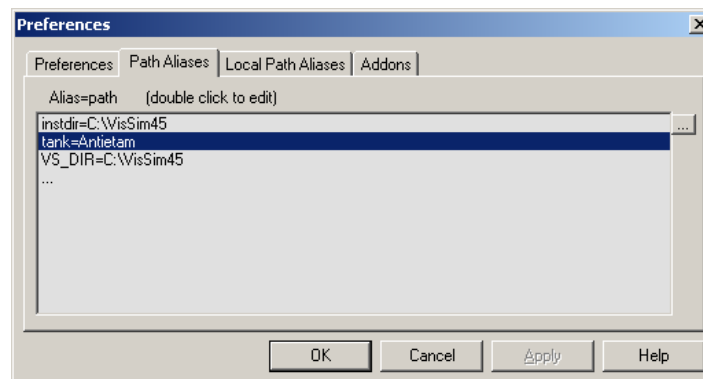


**Registered Servers:** Lists the OPC servers registered on the computer.

**Server ID:** Specifies the name of the OPC server to which to connect.

**Remote Computer Name:** Specifies the name of the computer where the OPC server is (or will be) running. To choose a server, click on the > button to navigate across the network. Leave this field blank if the OPC server is local. To connect via an alias, type \$<alias-name>.

If you are planning to deploy your distributed model in another network, you will likely need different computer names. To make the distributed model portable, you can use VisSim's path aliases. To access path aliases, choose the Edit > Preferences command and click on the Path Aliases tab. The following dialog box appears:



Enter the alias in the following general format:

<alias>=<computer>

You can use an alias as a substitute for a real computer name. To expand the alias, prefix the alias name with a dollar sign (\$).

#### Action

**Establish connection to the server at the simulation start:** Connects to the specified OPC server when the model is running.

**Connect to the server and stay connected:** Connects to the specified OPC server immediately. In this case, all server items will be available for browsing.

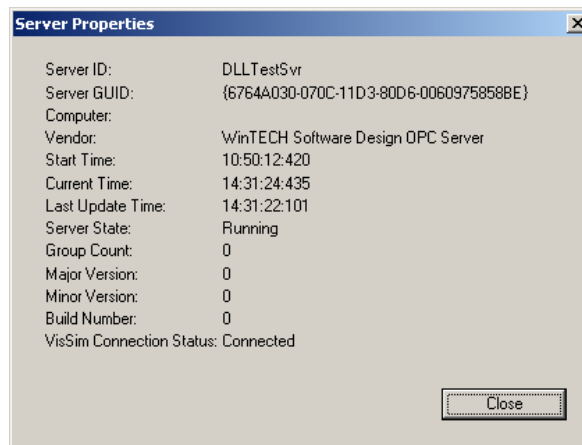
#### If connection to the server is broken

**Try to reestablish connection:** Tries to reconnect to the specified OPC server.

**Stay disconnected:** Does not try to reconnect to the specified OPC server.

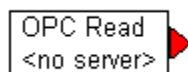
**Show Log:** Views [log events](#).

**Properties:** Shows the OPC server properties. Note that the properties can be viewed only if a connection to the server is established. Properties may vary from server to server. The following is an example of a typical Server Properties dialog box:

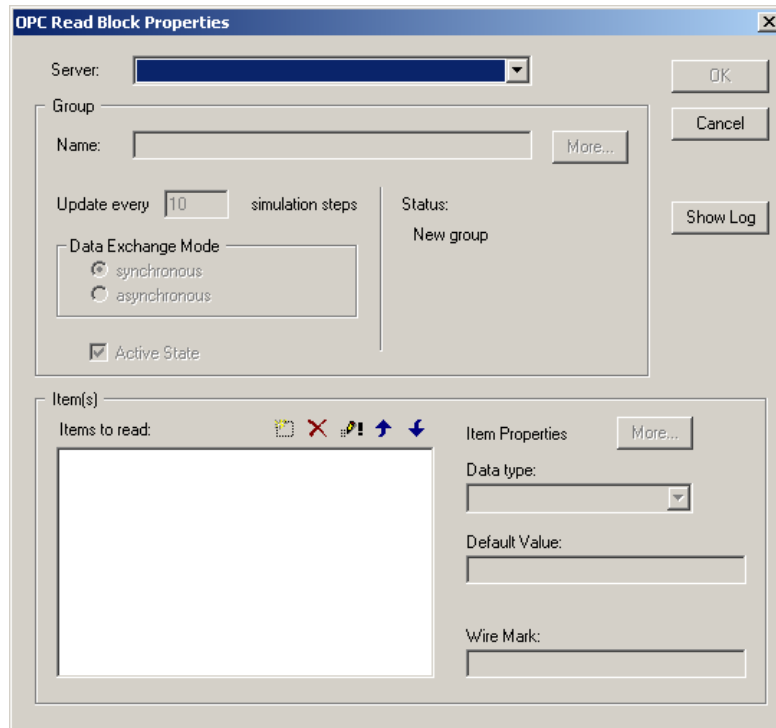


Note that the GUID can be copied.

## OPC Read block



The OPC Read block reads data from the OPC server. The OPC Read properties are briefly described below.



**Server:** Specifies the name of the OPC server to which to connect. Click on the down arrow to select an OPC server.

**Group Name:** Specifies the name of the group on the server.






**More (Group Properties):** Allows you to [configure group properties](#) in addition to the Update every \_ simulation steps and Data Exchange Mode properties.






**Update every \_ simulation steps:** Indicates the update rate.

**Date Exchange Mode:** Lets you choose between synchronous and asynchronous. By default, the date exchange mode is synchronous.

**Active State:** If you do not need to exchange data with the OPC server, you can deactivate this option.

**Status:** Provides [data exchange status](#).

**Items to Read:** Specifies the names of the items. Use the , , , , and  buttons to edit item names.

To	Do this
Add a name	Click on  button. An ensuing dialog box appears. For more information, see “Selecting the item from the server.”
Delete a name	Click on  button
Move the name	Click on the  or  arrow button
Edit the name	Click on the  button

**Date Type:** Specifies the data type of the item.

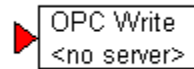
**Default Value:** Indicates the initial value.

**Wire Mark:** Indicates a label name that is displayed on the output connector tab for the block.

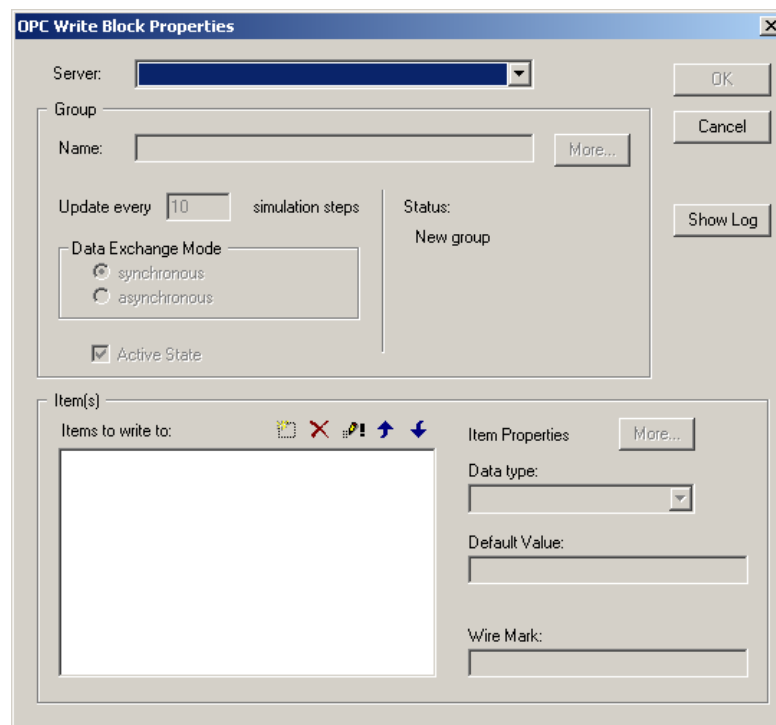
**More (Item Properties):** Shows the [item properties](#).

