



Q20-2 IO-Link Device Parameter Data Add-On Instruction Guide, v4

July 24th, 2025

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 Q20-2. This AOI has four 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_Q20_2_Param_v4_AOI.L5X

UDT's Packaged with the AOI

Banner_Device_Locks_v4
Banner_Device_Param_v4
Banner_IOL_Port_v4
Banner_MDC_v4
Banner_Q20_2_BDC_v4
Banner_Q20_2_Config_v4
Banner_Q20_2_Pulse_v4
Banner_Q20_2_RD_v4
Banner_Q20_2_Status_v4
Banner_Q20_2_v4
Banner_Q20_2_WD_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.

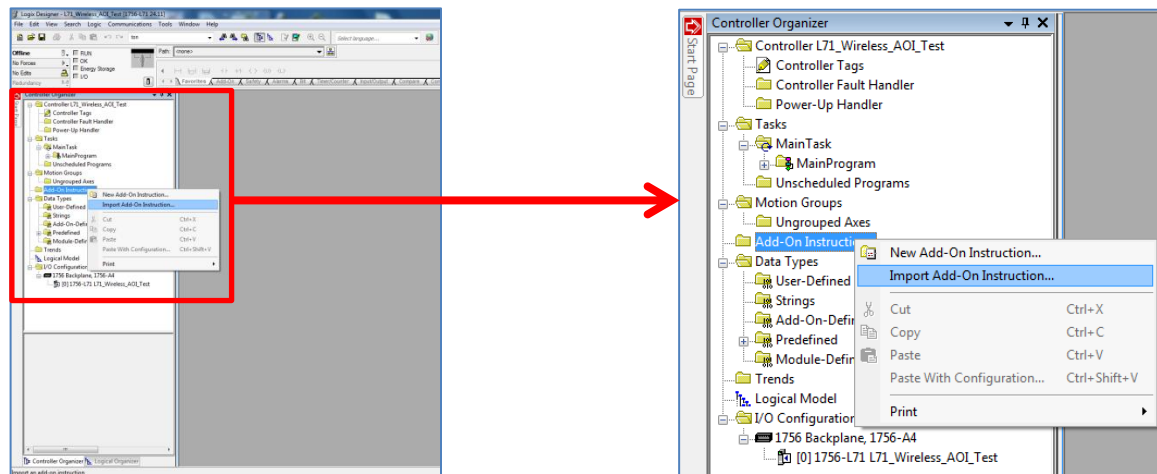
Contents

1.	Installation Process.....	1
2.	Configuring the AOI	3
3.	Linking the Device AOI to the Master AOI	5
4.	Using the Paired IO-Link Master and Device Parameter Data AOIs	6
Appendix A	Command Register.....	7
Appendix B	AOI Resets	8

