Industrial Control Links

ICL Application Note	No. 00043

Wonderware, Modbus TCP and ICL Controllers

Wonderware is one of the largest suppliers of industrial automation and information software solutions so there may be a good chance that your current or upcoming application will need to interface with their SCADA system. Large SCADA projects often have many nodes and one of the best ways to connect a system together is through the use of Ethernet.

Modbus TCP is a protocol that is often used by industrial devices to communicate over an Ethernet network. ICL controllers can be configured to communicate with Wonderware's DASMBTCP server. This document will walk you through the entire configuration - from DASMBTCP Server setup, to ICL network session settings, to InTouch window creation. For more in depth information on Wonderware's products, we suggest referring to their manuals. This write-up will only cover the basics necessary to get Wonderware connected up to an ICL controller.

Configuring the Wonderware DASMBTCP Server

You will need to start by installing the stand-alone DASMBTCP server for Schneider Automation devices. Version 1.1 of the software was used for this procedure. The information in this section can be found starting on page 18 of the Wonderware MBTCP DAServer User's Guide.

- Start by running the setup.exe file for the DASMBTCP server. This will run the installation program. Use of the default settings is recommended.

- Next you will need to launch the Wonderware DAServer Manager. To do this, locate the Wonderware folder in your start menu and select the System Management Console.

- We will need to configure the DASMBTCP server so start by expanding out the "DAServer Manager" tree, then the "Default Group" tree and then the "Local" tree. The ArchestrA.DASMBTCP.1 object should now be exposed.

- Make sure that the server is currently stopped. Do this by right clicking on the ArchestrA.DASMBTCP.1 object and selecting "Deactivate Server" from the menu. If the menu instead reads "Activate Server" the server is already stopped and you can proceed.

- If you expand the ArchestrA.DASMBTCP.1 object you will see a configuration branch. Right click on the Configuration object and select "Add TCPIP_PORT Object" from the menu. This

