Communicating Between Janus Processors and Rockwell Processors using Ethernet/IP Tag Client

Janus Processors (JPLC) and Coprocessors (JACP) include many industrial protocols "built-in" to allow communication with other equipment on the plant floor. Among those is Ethernet/IP (EIP) which can be used to communicate with other EIP enabled devices, including Rockwell PLCs. Janus products feature the following capabilities on EIP.

- **Ethernet/IP Tag Client** – enables Janus products to read tags directly from Rockwell PLCs
- **Ethernet/IP Tag Server** – enables Rockwell PLCs to read tags directly from Janus products
- **Ethernet/IP I/O Scanner** – enables Janus products to communicate with EIP devices like drives and I/O blocks
- **Ethernet/IP Adapter** – enables Janus products to appear as an adapter to other EIP I/O Scanners
- **Ethernet/IP Flex I/O** Scanner – enables Janus product to communicate with Flex I/O devices using EIP

In this Tech Tip we will show how to set up communications using Ethernet/IP Tag Client to a Rockwell Compact Logix PLC.

1.1 Overview

This Tech Tip assumes you are familiar with programming using CTI Workbench and Rockwell Studio 5000, so we do not detail every step and menu click to construct the configuration. Instead, we show the finished configuration screens with comments.

Here are the steps involved:

In CTI Workbench:
- Create a new project and set up IP address and other parameters in Project Settings
- Use the Fieldbus Configurator to Add the Ethernet/IP Tag Client
- Use "Insert Master/Port" in the Fieldbus configuration to add a connection to the Rockwell PLC. Configure the IP address and description.
- Use "Insert Slave/Data Block in the Fieldbus configuration to add the tags you want to READ and WRITE from the Rockwell PLC

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In Rockwell Studio 5000:

- Create a new project and set up the Controller Properties – description, IP address, Ethernet port setup. The IP address must match the one entered for the Rockwell PLC in the Workbench Fieldbus configuration.
- Create tags which match the names used in the Workbench

1.2   Workbench Setup

First create a new project (if you don't have one already) and set up the IP address in Project Settings.

Next, go to the Fieldbus configuration and add-in the "Ethernet/IP Tag Client" Protocol. Once added, it will show up in the Fieldbus configuration pane. Enter your IP address – this is the same one you entered from Project Settings.
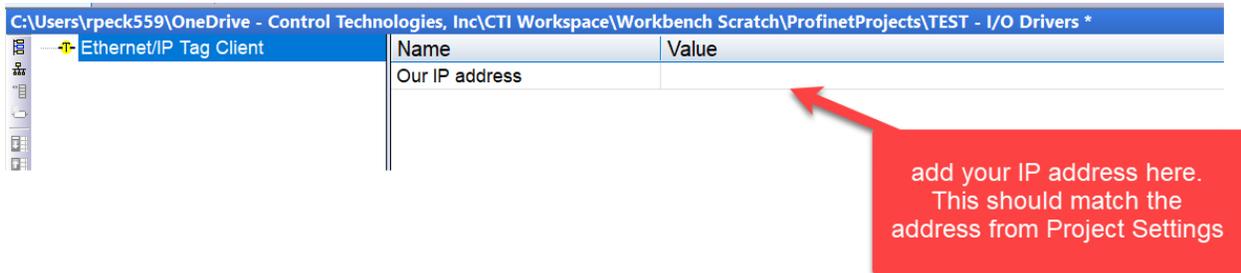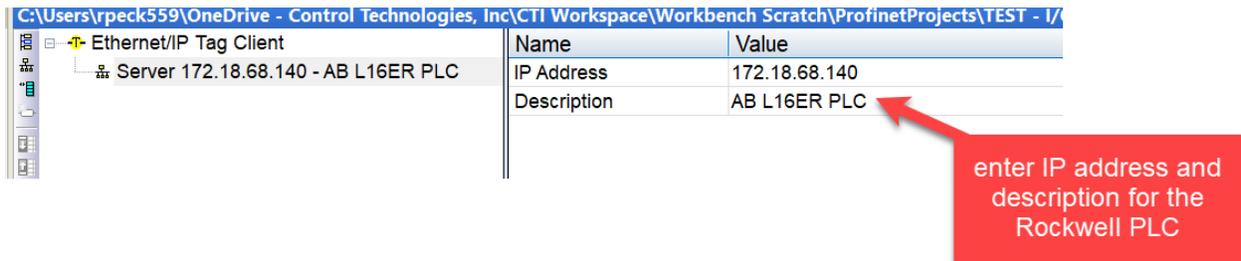

