

Data Exchange Using Logix CPU Tags

Controllers: RCC, X5, XL4, EXL6, EXLW, XL7, EXL10, ZX

A. INTRODUCTION

The latest Horner Controllers (RCC, X5, XL4, EXL6, XL7, EXL10 & ZX) support the ability to exchange Global Tags with Rockwell Automation Logix Processors over an Ethernet IP network. This capability was added with the release of Cscape 9.70 SP1. The Global Tags, once imported into Cscape - can be displayed on the OCS screen by being tied to any read-only or editable graphics object. Through this same method, the Global Tags can be referenced from graphics objects on WebMI screens as well. As an additional capability, the Global Tags can be fully mapped into local OCS reference space (%R, %AI, etc.) This provides the added capability of including Global Tag sourced data into OCS Datalogs, Emails, Logic Programs, etc. Once imported into Cscape, the Global Tags are updated automatically in the background about every 25mS.

B. RESOURCES NEEDED

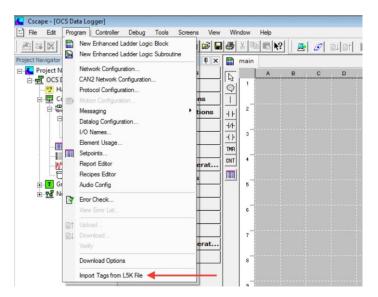
The following resources are needed to configure Logix Tag Exchange:

- 1) RCC, X5, XL4, EXL6, EXLW, XL7, EXL10 or ZX with firmware 14.18 or later
- 2) Cscape v9.70 SP1 or later required
- Appropriate Rockwell Automation Programming software for Logix CPUs 3)

C. Logix Tag Exchange CONFIGURATION & IMPORT PROCEDURE

To configure Logix Tag Exchange communication over Ethernet IP, complete the following:

- Save the Project running on the Rockwell Logix CPU as a L5K file. 1)
- Confirm Firmware Version 14.18 or later is loaded to the OCS. 2)
- Open Cscape 9.70 SP1 or later. 3)
- 4) Click **Program** Import Tags from L5K File to configure Ethernet protocol.





Click Import Device from the window below.

L5K Tag Import	
L5K File Import	Properties Tag Name: Type: Device name Ip Address Alias of
	Starting Register Name: Selected Addresses Add From L5K
Import Device Delete Device	DeleteOK

5) An **Open** window is displayed. Browse to the appropriate location, and select the desired L5K file, andClick **Open**.

Look in: 🚺	OCS Data Logger Project	- 🗧 🖻 🚽	•
Name	A.	Date modified	Т
Project.	LSK	12/13/2016 3:17	PM L
∢ File name:	"	0;	ben

6) The Name, IP Address, and Port configuration for the Rockwell Logix CPU will be displayed. Click OK, and the Global Tags from the Logix CPU will be displayed on the next window. If the IP is not display, IP address of Rockwell Logix CPU should be manually entered. Some L5K files for controllers, like flex Logix, do not export the IP address, thus the need to be manually entered.

Device Config		×
Name	Logix CPU Line 5	
IpAddress	192 . 168 . 0 . 201	
Port	44818	
	OK Cancel	



7) More/Less tags can be displayed in the L5K File Import pane by pressing the [+] and [-] boxes on the tag list (the example below shows only 4 tags - but typical applications will have dozens or even hundreds). At this point, it is important to ensure the Logix Tag Exchange is tied to the appropriate LAN port on the OCS. The Port pull- down list displays the four possible assignments. For controllers with a single LAN port, the choices will be ETN1/1 and ETN1/2. ETN1/1 will be selected if Logix Tag Exchange will be the first downloadable protocol assigned to the LAN1 port. ETN1/2 will be selected if another downloadable protocol (such as Modbus TCP Client) has already been configured as the first downloadable protocol assigned to the LAN1 port. Controllers with LAN2 ports will list ETN2/1 and ETN2/2 assignments as well.

.5K File Import	Properties Port
Devices ED-Logix CPU Line 5-192.168.0.201 ED-Controller Tags Machine_RPM - Machine_Start - Machine_Status - Machine_Status	Tag Name: Machine, RPM Type: DINT Device name Logix CPU Line 5 Ip Address 192,168,0.201 Alias of
- MainProgram	Starting Register
	Add From L5K
Import Device Delete Device	Delete

8) After selecting the Port, some applications can be completed simply by Clicking OK (read the following before proceeding). Applications strictly displaying Logix Tags on OCS Screens or WebMI Pages do notrequire any further configuration (just Click OK). Applications using Logix Tag data inside their OCS program for datalogging or program logic require an additional step - mapping the Logix Tags into OCS Reference/Register space.

