

# INGEAR AB OPC Server Quick Start with ControlLogix PLCs

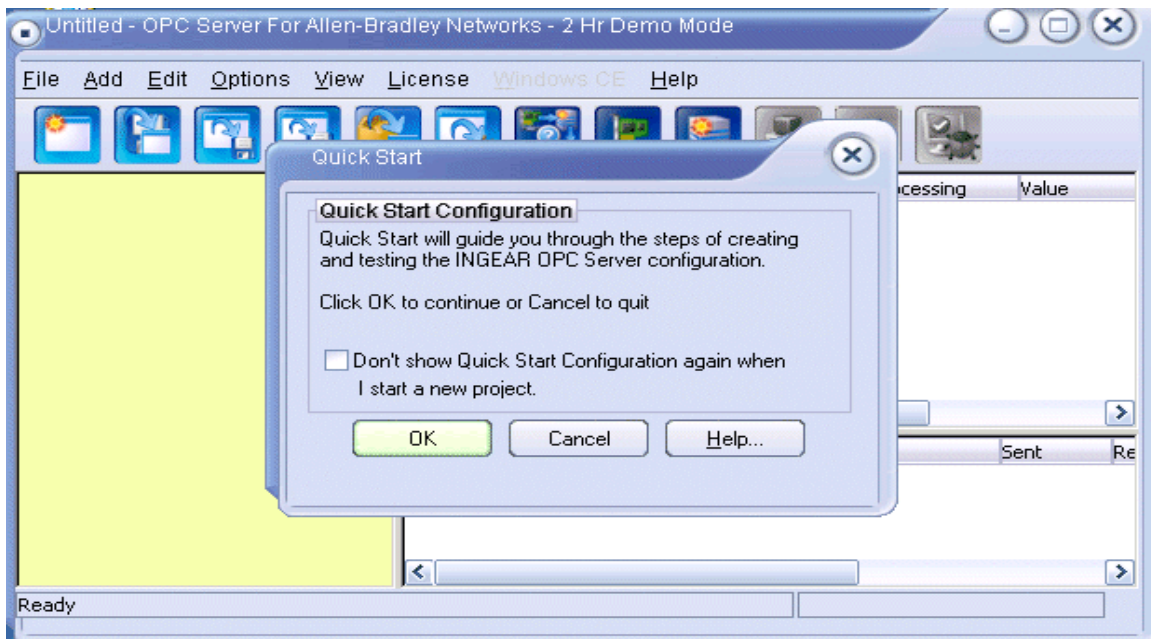
The purpose of this paper is to demonstrate how to connect the ControlLogix using the INGEAR AB OPC Server. Additional information can be found in the Server Help file.

## 1) Configuring the INGEAR OPC Server

Open the OPC Server from the Windows Start menu as shown below.



When the INGEAR AB OPC Server opens you will see the Quick Start dialog below. Details on configuring the other INGEAR OPC Servers can be found in their respective help files. Tags don't have to be entered into the OPC Server as done in this example. Dynamic tags can be added from within the OPC client as long as a Driver, (under Edit→Comm Settings on the INGEAR AB OPC Server Menu) and Device are configured first in the INGEAR OPC Server. The use of dynamic tags is covered at the end of this document.

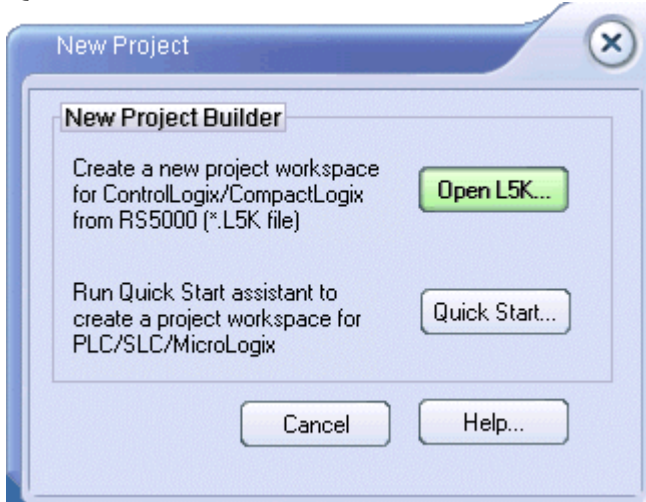


Click on the OK button on the Quick Start Configuration screen.