will create a new port object named "New_TCPIP_PORT_000." The default settings can be used.
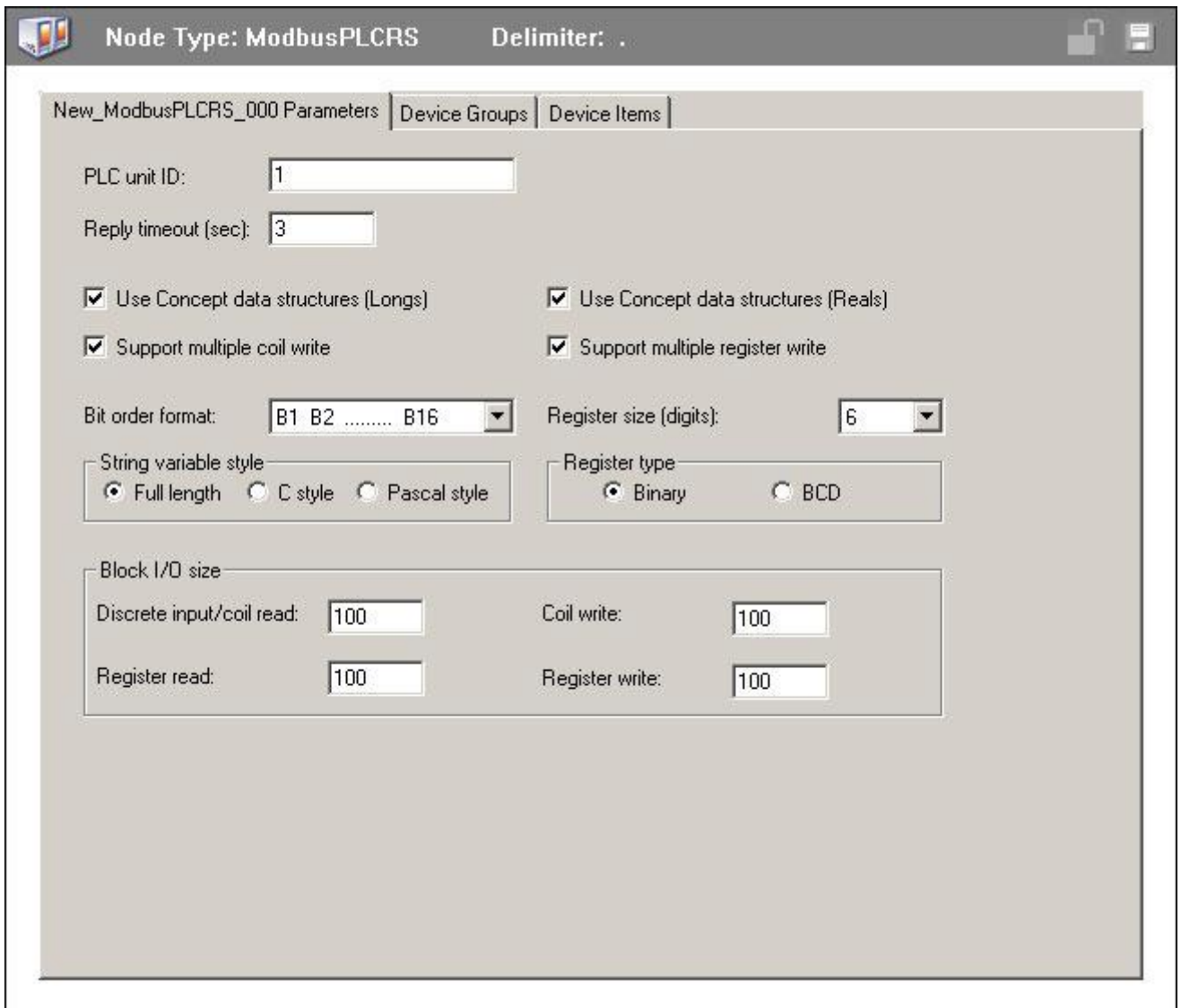
- Right click on the TCPIP_PORT object and select "Add ModbusBridge Object" from the menu. After adding the object, select it so that the properties are displayed in the right pane. The bridge type should be "NR&D Pen-T Bridge." The Network Address will need to be the static IP address that the controller will have. If you are unsure about what IP address your controller should have, or if it will be behind a firewall or other security device, we strongly recommend that you speak with your Network Administrator before continuing.

- Right click on your newly created ModbusBridge Object and select "Add ModbusPLCRS Object" from the menu. At this point the tree structure of the DASMBTCP server should look like the following image:
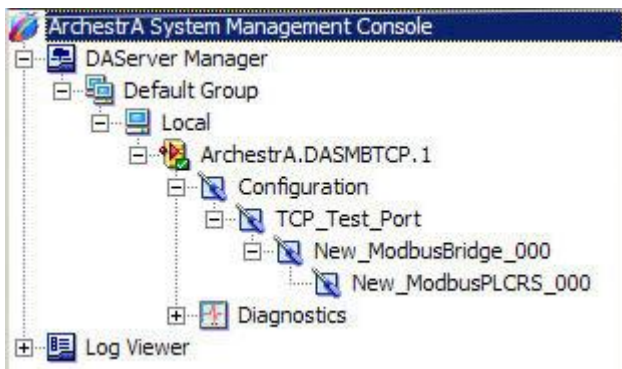

- You will now need to finish the configuration of the ModbusPLCRS object. Selecting the ModbusPLCRS object will display its properties in the right windowpane.

    There is only one change you may need to make to the "New_ModbusPLCRS_000 Parameters" tab. In addition to the IP address Modbus TCP uses device IDs to determine which device it is talking to. In Wonderware this is called the "PCL unit ID." I have left this as the default value of 1. This means that Wonderware is going to try to talk to Modbus device 1 at the given IP address. Valid entries range between 1 and 255. However ICL devices use 255 as a broadcast ID so we recommend not using that value.