LSK Tag Import	Properties Tag Name: Machine_RPM Type: DINT Device name Logik CPU Line 5 Ip Address 192168.0.201 Alias of Stating Register TR12001 Lame: Selected Addresses Selected Addresses Delete
Import Device Delete Device	ОК



9) In this step, we will take the extra step of mapping the Logix Tags to OCS Register space. First assign a Starting Register (Step 1 above). This will be the starting register for the entire list of tags that will subsequently be mapped. This step only needs to be completed once. Next, Select the first Tag to be imported in the L5K Import Pane (Step 2 above). Next, Click Add from L5K (Step 3 above). This will perform the mapping for the selected tag, and it will appear in the Selected/Addresses pane. Now repeatsteps 2 and 3 until all desired tags are mapped (see below). Click OK to complete the mapping process.

L5K Tag Import	
L5K File Import Devices : Logix CPU Line 5-192.168.0.201 : Controller Tags - Machine_RPM - Machine_Status - Machine_Status	Properties Tag Name: Machine_Stop Type: B00L Device name Logix CPU Line 5 Ip Address 192.168.0.201 Alias of
— MainProgram	Starting Register 3/R12001 Name: Selected Addresses Machine_Statu Machine_Status Machine_Status Machine_Status Machine_Status Machine_Status Machine_Status Machine_Status Machine_Status
Import Device Delete Device	Delete

10) Now verify that everything mapped correctly. Click **Controller Hardware Configuration** to displaythe Hardware Configuration dialog box.

Series XL Series	<u> </u>		Description: Touch screen Operator Control Station with	
Device Type EXL10e	•	5	fixed I/O	
Model #: HEEXV1E2		Properties Display Type:	480 by 640 LCD	
Network Ports		Keypad Type:	Touch + 7 F keys	
CAN1 CsCAN -	Config	Program Memory:	1024 K Bytes	
CAN2 CsCAN	Config	Network Type:	CsCAN	
LAN1 ETN300 -	Config	Advanced Ladde Supports Analog		
LAN2 ETN300 -	Config	Real Time Clock Supports Retentiv	Support	
Serial Ports	Config			
			Auto Config	



11) Click on the **Config** button for the LAN port to which the Logix Tag Exchange was assigned. In the example above, **LAN1**.

gister Usage —	D.(
IP Address:	Default Settings	Register				Get settings from	
	192 . 168 . 254 . 128		Name:	<u>·</u>		Configuration 💌	Use CAN ID for last Octe
Net Mask:	255 . 255 . 255 . 0		Name:	•	32-811	Configuration 👻	
Gateway:	0.0.0.0		Name:	•	32-811	Configuration 👻	
Status:			Name:	•	16-BIT		
Version:			Name:	•	16-BIT		
	IP (Ping) (Ethernet Global Data) P Slave (90-30 Service Rec	uest)		Configure Selected Proto	col		
Moo Ethe FTP HTT	dbus Slave ernet/IP (File Server) IP (Web Server) II Over TCP/IP						
Moo Ethe FTP HTT	dbus Slave ernet/IP (File Server) IP (Web Server) II Over TCP/IP						
Mor Ethe FTP HTT ASC	dbus Slave ernet/IP (File Server) IP (Web Server) II Over TCP/IP		Network	Devices Scan List			

12) *EipcClient vX.XX* should be displayed in the appropriate **Downloadable Protocols** pulldown list. This stands for "Ethernet IP Client" with the version of the Protocol Driver also listed. In the case of this protocol, the **Network** Button has no meaning. Click **Devices** to view the next dialog box.

Name	ID	Status	On Error	
Logix CPU Line 5	192.168.0.201		Retry	Add
				Delete
				Config
				OK



13) The Device List dialog should list the Name and ID (IP Address) of the Logix CPU. Now Click OK to return to the LAN1 Configuration dialog box. This time, Click Scan List to display the following dialogbox.

