

Setting up Pinnacle Ethernet IP communication with Allen Bradley PLCs

This document will describe how to configure an ICL Pinnacle controller to communicate with an Allen Bradley PLC using the Allen Bradley Ethernet IP communication protocol. The Allen Bradley configuration is done either in RSLogix 500 or RSLogix 5000 depending on the type of AB controller you are using.

The ScadaWorks Software Package

Configuring the Pinnacle controller is done in ScadaBuilder, which is a part of the ICL ScadaWorks package. This document was written on 11/4/2014, and the latest ScadaWorks release at that time was at 5.03b58. Earlier versions of ScadaBuilder may not work properly with the methods described in this document.

The latest version of ScadaWorks can be downloaded here:

<http://files.iclinks.com/software/scadaworks/release/InstallImage.zip>

The Pinnacle Technical Reference Manual can be downloaded here:

<http://files.iclinks.com/manuals/pinnacle/technicalreference/PinnacleSeriesTechnicalReferenceManual.pdf>

The ScadaWorks software requires a license to run. A demo license can be acquired that will allow the Pinnacle controller to run for 30 minutes at a time for testing and evaluation purposes.

Contact our sales department at smeyer@iclinks.com for more information.

Working with an Allen Bradley SLC-500 type controller (the examples below were tested with a MicroLogix 1400 and RSLogix 500)

Configuring the AB Controller as Slave

The AB controller has Ethernet IP slave capability by default and does not require any configuration as far as communication settings, other than the controllers IP address.

Register / variable types.

The AB and Pinnacle share 3 common types of registers, booleans, integers, and floating point (real) numbers. Allen Bradley controllers use “Data File numbers” for the different data types which default to:

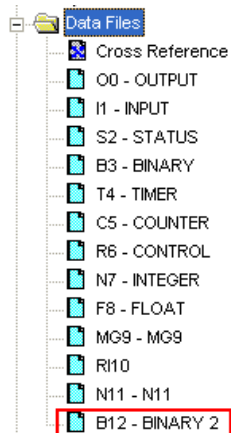
File 3 for booleans (B3)

File 7 for integers (N7)

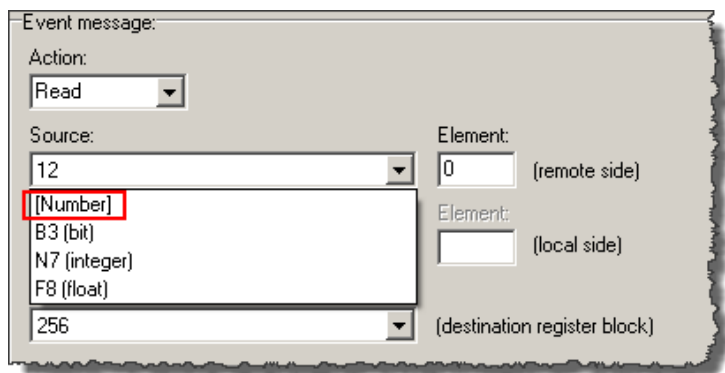
File 8 for real numbers (F8).

When configuring a Pinnacle read or write event, ScadaBuilder lets you pick these types by the default B3, N7, or F8, or you can enter a different file number for other data files. Note that only Boolean, Integer, and Float/Real data types can be accessed from the AB controller by the Pinnacle controller.

For example, this illustration shows an AB controller configuration in RSLogix 500 that has a second data file for Booleans, called B12.



To access that data file, the number in the ScadaBuilder read or write event would be set to 12 by first selecting “Number” and then entering 12.



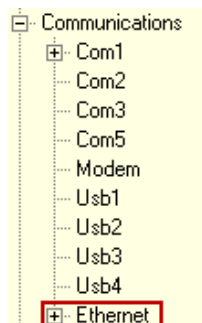
Note that the B3 file data could also be accessed by simply selecting “B3 (bit)” from the drop down list.

