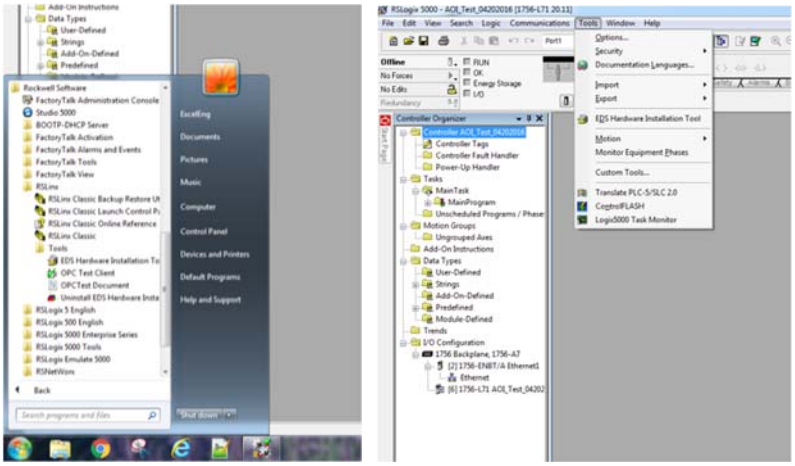
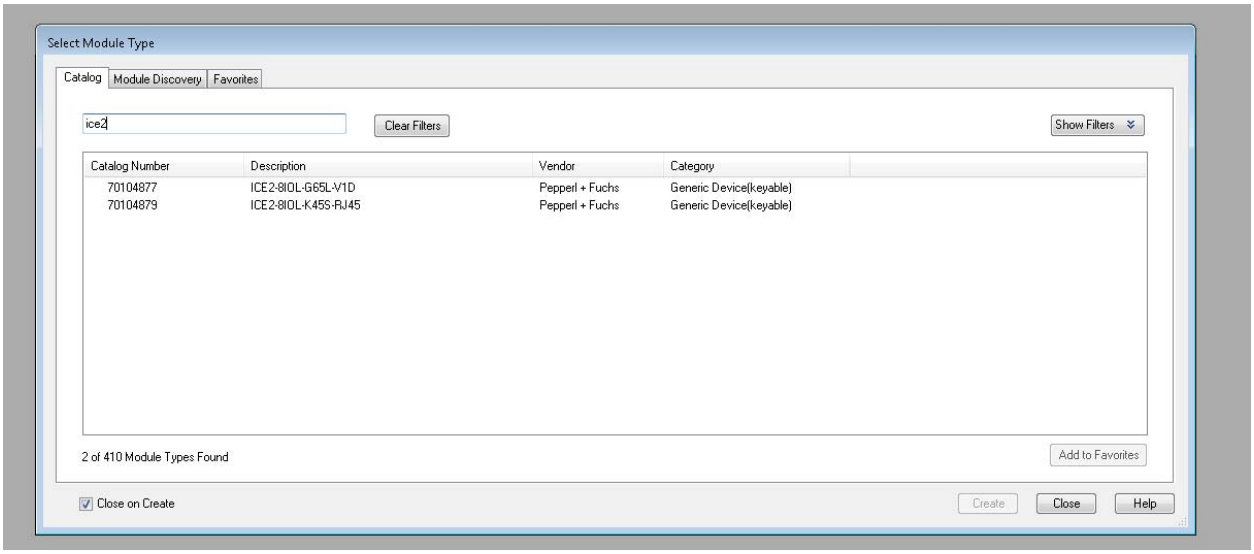
Comtrol_ICE2_x_Port AOI

Installation and Configuration Guide

Contents

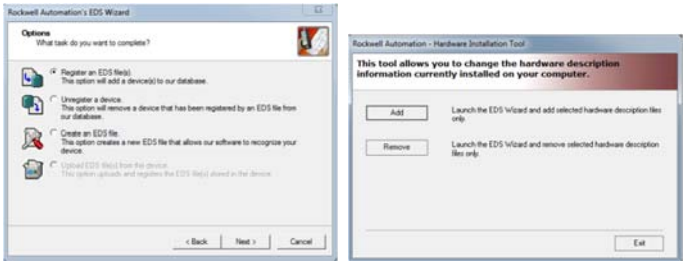
EDS Installation





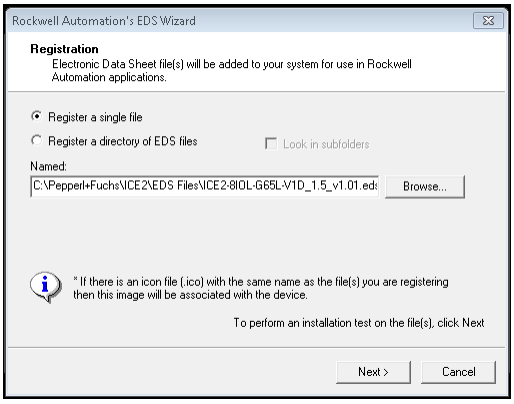
To install an EDS (Electronic Datasheet), the EDS Hardware Installation Tool is used. To access this program, either select it from RSLinx → Tools in the program menu, or from the Tool dropdown menu in RSLogix 5000. Once the installation tool is running, perform the following procedure:

1. Select “Register an EDS file(s)” and press Next. NOTE: In the RSLinx version of the installation tool, press the Add button. The remaining steps are identical between the two program versions.