- If you have used the default values, the "New_ModbusPLCRS_000 Parameters" tab should look similar to the following image:

- Now select the "Device Groups" tab. You will need to add one group to the list. I have used "ICL" for this example and assigned an update interval of 1000ms.

The server is now configured. Before using the server to read data off of your ICL controller you will need to save your settings and restart the server. To start the server right click on the ArchestrA.DASMBTCP.1 object and select "Activate Server."

ICL Controller Configuration

Since Wonderware uses Modbus TCP we will need to set up a corresponding slave session on the ICL controller and configure it for the register mode that Wonderware uses. This is a relatively short process.

- Ethernet will need to be enabled in your project. This is done in the "Ethernet/Serial IP" tab of the "Node Settings" window. The window can be accessed by simply double-clicking on your node in the left panel.
 - o Check the "Enable Ethernet" box.

- You will need a static IP for your device. This will be the same IP as you entered into the Network Address field in the DASMBTCP setup.
- In most cases the default Network Mask can be used.
- Press ok to accept these changes.
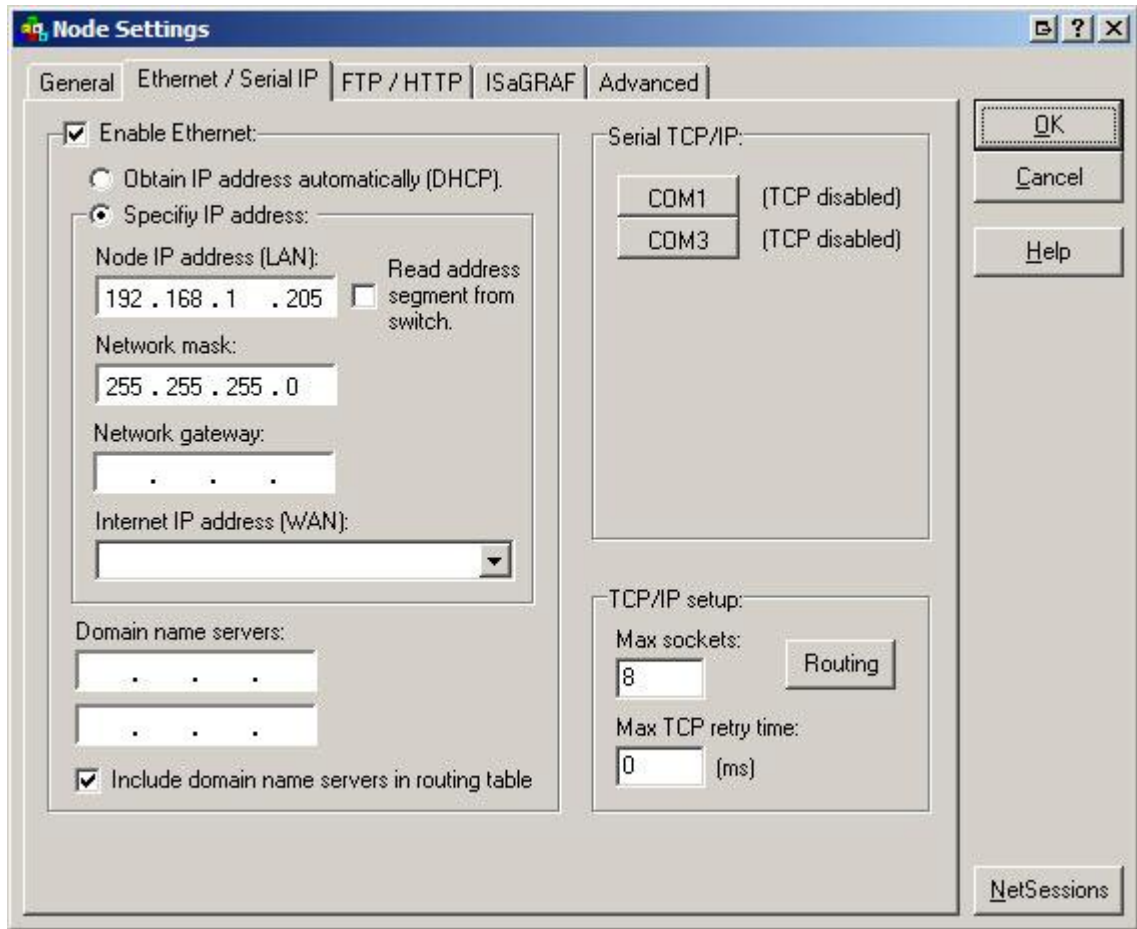
- Next you will need to create the network session responsible for communicating with Wonderware. Start by selecting "Setup" | "Network Sessions…" from the main menu.
  - If you do not have any existing sessions you will be prompted to provide a name for your new session. Enter in a descriptive name for your session.
  - If you already have existing sessions you will need to press the "New" button found on the right hand side of the Network Sessions window. You will then be prompted for the name of your new session.