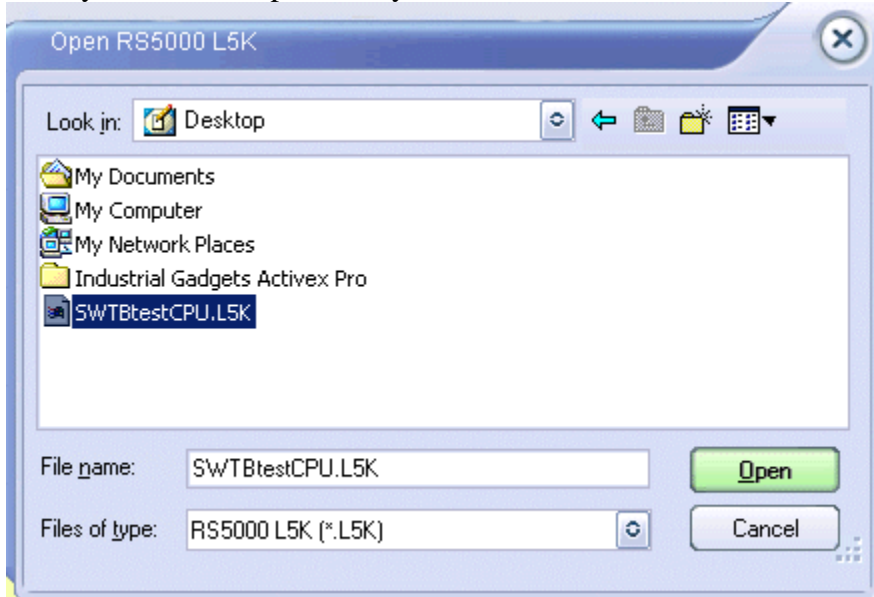
When configuring a ControlLogix you can import the tags from the AB RSLogix 5000 PLC programming software if you have saved this file as an .L5K file. The L5K file can be created in RSLogix 5000 by choosing File, Save As and choosing to save your project as a L5K

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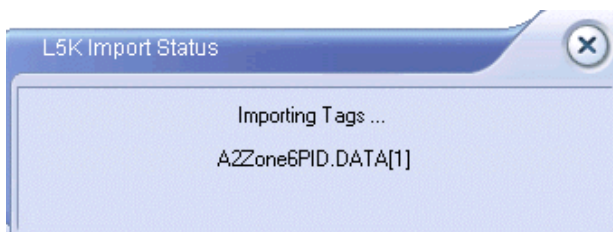
extension. If you are connecting to something other than a ControlLogix then click on the Quick Start button as shown below.



Once you click on Open L5K you can browse to the L5K file as seen below.



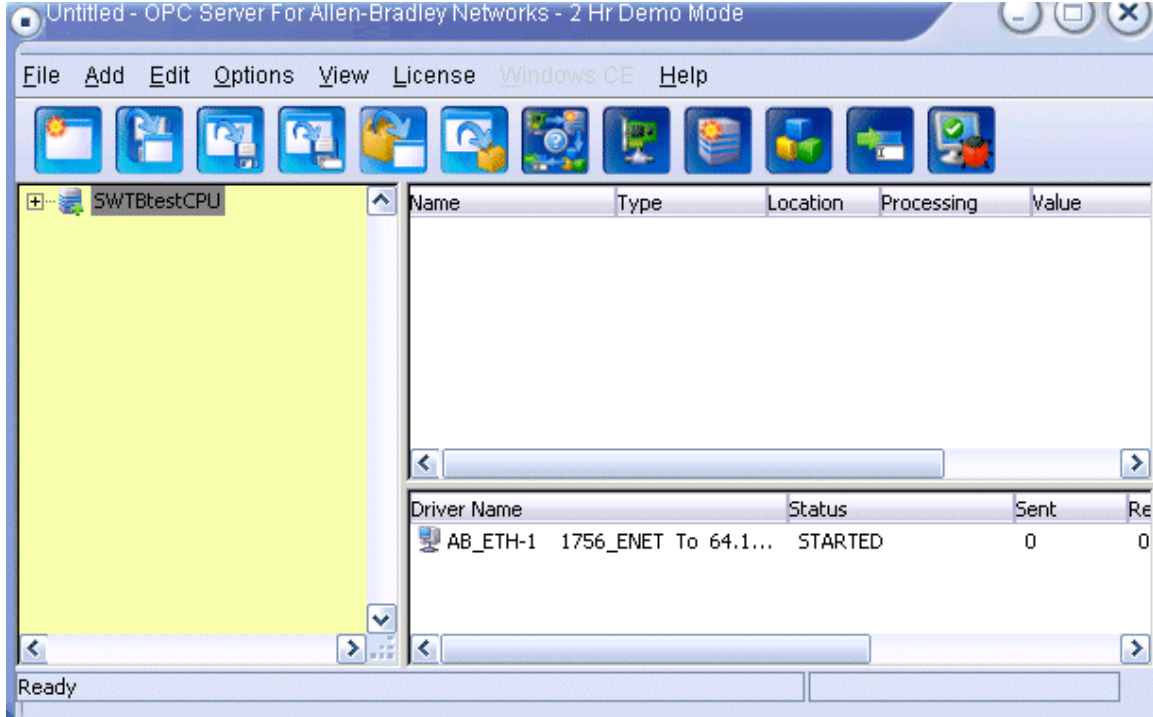
Click Open and the OPC Server will begin importing the tags. The L5K Import Status will pop-up as shown below while the tags are imported.