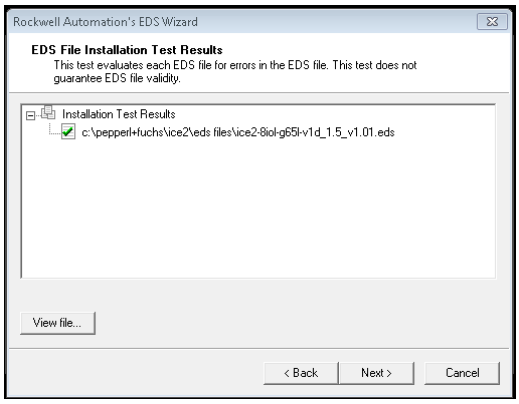


2. Select “Register a single file.”

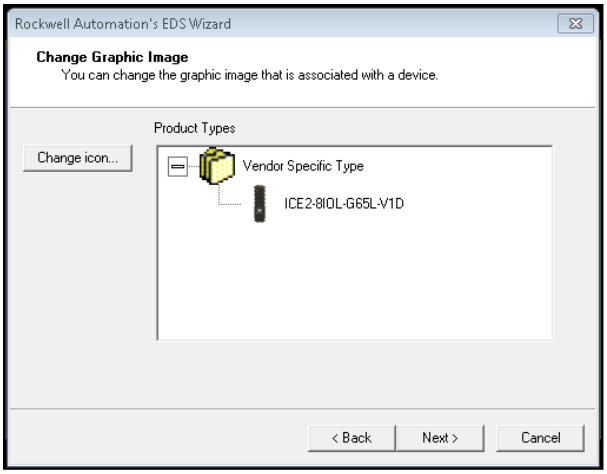
3. Enter the path to the EDS, or press Browse and navigate to the EDS file, then press Open.
4. Press Next.

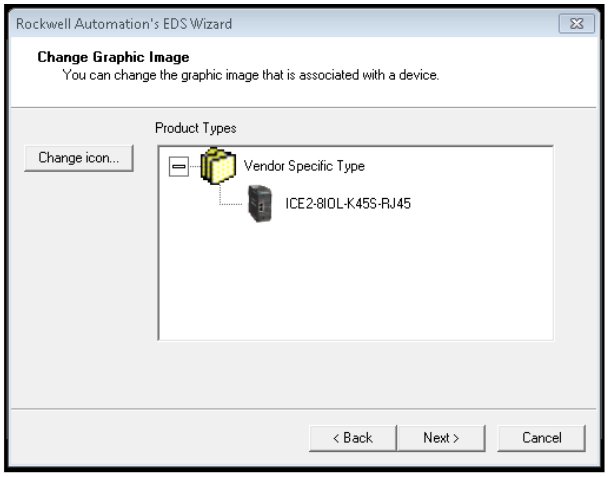


5. EDS File Installation Test Results should show a green check mark if the EDS is valid.



6. Continue pressing Next until the installation wizard is complete.



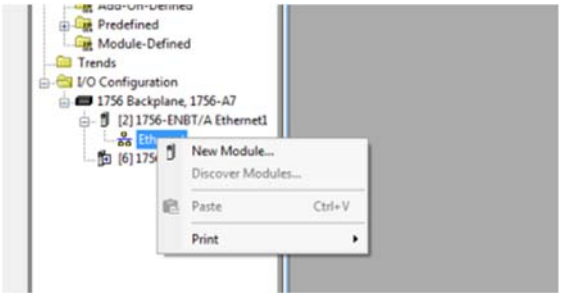


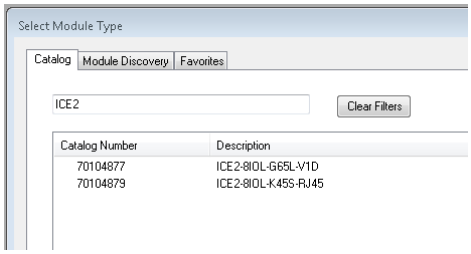
7. To add another EDS, repeat Steps 1 – 6. When finished, exit the Installation Tool.
8. Rockwell software may need to be restarted to see the new EDS files.

Module Installation

Once the EDS is installed, a user may install the module in RSLogix either by module discovery, or by selecting the appropriate module from a list.

1. In the I/O Configuration tree, right-click on the Ethernet connection to the IO-Link module.
    a. Select New Module.
    b. Enter ICE2 into the search box. This will display only ICE2 modules.
    c. Choose the desired module, then press the Create button.