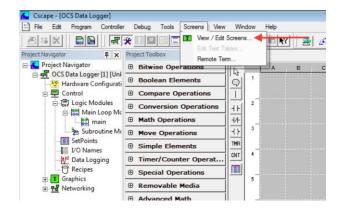
Local Name	Register	Type	Dev Name	ID	Target	Length	Trigger	
	%R12001	<>	Logix CPU Line 5	192.168.0.201	Machine_RPM	1 (DW)	None	Add
	%R12003 %R12004	<>	Logix CPU Line 5 Logix CPU Line 5	192.168.0.201 192.168.0.201	Machine_Start Machine_Status	1 1 (DW)	None None	Delete
	%R12006	<>	Logix CPU Line 5	192.168.0.201	Machine_Stop	1	None	
								Config
								C
								Edit Name

14) The Scan List dialog box shows the detailed mapping of each imported tag. This includes the specific Register mapped to the tag, Logix CPU Name it is associated with (Dev Name), the name of the tag (Target), and its Length in Words or Double Words (DW). Tags that are 1- bit, 8- bit, or 16- bits in length are mapped to a complete 16- bit Register. Tags that are 32- bits in length are mapped to a single double- word (stored in two consecutive 16- bit registers above). Note that Local Names (I/O Names) for the mapped register are NOT automatically created - as of version 3.21 of the Ethernet IP Client driver. This capability will be added in a future release of the driver.

D. Accessing Imported Logix Tags from the Cscape Graphics Editor

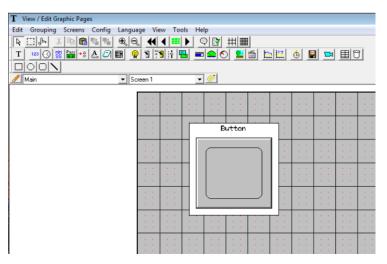
Now that Logix Tags have been imported into the Cscape project, they can be tied to graphics objects on OCS Screens, and on WebMI Web Pages. The procedure is exactly the same whether creating screens to download to the OCS, or creating screens that are to be published as Web Pages. :

1) Click Screens View / Edit Screens to launch the Cscape Graphics Editor.





2) Select a Graphic Object by clicking on one of the icons. In this example, we will Click the Switch Object. To place the object, <u>Click and Hold</u> somewhere on the screen, then <u>drag</u> from top-left to bottom-right to size the object. <u>Release</u> the mouse, then <u>Double-click</u> the object to configure it.



3) In the **Controller Register** section of the dialog box, examine the **Data Source** pull- down list, and Select the Logix CPU data source from the list:

Controller Reg	jister				
Data Source:	Internal regist	ers			•
Address:	Internal regist	ers			
	Logix CPU Lir	165-EIN			
Name:	I			-	•
Keypress Sou	rce				
C Attach to r	nearest soft kej	2			
C Auxiliary R	egister				
Address:		Name:			
C Cursor Sel	ectable				
Touch					
Action:	Momentary	•		el to last screen afte nside Line Detail	ar press
Ind	icator Propertie	is >>	Positions:	2 .	
Display Prope	rties				
Attribu	ites >>>	Backgrou	ind Color >>>		
Lege	nd >>>	Line	Color >>>		
A	****				

4) Next to the **Address** field, **Click** on the **Arrow icon**:

Controller Reg	istor				
	Logix CPU Line 5 - E	ÎN.	/	-	
Address:		▼ > Re	gister Width:	1-Bit 💌	



5) A dialog is displayed which will allow you to browse the tags that were imported for the Logix CPU selected.Navigate the **Devices** pane, pressing the [+] symbols as necessary to find the desired tag. In this case, the *Machine_Start* tag is the desired data source for the Switch Object being configured. Select the tag, then Click **OK**.

Devices	Properties	the second se
E- Logix CPU Line 5-192.168.0.201	Tag Name:	Machine_Start
Controller Tags Machine_RPM	Туре:	BOOL
- Machine_Start	Device Name:	Logix CPU Line 5
Machine_Status Machine_Stop	Ip Address	192.168.0.201
MainProgram	Alias	
		OK. Cancel

6) The selected tag (in this case *Machine_Start*) is now linked to the **Switch Object** on the screen. Complete the configuration of the **Switch Object** by assigning a **Legend**, and changing the style (ie shape, color) and operation (i.e. momentary, toggle) of the button as desired. Click **OK** when complete.

