



IC70 IO-Link Device Parameter Data Add-On Instruction Guide, v4 November 25th, 2024

This document covers the installation and use of Add-On Instruction (AOI) for the Logix Designer software package from Rockwell Automation. This AOI handles acyclic IO-Link commands to and from a SD50 Pro device. This AOI has nine User Defined Tag data types.

This IO-Link Device Parameter Data AOI is meant to be used alongside a v4 Banner IO-Link Master AOI.

Components

Banner_IC70_Param_v4_AOI.L5X

UDT's Packaged with the AOI

Banner_IC70_16P_Config_v4
Banner_IC70_16P_Direct_Param_v4
Banner_IC70_16P_IO_Metrics_v4
Banner_IC70_16P_RD_v4
Banner_IC70_16P_SMR_Port_v4
Banner_IC70_16P_v4
Banner_IC70_16P_WD_v4
Banner_IOL_PORT_v4

NOTE:

This Banner IO-Link Device Parameter AOI is useless on its own.

It is intended to be linked to a v4 Banner IO-Link Master AOI to function.

Other AOIs Available Separately

Banner has AOI files for controlling other Banner IO-Link devices and for a variety of IO-Link Masters. Banner also has AOI files for easily handling Banner device Process Data.

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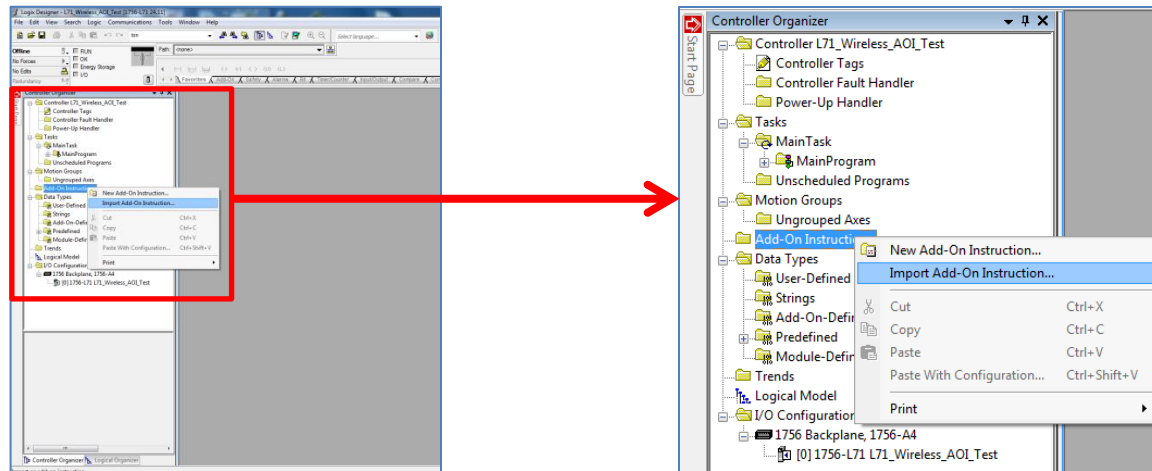
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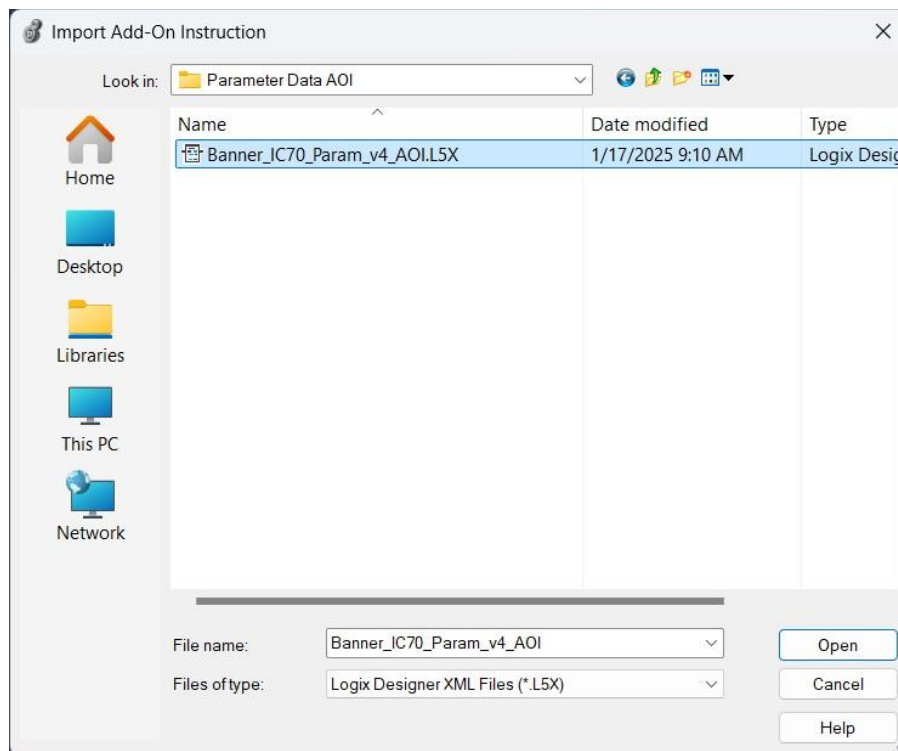
1. Installation Process

This section describes how to install the AOI in Logix Designer software.