Configuring the Pinnacle Controller as Master

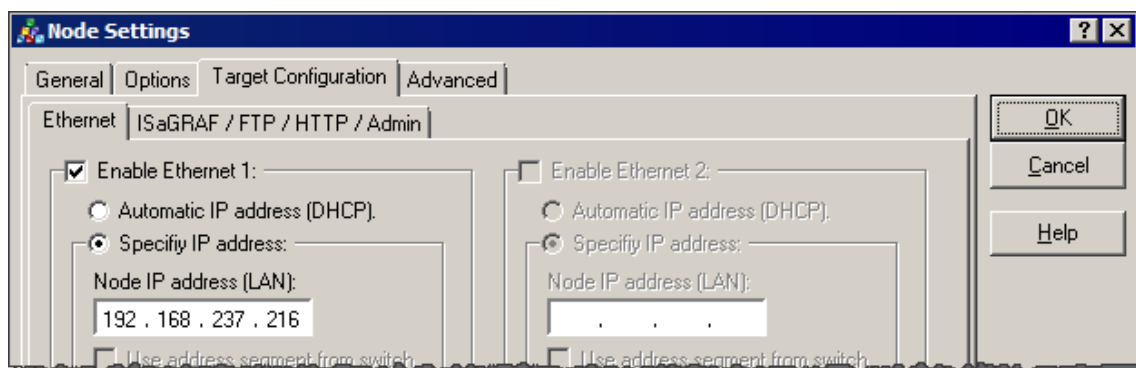
The Network Session

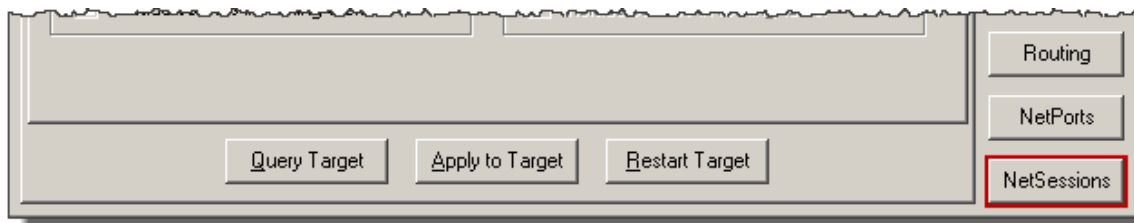
Configure a new network session as an “Ethernet/IP PCCC Master”. A network session in ScadaBuilder represents the communications protocol and port being used to communicate with one or more remote destination controllers.

Under “Communications”, double click on “Ethernet” to bring up the node settings dialog.

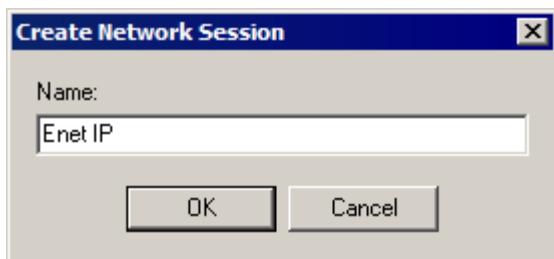


Next, click the “Net Sessions” button in the lower right corner of the node settings.