- Under the "General" tab you will want to select "Modbus TCP/UDP slave" from the "Protocol" drop down menu.
- The "Network Address" is the Modbus address and should match the Modbus address entered in the "PCL unit ID" field on the "New_ModbusPLCRS_000 Parameters" tab in the DASMBTCP setup. Here we have configured the "Networks Address" to 1.
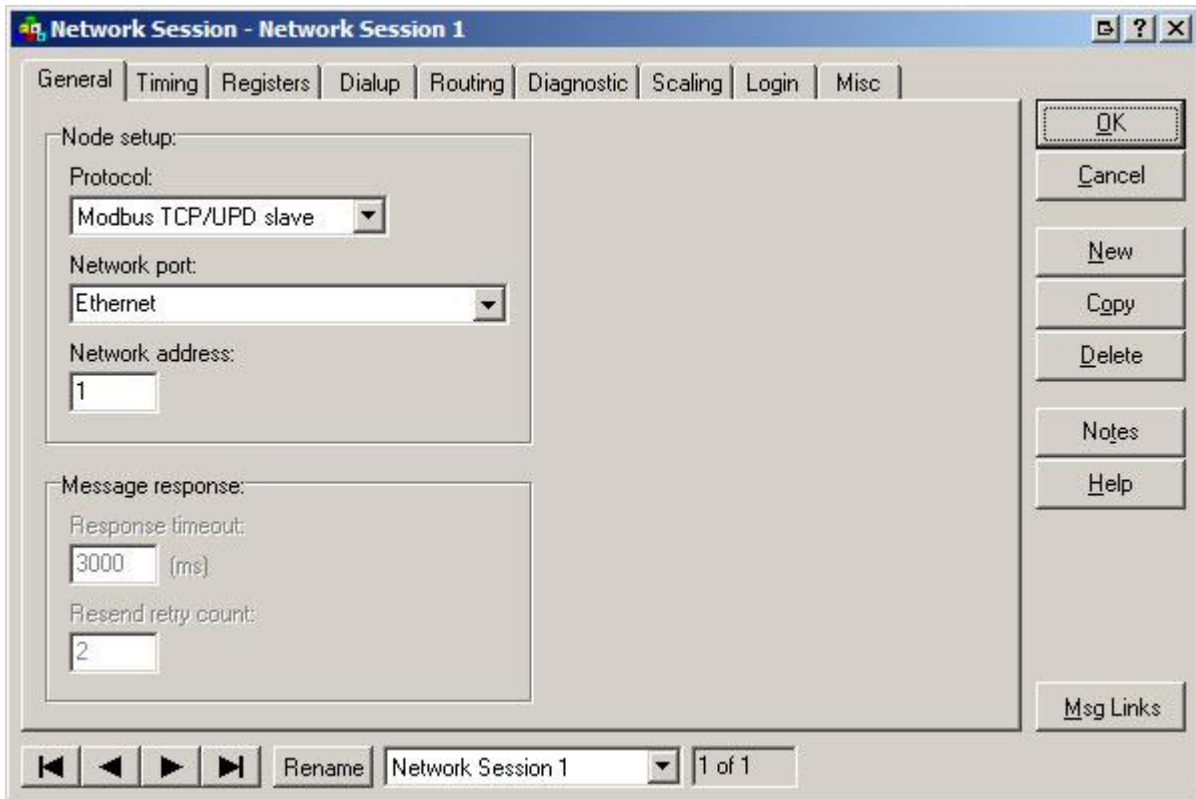
- Next we need to make a few adjustments to the "Registers" tab. Set the following Register modes:
    - "Register Mode" to "FIX"
    - "Integer Cast Type" to "Signed"
    - "Message Index" to "Calculated"
    - "Message Count" to "Standard"
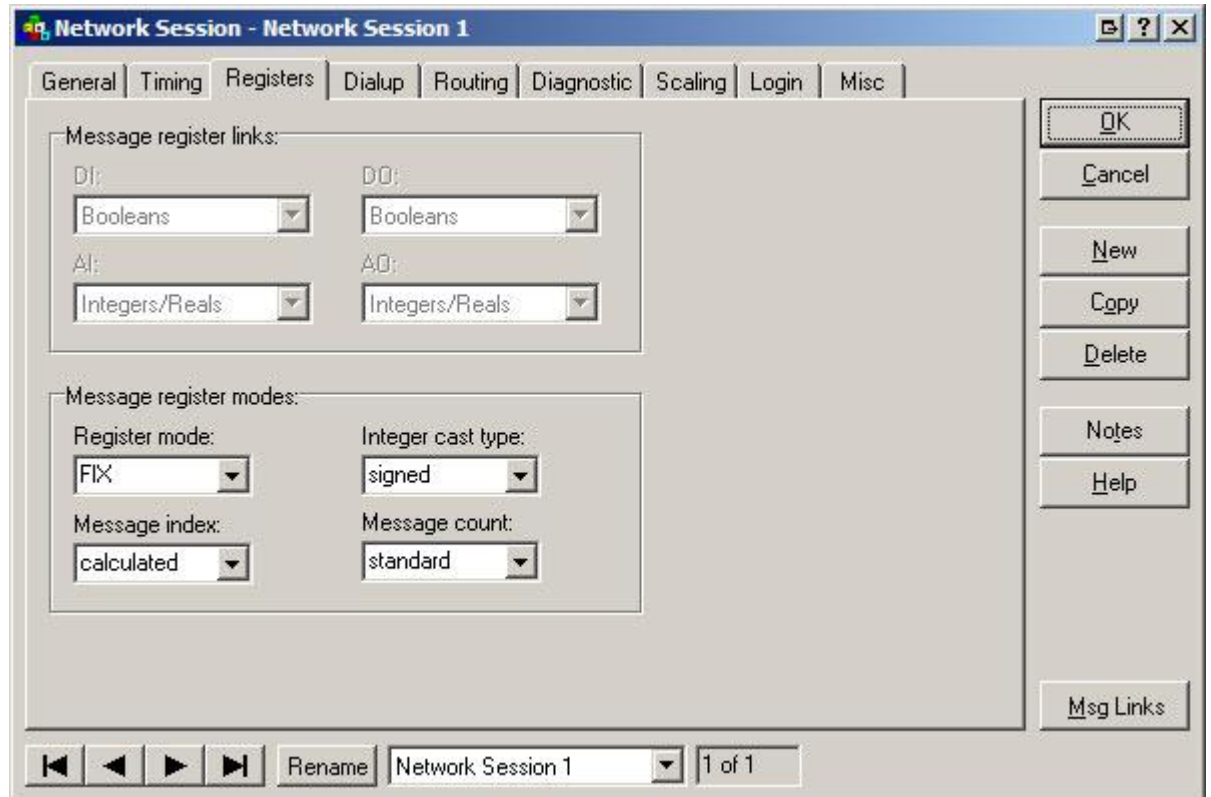
That is all you will need to set up on your ICL controller for use with Wonderware. You will need to download your application onto the controller. A complete controller setup is recommended if you did not have Ethernet enabled prior to this setup to ensure the right firmware is downloaded onto your controller.