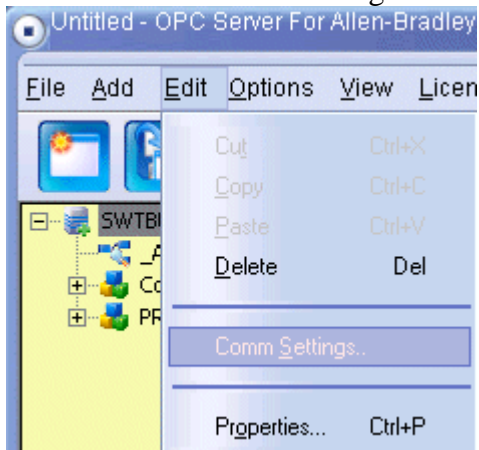
When the OPC Server is done importing the tags, the name of the device as pulled from the L5K file can be seen in the tree window to the left as seen below. In this case the device is called SWTBtestCPU. You can click on the “+” sign to expand the tree and see all the tags and

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groups imported from the L5K file. Tag groups and tags that won't be used can be deleted.



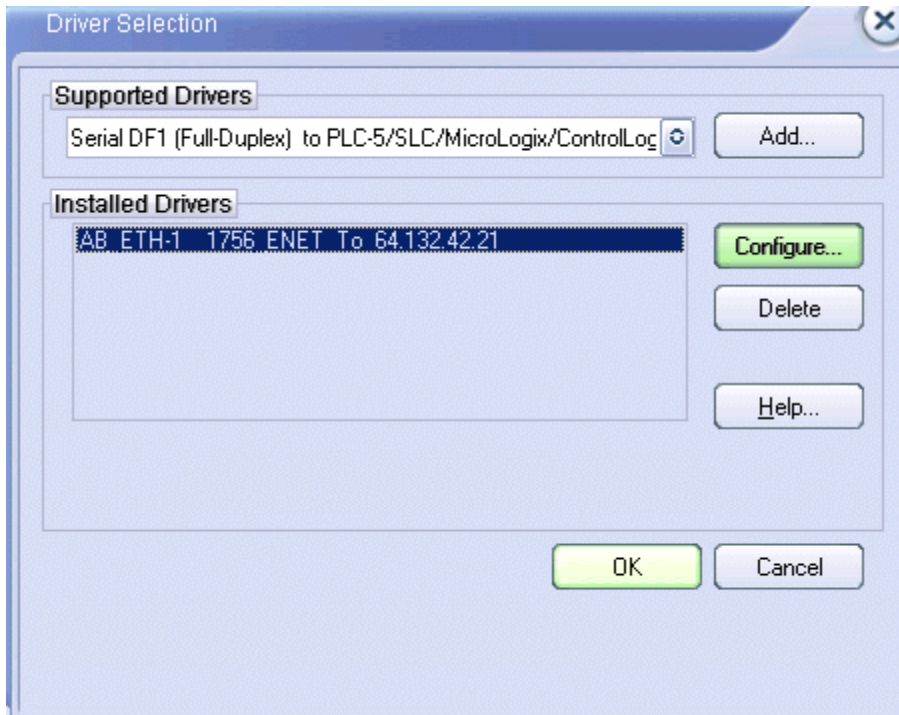
The first thing to do is to check to make sure the right IP address was imported. This is done by going to the Edit menu and choosing Comm Settings as shown below and making the changes in the Driver Selection dialog.



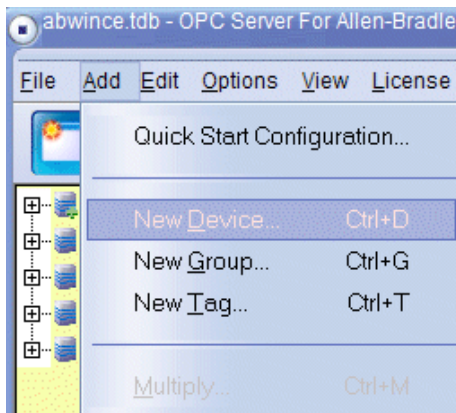
*When entering Dynamic tags only without the L5K import, selecting Edit → Comm Settings would be the first step to configure a Driver so that the OPC server knows how it will communicate to your PLC.*

The Driver Selection dialog will open showing the configured drivers. If your IP address is shown correctly simply click Cancel. If it's wrong or you are not sure click on Configure. You can change your IP address to the correct one and close the dialog.