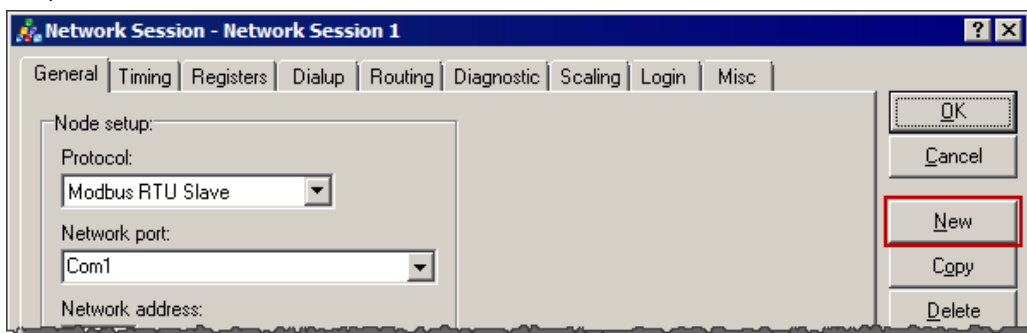




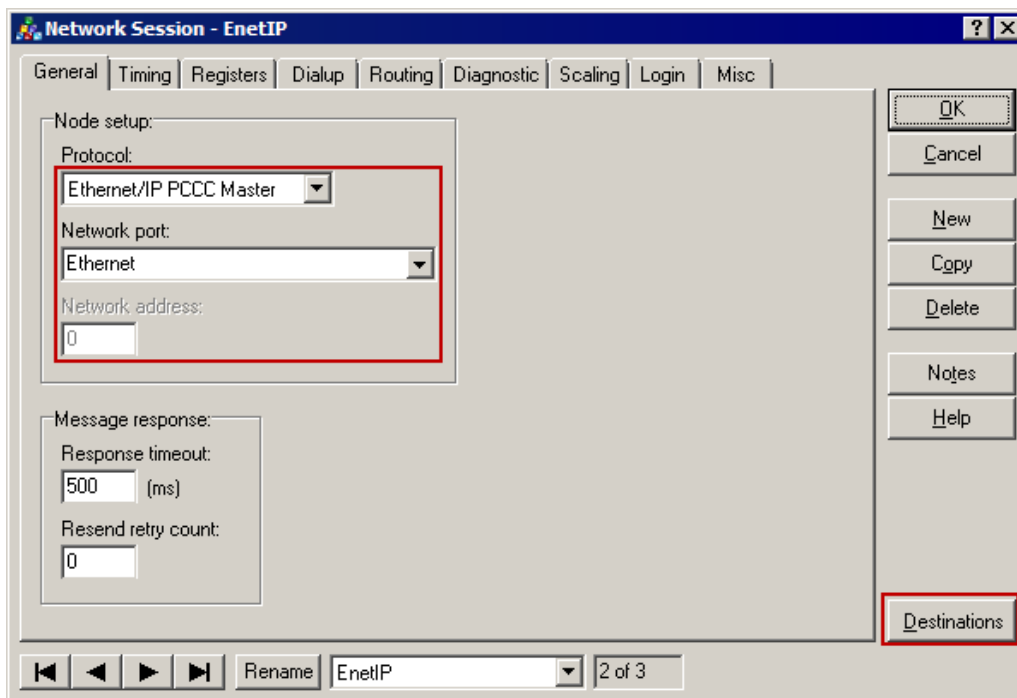
If there are no existing network sessions, the “Create Network Session” dialog will come up. Enter a name for the session such as “Enet IP” and click “OK”.



If there are existing network sessions, then the network session dialog will come up. In that case, click the “New” button first, then enter the name and click “OK”.



In the network session window, set the Protocol to “Ethernet/IP PCCC Master”, the port to Ethernet, and then click the “Destinations” button:

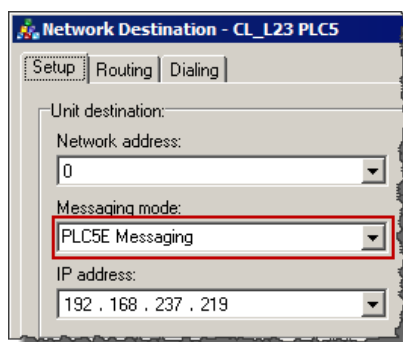
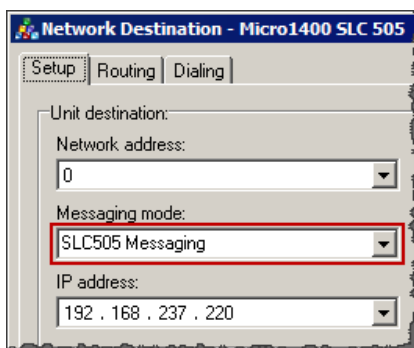


Important:

The “Messaging mode” should be set to “SLC505 Messaging” or “PLC5E Messaging” depending on the type of controller.