add your IP address here. This should match the address from Project Settings

Next, use the "Insert Master/Port" icon to add a connection to the Rockwell PLC. Enter the IP address and description for the Rockwell PLC.

enter IP address and description for the Rockwell PLC

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Use the "Insert Slave/Data Block" icon to insert a WRITE command as shown below:

Click OK and the WRITE command is added.

Now we need to create and map variables. Create the following global variables in Workbench:

Data Variables
V1001 through V1013   INT
V2001 through V2013   INT

Status Variables
Cmd1_ServerOK   INT
Cmd1_UCMM_Busy   INT
Cmd1_Transactions   INT
Cmd1_GeneralStatus   INT
Cmd1_ExtendedStatus   INT
Cmd2_ServerOK   INT
Cmd2_UCMM_Busy   INT
Cmd2_Transactions   INT
Cmd2_GeneralStatus   INT
Cmd2_ExtendedStatus   INT

Now map the variables V1001 – V1013 plus the four "Cmd1" status variables into the WRITE command by dragging. You can use the "Renumber Offsets" command to do the offset numbering or do it manually. When complete, your configuration should look like this:

Name	Value
Tag name	V1000
PLC Slot	0
Mode	Write
Nb. Elements	13
Offset	0
Tag data type	INT
Period (ms)	1000
Timeout (ms)	3000

Ethernet/IP Tag Client
- Server 172.18.68.140 - AB L16ER PLC
  - V1000 (Write)
    - 0: V1001 | V1000 (Write)
    - 2: V1002
    - 4: V1003
    - 6: V1004
    - 8: V1005
    - 10: V1006
    - 12: V1007
    - 14: V1008
    - 16: V1009
    - 18: V1010
    - 20: V1011
    - 22: V1012
    - 24: V1013
    - 0: Cmd1_ServerOK
    - 0: Cmd1_UCMM_Busy
    - 0: Cmd1_Transactions
    - 0: Cmd2_GeneralStatus
    - 0: Cmd2_ExtendedStatus

Symbol	Offset	Bit	Format	Mode	
V1001	0	0	16 bit - signed	Data exchange	
V1002	2	0	16 bit - signed	Data exchange	
V1003	4	0	16 bit - signed	Data exchange	
V1004	6	0	16 bit - signed	Data exchange	
V1005	8	0	16 bit - signed	Data exchange	
V1006	10	0	16 bit - signed	Data exchange	
V1007	12	0	16 bit - signed	Data exchange	
V1008	14	0	16 bit - signed	Data exchange	
V1009	16	0	16 bit - signed	Data exchange	
V1010	18	0	16 bit - signed	Data exchange	
V1011	20	0	16 bit - signed	Data exchange	
V1012	22	0	16 bit - signed	Data exchange	
V1013	24	0	16 bit - signed	Data exchange	
Cmd1_ServerOK	0	0	4294967295	Data exchange	
Cmd1_UCMM_Busy	0	0	4294967295	Data exchange	
Cmd1_Transactions	0	0	4294967295	Data exchange	
Cmd2_GeneralStatus	0	0	4294967295	Data exchange	
Cmd2_ExtendedStatus	0	0	4294967295	Data exchange	