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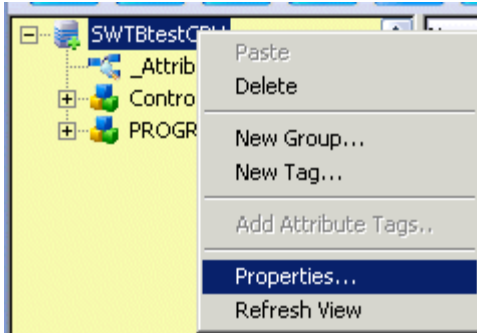


*When manually configuring the Driver because you are using Dynamic Tags or manually setting up the OPC server for some other reason, you will click on the drop-down under Supported Drivers, choose the driver for the type of connection you are using and click on the Add button. Once a Driver is installed you can go to Add and choose NewDevice to manually add a device as shown below or Click on the Quick Start Configuration to guide you through.*

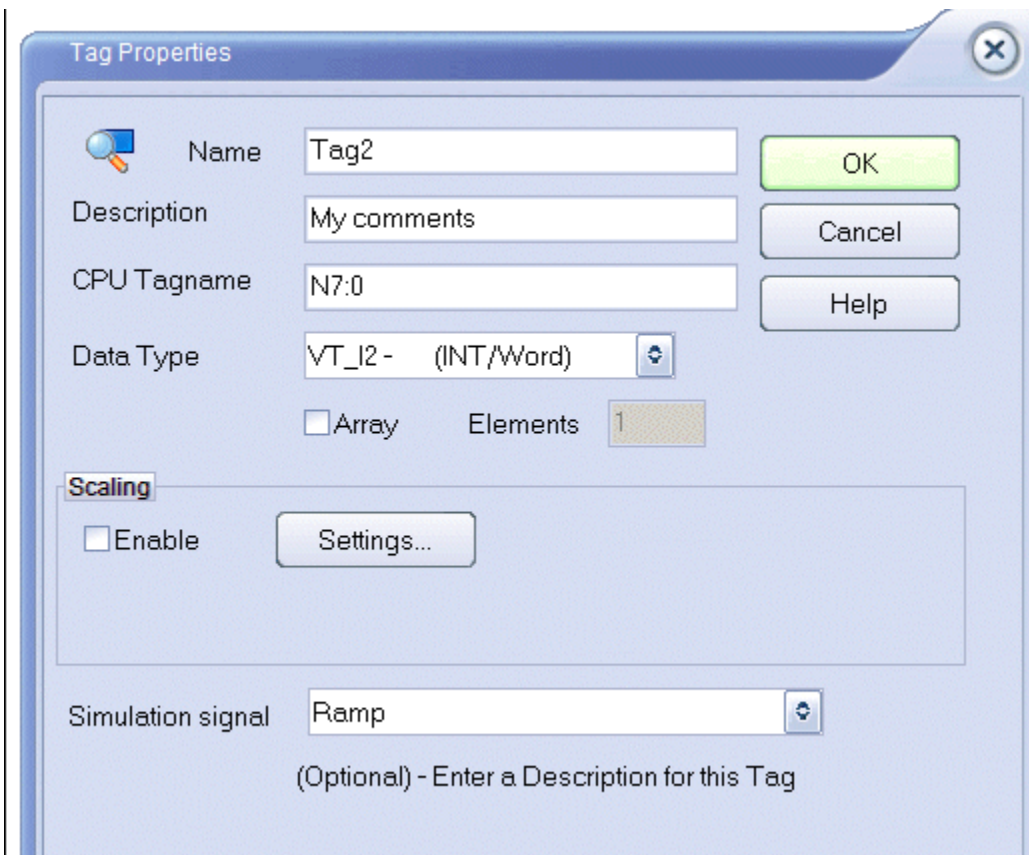


Next we will check the device configuration by right clicking on the device name as shown below (“SWTBtestCPU” in our case) and choosing Properties.

