

S4B Process Data Function

This document covers the installation and use of a function for Siemens's TIA Portal software package. This function handles cyclic IO-Link Process Data Out to a Banner S4B light via an IO-Link Master from a Siemens PLC. The function covers parsing and display of the S4B sensor Process Data Out.

Components

Banner S4B Library v16.zal16

There are two methods for the process data. The first is used when creating a connection to Banner's IO-Link masters. The second set of instructions are for systems using other manufacturer's IO-Link masters.

Installation Instructions

1. Open a project.
2. Go to the Open Global Library option in the Libraries tab in TIA Portal v16 or greater.



3. Switch the "Files of type" to Compressed libraries. Go to the location of the compressed library.
4. Press the Open button and the library will be uncompressed and opened.
5. The library is now accessible in the Libraries tab in v16 or greater.

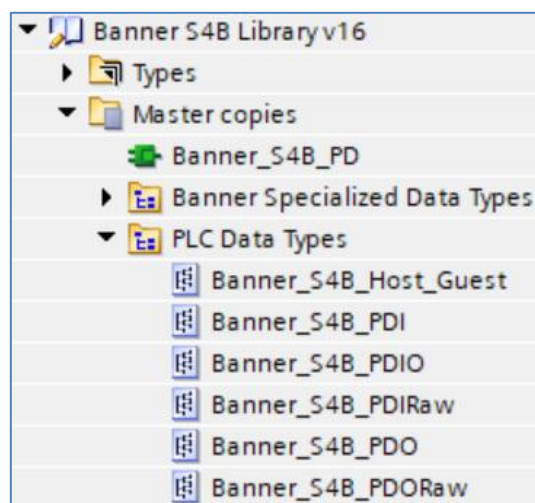
S4B Process Data Function

Setup of S4B with a Banner DXMR

1. Go to Device and Networks to configure the DXMR. Add the DXMR if it has yet to be added to the system.
2. Add Banner IO-Link Master Info to Slot 1. This sets the DXMR for IO-Link mode.
3. Open the IO-Link Generic Devices and select the proper module. The 32/32 byte is required for S4B. Slot 2 data starts at %I2 and %Q2 for inputs and outputs. The previous two bytes Port Control.

Module	Rack	Slot	I address	Q address	Type
▼ dxm	0	0			1-port Device
▶ Interface	0	0 X1			dxm
Banner IO-Link Master Info_1	0	1	68...76		Banner IO-Link Master Info
IO-Link In/Out 32/32 Byte + Status_1	0	2	2...37	2...47	IO-Link In/Out 32/32 Byte + Status

4. Drag the necessary tag from Banner_Specialized_Data_Types. The tag used in this example is "Banner_32out" and "Banner_32in".
5. Drag the necessary files from the PLC Data Types Folder.
 - a. Move Banner_S4B_Host_Guest, Banner_S4B_PDI, Banner_S4B_PDIO, Banner_S4B_PDIraw, Banner_S4B_PDO, and Banner_S4B_PDORaw to the PLC Data Types area.



6. Move Banner_S4B_PD to the Program Blocks area.
7. Go to PLC Tags. Create four tags. One set of tags is for the full data structure while the second set creates tags to represent the raw Process Data from the IO-Link Master. In this example, Tag table_1 was created, then the tag "S4B IOLM1 01 PDO" was created using a Data Type of "Banner_32out". This naming convention calls out the type of device in question as well as the specific IO-Link Master and port number where the sensor is connected. A different IO-Link Master might be named IOLM2 or IOLM3, for instance, and other specific sensors may be connected to different port numbers. The "Q" address found in step 3 is tied to this new tag. The tag that represents the raw data is "S4B IOLM1 01 outRaw" and uses the "Q" address found in step 3. Tags "S4B IOLM1 01 PDI" and "S4B IOLM1 01 inRaw" are created for the inputs also. This is the tag that will be used in the Function block.