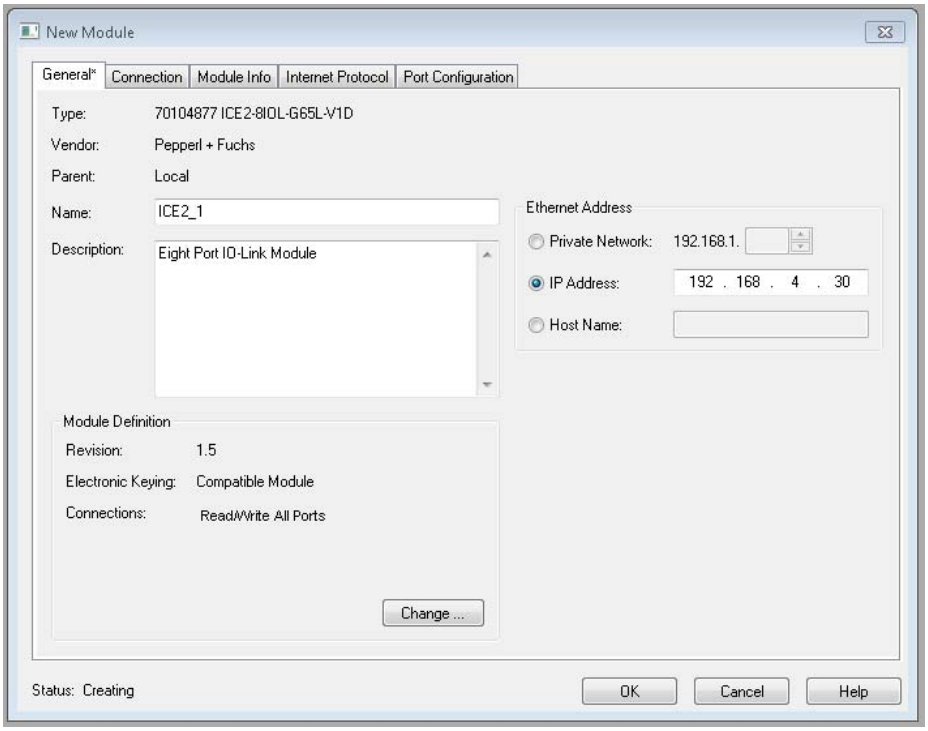




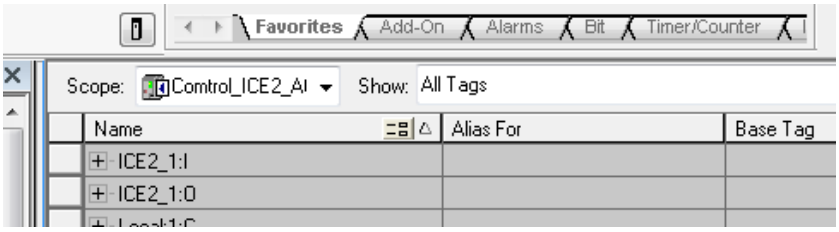
–OR-

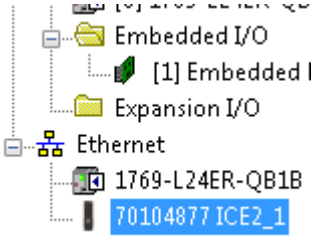
    d. Select Discover Module. This option is only available if RSLogix is online with the PLC.
    e. Select the detected module, then press Create.

2. Give the module a name, description, and IP address. If the module was discovered, the IP address will already be supplied.



3. Modify other settings, if desired, and then press OK. The module will be added to the tree, and I/O tags will be added to the Controller Tags.

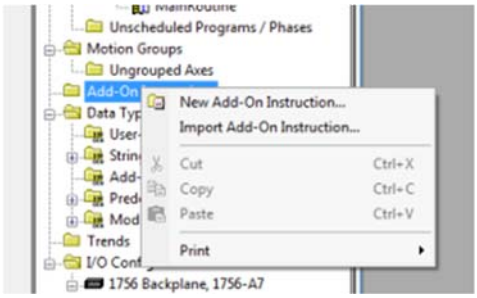




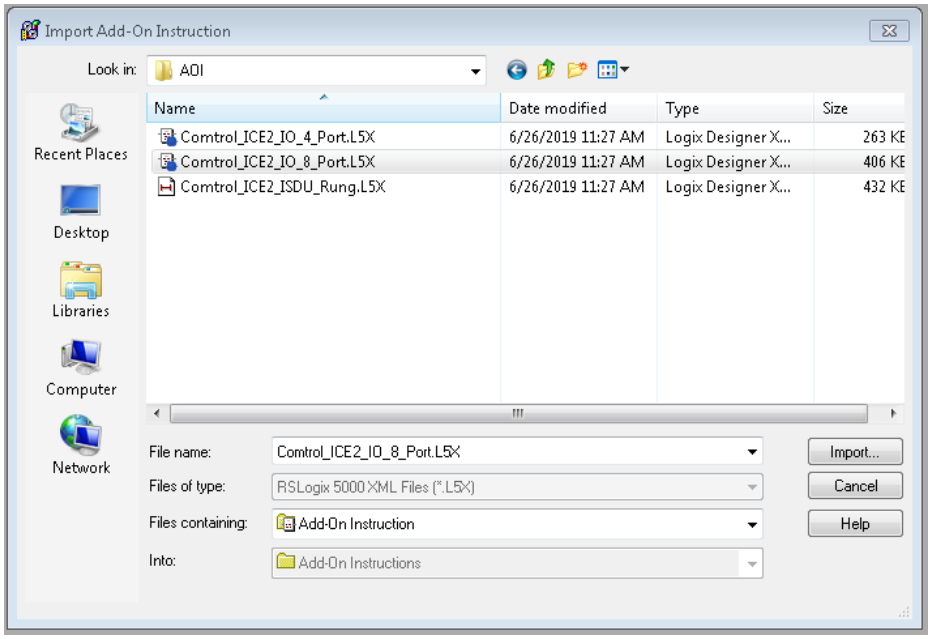
AOI Installation

The ICE2 AOIs must be imported into the PLC program before use.

