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

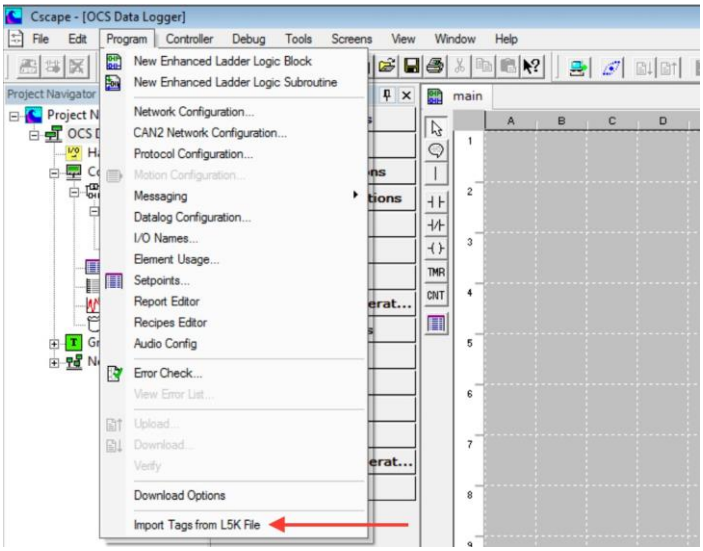
The following resources are needed to configure Logix Tag Exchange:

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

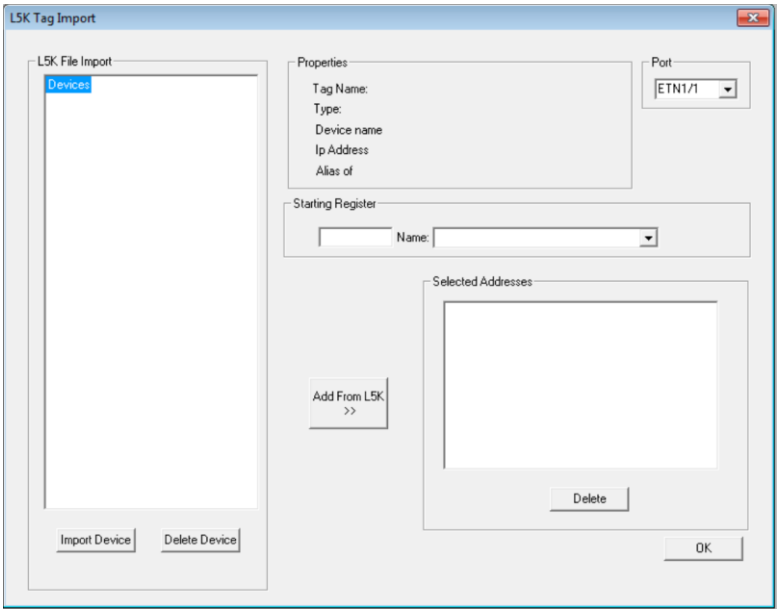
C. Logix Tag Exchange CONFIGURATION & IMPORT PROCEDURE

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

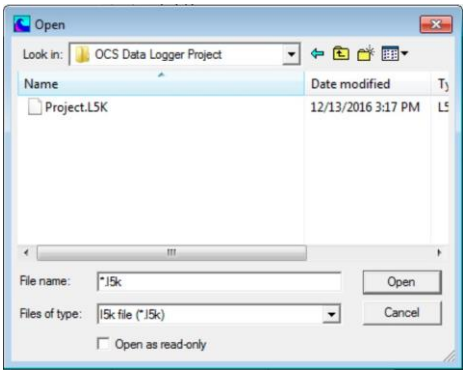
1) Save the Project running on the Rockwell Logix CPU as a L5K file.
2) Confirm Firmware Version 14.18 or later is loaded to the OCS.
3) Open Cscape 9.70 SP1 or later.
4) Click **Program Import Tags from L5K File** to configure Ethernet protocol.



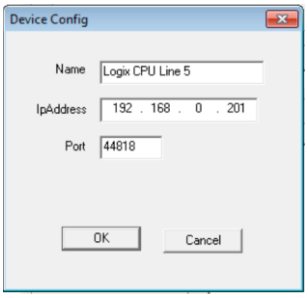
Click **Import Device** from the window below.