Setting up your InTouch Screens

In the following section we will look at how to configure your InTouch screens for reading Booleans, Integers and Floating-point numbers.

- Start by launching InTouch and creating a new project with a new window.
- You will have to set up an Access Name for your ICL controller.
  - Expand the "Configure" tree and then double click on "Access Names."
  - Once the Access Names window has opened click the "Add" button.
  - Fill out the window to match the image below and press "OK" when you have finished.

- You will now need to set up your Tagname Dictionary. The more general rules are:
  - For all data types you will need to set the "Access Name" field to match the name you entered in the Access Names window.
  - Watch initial clamping values in InTouch as they are often much more restrictive than the actual values a register can contain.
  - Addressing is 5 digits except for Booleans
- More specific rules follow with images taken from a sample application.
  - For Booleans:
    - The "Type" needs to be set to "I/O Discrete."
    - Addressing is direct.
      - A Boolean with an index of 123 on the controller is indexed as "123" in the InTouch software.
  - For Integers:
    - The "Type" needs to be set to "I/O Integer."
    - Addressing is "4" plus a zero-padded index of $2 * N - 1$ plus the letter "L."
      - An Integer with an index of 123 on the controller is indexed as "400245 L" in the InTouch software.
  - For Floats/Reals:
    - The "Type" needs to be set to "I/O Real."
    - Addressing is "4" plus a zero-padded index of $2 * N - 1$ plus the letter "F."
      - A Float with an index of 123 on the controller is indexed as "400245 F" in the InTouch software.

- Next you will have to place your controls on the page. Make sure that the tag name matches those that you have programmed into the Tagname Dictionary and double check the clamping.

Putting it All Together

Before you actually do a test run you will want to make sure a few things are in place.

First, make sure that you DASMBTCP server is up and running. This is accomplished by once again launching the Wonderware DAServer Manager. You should see a green arrow and a green check box next to the ArchestrA.DASMBTCP.1 object. If this is not how yours looks, you may want to try deactivating the server and then activating it once again. When things are working properly, the tree should look similar to the image below. Note the green arrow and checkbox:
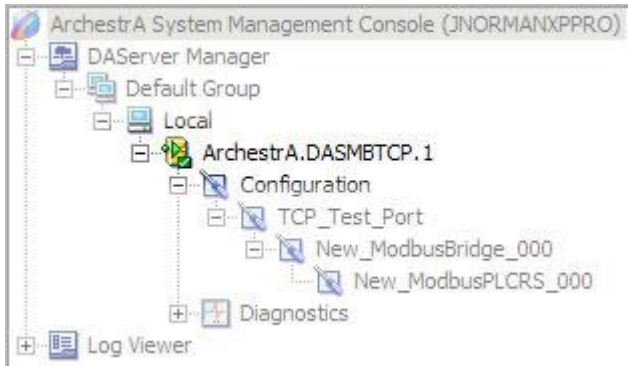
Once that is done, you need to make sure that your ScadaBuilder program has been downloaded onto your controller. (If this is a new controller, an old controller getting a new program, or if you just want to be safe, a "complete controller setup" is recommended.)

Summary

Launching your InTouch screen should now result in a fully functional and working interface with your controller. If you have the debugger running on your controller you should be able to see changes made to registers in your InTouch screen show up on the controller in real time.

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