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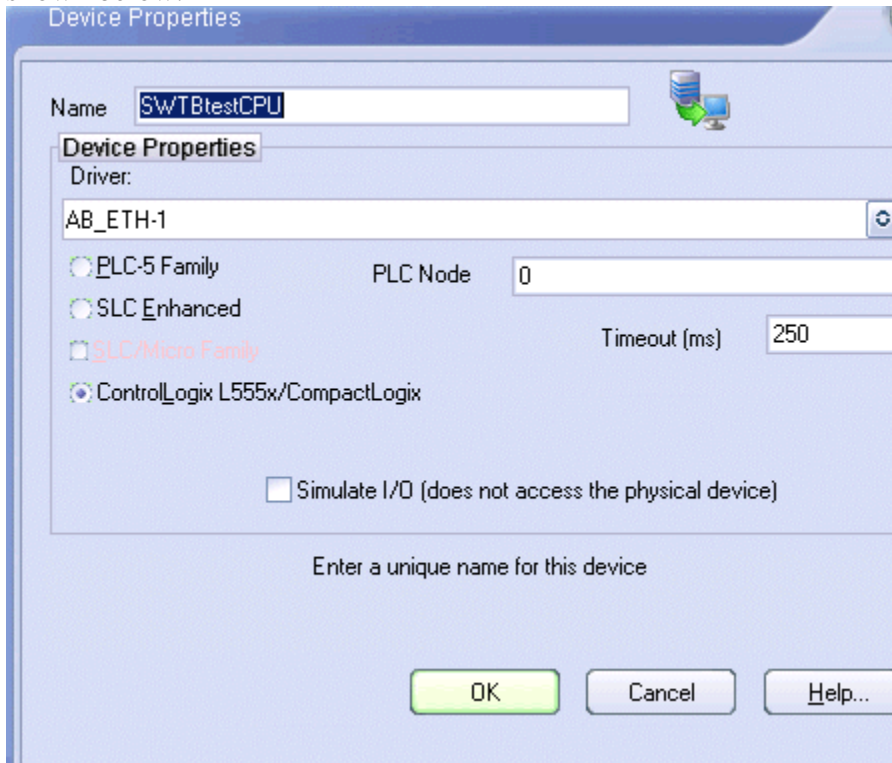
*When manually configuring the OPC Server or doing Dynamic tags we suggest that you add at least one tag to check communications. This would be done by choosing New Tag from this same menu above. The Tag Properties window will open as shown below. See the INGEAR OPC Server help file or click the Help button shown in the INGEAR OPC Server for details about these settings.*



The Device Properties window will open as shown below. Check to make sure the Driver that we configured above is selected. Verify that the PLC Node is the same as the Slot number that your ControlLogix CPU is located in. Check the INGEAR AB OPC Server help file if your

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ControlLogix is on a different rack from the Ethernet module you are using. In this case a route path will have to be entered and specifics on creating a route path for various types of configurations, including ControlLogix Gateway, are included in the INGEAR AB OPC Server help file. The help file is accessible from the Help button on the Device Properties dialog as shown below.



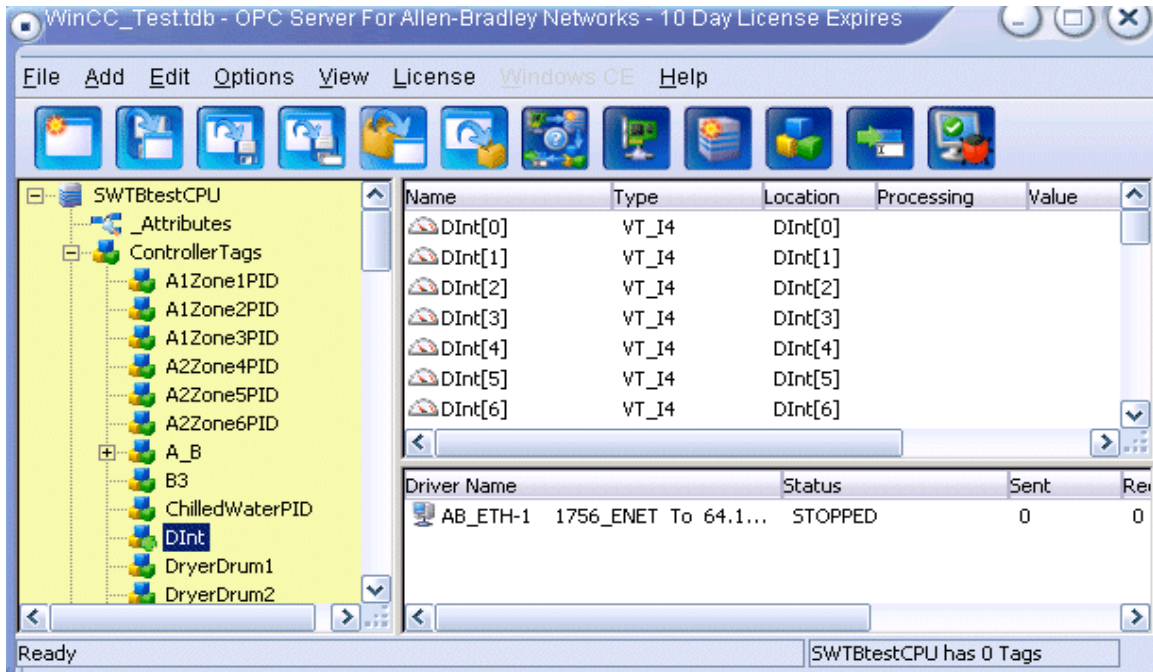
Once these items have been verified click OK.