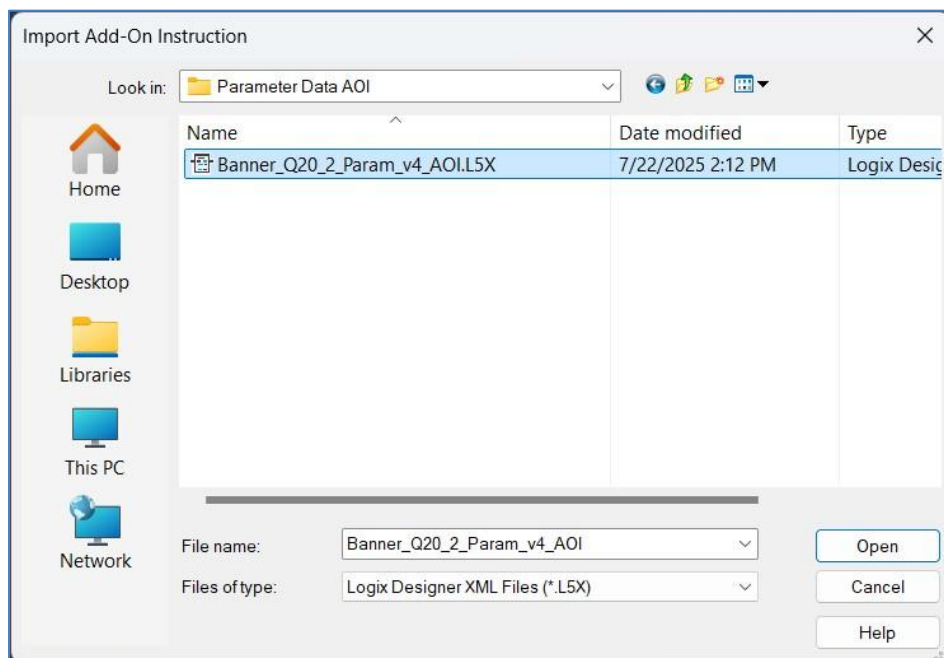
1. Installation Process

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

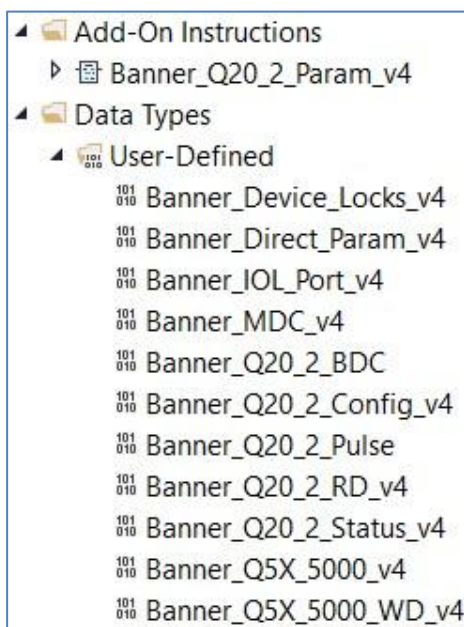
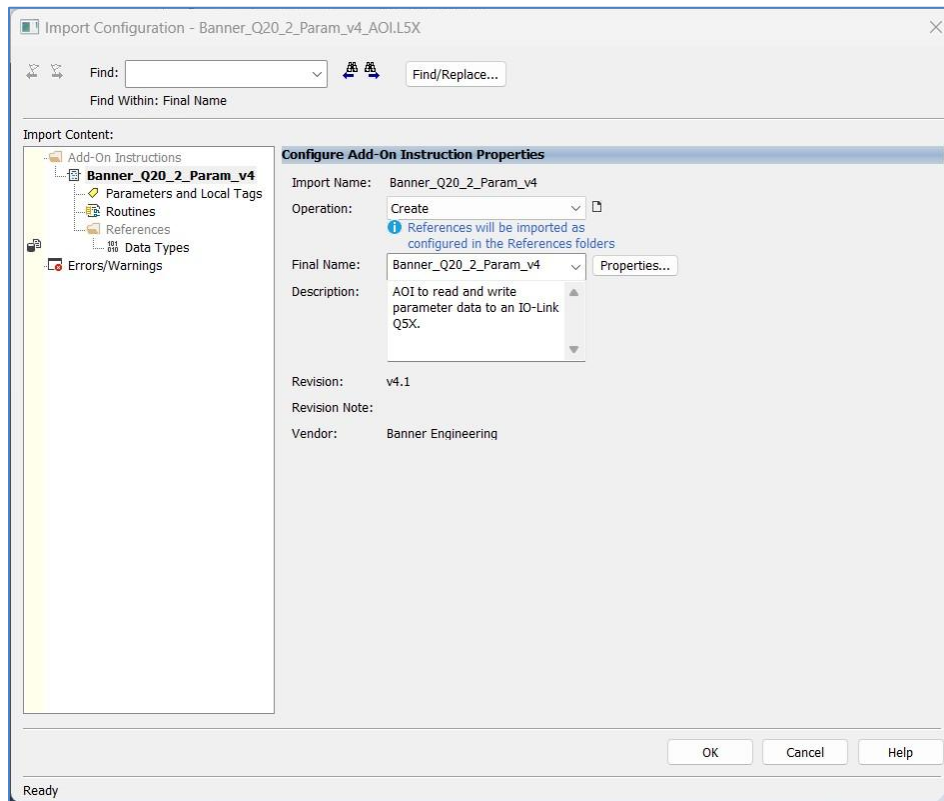
1. Open a project in Logix Designer software.
2. In the Controller Organizer window, right-click on the Add-On Instruction folder. Select the Import Add-On Instruction option.



3. Navigate to the correct file location and select the AOI to be installed. In this example the "Banner_Q20_2_Param_v4_AOI.L5X" file will be selected. Click the Open button.



- 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.

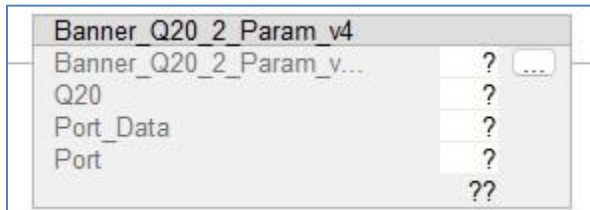


- The AOI is added to the Controller Organizer window and should look like the picture on the left.
- AOI installation into the Logix Designer software complete.

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_Q20_2_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_Q20_2_Param_v4”. Click New Tag. In this example, we’ll use the name “Q20_2_IOLM1_01_Status”. The example naming convention accounts for this being a Q20-2 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.