Lastly, we need to change the four status variable types to their matching diagnostic settings. To do this, double-click on the "Cmd1_ServerOK" status variable. In the dialog that comes up, select the "Diagnostic/Control" radio button and select "ServerOK" in the list below.
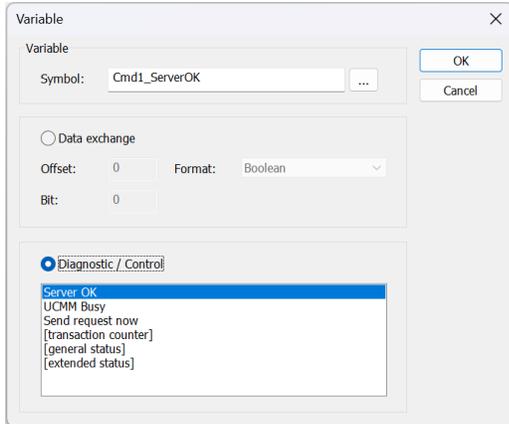
Then click OK. That will set the correct status type for that variable. Repeat this process for the remaining 3 status variables, selecting the correct status for each one. Your configuration should now look like this:
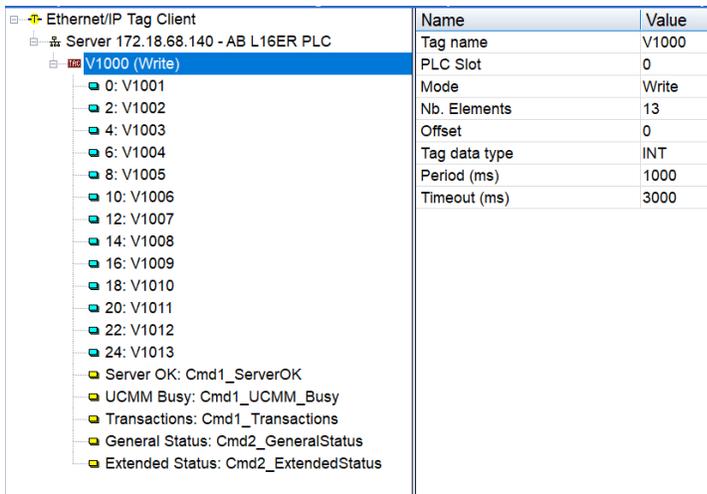
Symbol	Offset	Bit	Format	Mode
V1001	0	0	16 bit - signed	Data exchange
V1002	2	0	16 bit - signed	Data exchange
V1003	V1002	0	16 bit - signed	Data exchange
V1004	6	0	16 bit - signed	Data exchange
V1005	8	0	16 bit - signed	Data exchange
V1006	10	0	16 bit - signed	Data exchange
V1007	12	0	16 bit - signed	Data exchange
V1008	14	0	16 bit - signed	Data exchange
V1009	16	0	16 bit - signed	Data exchange
V1010	18	0	16 bit - signed	Data exchange
V1011	20	0	16 bit - signed	Data exchange
V1012	22	0	16 bit - signed	Data exchange
V1013	24	0	16 bit - signed	Data exchange
Cmd1_ServerOK	0	0	Boolean	Server OK
Cmd1_UCMM_Busy	0	0	Boolean	UCMM Busy
Cmd1_Transactions	0	0	Boolean	[transaction counter]
Cmd2_GeneralStatus	0	0	Boolean	[general status]
Cmd2_ExtendedStatus	0	0	Boolean	[extended status]

Now repeat the steps above for the V2000 command and variables, except making this a READ command. The finished configuration looks like this.

```
⊟ -T- Ethernet/IP Tag Client          │ Name         │ Value
   ⊟ ⊹ Server 172.18.68.140 - AB L16ER PLC │ IP Address   │ 172.18.68.140
      ⊟ TAG V1000 (Write)              │ Description  │ AB L16ER PLC
         ▭ 0: V1001
         ▭ 2: V1002
         ▭ 4: V1003
         ▭ 6: V1004
         ▭ 8: V1005
         ▭ 10: V1006
         ▭ 12: V1007
         ▭ 14: V1008
         ▭ 16: V1009
         ▭ 18: V1010
         ▭ 20: V1011
         ▭ 22: V1012
         ▭ 24: V1013
         ▭ Server OK: Cmd1_ServerOK
         ▭ UCMM Busy: Cmd1_UCMM_Busy
         ▭ Transactions: Cmd1_Transactions
         ▭ General Status: Cmd2_GeneralStatus
         ▭ Extended Status: Cmd2_ExtendedStatus
      ⊟ TAG V2000 (Read)
         ▭ 0: V2001
         ▭ 2: V2002
         ▭ 4: V2003
         ▭ 6: V2004
         ▭ 8: V2005
         ▭ 10: V2006
         ▭ 12: V2007
         ▭ 14: V2008
         ▭ 16: V2009
         ▭ 18: V2010
         ▭ 20: V2011
         ▭ 22: V2012
         ▭ 24: V2013
         ▭ Server OK: Cmd2_ServerOK
         ▭ UCMM Busy: Cmd2_UCMM_Busy
         ▭ Transactions: Cmd2_Transactions
         ▭ General Status: Cmd2_ExtendedStatus
         ▭ Extended Status: Cmd2_GeneralStatus
```