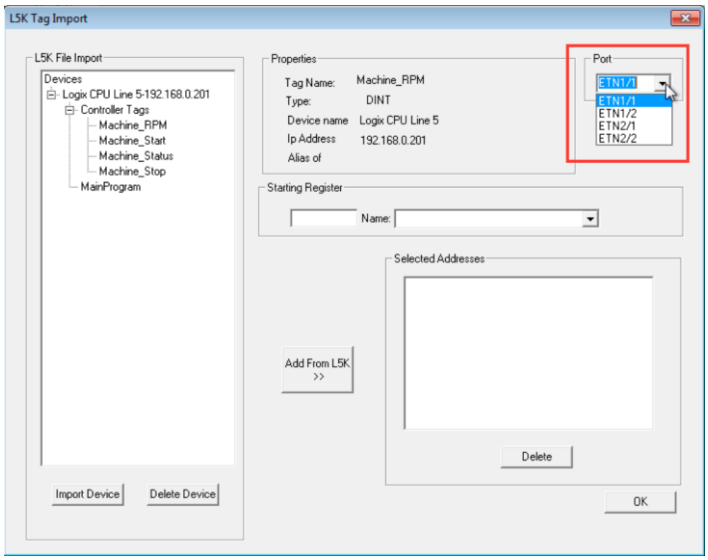
5) An **Open** window is displayed. Browse to the appropriate location, and select the desired L5K file, andClick **Open**.



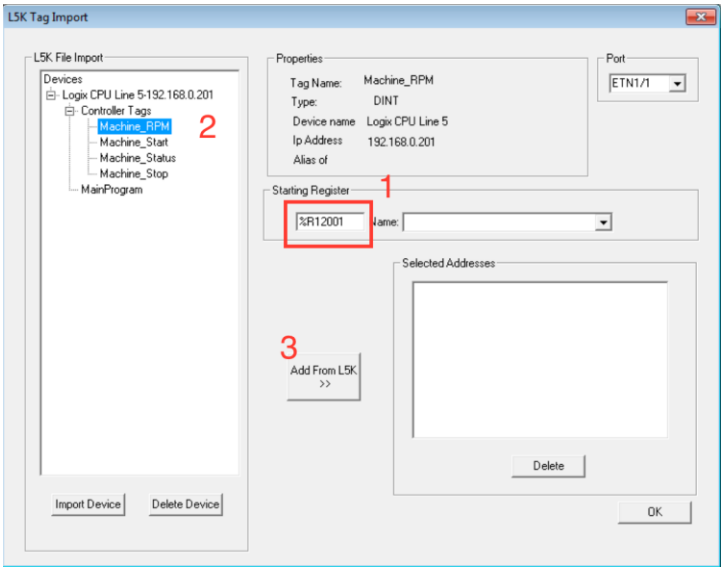
6) The **Name**, **IP Address**, and **Port** configuration for the Rockwell Logix CPU will be displayed. Click **OK**, and the Global Tags from the Logix CPU will be displayed on the next window. If the IP is not display, IP address of Rockwell Logix CPU should be manually entered. Some L5K files for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



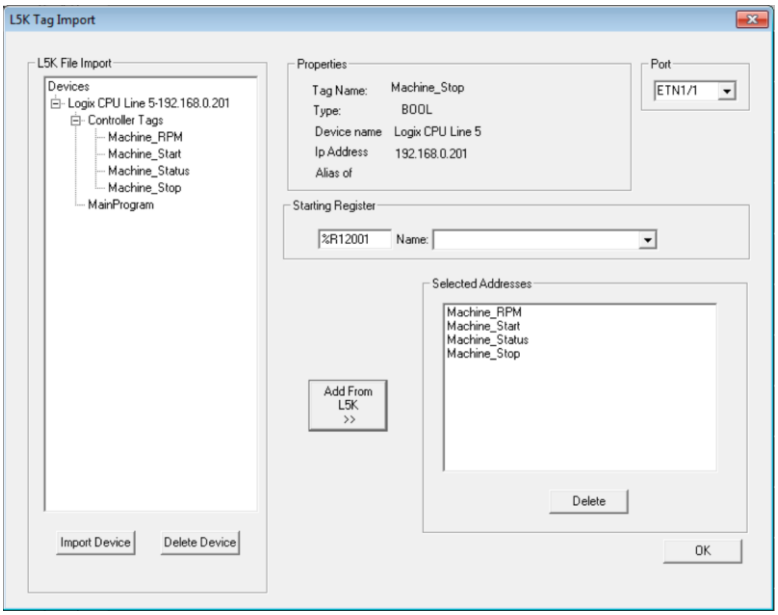
7) More/Less tags can be displayed in the **L5K File Import** pane by pressing the **[+]** and **[-]** boxes on the tag list (the example below shows only 4 tags – but typical applications will have dozens or even hundreds). At this point, it is important to ensure the Logix Tag Exchange is tied to the 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.