**Show Log:** Views log events. For more information, see “Logging Issues.”

## OPC Write block



The OPC Write block writes data to the OPC server. The OPC Write properties are briefly described below.



**Server:** Specifies the name of the OPC server to which to connect. Click on the down arrow to select an OPC server.

**Group Name:** Specifies the name of the group on the server.






**More (Group Properties):** Allows you to [configure group properties](#) in addition to the Update every \_ simulation steps and Data Exchange Mode properties.






**Update every \_ simulation steps:** Indicates the update rate.

**Date Exchange Mode:** Lets you choose between synchronous and asynchronous. By default, the date exchange mode is synchronous.

**Active State:** If you do not need to exchange data with the OPC server, you can deactivate this option.

**Status:** Provides [data exchange status](#).

**Items to Read:** Specifies the names of the items. Use the , , , , and  buttons to edit item names.

To	Do this
Add a name	Click on  button. An ensuing dialog box appears. For more information, see “Selecting the item from the server.”
Delete a name	Click on  button
Move the name	Click on the  or  arrow button
Edit the name	Click on the  button

**Date Type:** Specifies the data type of the item.

**Default Value:** Indicates the initial value.

**Wire Mark:** Indicates a label name that is displayed on the input connector tab for the block.

**More (Item Properties):** Shows the [item properties](#).

**Show Log:** Views [log events](#).

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## Setting up block properties

Using the Properties dialog box for the OPC Read and OPC write blocks, you can do the following:

- Configure group properties
- Select an item from the server

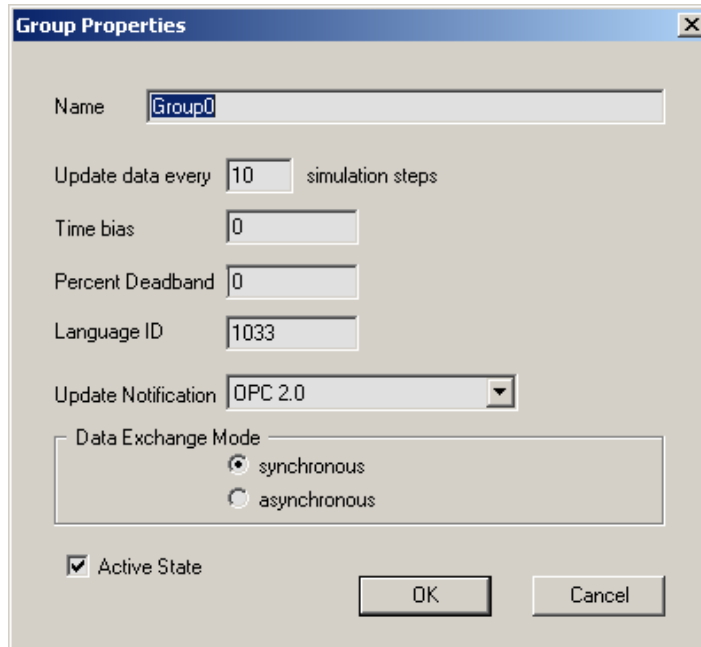
### Configuring group properties

#### To configure group properties

1. Call up the Properties dialog box for the OPC Read or OPC Write block.
2. In the Properties dialog box, click the **More** button to the right of the Group Name text box.

The following dialog box appears:





3. In the Name box, enter a new group name or keep the existing name.
4. In the Update Data Every box, enter an update rate.
5. Enter the following information into the other text boxes:

Box	Description
Time Bias	Some OPC servers use time bias setting to store time zone information. The information might be used to display server time stamps in a time zone other than UTC or the local time zone. Either keep 0 in this field or enter the difference in hours between the UTC and the local time.
Percent Deadband	Some OPC servers support deadband for updates from analog data sources. The deadband value is a percentage of full-scale deflection and so the high and low limits for the item must be known ahead of time. If your server's manual does not contain special recommendations regarding the deadband, keep the default value in this field.
Language ID	The default value 1033 corresponds to American English.
Update Notification	Keep the default value.
Data Exchange Mode	Lets you choose between synchronous and asynchronous. By default, the date exchange mode is synchronous
Active State	An item must be active to exchange data. OPC servers update values for active items in active groups.