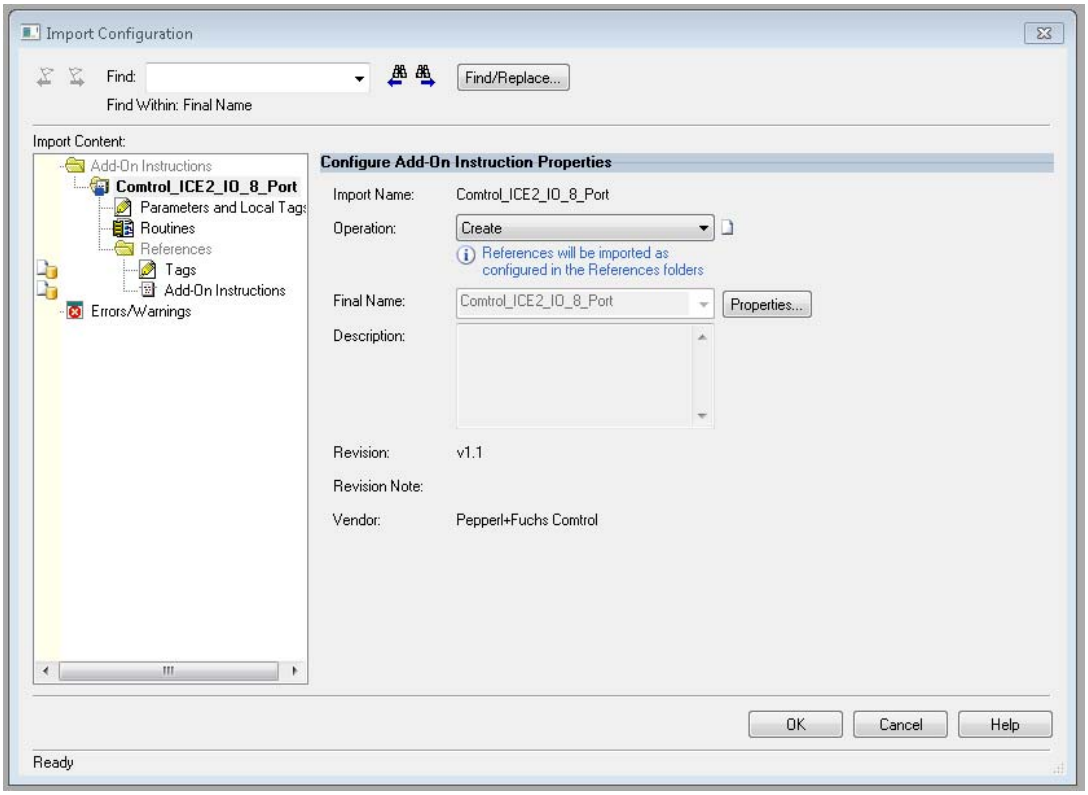
1. Right-click on Add-On Instructions in the Controller Organizer. Select "*Import Add-On Instruction*".



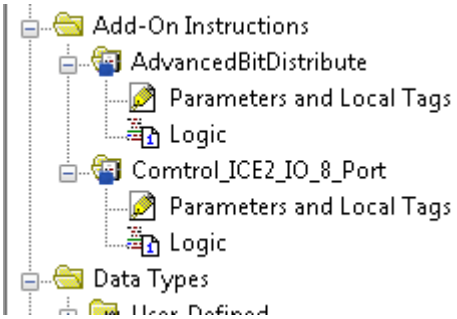
2. Navigate to the directory with the IO-Link Master AOI L5k files and select Comtrol_ICE2_IO _x_Port.L5X, where x = 4 or 8 and click "Import".



3. Review the import configuration and correct any error, then click "OK". Errors are marked by red flags, and are typically listed in the Errors/Warnings section of AOI Import.