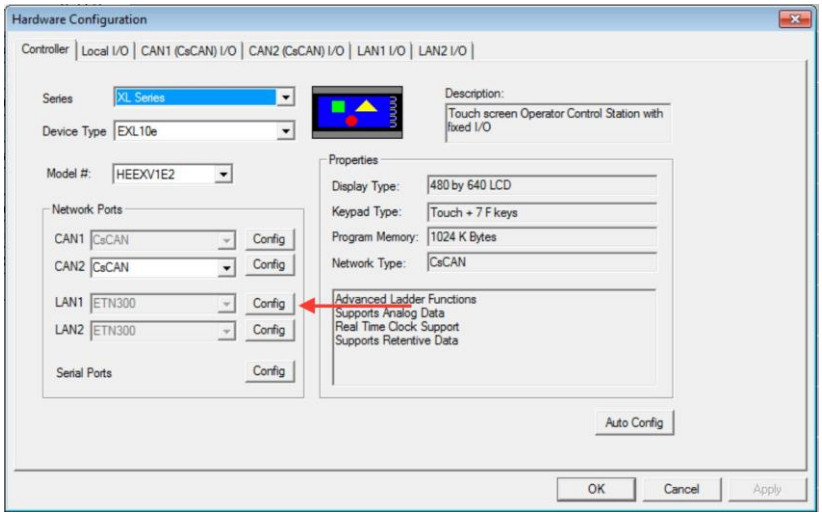
8) After selecting the Port, some applications can be completed simply by Clicking **OK** (read the following before proceeding). Applications strictly displaying Logix Tags on OCS Screens or WebMI Pages do notrequire any further configuration (just Click **OK**). Applications using Logix Tag data inside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



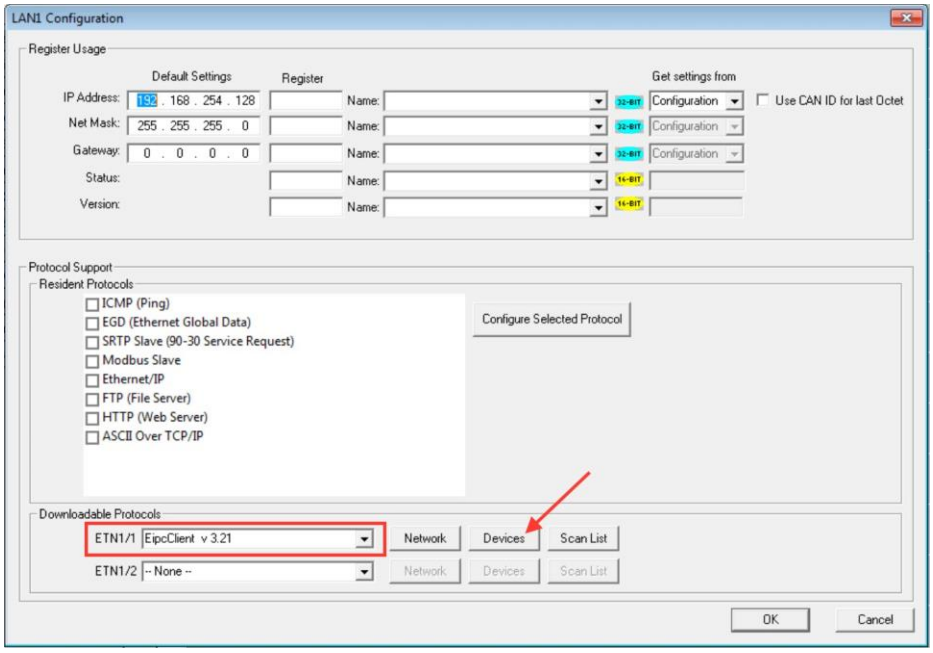
9) In this step, we will take the extra step of mapping the Logix Tags to OCS Register space. First assign a **Starting Register** (Step 1 above). This will be the starting register for the entire list of tags that will subsequently be mapped. This step only needs to be completed once. Next, **Select** 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.