6. Click on the OK button, or press ENTER.

The OPC Read or OPC Write Properties dialog box re-appears with the updated group entries.

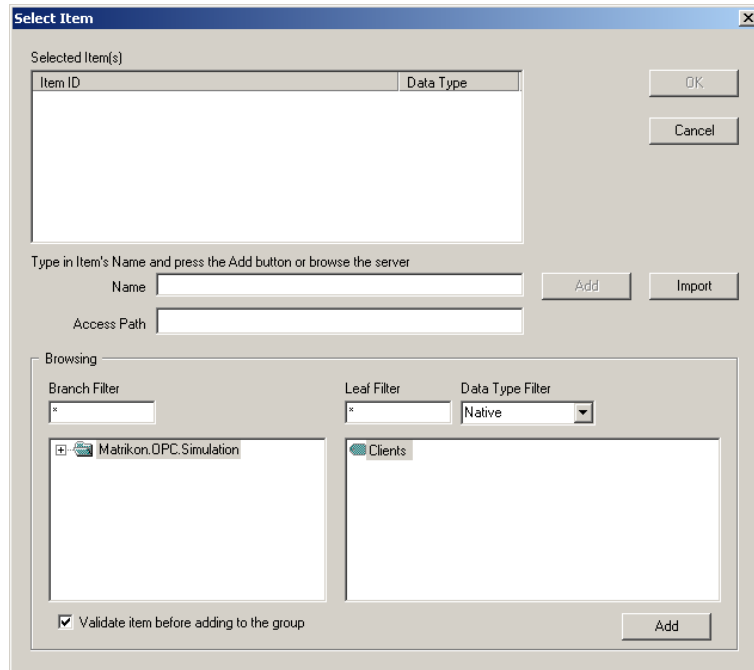
## Selecting the item from the server

### To select an item from the server

1. Call up the Properties dialog box for the OPC Read or OPC Write block.

2. In the Properties dialog box, click on the  button above the Items to Write/Items to Read to window.

The following dialog box appears if a connection to the server was established:



3. Do the following:
  - View the selected items in the Selected Items window.
  - Use the lower left window to browse the server structure, or enter the item name in the Type in Item's Name box and press the Add button.
  - Use the lower right window to display items.
  - Use the **Branch Filter**, **Leaf Filter**, and **Data Type Filter** boxes to narrow the list of names to browse. Most servers support the wildcard (\*) symbol, which means to display all names.
  - Activate the **Validate Item Before Adding To The Group** box in order to check the selected item for validity.
  - Click **Add** to add selected items to the list of selected items.
4. Click **OK**, or press **ENTER**.

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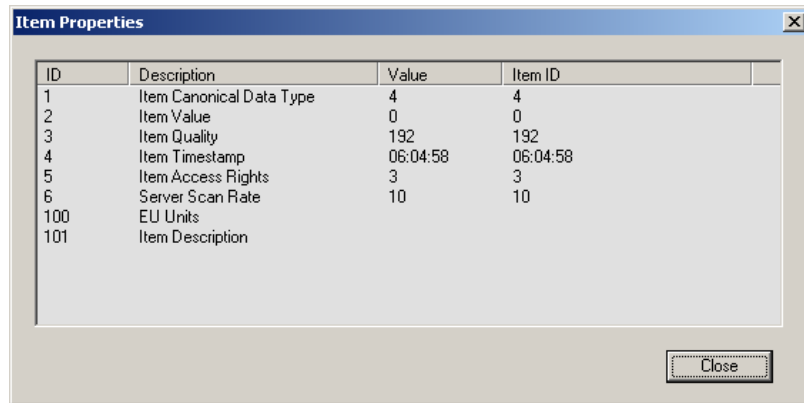
## Using the Status information to fine-tune your simulation

You must simulate the model with a large simulation step. Then check the status of the OPC Read and OPC Write blocks. The status will show the server's update rate, the minimum and maximum exchange rates, and the mean of the exchange rates. Using this information you can fine-tune the simulation step.