*When Manually configuring or doing Dynamic tag this screen will need to be configured as discussed above. The Driver in the drop down will need to be selected (the available selections will depend on what you have configured for Installed Drivers under the Edit → Comm Settings options) as well as the PLC type by selecting the appropriate radio button. See the help file for more information about the PLC Node address or ControlLogix route address.*

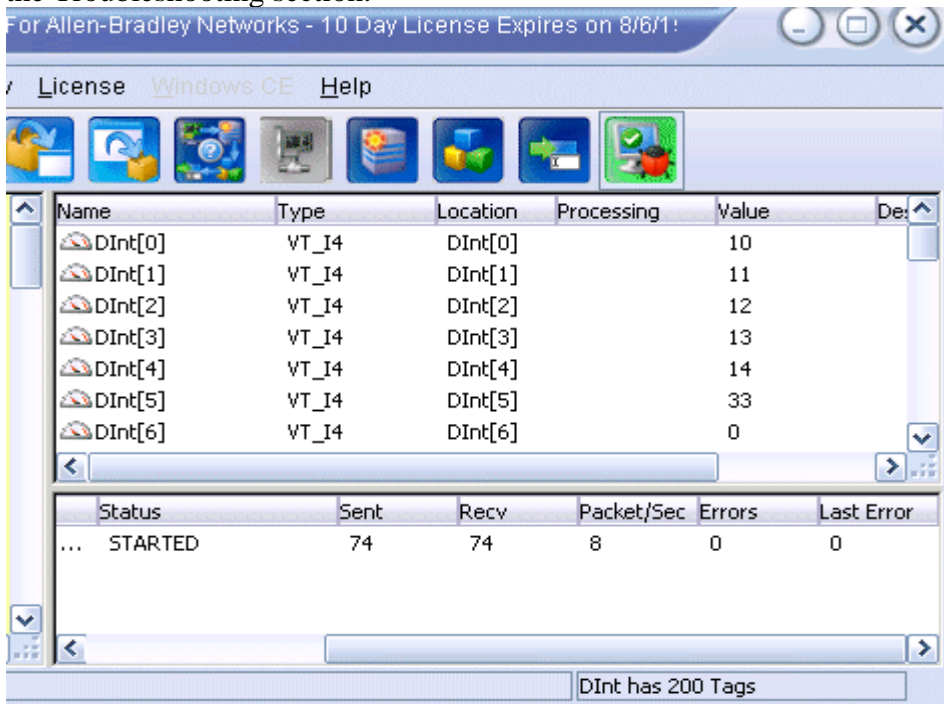
The final part of configuring the OPC Server is to test the Connection. This can be done now or at a later time when you are connected to the PLC. This next step can be done as long as at least one tag is configured in the OPC Server. As previously stated, we suggest having a single tag configured just for basic success/fail testing, even if all the other tags are added Dynamically from the HMI/SCADA system or other OPC client application.

Select a group under the device as shown below. In this case a group named “Dint” was selected. The tags configured under this group are shown in the right pane.

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Click on the Debug icon to the far right as shown below. This can also be done by clicking View|Monitor on the OPC Server menu. This starts the connection to the PLC. Under the Status heading in the Event pane on the bottom of the Server. If there are errors these will be shown here along with the Last error. The INGEAR OPC Server Help file lists the errors under the Troubleshooting section.

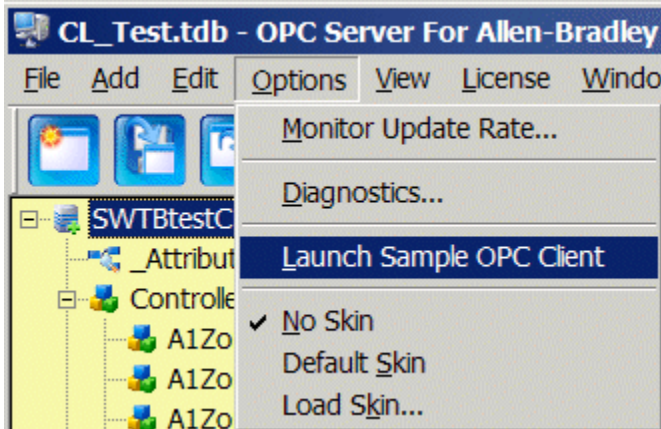


Once the connection to the PLC has been made the Value for the tags will show under the Value column as shown above. That's all there is to configuring the Server!

