# **Tech Tips**



# Communicating Between Janus Processors and Rockwell Processors using Ethernet/IP Tag Server

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
- Create variables for the items written to and read from the Rockwell PLC
- Use the Fieldbus Configurator to Add the Ethernet/IP Tag Server
- Use "Insert Master/Port" in the Fieldbus configuration to add a list of Served Tags.
- Use "Insert Slave/Data Block in the Fieldbus configuration to add the tags you want to READ and WRITE from the Rockwell PLC
- Add the corresponding variables to each of the Served Tags



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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

Create RLL rungs using MSG instructions to CIP Data Table Read and CIP Data Table Write to read and write tagnames from the Janus product.

#### 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 Server" Protocol. Once added, it will show up in the Fieldbus configuration pane.

::\Users\rpeck559\OneDrive - Control Technologies, Inc\CTI Workspace\Workbench Scratch\TestProjects\EIP_							
Ethernet/IP Tag Server	Name						

Next, use the "Insert Master/Port" icon to add a "Served Tags" item to the configuration,

C:\	:\Users\rpeck559\OneDrive - Control Technologies, Inc\CTI Workspace\Workbench Scratch\TestProjects\EIP_Tag_Se								
<b> =</b> -	Ethernet/IP Tag Server	Name							
쁆	A Served Tags								
*8	•								
-0-									
<b>I</b>									

Use the "Insert Slave/Data Block" icon to insert a Tag. The "Configure EIP Tag" dialog will come up. Complete the fields as shown.

Configure EIP Tag		×
EIP Tag Name	MyTag1	
EIP Access Mode	Read ~	
EIP Data Type	INT ~	
Num. Elements	1	
Automatically fill-in a	ppropriate I/O mappings for this module	
Automatic Variable Decla	ration	
Create new varia	oles in mappings with prefix below	
Optional Variable Pre	fix (i.e. CARD1_)	
		OK Cancel



Click OK and the tag will be added.

C:\	Users\rpeck559\OneDrive - Control Technologies, Inc\	CTI Workspace\Wor
	Ethernet/IP Tag Server	Name
쁆	▲ Lass & Served Tags	Tag Name
- 8 	🔤 MyTag1 (Read Only)	Access Mode
_		Nb. Elements
•		Tag Data Type

Now repeat this process for the other tags: MyTag2 (Write1 element), V2000 (Read 4 elements), and V3000 (Write 4 elements). All tags should be INT data type.

Here is the finished tag configuration.

C:\U	sers\rpeck559\OneDrive - Control Technologies, Inc	:\CTI Workspace\Workbench Scr
⊒ ⊿	🕁 Ethernet/IP Tag Server	Name
묾	▲ 品 Served Tags	Tag Name
8	🏧 MyTag1 (Read Only)	Access Mode
	🏧 MyTag2 (Read/Write)	Nb. Elements
t	🔤 V2000 (Read Only)	Tag Data Type
	₩ V3000 (Read/Write)	
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÷		

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

- V1001, V1010 INT
- V2000 through V2003 INT
- V3000 through V3003 INT

Now map the variables as shown below. Don't forget to use the "Renumber Offsets" command for V2000 and V3000 so the offsets are correctly numbered. When complete, your configuration should look like this:





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.



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.

General Ma	jor Faults	Minor Faults	Date/T	ime	Advanced	S	FC Execution	Projec
Nonvolatile Memory	Capacity	Internet Proto	pcol P	ort Configura	tion N	etwork	Security	Alarm Lo
Ohtain IP setti	igure IP settings							
	nga automaticalij	asing briot						
ID Address:	172 19	68 140	Subset	Maski	255	255	240 0	
IP Address.	172 . 10	00 . 140	Subnet	Wask.	200	. 200	240.0	
			Gatewa	y Address:	172	. 18	64.1	
Domain Name:			Primary Addres	DNS Server	0	. 0 .	0.0	
Host Name:	CompactLogix		Second Server	ary DNS Address:	0	. 0	0.0	

On the "Port Configurations" tab, be sure you have one or more Ethernet ports enabled and set up.