Tag name	PLC Slot	Mode	Nb. Ele...	Offset	Tag dat...	Period (...	Timeout...
V1000	0	Write	13	0	INT	1000	3000
V2000	0	Read	13	0	INT	1000	3000

Now compile your application (correcting any problems) and download to the target. Next, we'll set up the Rockwell side.
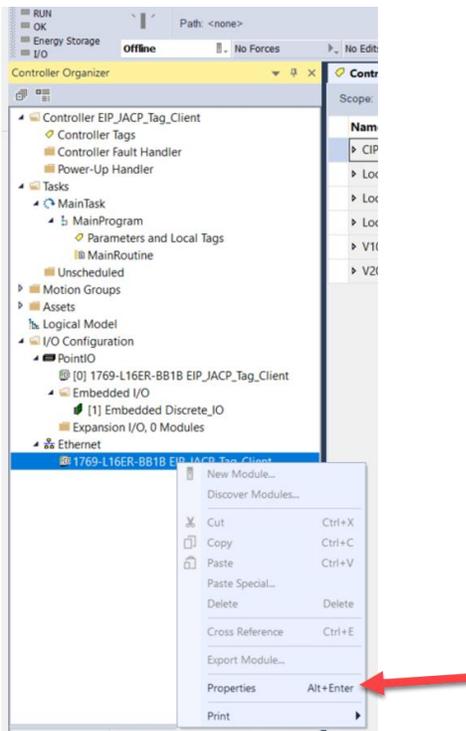
1.3 Studio 5000 Setup

After creating your project click on your Rockwell controller in the main navigation tree under I/O Configuration – Ethernet.


we're using a Compact Logix 1769-L16ER and our application name in Logix Designer is "EIP_JACP_Tag_Client
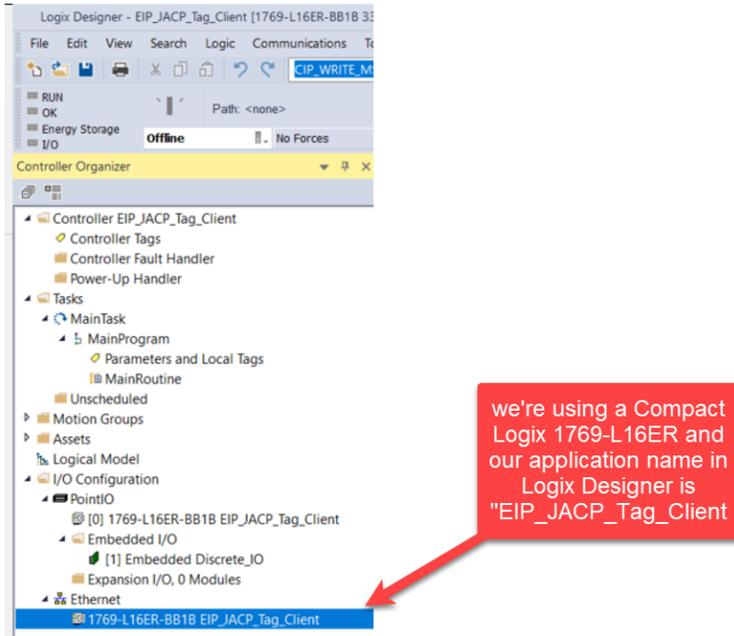
Then right-click and click on "Properties".