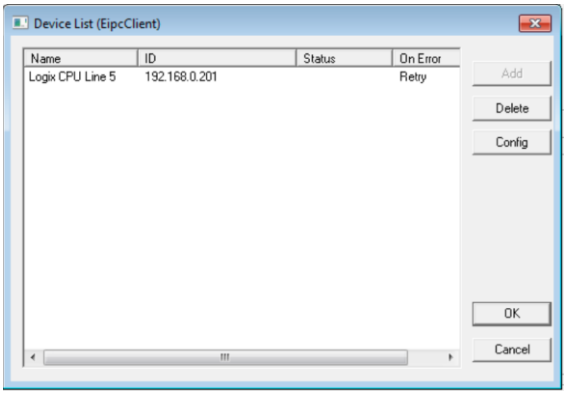
10) Now verify that everything mapped correctly. Click **Controller Hardware Configuration** to displaythe Hardware Configuration dialog box.



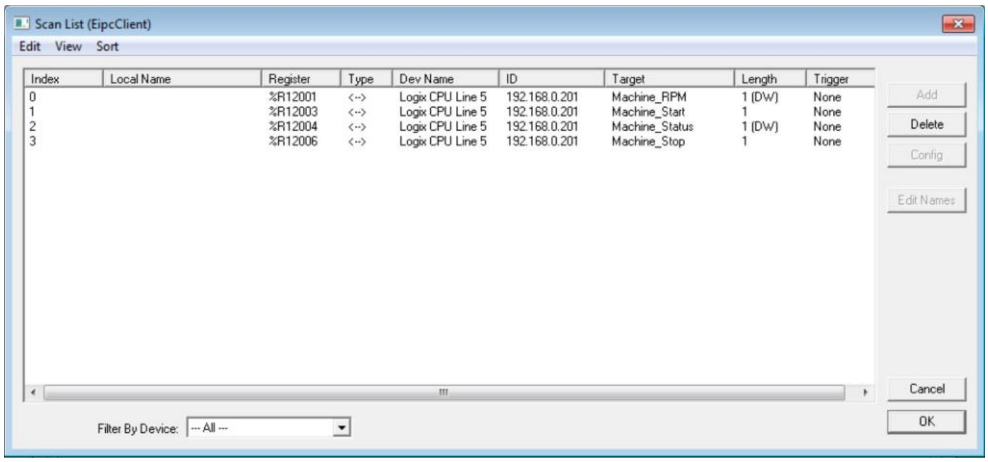
11) Click on the **Config** button for the LAN port to which the Logix Tag Exchange was assigned. In theexample above, **LAN1**.



12) *EipcClient vX.XX* should be displayed in the appropriate **Downloadable Protocols** pull-down 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.



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.

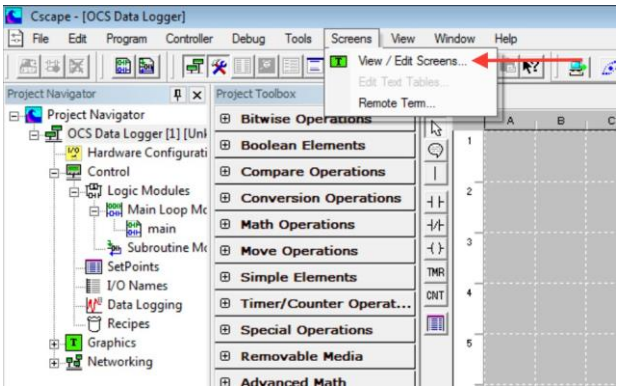


14) The **Scan List** dialog box shows the detailed mapping of each imported tag. This includes the specific **Register** mapped to the tag, Logix CPU Name it is associated with (**Dev Name**), the name of the tag (**Target**), and its **Length** in Words or Double Words (DW). Tags that are 1-bit, 8-bit, 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.