SLC500 type (RSLogix 500)

CompactLogix or ControlLogix (RSLogix 5000)

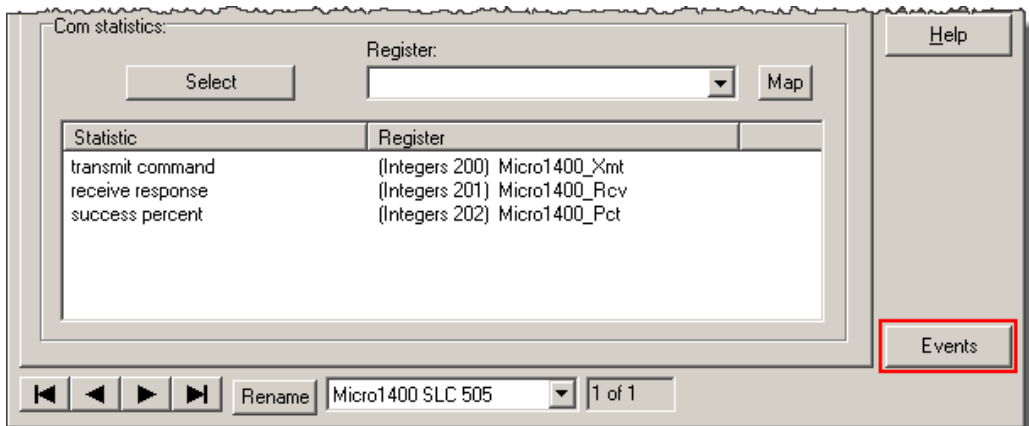


The destination network address should be set to zero. The IP address is for the AB controller. The other mappings at the bottom are optional, but can be used for diagnostics, comm. fail indication, and turning polling on and off for this destination.

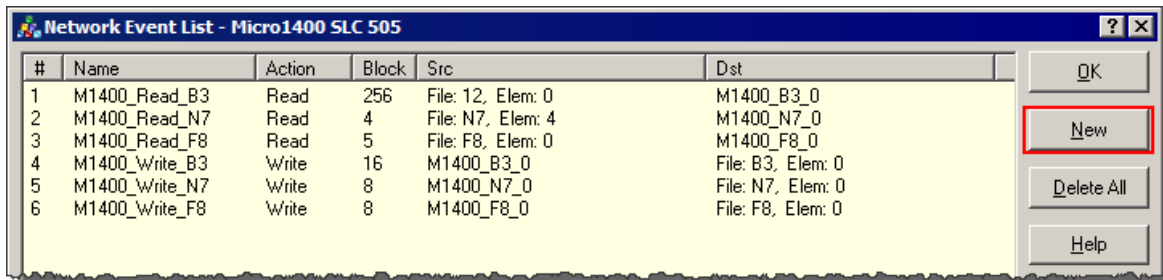
If you closed the network destination configuration window in ScadaBuilder, then re-open it. You can open any of the configuration windows at anytime by double clicking the name:



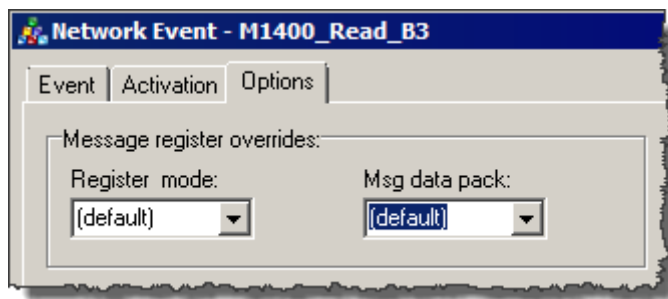
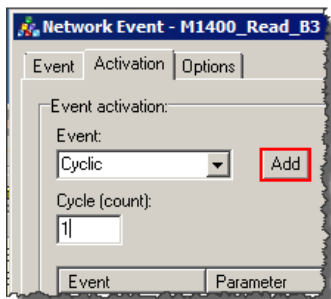
Click the "Events" button at the lower right corner of the destination configuration window to open the event window.