This brings up the "Controller Properties" dialog. On the "Internet Protocol" tab, configure the IP settings of your Rockwell PLC. This must match the setting made in the Workbench fieldbus configuration for this Rockwell PLC.
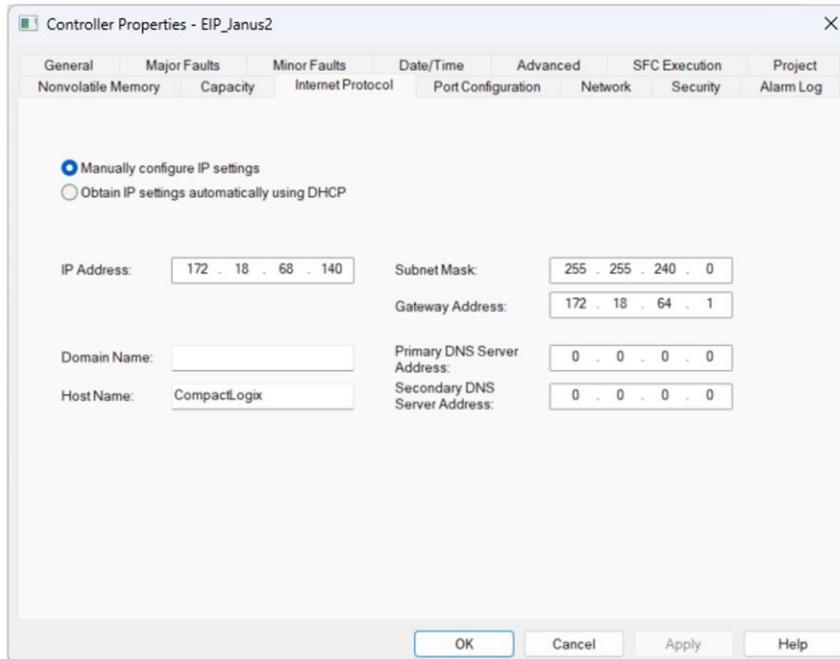
On the "Port Configurations" tab, be sure you have one or more Ethernet ports enabled and set up.

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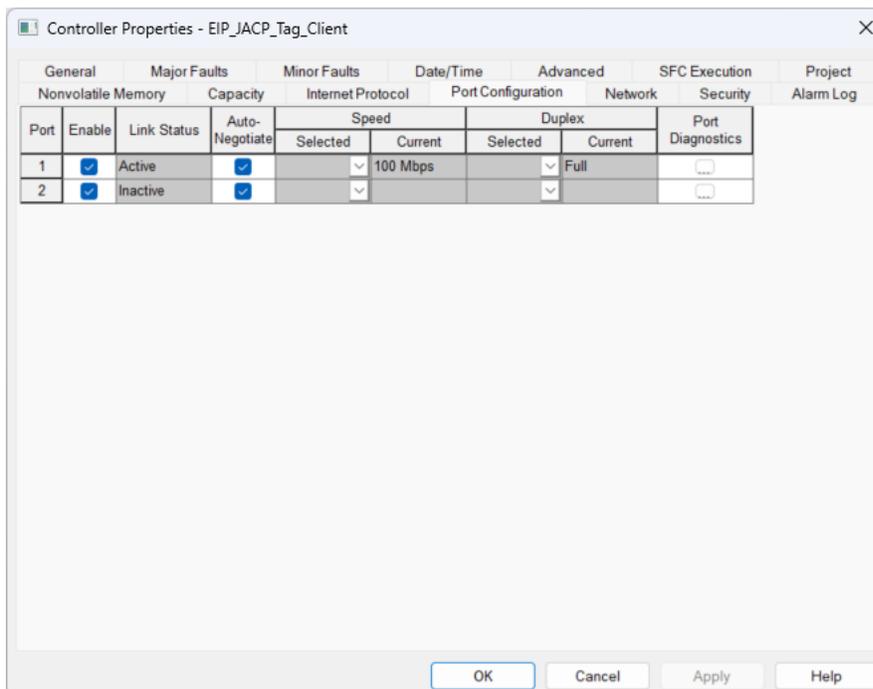
Now go back to the main navigation tree and expand your main project item, and click "Controller Tags".