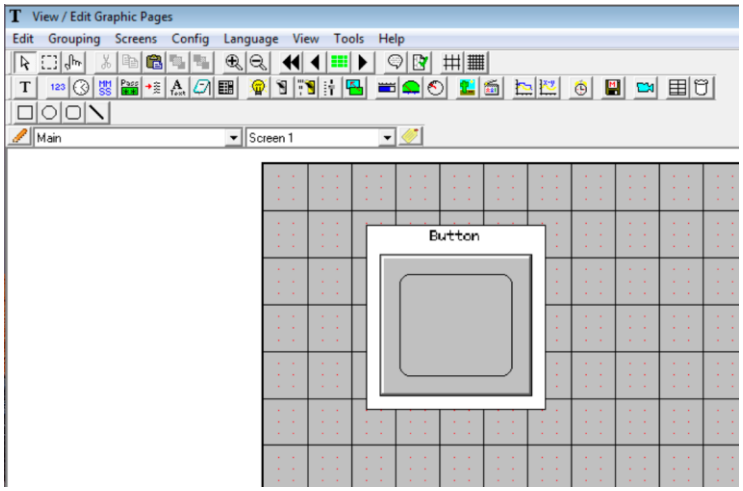
D. Accessing Imported Logix Tags from the Cscape Graphics Editor

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 tothe OCS, or creating screens that are to be published as Web Pages. :

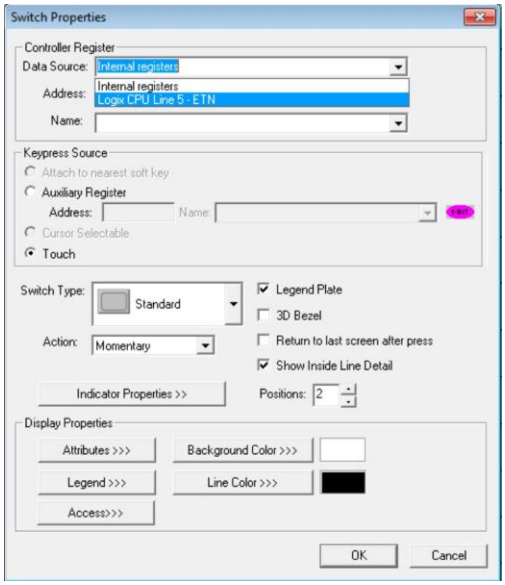
1) Click **Screens** **View / Edit Screens** to launch the Cscape Graphics Editor.



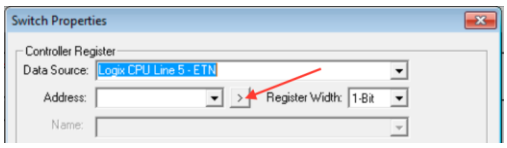
2) Select a Graphic Object by clicking on one of the icons. In this example, we will Click the **Switch Object**. To place the object, Click and Hold somewhere on the screen, then drag from top-left to bottom-right to size the object. Release the mouse, then Double-click the object to configure it.



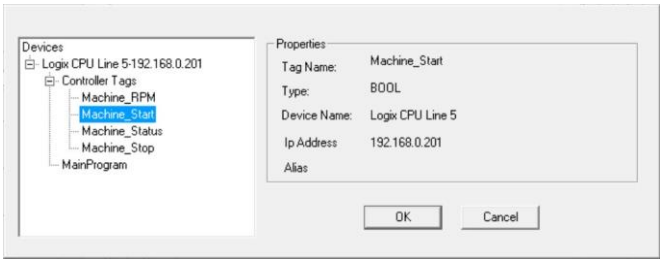
3) In the **Controller Register** section of the dialog box, examine the **Data Source** pull-down list, and Select the Logix CPU data source from the list:



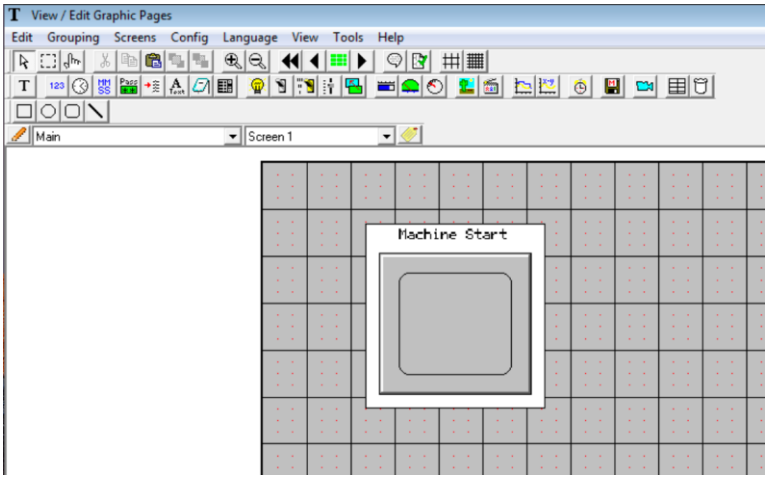
4) Next to the **Address** field, **Click** on the **Arrow icon**:



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**.