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## Viewing item properties

Item properties are provided by server's vendor. Use the More button to display the Item Properties dialog box.



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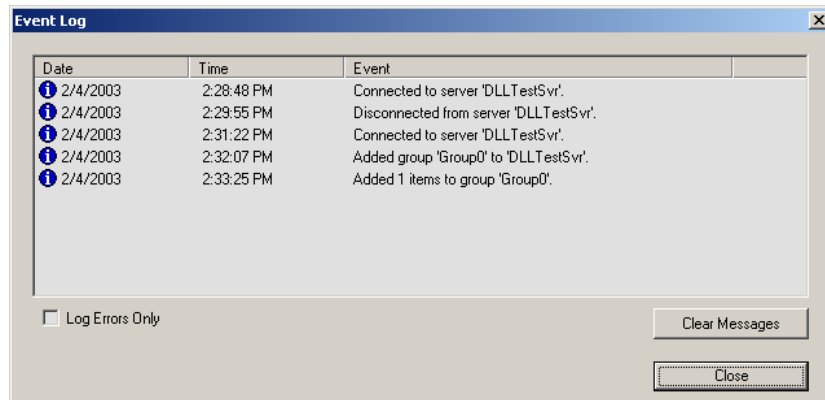
## Logging issues

There are several ways to view the event log:

- One way is through the dialog boxes for the OPC Read and OPC Write blocks
- Another way is using the OPC Log block

### Viewing logs with OPC Read and OPC Write blocks

To view the event log, click on the Show Log button in the Properties dialog box for the OPC Read or OPC Write block. The following dialog box appears:



Because each data exchange causes one or two events to appear in the log file, the log will quickly fill. To significantly reduce the number of messages and memory use, activate the Log Errors Only box.

### Viewing logs with OPC Log block

You can also use the OPC Log block to collect and view events, errors, and messages. When you insert this block into a diagram, it appears as follows:

Date	Time	Event

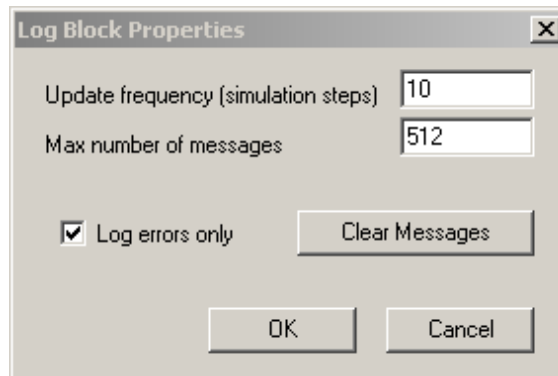
### To move the OPC Log block

- Place the cursor in the white area of the block and drag the mouse.

### To change the settings for the OPC Log block

- Right-click over the white area of the block.

The following dialog box appears:



**Update Frequency:** The value entered here should match the values used in the OPC Read and OPC Write blocks. The higher the number you enter in this box, the more system resources are used. Consequently, if you need system resources, use a lower frequency rate.

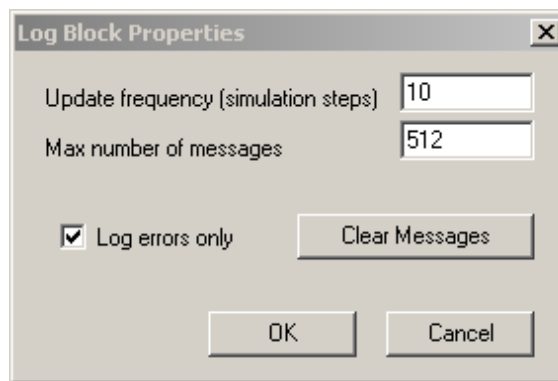
**Max Number of Messages:** Indicates the maximum number of messages recorded. When the limit has been reached, messages begin to disappear starting with the oldest message.

**Log Errors Only:** Because each data exchange causes one or two events to appear in the log file, the log will quickly fill. To significantly reduce the number of messages and memory use, activate the Log Errors Only option.

### To clear the OPC Log block of all messages

1. Right-click over the white area of the block.

The following dialog box appears:



2. Click **Clear Messages**.





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