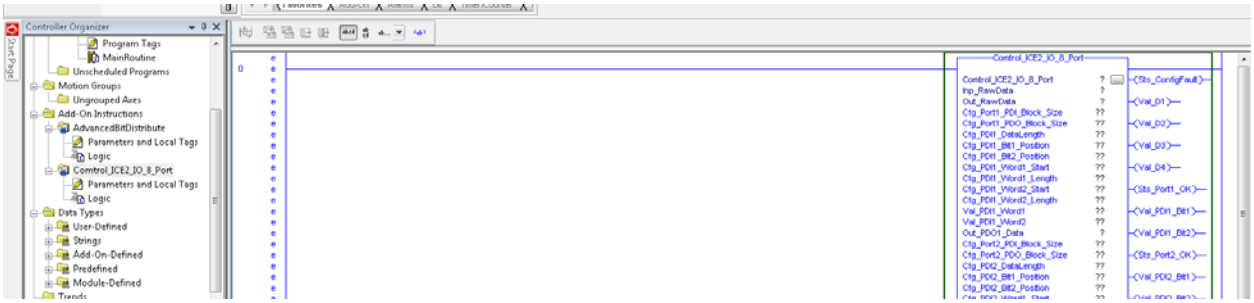


4. The Comtrol_ICE2_IO_x_Port and AdvancedBitDistribute AOIs are added to the tree.

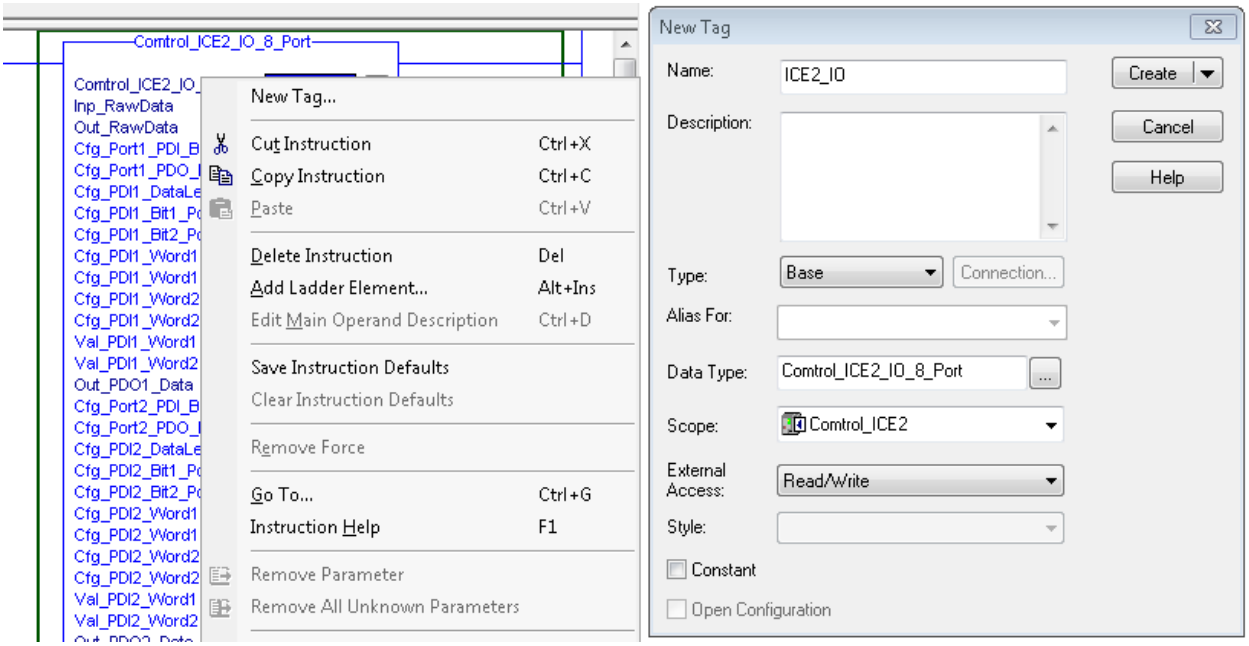


Creating an AOI Instance

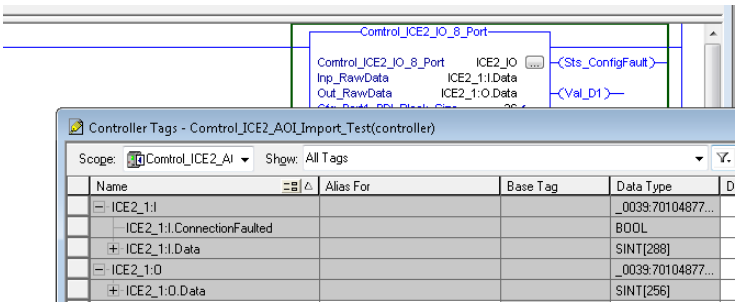
1. To use the AOI, simply drag it from the Controller Organizer to desired position in the program logic. This will create a new instance of the AOI.



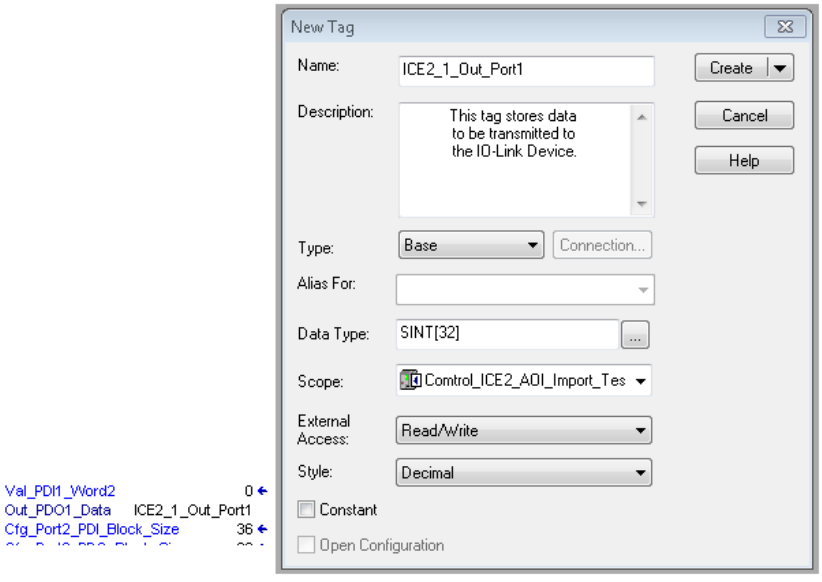
2. A backing tag must be made for the new AOI, to store data. To create a backing tag:
    a. Right-click the "?" next to the Comtrol_ICE2_IO_x_Port parameter on the AOI faceplace, and select "New Tag…"
    b. In the popup, enter "Name" for the new instance.
    c. Add a description, if desired.
    d. Ensure that the tag is in the desired scope (Controller vs. Program).
    e. Do not change the datatype, or else the AOI will not work correctly.
    f. Click "Create".
    g. All default configuration values for the AOI will be automatically generated. These may be changed during configuration.



3. Next, link the raw input and output data to the AOI.
    a. Double-click on the "?" next to the Inp_RawData parameter on the AOI faceplace, then click the down arrow.
    b. Find the input tag that was automatically created when IO-Link module was installed. Its name will follow the format <Module Name>:I.
    c. Use the plus sign (+) to expand the tag. Find the subtag called <Module Name>:I.Data. Double-click this tag to select it.
    d. Repeat steps a – c for the Out_RawData parameter. The output tag will follow the format <Module Name>:O.Data.