T View / Edit Graphic Pages			
Edit Grouping Screens Config Langua	View Tools Help		
	◀◀■▶ ◎ 8	/ ₩ #	
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🖉 Main 💌 Sci	n1 💌 🍼		
		hine Start	
		1	
] [] :	

7) At run- time, whenever the switch is operated from the touch screen - the OCS will write a 1 to the *Machine_Start* tag. When the button is released, the OCS will write a 0 to the same tag.



4.1 Accessing Imported Logix Tags from the Logic Editor, Data Logger, or Email Configuration

The Cscape Graphics Editor has the ability to directly access Logix Tags that have been imported, whether or not the tags have being fully mapped into OCS Register space. When accessing tags from other aspects of Cscape, including the Cscape Logic editor, Datalogging Configuration, or Email configuration - Cscape can only access the *Local* OCS Registers / Local I/O Names where imported tagswere mapped.

Return to the Ethernet IP Client Scan List. Click **Controller** Hardware Configuration, Click **Config** next to the appropriate LAN port, and Click **Scan List** next to the Ethernet IP Client Downloadable Protocol.

Index	Local Name	Register	Type	Dev Name	ID	Target	Length	Trigger	
)	EIP_Machine_RPM	%R12001	<->	Logix CPU Line 5	192.168.0.201	Machine_RPM	1 (DW)	None	Add
Ç.	EIP_Machine_Start	%R12003	<>	Logix CPU Line 5	192.168.0.201	Machine_Start	1	None	Delete
2	EIP_Machine_Status EIP_Machine_Stop	%R12004 %R12006	<->	Logix CPU Line 5 Logix CPU Line 5	192.168.0.201 192.168.0.201	Machine_Status Machine_Stop	1 (DW)	None None	Delete
·	En _machine_ordp	4112000	1.7	Login of O Line 5	132.100.0.201	macrane_orop		None	Config
									Edit Name
<				m					Cancel

Once again, the **Scan List** dialog displays the details of the mapping of the imported Logix tags and localOCS register space. Since the last time we examined this dialog, the local OCS registers were manually assigned Local I/O Names (this does not yet happen automatically as of Cscape 9.7 SP2). To reduce confusion, Local I/O Names were configured with the same name as the Logix Tag, but with an added Prefix.

When accessing Logix Tag data from an OCS Screen or WebMI web page, EITHER the direct Logix Tag Name OR the Local Register / Local I/O Name may be referenced. The Cscape Graphics Editor has the ability to access the data either way via the procedures outlined in Section 4.0.

When accessing Logix Tag data from anywhere else in the OCS, the Local Register / Local I/O Name must be referenced. In our example, to configure an OCS Datalog to include data whose source is the *Machine_RPM* tag, local Register %R12001 (with Local I/O Name *EIP_Machine_RPM*) must be added to the Datalog.

Group Operation		Variable Operations		
1/10-10-10-10-10-10-10-10-10-10-10-10-10-1				
Configured Grou		Configured Variables: Address	Name	Type
	CHINE	Address	Name	Type
	C			
	Add Variable			×
	10/02/01/02/02/02/02/04/04			
			_	
	Address: 2/R12001 Nar	ne: EIP_Machine_RPM		
	Address: 2812001 Nar	ne: EIP_Machine_RPM		
			•	
	Address: 2812001 Nar Data Type: DINT	ne: EIP Machine RPM		
			OK Cancel	
Add Group	Data Type: DINT			Delete Variable
Add Group				Delete Variable
	Data Type: DINT		OK Cancel	Delete Variable
Global Attribute I	Data Type: DINT		OK Cancel	Delete Variable
	Data Type: DINT	•	OK Cancel	Delete Variable