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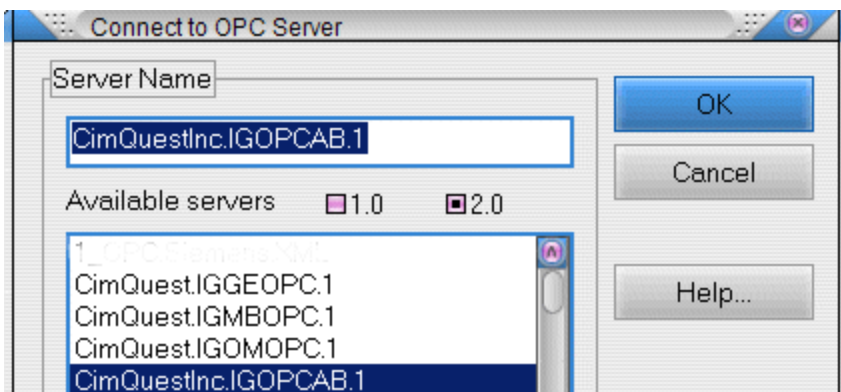
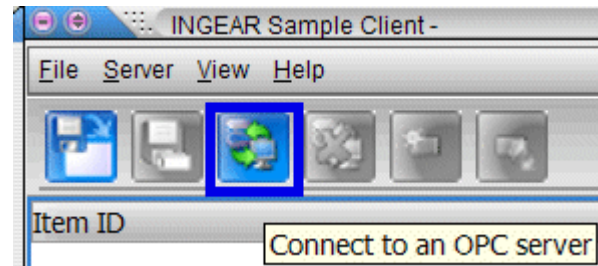
## Dynamic Tag Configuration:

If tags are not added into the OPC Server or you prefer not to browse for tags you can configure Dynamic tags in the OPC Client using PLC addresses. If using Dynamic Tags, a Driver must still first be configured under Edit→Comm Settings and a new device must be configured in the OPC Server at a minimum.



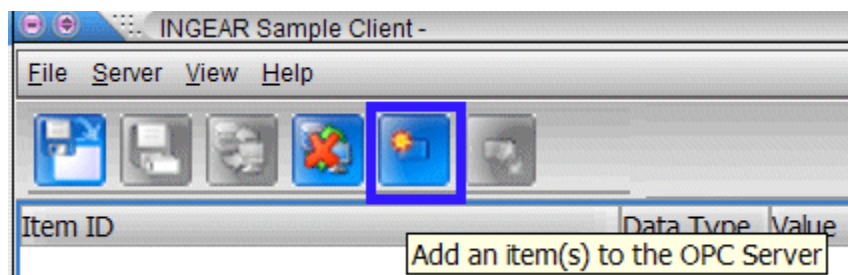
To demonstrate Dynamic Tag Configuration, we will start by launching the Sample OPC Client from the INGEAR AB OPC Server as shown to the right.

Once the INGEAR Sample Client opens, click on the Icon to connect to an OPC server as shown to the right.



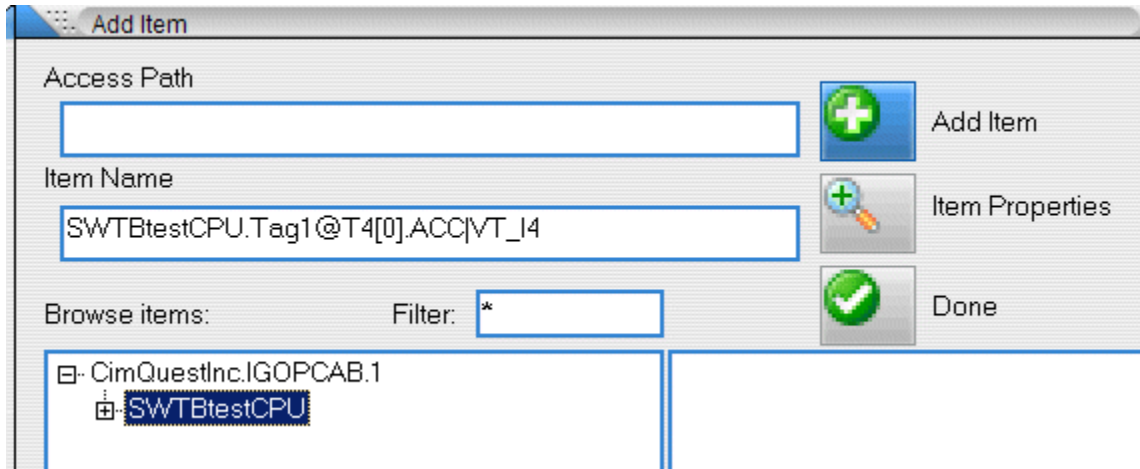
Choose the ProgID for the INGEAR AB OPC Server as shown to the left and click OK.