4. Add tags for port Output data – each port needs its own tag.
    a. Right-click the "?" next to the Out_Portx_Data, where x is the port number. Select "New Tag…"
    b. Name the storage tag.
    c. Add a description, if desired.
    d. Change SINT[1] to SINT[32] (for default output block size)
    e. Press Create.
    f. Repeat steps a – f for each IO-Link port.



5. The AOI should now be functional. If ‘e’s are still present on the left side of the rung, review the above steps and make any necessary corrections.

Additional Configuration for the AOI

Setting the PDI_ and PDO_Block_Size

The Cfg_Portx_PDI_Block_Size and Cfg_Portx_PDO_Block_Size define the block size of input and output bytes transferred by the IO-Link Master for each port. By default, each IO-Link Master port is set to 36 byte input block and 32 byte output block.

If the default block sizes are not being used then the above AOI values must be set to match the IO-Link Master.

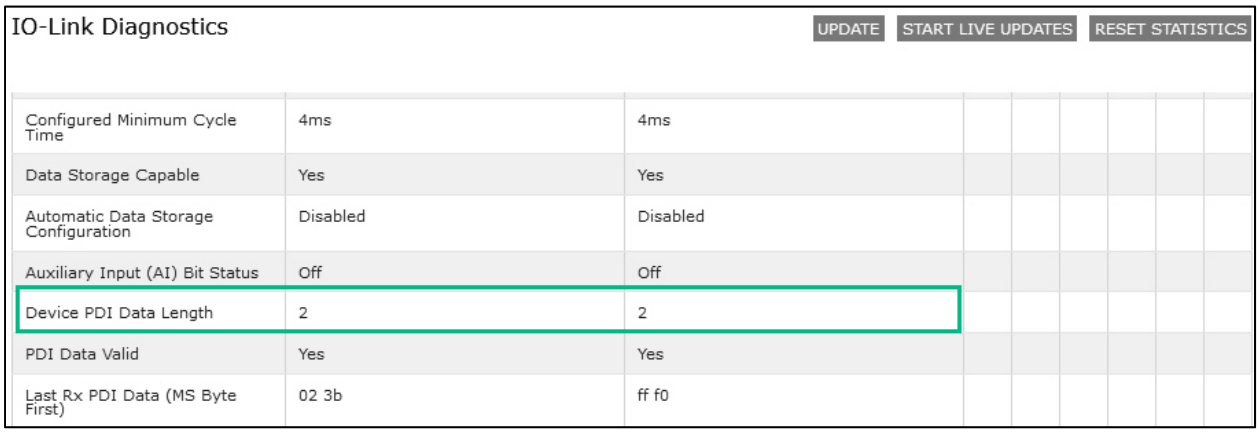
EtherNet/IP Settings

ETHERNET/IP PORT CONFIG	PORT 1 EDIT	PORT 2 EDIT	PORT 3 EDIT	PORT 4 EDIT
ISDU Data Settings:				
ISDU Response Timeout (1 - 10000)	0 sec	20 sec	20 sec	20 sec
Process Data Settings:				
PDI Data Block Size (To PLC)	36 bytes	36 bytes	36 bytes	36 bytes
PDI Data Block Format (To PLC)	word (16 bit)	word (16 bit)	word (16 bit)	word (16 bit)
PDI Data Byte-Swap Method	word (16 bit) byte-swap	word (16 bit) byte-swap	word (16 bit) byte-swap	word (16 bit) byte-swap
PDO Data Block Size (From PLC)	32-bytes	32-bytes	32-bytes	32-bytes
PDO Data Block Format (From PLC)	word (16 bit)	word (16 bit)	word (16 bit)	word (16 bit)
PDO Data Byte-Swap Method	word (16 bit) byte-swap	word (16 bit) byte-swap	word (16 bit) byte-swap	word (16 bit) byte-swap

Setting the Input Data Length

****** Very Important – this must be done for the data to be parsed correctly ******

The Cfg_Portx_DataLength parameter refers to the number of bytes that make up input process data, for a given port. This value must match the device PDI bytes found on the IO-Link Master Diagnostics page or sensor datasheet.



The input data block has 4 header bytes followed by the device PDI data bytes, the rest of the block is filled with nulls (0).

Setting the IO-Link Master Port Byte Swap

Using the web pages of the IO-Link Master, select “Configuration” from the menu and then “ETHERNET/IP SETTINGS”. The master should be set to defaults as shown below with the exception of the byte-swap. Change each port byte swap to “no byte-swap”.

EtherNet/IP Settings

ETHERNET/IP PORT CONFIG	PORT 1 EDIT	PORT 2 EDIT	PORT 3 EDIT	PORT 4 EDIT
ISDU Data Settings:				
ISDU Response Timeout (1 - 10000)	20 sec	21 sec	22 sec	23 sec
Process Data Settings:				
PDI Data Block Size (To PLC)	36 bytes	36 bytes	36 bytes	36 bytes
PDI Data Block Format (To PLC)	word (16 bit)	word (16 bit)	word (16 bit)	word (16 bit)
PDI Data Byte-Swap Method	no byte-swap	no byte-swap	no byte-swap	no byte-swap
PDO Data Block Size (From PLC)	32-bytes	32-bytes	32-bytes	32-bytes
PDO Data Block Format (From PLC)	word (16 bit)	word (16 bit)	word (16 bit)	word (16 bit)
PDO Data Byte-Swap Method	word (16 bit) byte-swap	word (16 bit) byte-swap	word (16 bit) byte-swap	word (16 bit) byte-swap
Clear Event Code In PDO Block	false	false	false	false

ETHERNET/IP CONFIGURATION	EDIT
TTL (Time To Live) Network Value (1 - 255)	1 hop(s)

Configuring the Input Data Parsing

The AOI can extract 2 bits and 2 words from each port’s input data.