4.2 Helpful Hints for creating Local I/O Names

- 1) When Mapping Logix Tags into OCS Register space (see Section 3, Step 9 above), it may be desired to import tags in order of data length. In other words, it may be desired to map bit-·length tags first, followed by word- length tags, double- word length tags, etc. This will make mapping more efficient and may make it easier to add local OCS I/O Names later in a semi- automated fashion.
- 2) Tags and Comments can be exported from the Rockwell Project in .csv format. Cscape can import I/O Names from the Windows clipboard, typically copied from a spreadsheet. The following procedure will helpminimize the effort required to enter Local OCS I/O Names for each of the imported and mapped Logix Tags.
 - a. From the Rockwell Software, open your project and **Export Tags and Local Comments** from the**Tools** Menu.
 - b. Open a copy of the exported .csv file in Excel.
 - c. Delete all Rows *except* the Rows containing Global Tags that have been imported and mapped intoCscape. If the Rows are in the order that the Tags were imported into Cscape -- that will make things easier when you fill in the details later.
 - d. The imported Tag Names should be in Column C, and the Comments in Column D.
 - e. Clear Contents (don't delete) Columns A & B, because those need to be redefined for I/O Nameimport into Cscape. Columns C and later can be left in their current form.
 - f. In Column A, fill in the OCS Register references, using the complete designation including percent sign (i.e., %R12001, %R12003, etc.). For bit- length Tags, Cscape will allocate an entire word register for the import, but the Boolean data is most easily referenced from the least- significant bit of the register. In other words, even though Cscape maps all of %R12003 for the *Machine_Start* tag, since it is a BOOL type variable, the I/O Name would be best mapped to %R12003.1, which references the least significant bit only.
 - g. In Column B, fill in the I/O Name length designation associated with that tag (1, 16 or 32). For example, use 1 for any bit- length tags, 16 for any word- length tags, and 32 for any double- word or floating point tags.
 - In column C, if you decide to add a prefix to the Tag names to differentiate them from their exactLogix Tag name, you may do so now. You may also choose to simply leave the Local OCS I/O Name and Logix Tag Name identical.
 - i. Once finished, re- examine your work making sure that the mapping and lengths are correct.
 - j. *Highlight columns A through D only*, and perform a Copy (CTRL-C)

A	B	C	D	E	F	G
1 %R12001	32	EIP_Machine_RPM	Ranges from 500-3000 RPM	DINT		(RADIX := Decimal, Constant := false, ExternalAccess := Read/Write)
2 %R12003.1	1	EIP_Machine_Start	Remote Start	BOOL		(RADIX := Decimal, Constant := false, ExternalAccess := Read/Write)
3 %R12004	32	EIP_Machine_Status	See Machine Operations Manual	DINT		(RADIX := Decimal, Constant := false, ExternalAccess := Read/Write)
4 %R12006.1	1	EIP_Machine_Stop	Remote Stop	BOOL		(RADIX := Decimal, Constant := false, ExternalAccess := Read/Write)
5						

- k. In Cscape, Click **Program** I/O Names to bring up the I/O Names dialog box.I. Click **Paste**.
- m. Cscape will display a Message "Are you sure you want to paste I/O names from the clipboard andoverwrite any duplicate names?". If you are sure, Click Yes. After examining the imported I/O Names, Click OK to complete the process. See image below.



Point	Туре	Name	comment		
%K01	1-bit	F1 KEY			
%K.02	1-bit	F2_KEY			
%K03	1-bit	F3_KEY			Copy All
%K04	1-bit	F4_KEY			
%K05	1-bit	F5 KEY			Paste
%R12001	32-bit	EIP_Machine_R	PM	= .	Faste
%R12003.1	1-bit	EIP_Machine_SI	art		
%R12004	32-bit	EIP Machine SI	atus		
%R12006.1	1-bit	EIP_Machine_SI	top		Add
\$S001	1-bit	FST_SCN			
\$S002	1-bit	NET_OK			Edit
\$S003	1-bit	T_10MS			P
6S004	1-bit	T_100MS			Remove
\$S005	1-bit	T_SEC			Where
\$S006	1-bit	10_0K			where
\$S007	1-bit	ALW_ON			
S008	1-bit	ALW_OFF			
\$S009	1-bit	PAUSING_SCN			
\$S010	1-bit	RESUMED_SCN	1		
«S013	1-bit	NET_IO_OK			
SR001	16-bit	USER_SCR			
\$SR002	16-bit	ALRM_SCR			
\$\$R003	16-bit	SYS_SCR			
SR004	16-bit	SELF_TST		1	
SR029	16-bit	NET_ID			OK
%SR044	16-bit	RTC_SEC			
%SR045	16-bit	RTC_MIN		-	Cancel

E. TECHNICAL SUPPORT

For assistance and manual updates, contact Technical Support at the following locations:

North America

Tel: 1877-665-5666 Fax: 317 639-4279 Web: <u>www.hornerautomation.com</u> Email: <u>techsppt@heapg.com</u>

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