Then click "New" to create a new event.



Go to the Activation tab first and configure the type of activation you want to use. The most common method is "Cyclic" with a Cycle value of 1 which will cause the controller to poll for data at the fastest rate possible. You can also choose to poll by time (Timer) in seconds or use one of the many other types of triggers the ScadaBuilder provides. Click the "Add" button to add the selected configuration. Also, the "Message data pack" under the read or write events "options" tab should be set to "default" for reading Booleans.



Reading and Writing Boolean Data

When reading or writing Boolean data, the Pinnacle can read from, or write to, any number of data points in the AB controller from 1-256 (via the block size setting), but (for Boolean data only) the starting element for the read event has to be zero:

Event name:
Event name (optional):
M1400_Read_B3

Event message:
Action:
Read

Source: B3 (bit) Element: 0 (remote side)

Destination: M1400_B3_0 (110) Element: (local side)

Block size (or select last register of block): 16 (destination register block)

Then set the block size so that the bits you want to read are included. For example, if you want to read bit #8 (B3:0/8), then set the element to 0 and the block size to 8. You will get other bits that you don't need, but you will also get bit #8.

In RSLogix:

| Offset | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|--------|----|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|
| B3:0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| B3:1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| B3:2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

In ScadaBuilder Read or Write Event:

Event message:
Action:
Read

Source: B3 (bit) Element: 0 (remote side)

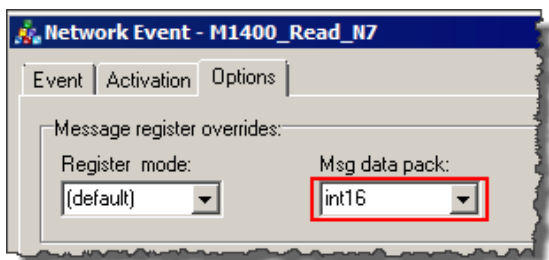
Destination: M1400_B3_0 (1000) Element: (local side)

Block size (or select last register of block): 9 (destination register block)

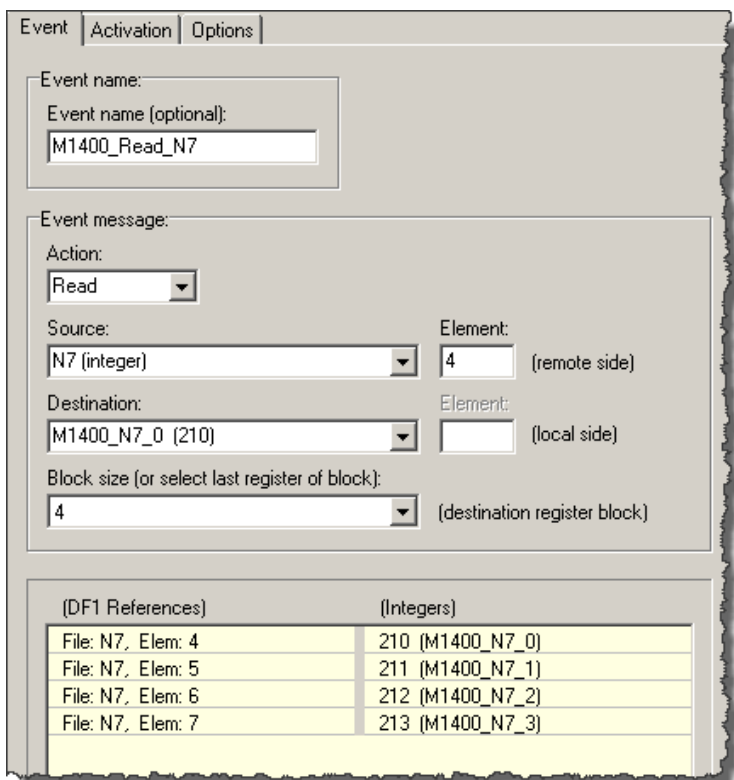
| (DF1 References) | (Booleans) |
|-------------------|-------------------|
| File: B3, Elem: 0 | 1000 (M1400_B3_0) |
| File: B3, Elem: 1 | 1001 (M1400_B3_1) |
| File: B3, Elem: 2 | 1002 (M1400_B3_2) |
| File: B3, Elem: 3 | 1003 (M1400_B3_3) |
| File: B3, Elem: 4 | 1004 (M1400_B3_4) |
| File: B3, Elem: 5 | 1005 (M1400_B3_5) |
| File: B3, Elem: 6 | 1006 (M1400_B3_6) |
| File: B3, Elem: 7 | 1007 (M1400_B3_7) |
| File: B3, Elem: 8 | 1008 (M1400_B3_8) |