To extract a bit:

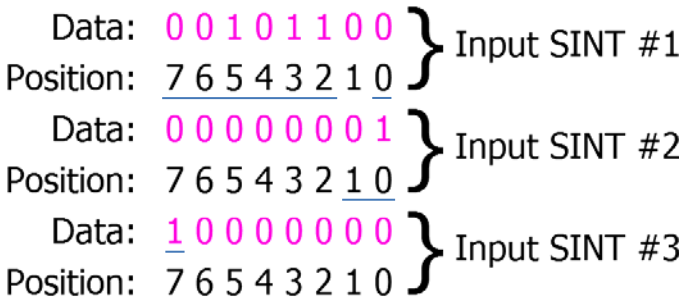
1. Double-click the number next to the Cfg_Portx_Bity_Position parameter, where x is the port number and y is either 1 or 2.
2. Set the parameter to the position of the desired bit. The position will be a number from 0 to the Cfg_Portx_Data_Length * 8 – 1.
3. The value of the parsed bit will be shown in Val_Portx_Bity, where x is the port number, and y is equivalent to the number selected in step 1.
4. To use this bit elsewhere in the program logic, navigate to the AOI backing tag, then use the plus sign (+) to expand it. The bit value will be called <Backing Tag Name>.Val_Portx_Bity, using the above substitutions.

To extract a word:

1. Double-click the number next to the Cfg_Portx_Wordy_Start parameter, where x is the port number and y is either 1 or 2.
2. Set the parameter to the position of the desired bit. The position will be a number from 0 to the Cfg_Portx_Data_Length * 8 – 1.
3. Double-click the number next to the Cfg_Portx_Wordy_Length parameter, where x is the port number and y is the number chosen above.
4. Set the parameter to the number of bits in the data to be parsed. This must be between 0 and 32.
5. The value of the parsed data will be shown in Val_Portx_Wordy, where x is the port number, and y is equivalent to the number selected in step 1.
6. To use this bit elsewhere in the program logic, navigate to the AOI backing tag, then use the plus sign (+) to expand it. The bit value will be called <Backing Tag Name>.Val_Portx_Wordy, using the above substitutions.

Example:

The device connected to IO-Link port 2 has data of interest in the first three SINTs after the header data. Cfg_Port2_DataLength should be set to 3.



Setting Cfg_Port2_Bit1_Position to 0, the first status bit is parsed and displayed in Val_Port2_Bit1. Its value is 0. If the AOI backing tag is named ICE2_1, the tag can be referenced at ICE2_1.Val_Port2_Bit1.

Set Cfg_Port2_Bit2_Position to 23 to parse the second status bit. It will appear in Val_Port2_Bit2, with a value of 1; the tag path is ICE2_1.Val_Port2_Bit2.

To extract the remaining process data, first note that is it 10 bits long. That is less than one word (32 bits). Set Cfg_Port2_Word1_Start to 2, and Cfg_Port2_Word1_Length to 10. The result, located in Val_Port2_Word1, is 75 (01001011 binary = 75 decimal). The tag path is ICE2_1_Val_Port2_Word1.

Send Output Data to an IO-Link Device

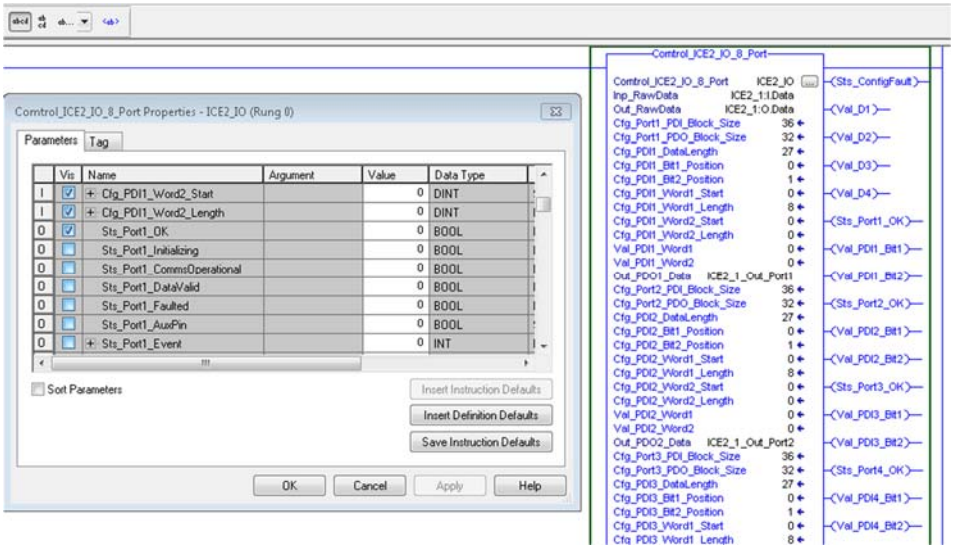
Send output data to a device is as simple as copying the data into the storage tag for the corresponding port's output data. The output is automatically updated. It will continue to send the value until a new number is copied into the tag.