Nonvolatile Memory         Capacity         Internet Protocol         Port Configuration         Network         Security         Alarm Lo           Port         Enable         Link Status         Auto- Negotiate         Speed         Duplex         Port         Port         Diagnostics         I         Imactive	Ge	eneral	Major Fa	ults	Minor Faults	Date/Ti	ime Adv	anced	SFC Execution	Project
Dot     Enable     Link Status     Auto- Negotiate     Speed     Duplex     Port       1     Imachine     Active     Imachine     Imach	No	nvolatile	Memory	Capacity	Internet Pr	rotocol P	ort Configuration	Networ	k Security	Alarm Log
Ont       Linde       Link Status       Negotiate       Selected       Current       Selected       Current       Diagnostics         1 <ul> <li>Active</li> <li>Active</li> <li>Inactive</li> <li>In</li></ul>	Oort	Enable	Link Status	Auto-	Sp	eed	Duplex		Port	
1       2       Active       Imactive	on	Linable	Link Status	Negotiate	Selected	Current	Selected	Current	Diagnostics	
2 Inactive	1		Active		~	100 Mbps	~	Full		
	2	$\sim$	Inactive		~		~			



Now we need to create tagnames matching the ones we created in Workbench. 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 4 tags:

- MyTag1 INT, 1 element
- MyTag2 INT, 1 element
- V2000 INT, 4 elements
- V3000 INT, 4 elements

Here are the finished tags:

[1] Embedded Discrete_IO	▶ MyTag1	1001		Decimal	INT	JACP READ
<ul> <li>▲ S Ethernet</li> </ul>	MyTag2	1010	1	Decimal	INT	JACP WRITE
I769-L16ER-BB1B EIP_JACP_Tag_Server	▲ V2000	{}	{}	Decimal	INT[4]	JACP READ
	▶ V2000[0]	2000	1	Decimal	INT	JACP READ
	▶ V2000[1]	2001	1	Decimal	INT	JACP READ
	▶ V2000[2]	2002		Decimal	INT	JACP READ
	▶ V2000[3]	2003		Decimal	INT	JACP READ
	▲ V3000	()	{}	Decimal	INT[4]	JACP WRITE
	▶ V3000[0]	3000		Decimal	INT	JACP WRITE
	▶ V3000[1]	3001		Decimal	INT	JACP WRITE
	> V3000[2]	3002		Decimal	INT	JACP WRITE
	▶ V3000[3]	3003		Decimal	INT	JACP WRITE

Now, we'll create 4 rungs of RLL using 4 different MSG instructions to do the following:

- Read MyTag1 from Janus
- Write MyTag2 to Janus
- Read V2000 (4 elements) from Janus
- Write V3000 (4 elements) to Janus

We latch the rungs using the "EN" output of the MSG instructions in a NC contact. This keeps the instruction activated until it completes.



## Here is the finished program:

Logix Designer - EIP_JACP_Tag_Server [1769-L16ER-BB	18 33.11]			- 8 ×
File Edit View Search Logic Communications 1	fools Window	Help		
ڻ 🖆 🖴 😸 🗗 බ 🤊 💎 📴 WRITE M	55 v 🐄	5 🎜 📴 📐 🕞 😹 🖞	1 CK 1 KK CK CK	
Run Mode			A La factuar are are	
Controller OK Path: Ethernet\172.18.68.140	·	N # 0		
1/0 OK Rem Run	▶, No Edits	e.	4 > Favorites Add-On Alarms Bit Timer/Counter Input/Output Compare Compute/Math Move/Logical	
Controller Organizer 🗢 🔻 🛪	Controller	Tags - EIP_JACP_Tag_Server(control	e)    MainProgram - MainRoutine ×	
0 °	1. 23 23	民間 致感 医肾炎		
	•	READ JACP MyTag1 IL OP_READ_MSG_2_TRIGGER WRITE JACP MyTag2 IL OP_WRITE_MSG_2_TRIGGER	READ JOIN JUNIT DI WITE LAO' Mringt WITE LAO' Mringt	BEAD ACC My lagt      Missinge Control (MP_BEAD MISG)      View       View
B MainRoutine     B MainRoutine     B MainRoutine     B MainRoutine     begical Model     Configuration     Configuration     D (0) 1769-116ER-0B1B EP_JACP_Tag_Server     C mitoded I/0	2	READ JACP V2000 IIL CIP_READ_V2000_TRIGGER	SEVEL VARIAN GP JERO JOSE EN JU	Massage Control GP_MRTIR_MG_0
II Embedded Discrete_JO     II Embedded Discrete_JO     II Expansion IVO, 0 Modules     Als Ethernet     B 1769-L16ER-8818 EIP_JACP_Tag_Server	з	WRITE_JACP V3000 IL CP_WRITE_V3000_TRIGGER	WRITE JACP VIXOOD OP_VMITE VIXOO DN 	WRITE JACP VIXINE Message Current CP_WRITE_VXWW ==== (1)
	(End)			
Description Status Scheduled Number of Routines 1 Main Routine Fault Routine fault Routine Last Scian 18 us				
				)
🔂 Errors 🔊 Search Results				
				Communication Software Conten Still Line Aven A et 4
Keady				Communication Software: Factory lalk Linx Rung 0 of 4 APP VER III