Reading and Writing Integer Data

The “Message data pack” under the read events “options” tab should be set to “int16” for reading or writing integer data.

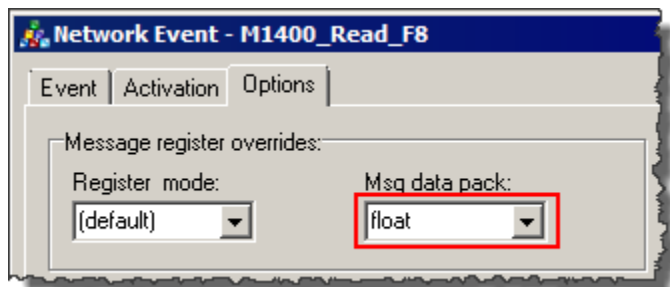


This example will read four N7 elements from the AB controller into four integer type registers, starting at the 4th element:

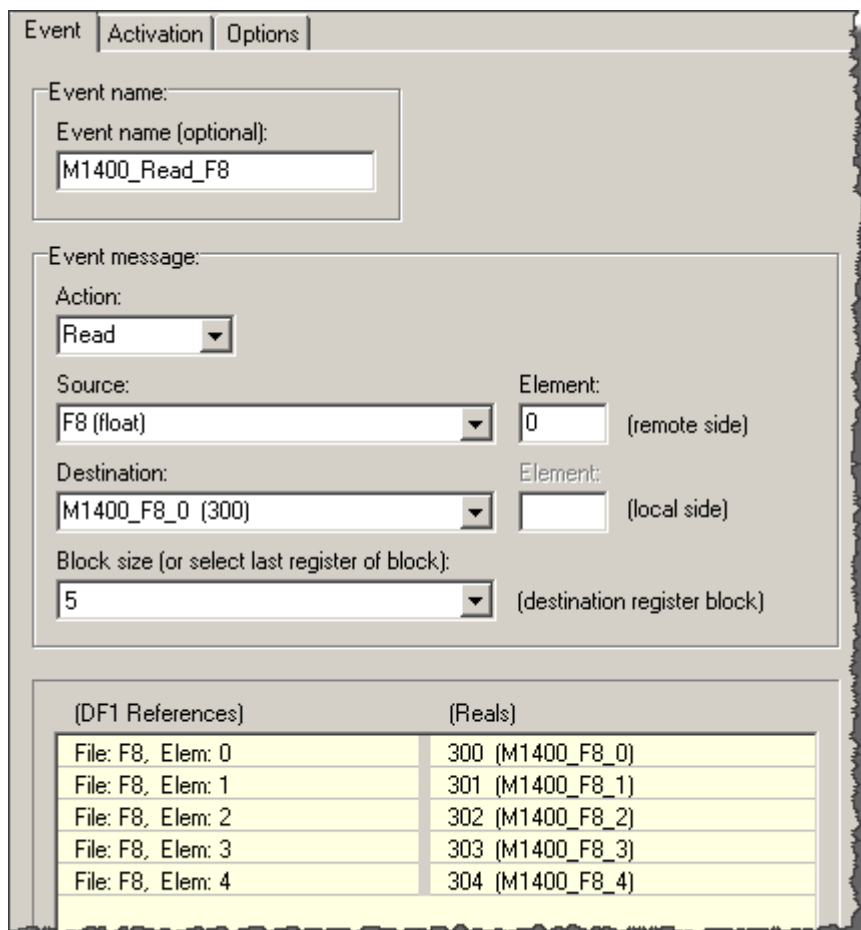


Reading and Writing Real / Floating Point Data

The “Message data pack” under the read events “options” tab should be set to “float” for reading real numbers.