Add tags to this configuration. The names and structures of the tags must match the tags you configured in the Workbench fieldbus configuration. Here, we've added 2 tags: V1000 (13 elements) and V2000 (13 elements).

we've created a 13-element INTEGER array
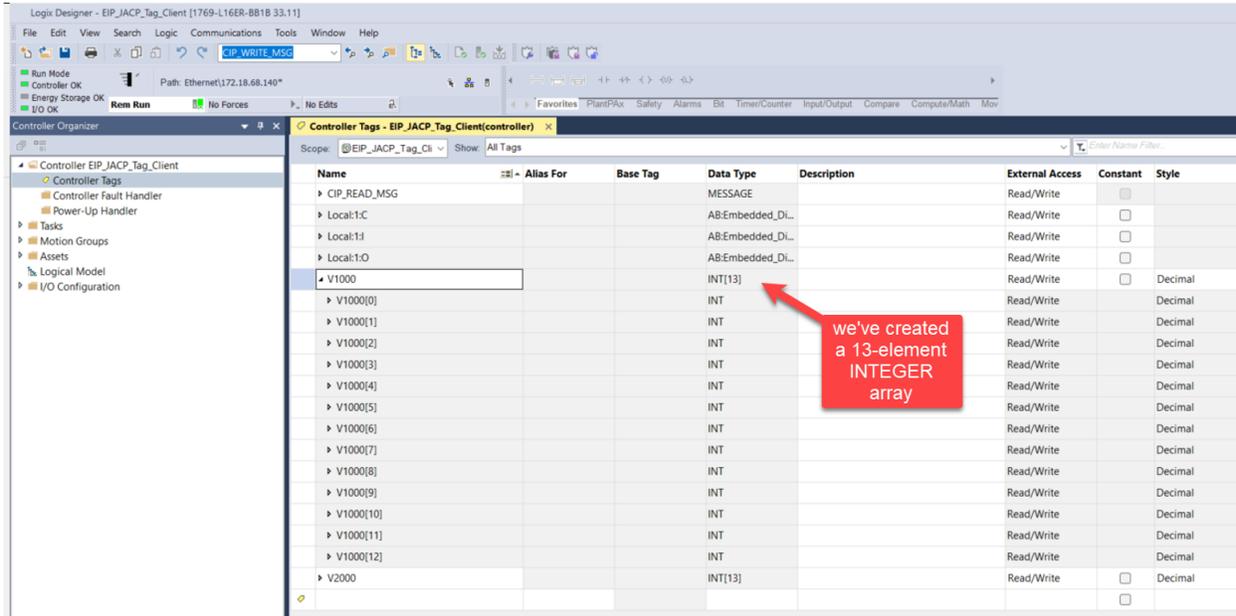
Compile and run the application on the Rockwell PLC. In Studio 5000, you can change the values of V2000(0) – V2000(12) and these values will show up in V2001-V2013 the Workbench fieldbus configuration windows. Likewise, you can change the values of V1001-V1013 in Workbench and these values will show up in Studio 5000 V1000(0) – V1000(12).

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The transaction counter and other status variables can be used to diagnose errors and monitor operation. In addition, you can view the "EIP Tag Client Statistics" in the "Statistics" section of the Janus web page:

Janus ACP Classic V1 v01.05 2023-03-06

Module Clock: Tue, 2023-03-07 19:34:47 EST   Browser Clock: Wed Mar 13 2024 11:36:32 GMT-0400 (Eastern Daylight Time)

| Turn Auto Refresh Off | Clear Statistics | Last Cleared: Tue, 2023-03-07 19:34:17 EST

- Product Information
- Application Information
- Configuration
- Event Log
- Statistics
- Error Descriptions & Status
- Display All Pages
- Custom HTML (graphics)
- Acknowledgements
- Product Support

EIP Tag Client Statistics

Open Time (µsec)	9
Minimum Exchange Time (µsec)	14
Average Exchange Time (µsec)	17
Peak Exchange Time (µsec)	215
Close Time (µsec)	0

Server IP Addr	ReadTag Req	ReadTag Err	WriteTag Req	WriteTag Err	Gen Status	Ext Status
172.18.68.140	30	0	30	0	0	0

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