The following screen captures show the setup of the MSG instructions.

#### CIP\_READ\_MSG2 – reads MyTag1

Message Conf	iguration -	CIP_READ	_MSG_2			
Configuration	Communica	tion Tag				
Message Ty	pe:	CIP Data T	able Read		~	
Source Elem	ent	MyTag1				
Number Of E	ements:	1	•			
Destination E	lement	MyTag1		~		New Tag
Enable	O Enable V	laiting	O Start	Done	Done Length:	1
DError Code:	12 19 69 23	Extende	ed Error Code:		Timed Ou	t •
Error Text	172.10.00.230	,				
			ОК	Cancel	Apply	Help
Aessage Conf	iguration -	CIP READ	MSG 2			
Configuration	Communica	tion Tea				
Conliguration	communica	aon Tag				
Path:	2, 172.18.68	3.230			Brov	vse
0.5	2, 172.18.68	.230				
Broadc	ast					
Communica	tion Method	Channel:	'A'	× Destination	0	<b>.</b>
CIP With	) DH+	Course Lin	0	Destination	Link: 0	A (Octal)
Source	ID	Source Lin	K. U	Destination	Node:	(Octai)
Conne	cted		🔽 Cache Co	nnections 🔷 🕈	Larg	e Connection
Enable	O Enable W	/aiting	Start	ODone	Done Length:	0
O Error Code:		Extende	ed Error Code:		Timed Out	•
Error Path: 2, 1	72.18.68.230	1				
THE PARTY OF A PARTY O		,				
Enorrow		,				



## CIP\_WRITE\_MSG\_2 – writes MyTag2

	I - CIP_WIGHE_WIGH	1_2		×
Configuration Commun	ication Tag			
Message Type:	CIP Data Table W	/rite	~	
Source Element	MyTag2	~	]	New Tag
Number Of Elements:	1			
Destination Element	MyTag2			
●Enable ○Enable	∌Waiting OS	tart 🔹 Dor	ne Done Lengt	h: 1
<ul> <li>Enable</li> <li>Error Code:</li> </ul>	⊧Waiting OS Extended Erro	tart ♥Dor r Code:	ne Done Lengt	h: 1 ut +
Enable OEnable     OError Code:     Error Path: 2, 172.18.68.2     Error Text	e Waiting OS Extended Erro 230	tart ●Dor r Code:	ne Done Lengt	h: 1 ut ♥

Message Con	figuration - CIP_WRI	E_MSG_2			×		
Configuration	Communication Tag						
O Path:	2, 172.18.68.230		Browse				
	2, 172.18.68.230						
Broad	cast						
Communic	ation Method				_		
O CIP	ODH+ Channel:	'A'	✓ Destination Lin	0	* *		
	th Source Li ID	nk: 0	Destination No	ode: 0	🔹 (Octal)		
Conne	cted	Cache Con	ections •	Large	Connection		
Enable Error Code: Error Path: 2, Error Text:	C Enable Waiting Extend 172.18.68.230	♥ Start	O Done	Done Length:	•		
		ОК	Cancel	Apply	Help		