New Tag

Name:

Description:

Usage:

Type:

Alias For:

Data Type:

Parameter Connection:

Scope:

External Access:

Style:

☐ Constant

☐ Sequencing

☐ Open Configuration

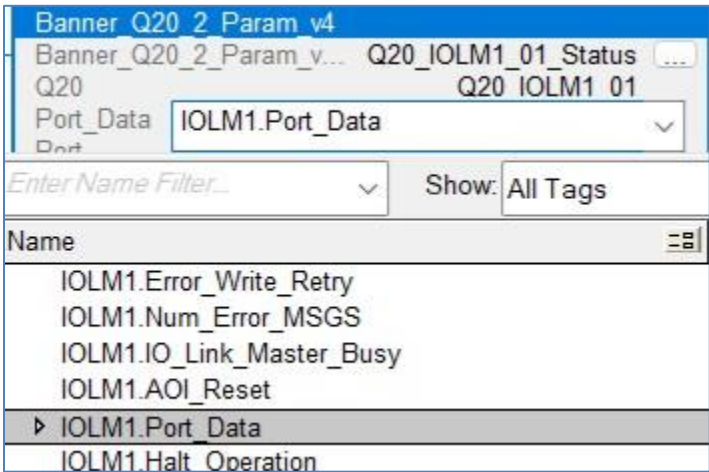
☐ Open Parameter Connections

3. Now click on the question mark on the line labeled “Q20”. Click New Tag. In this example, we’ll use the name “Q20_2_IOLM1_01”. This array of tags includes the port number to which the Q20-2 is connected and the Read and Write data blocks, made up of the information from the IO-Link Index and Subindex values.

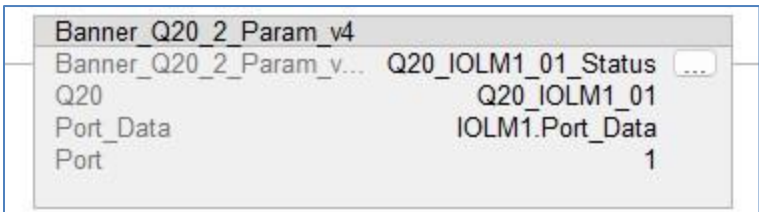
3. Linking the Device AOI to the Master AOI

The third tag in the Q20-2 AOI is meant to be tied into the IO-Link Master AOI.

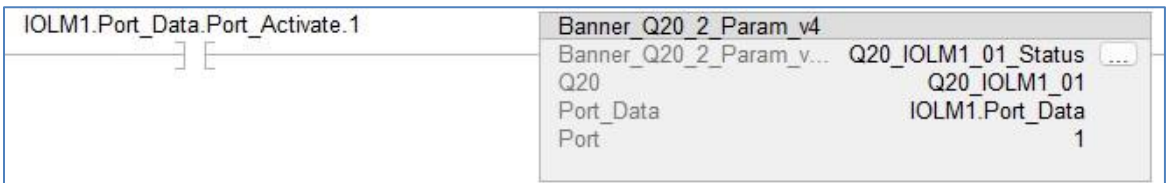
1. For the “Port_Data” line, choose the relevant IO-Link Master AOI’s “Port_Data” variable. In this example, we choose “IOLM1.Port_Data”. This tag is created during the IO-Link Master AOI installation.



2. For the next line of the Q20-2 AOI, “Port”, type in a number equal to the IO-Link Master port number to which the Q20-2 is connected. In this example, the Q20-2 is on Port 1.



3. Finally add an “examine on” in front of the AOI. Link this to the Port_Data tag called “Port_Activate”. The full tag name is IOLM1.Port_Data.Port_Activate.1”.



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.

Q20_IOLM1_01	{...}
Q20_IOLM1_01.Initial_Global_Read	0
Q20_IOLM1_01.Command	0
Q20_IOLM1_01.Read	{...}
Q20_IOLM1_01.Write	{...}
Q20_IOLM1_01.Reset	0

The table below shows the command numbers associated with the reading and writing of specific pieces of data. See the Q20-2 IODD file or the Q20-2 IO-Link Data Reference Guide for more information about the parameters.

Table 1: AOI Command Numbers

Q20-2 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	
Teach Channel	6	46
Teach Status (59)	7	
BDC1 Setpoints (60)	8	48
BDC1 Configuration (61)	9	49
BDC2 Setpoints (62)	10	50
BDC2 Configuration (63)	11	51
Configuration (64)	12	52
BDC1 VSC	13	53
BDC2 VSC	14	54
Status (67)	15	
Pulse Frequency Configuration (71)	16	56
Pulse Frequency Setpoints (78)	17	57
Pulse Frequency LOS (79)	18	58
MDC Descriptor (16512)	19	

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.

▲ Q20_IOLM1_01	{...}
Q20_IOLM1_01.Initial_Global_Read	0
▶ Q20_IOLM1_01.Command	0
▶ Q20_IOLM1_01.Read	{...}
▶ Q20_IOLM1_01.Write	{...}
Q20_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 Q20-2 having their respective AOIs being reset in this way.