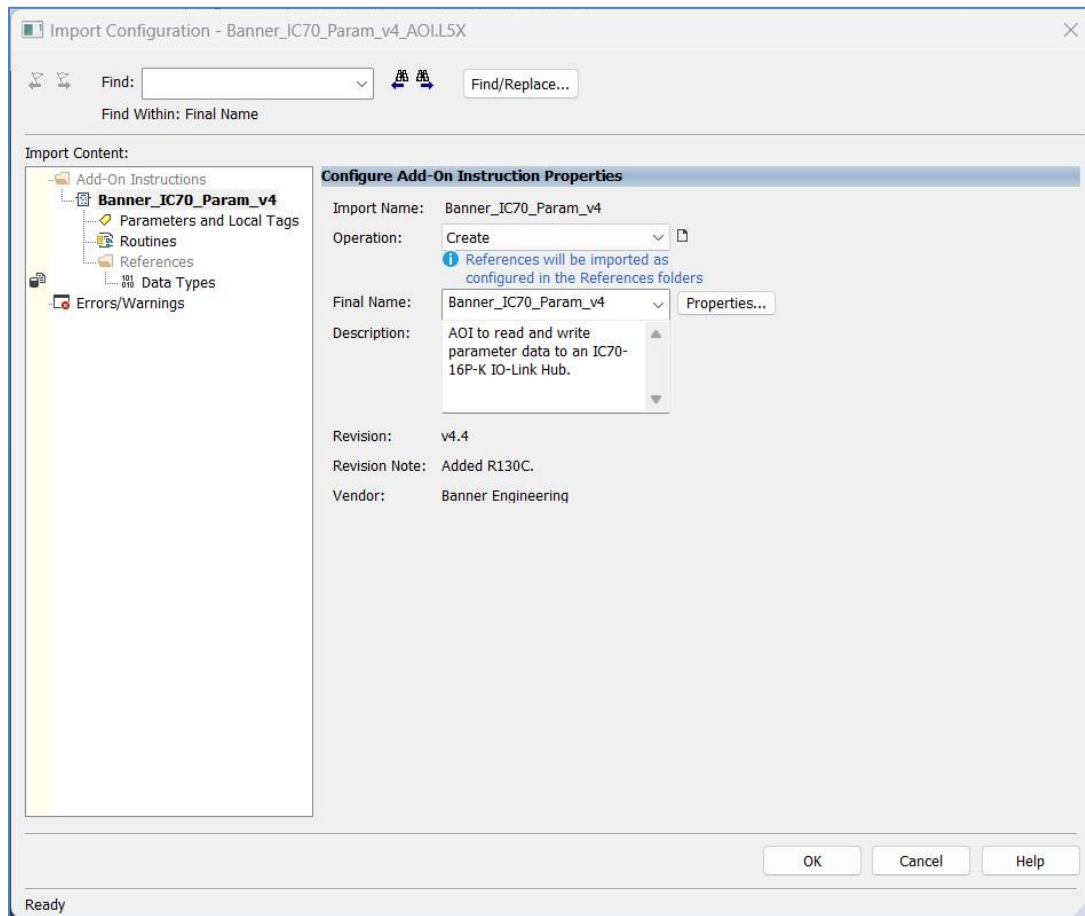
1. Open a project.
2. In the Controller Organizer window, right-click on the Add-On Instruction folder. Select the Import Add-On Instruction option.



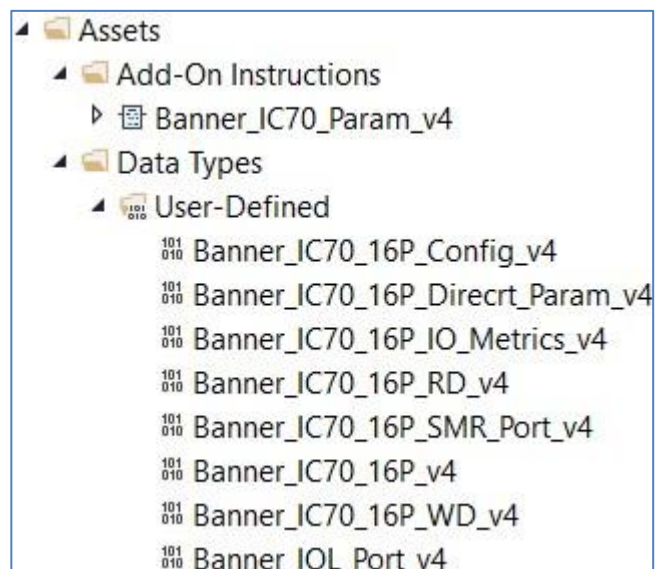
3. Navigate to the correct file location and select the AOI to be installed. In this example the "Banner_IC70_Param_v4_AOI.L5X" file will be selected. Click the Open button.