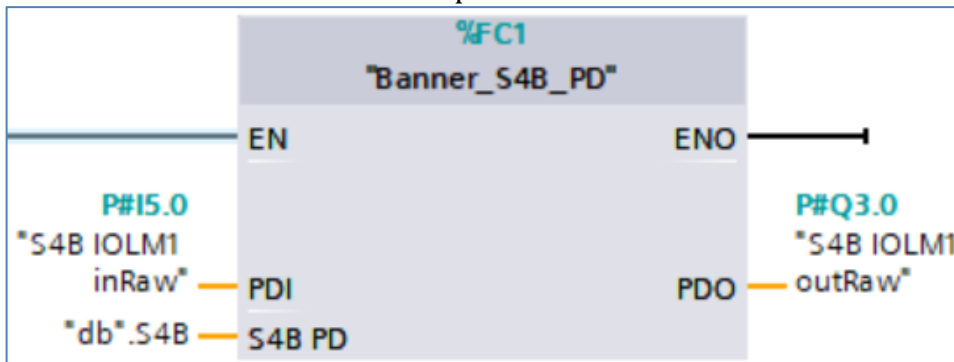
▶ S4B IOLM1 inRaw	"Banner_S4B_PDIraw"	%I5.0
▶ S4B IOLM1 outRaw	"Banner_S4B_PDORaw"	%Q3.0
▶ S4B IOLM1 PDI	"Banner_32In"	%I1.0
▶ S4B IOLM1 PDO	"Banner_32Out"	%Q1.0

S4B Process Data Function

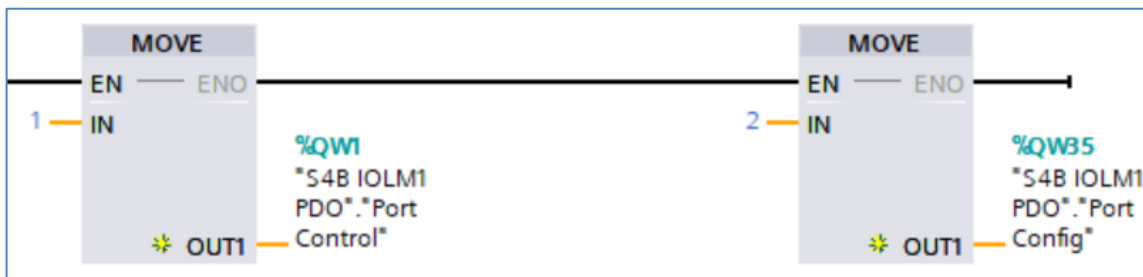
8. Go to Program blocks. Add a new Data block if necessary. In this example the new data block is named "db".
9. In the new data block, we have created a new tag to represent the parsed Process Data for our S4B. The tag name again calls out the type of sensor, the IO-Link Master, and the port number. Use the data type "Banner_S4B_PDIO" for the new tag.

▼ S4B IOLM1 01 PD	"Banner_S4B_PDIO"
■ ► PDI	"Banner_S4B_PDI"
■ ► PDO	"Banner_S4B_PDO"

10. Add the "Banner_S4B_PD" function to an OB ladder. Link the "PDO" to the raw process data variable from step 6. The tag name again calls out the type of device, IO-Link Master, and the port number. Use the variable called "S4B IOLM1 01 outRaw" in this example. Link the "PDI" to the raw process data variable from step 6. Use the variable called "S4B IOLM1 01 inRaw" from step 6. The "S4B PD" needs to be linked to the variable created in step 8. It was called "S4B IOLM1 01 PD" for this example.



11. The final step is to configure the IO-Link output control. This is done by sending a 1 to Port Control and a 2 to Port Config. Both parameters are part of the tag created in step 6 "S4B IOLM1 01 PDO".