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) andoperation (i.e. momentary, toggle) of the button as desired. Click **OK** when complete.

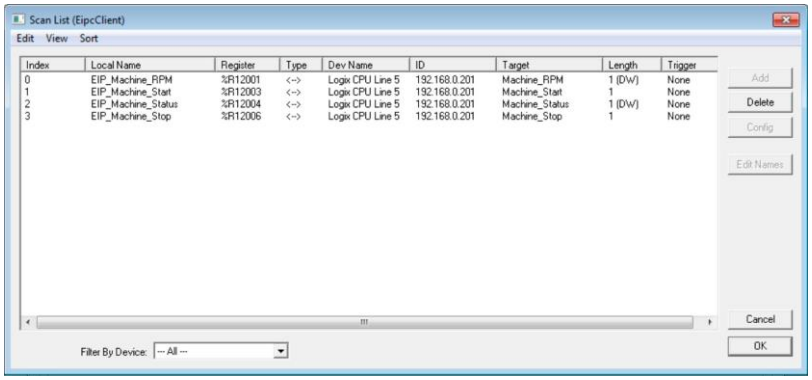


7) At run-time, whenever the switch is operated from the touch screen – the OCS will write a **1** to the *Machine_Start* tag. When the button is released, the OCS will write a 0 to the same tag.

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.

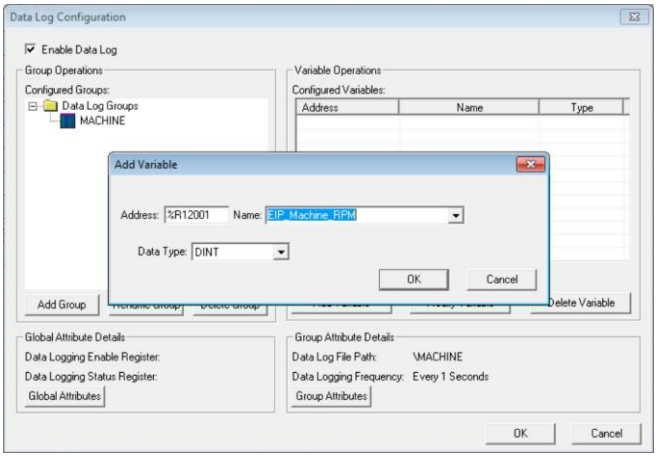
Return to the Ethernet IP Client Scan List. Click **Controller** **Hardware Configuration**, Click **Config** next to the appropriate LAN port, and Click **Scan List** next to the Ethernet IP Client Downloadable Protocol.



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 tothe Datalog.

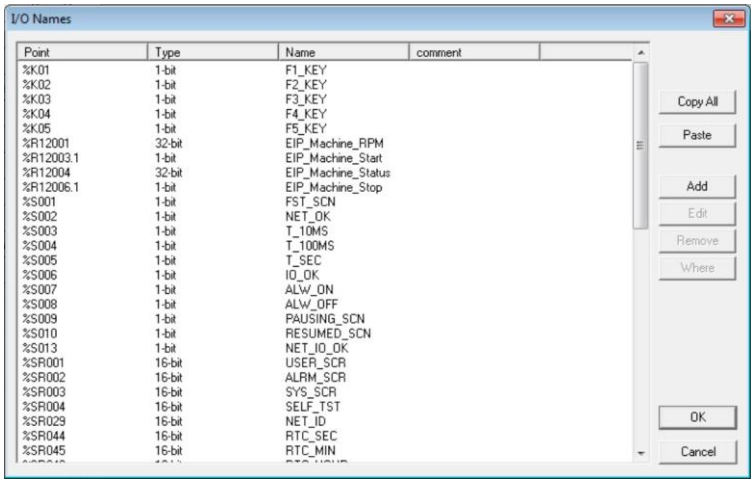


4.2 Helpful Hints for creating Local I/O Names

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.
    h. 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.
    l. 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.



E. TECHNICAL SUPPORT

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

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