4. The Import Configuration window will pop up. The default selection will create all the necessary items for the AOI. Click the OK button to complete the import process.



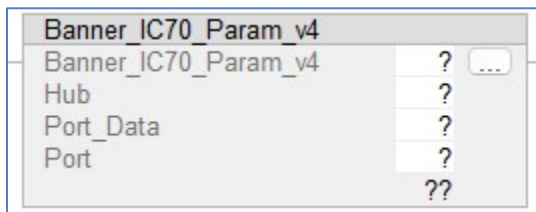
5. The AOI is added to the Controller Organizer window and should look like the picture on the right.
6. AOI installation into the Logix Designer software complete.



2. Configuring the AOI

Make sure to add and configure a Banner IO-Link Master AOI to your program before adding a Banner IO-Link Device AOI.

1. Add the “Banner_IC70_Param_v4” AOI to your ladder logic program. For each of the question marks shown in the instruction we need to create and link a new tag array. The AOI includes new types of User Defined Tag (UDT): custom arrays of tags meant specifically for this AOI.



2. In the AOI, right-click on the question mark on the line labeled “Banner_IC70_Param_v4”. Click New Tag. In this example, we’ll use the name “IC70_IOLM1_01_Status”. The example naming convention accounts for this being an IC70 device connected to IO-Link Master #1, port #1, in our program. More masters could be named IOLM2, IOLM3, and different sensors could be connected at other port numbers, etc.

The “EnableIn” and “EnableOut” variables are ladder logic rung status bits automatically added to all AOIs.

3. Now click on the question mark on the line labeled “Hub”. Click New Tag. In this example, we’ll use the name “IC70_IOLM1_01”. This array of tags includes the port number to which the IC70 is connected and the Read and Write data blocks, made up of the information from the IC70 IO-Link Index and Subindex values.

New Tag

Name: IC70_IOLM1_01

Description:

Usage: <controller>

Type: Base Connection...

Alias For:

Data Type: Banner_IC70_16P_v4

Parameter Connection:

Scope: Test

External Access: Read/Write

Style:

☐ Constant

☐ Sequencing

☐ Open Configuration

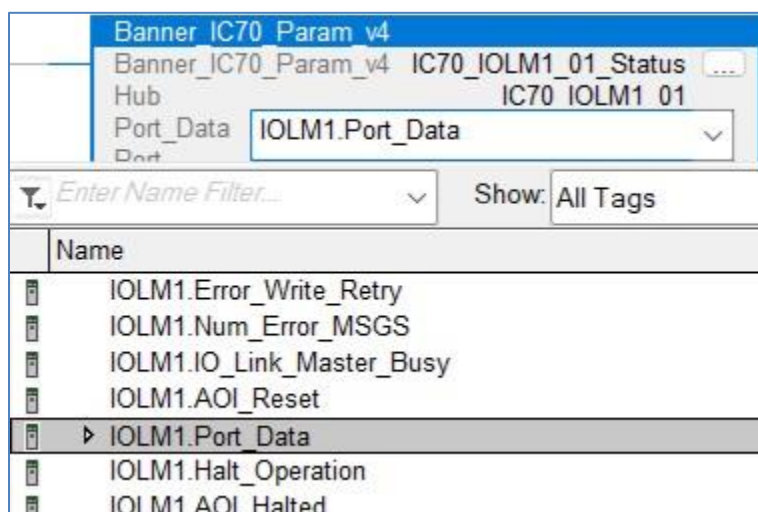
☐ Open Parameter Connections

Create Cancel Help

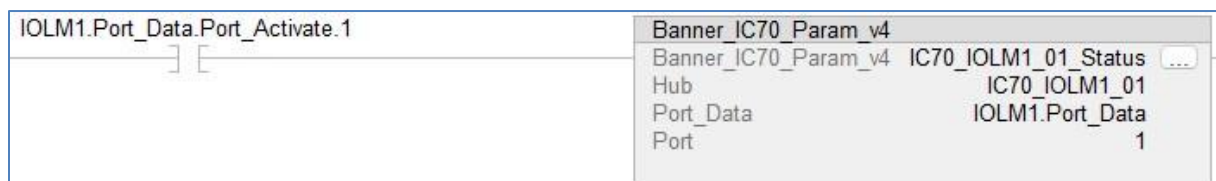
3. Linking the Device AOI to the Master AOI

The third tag in the IC70 AOI is meant to be tied to the IO-Link Master AOI.