## CIP\_READ\_V2000 - reads V2000 (4 elements)

onfiguration Communi	cation Tag				
Message Type:	CIP Data	Table Read		$\sim$	
Source Element	V2000				
Number Of Elements:	4	•			
Destination Element	V2000		~		New Tag
Enable OEnable	Waiting	♥ Start	Q Done	Done Length:	0
Enable OEnable	Waiting	♥ Start	O Done	Done Length:	0
Enable OEnable Error Code: ror Path: 2, 172 18 68 3	Waiting Extend	Start ded Error Code:	⊖ Done	Done Length:	0
Enable O Enable Error Code: ror Path: 2, 172 18.682 ror Text	Waiting Extend 30	Start ded Error Code:	⊖ Done	Done Length:	0
Enable OEnable Error Code: ror Path: 2, 172, 18, 68, 2 ror Text	Waiting Extend 30	Start ded Error Code: OK	O Done	Done Length: Timed Out	0 •

nfiguration	Communica	tion Tag					
O Path:	2, 172.18.68	3.230				Browse	ə
	2, 172.18.68	.230					
Broadd	ast	~					
Communic	ation Method						_
O CIP	O DH+	Channel:	'A'	∑ Destination I	Link:	0	*
CIP Wit Source	h ID	Source Link:	0	Destination I	Node:	0	🔹 (Octal
Conne	ected		🔽 Cache C	Connections •		Large C	Connection
Conne	ected		✔ Cache C	Connections •		Large C	Connection
Conne	⊙Enable W	/aiting	Cache C Start	© Done	Done L	Large C	Connection



## CIP\_WRITE\_V3000 - writes V3000 (4 elements)

lessage configuration				
Configuration Communi	cation Tag			
Message Type:	CIP Data Table Write		~	
Source Element	V3000	~		New Tag
Number Of Elements:	4			
Destination Element	V3000			
€Enable ◯Enable	•Waiting Start	⊖ Done	Done Length:	0
€Enable ◯Enable DError Code:	e Waiting ● Start Extended Error Code:	⊖ Done	Done Length: Timed Out	0.
⊌Enable ◯Enable ⊇Error Code: irror Path: 2, 172,18,68,2	e Waiting ● Start Extended Error Code: 330	⊖ Done	Done Length:	0

Message Configu	ration - CIP_WRITE_	V3000			×
Configuration Co	mmunication Tag				
O Path: 2,	172.18.68.230			Brows	e
2.	172.18.68.230				
Broadcast	· · · · · · · · · · · · · · · · · · ·				
Communication	n Method				_
O CIP O	DH+ Channel:	'A'	✓ Destination Lin	0 nk:	*
CIP With Source ID	Source Link:	0	Destination No	ode: 0	(Octal)
Connecter	1	Cache Conr	nections 🕈	Large	Connection
<ul> <li>Enable</li> <li>Error Code:</li> <li>Error Path: 2, 172.</li> <li>Error Text</li> </ul>	Enable Waiting Extended 18.68.230	O Start Error Code:	♥ Done	Done Length:	4
		ОК	Cancel	Apply	Help



Now we compile, download and run the Studio 5000 application. On the Controller Tags tab, we can see the communications working.



And in Workbench, we can see the same results.



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





#### Janus PAC Compact V2 v00.00 2024-02-28

Module Clock: Wed, 2024-02-28 10:17:51 EST Browser Clock: Thu Apr 04 2024 10:28:48 GMT-0400 (Eastern Daylight Time)

 Turn Auto Refresh On
 Clear Statistics
 Last Cleared: Never

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

Open Time (µsec)	17	transaction counters
Minimum Exchange Time (µsec)	1	increment on each
Average Exchange Time (µsec)	1	successful or ERROR
Peak Exchange Time (µsec)	38	transaction
Close Time (µsec)	0	
Tag Read Request Received	216	
Tag Read Successful Responses	216	
Tag Read Error Responses	0	
Tag Write Request Received	216	
Tag Write Successful Responses	216	
Tag Write Error Responses	0	
ETD Tag Server Errors		
EIP Tay Server Errors		