This read event example will read five F8 elements from the AB controller into 5 real type registers in the Pinnacle, starting with the first element (F8:0):



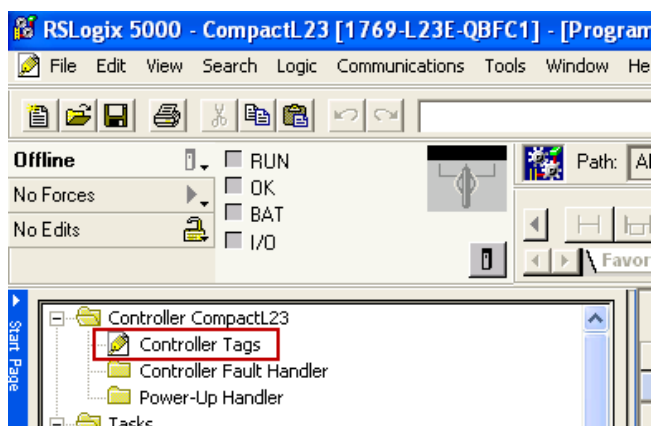
Working with Allen Bradley CompactLogix and ControlLogix type controllers (the examples below were tested with a CompactLogix L23E and RSLogix 5000)

Configuring the AB Controller as Slave

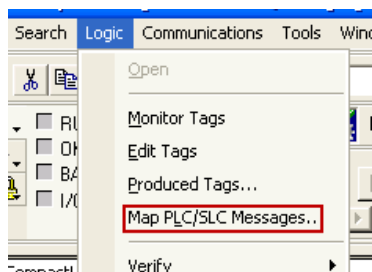
The AB controller has Ethernet IP slave capability by default and does not require any configuration as far as communication settings, other than the controllers IP address.

The Boolean, Integer, and Real / Float types are still used in these controllers but are implemented with data arrays. The arrays must be mapped to file numbers before a Pinnacle controller can access the data.

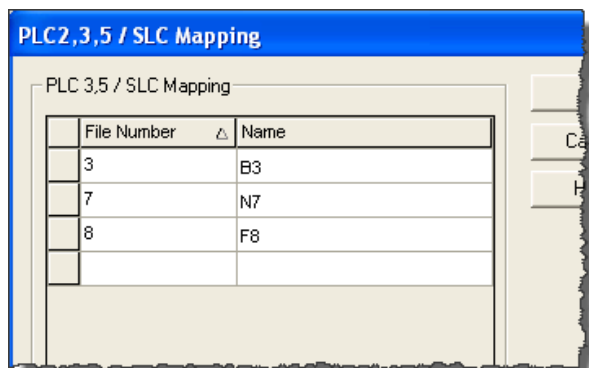
In RSLogix 5000, the data arrays that a Pinnacle can access are “Controller Tags”:



The arrays are mapped to file numbers via the “Logic - Map PLC/SLC Messages” menu.



From there, create the file number and select the array.



Note that the Boolean (B3) array is an integer type array which is necessary.

| | | | DATA [8] | Decimal |
|------|--|--|----------|---------|
| + B3 | | | INT[16] | Decimal |
| + N7 | | | INT[8] | Decimal |
| + F8 | | | REAL[8] | Float |

The 16 in the "INT(16)" for the B3 array indicates that there are 16 words, with 16 bits each, for a total of 256 bits. Only 1 word is required for the Pinnacle controller to poll up to 16 bits.