1. For the “Port_Data” line, choose the relevant IO-Link Master AOI’s “Port_Data” variable. In this example, we choose “IOLM1.Port_Data”.



2. For the last line of the IC70 AOI, “Port”, type in a number equal to the IO-Link Master port number to which the IC70 is connected. In this example, the device is on port 1.



3. The final step is to place an examine on in front of the AOI. This is linked to the Port_Activate for the port the device is plugged into. In this example that is IOLM1.Port_Data.Port_Activate.

4. Using the Paired IO-Link Master and Device Parameter Data AOIs

The goal is to make the Banner device's IO-Link Index and Subindex values appear in PLC tag arrays as if it were an EtherNet/IP-speaking device. Reading from and writing to the Banner IO-Link device becomes as easy as changing tag values in the PLC. All the complicated work of translating from EtherNet/IP to IO-Link is handled automatically, behind the scenes.

When the program is downloaded to the PLC and the PLC goes into run mode, the IO-Link Master AOI performs a global read for each connected Banner device AOI.

There are two methods for acyclic reading of Banner device Index and Subindex values.

1. The initial global read, as requested by the IO-Link Master AOI after the PLC program is downloaded and run.
2. Manually via the "Command" variable found in every Device Parameter Data AOI. The "Command" register can be used to force one-time read or write actions, as described in Appendix A of any Banner Device Parameter AOI guide.

Acyclic writes are done by updating the values that need to be adjusted. Then enter the necessary value into the "Command" register to trigger a IO-Link Index write. Each ISDU Index has a specific value that activates it. The "Command" values are described in Appendix A.

Appendix A Command Register

The “Command” register can be used to control the connected IO-Link device ‘by hand’. Placing the correct command numbers into this register is how the AOI achieves its automatic control.

▲ IC70_IOLM1_01	{...}
IC70_IOLM1_01.Initial_Global_Read	0
▶ IC70_IOLM1_01.Command	0
▶ IC70_IOLM1_01.Read	{...}
▶ IC70_IOLM1_01.Write	{...}
IC70_IOLM1_01.Reset	0

The table below shows the command numbers associated with the reading and writing of specific pieces of data. See the IC70 IODD file or the IO-Link Data Reference Guide for more information of the parameters.

Table 1: AOI Command Numbers

SD50 Pro Parameter (IO-Link Index #)	Read Command	Write Command
Global Read (all)	1	
Direct Parameters (0)	2	
System Command (2)		43
Device Access Locks (12)	4	44
Serial Number (21)	5	
All Time Run Time (69)	6	
Resettable Run Time (70)	7	47
All Time Run time Event Time (78)	8	48
Resettable Run Time Event Time (79)	9	49
IO Metrics 1 to 8 (80)	19	50
IO Metrics 9 to 16 (81)	11	51
Selectable Metric Reset (82)	12	52
Channel 1 Configuration (87)	13	53
Channel 2 Configuration (88)	14	54
Channel 3 Configuration (89)	15	55
Channel 4 Configuration (90)	16	56
Channel 5 Configuration (91)	17	57
Channel 6 Configuration (92)	18	58
Channel 7 Configuration (93)	19	59
Channel 8 Configuration (94)	20	60
Channel 9 Configuration (95)	21	61
Channel 10 Configuration (96)	22	62
Channel 11 Configuration (97)	23	63
Channel 12 Configuration (98)	24	64
Channel 13 Configuration (99)	25	65
Channel 14 Configuration (100)	26	66
Channel 15 Configuration (101)	27	67
Channel 16 Configuration (102)	28	68

Appendix B AOI Resets

From time to time, a reset may be needed for an AOI, particularly if one of the read/write processes the AOI undertakes is interrupted. To this end, each Device Parameter Data AOI and IO-Link Master AOI has a reset bit.

Toggling this bit to a “1” causes the AOI to start over and try again.

▲ SD50_IOLM1_01	{...}
SD50_IOLM1_01.Initial_Global_Read	0
▸ SD50_IOLM1_01.Command	0
▸ SD50_IOLM1_01.Read	{...}
▸ SD50_IOLM1_01.Write	{...}
SD50_IOLM1_01.Reset	0

Best practices suggest adding a rung to your ladder logic program that resets all IO-Link Master and Device Parameter AOIs on the first scan. The example below shows one IO-Link Master, called IOLM1, and one connected IC70 having their respective AOIs being reset in this way.