Accessing the Digital I/O (only for DR-8-EIP)

The DR-8-EIP module contains 2, non-IO-Link, digital inputs, and 2 digital in-outs (can function as either inputs or outputs. This I/O is wired to the terminals marked DI and DIO. To display these inputs, they must first be correctly configured in the IO-Link Gateway webpage. Additionally, the PDI_Bytes value for port 1 must be at least 2. Digital inputs will then automatically appear at tags Val_D1, Val_D2, Val_D3, and Val_D4.

AOI Status Parameters

To access the full list of AOI parameters, included status tags that are not normally visible, left-click on the ellipses button(…) located in the upper-right corner of the AOI. Parameters are located beneath the Parameters tab.



AOI Status		
Tag Name	**Description**	**Visible**
Sts_ConfigFault	Flag that indicates that there is a configuration fault in the AOI.	x
Sts_ConfigFaultCode	Code that indicates which configuration fault is active. See AOI Configuration Faults for details.	--
Port Status (where x = Port Number)		
Tag Name	**Description**	**Visible**
Sts_Portx_AuxPin	If the connected IO-Link Device uses the auxiliary pin, this flag shows its state.	--
Sts_Portx_CommsOperational	This flag is set if a device is connected to the port, and it is communicating correctly.	--
Sts_Portx_DataValid	This flag is set after valid data is first received after an IO-Link device is connected to the port. Until the device sends data for the first time (usually after the device changes state), this flag will be false.	--
Sts_Portx_Event	An event code for the connected IO-Link Device. See device document for possible event values.	--
Sts_Portx_Faulted	Connected IO-Link device is reporting a fault.	--
Sts_Portx_Initializing	Port is initializing. This takes place after a device is connected to the port, or the IO-Link Master has powered up.	--
Sts_Portx_OK	The OK flag is true when a device is connected and communicating correctly, has finished initializing, has sent valid data, and is not faulted. OK = (NOT Initializing) AND (CommsOperational) AND (DataValid) AND (NOT Faulted)	x

Status tags can be referenced elsewhere in PLC logic using the following format: < Backing Tag>.<Status Tag>.

AOI Configuration Faults

The Sts_ConfigFaultCode is an array of bits, each of which corresponds to a type of error. Multiple errors may be active at once.

Error Code Flag Bit	Description
0	Port 1 Input Configuration Fault
1	Port 2 Input Configuration Fault
2	Port 3 Input Configuration Fault
3	Port 4 Input Configuration Fault
4	Port 5 Input Configuration Fault
5	Port 6 Input Configuration Fault
6	Port 7 Input Configuration Fault
7	Port 8 Input Configuration Fault
8	Port 1 Output Configuration Fault
9	Port 2 Output Configuration Fault
10	Port 3 Output Configuration Fault
11	Port 4 Output Configuration Fault
12	Port 5 Output Configuration Fault
13	Port 6 Output Configuration Fault
14	Port 7 Output Configuration Fault
15	Port 8 Output Configuration Fault
16	Not Used
17	Not Used
18	Not Used
19	Not Used
20	Not Used
21	Not Used
22	Not Used
23	Not Used
24	Not Used
25	Master Input Configuration Fault
26	Master Output Configuration Fault
27	Not Used
28	Not Used
29	Not Used
30	Not Used
31	Not Used

Port x Input Configuration Fault

Port x Input Configuration Faults are port specific faults that concern the values of PDI_Bytes, DataLength, or the bit and word parsing feature.

Possible Causes:

The Sum of Cfg_Port1_PDI_Bytes … Cfg_Portx_PDI_Block_Size exceeds the number of bytes available in Inp_RawData.

Cfg_Portx_DataLength is less than 0 or greater than Cfg_Portx_PDI_Block_Size – 4 (the number of header bytes).

Cfg_Portx_Bity_Position is less than 0 or greater Cfg_Portx_DataLength * 8.

Cfg_Portx_Wordy_Start is less than 0 or greater Cfg_Portx_DataLength * 8.

Cfg_Portx_Wordy_Length is less than 0 or greater than 32.

Cfg_Portx_Wordy_Start + Cfg_Portx_Wordy_Length is greater than Cfg_Portx_DataLength * 8.

Port x Output Configuration Fault

Port x Output Configuration Faults are port-specific faults that concern the values of PDO_Bytes and Out_Portx_Data, the output data storage tag.

Possible Causes:

The Sum of Cfg_Port1_PDO_Bytes … Cfg_Portx_PDO_Block_Size exceeds the number of bytes available in Out_RawData.

Cfg_Portx_PDO_Block_Size is less than 0 or greater than 36.

Cfg_Portx_PDO_Block_Size is greater than the number of bytes in Out_Portx_Data, the output data storage tag.

Master Input Configuration Fault

A master input configuration fault occurs when the sum of all Cfg_Portx_PDI_Block_Size values exceed the bytes in Inp_RawData. This error is always coupled with a Port x Input Configuration Fault, at the port at which the requested input bytes first surpassed quantity of available input data.

Master Output Configuration Fault

A master output configuration fault occurs when the sum of all Cfg_Portx_PDO_Block_Size values exceed the bytes in Out_RawData. This error is always coupled with a Port x Output Configuration Fault, at the port at which the requested output bytes first surpassed quantity of available output data.