Click on the Add Item Icon as shown to the right.

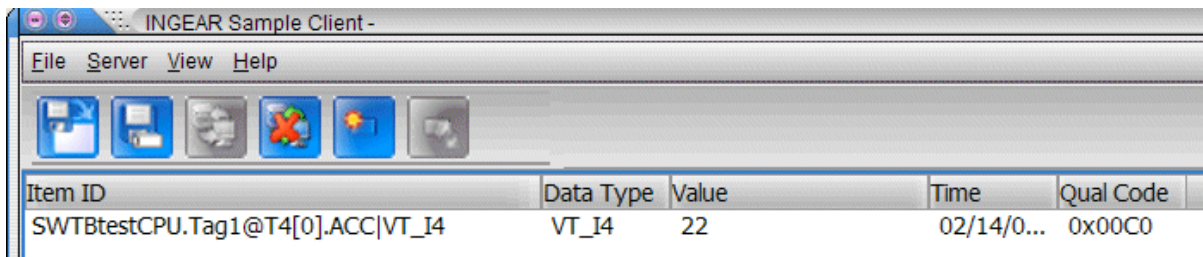


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The Add Item dialog below will now be open. To dynamically add a tag you need to enter the information in the Item Name field as shown below. The SWTBtestCPU is the name of the device created in the OPC Server. The name you created can be seen under the Browse items tree in the same way as SWTBtestCPU is shown here. The format and meaning of this Item Name will be explained below.



After you have entered the Item Name click on Add Item then Done to see the value as shown below.



This Item Name, **SWTBtestCPU.Tag1@T4[0].ACC|VT\_I4**, would be used to connect to a tag T[0].ACC in the PLC.

Meaning of the parts of the Dynamic Tag/Item Name Entered above:

**SWTBtestCPU** is the device name in the OPC Server

**Tag1** is a name given to the tag and can be any name your choosing.

**@** means what follows is the description of the tag above

**T[0].ACC** is the actual PLC address being read

**|VT\_I4** is the data type for this address (a full listing of these data types are in the INGEAR OPC Server help file)

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The matrix below will help you to match the data type suffix used in Dynamic Tags to the Common Name of data types.

OPC Native Type	OPC Client Data Type	Range
VT_BOOL	Boolean (bit value)	True / False
VT_BOOL   VT_ARRAY	Array of Booleans	
VT_I1	Signed Byte (8 bit value)	128 to 127
VT_I1   VT_ARRAY	Array of Signed Bytes	
VT_UI1	Unsigned Byte (8 bit value)	0-255
VT_UI1   VT_ARRAY	Array of Unsigned Bytes	
VT_I2	Signed Short (16 bit value)	-32786 to 32767
VT_I2   VT_ARRAY	Array of Signed Shorts	
VT_UI2	Unsigned Short (16 bit value)	0 – 65535
VT_UI2   VT_ARRAY	Array of Unsigned Shorts	
VT_I4	Signed Long (32 bit value)	-2147483648 to 2147483647
VT_I4   VT_ARRAY	Array of Signed Longs	
VT_UI4	Unsigned Long (32 bit value)	0 to 4294967295
VT_I4   VT_ARRAY	Array of Unsigned Longs	
VT_R4	Float (IEEE Single Precision Real)	1.40239846E-45 to 3.40282347E+38
VT_R4   VT_ARRAY	Array of Floats	
VT_BSTR	ASCII String	Length Option required

More detailed information on the syntax of Dynamic tags is show below.

### Dynamic Tags Fully Qualified Path Syntax

The client specifies the Dynamic Tag in its OPC Item Address field in the HMI/SCADA application or other OPC client.

**Syntax:** <device>.<subgroup>.<name>@<address>|DATA\_TYPE,<length>

- <device>.** This is the name of the Device to receive the dynamic tag. The device must exist in the OPC Server Project Workspace
- <subgroup>.** (optional) – A device subgroup may be specified as part of the dynamic tag. The device subgroup must exist in the OPC Server Project Workspace
- <name>** This is the name of the tag the client will dynamically create. If the name already exists in the OPC Server Workspace, the existing tag is used, otherwise a new tag is created.
- @<address>** This is the data source of the tag. If the Device is a ControlLogix, this is the atomic name of the tag. If the Device is a PLC / SLC / Micrologix, this is the data table file address
- |DATA\_TYPE** This is the data type of the tag. Valid types are VT\_I1, VT\_UI1, VT\_I2, VT\_UI2, VT\_I4, VT\_UI4, VT\_R4, VT\_BSTR
- ,<length>** (optional) – This is the length of the tag, and is used to specify the number of ASCII characters of the tag is a VT\_BSTR type or the number of elements if the tag is a VT\_ARRAY.