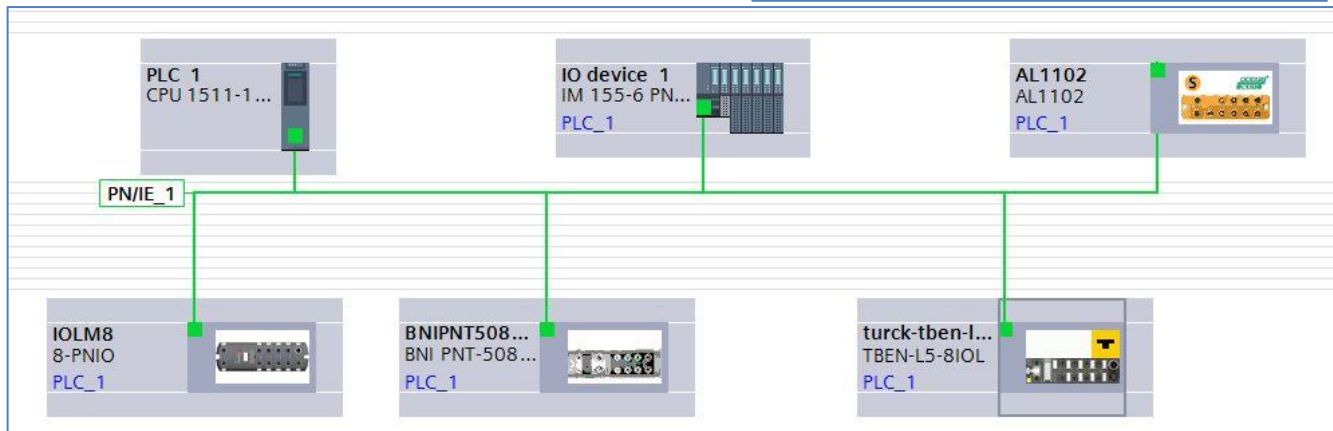
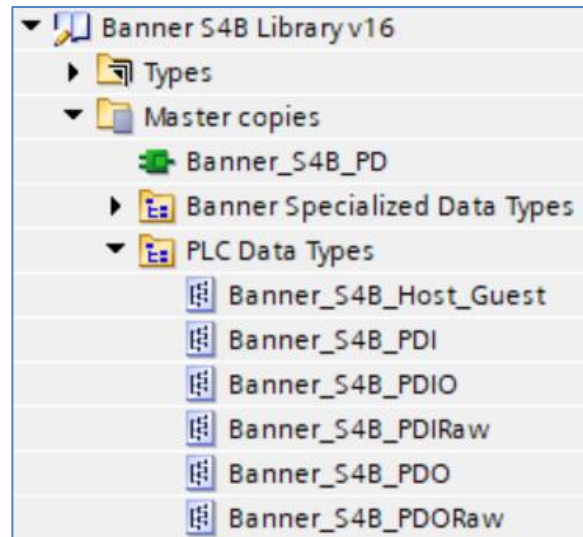


12. Process Data Setup is complete.
13. Compile and download the configuration to the PLC, then go online. Open the "db" data block and click Monitor all. The S4B can be controlled now.

S4B Process Data Function

Setup of S4B with other IO-Link Masters

1. The Banner S4B library will now be in the Global Library List. Expand the Master copies section.
2. Drag Banner_S4B_PD to the Program Blocks area under your PLC.
3. Drag Banner_S4B_Host_Guest, Banner_S4B_PDI, Banner_S4B_PDIO, Banner_S4B_PDIRaw, Banner_S4B_PDO, and Banner_S4B_PDORaw to the PLC Data Types area under your PLC.
4. Go to Devices and networks to configure the system as necessary. Below is an example of what a configuration might look like. This example shows 5 different IO-Link Masters connected to the same PLC.



5. Click on the relevant device and configure the IO-Link Master as necessary. Refer to the documentation for the IO-Link Master. Recall that a S4B requires 9 bytes of space for the Process Data Out and 1 byte for the Process Data In.
6. Record the "I" and "Q" addresses where this S4B Process Data is to be stored, as these addresses will be required in the next step. In this example, 4 bytes of Process Data Out and 20 bytes of Process Data In.

S4B Process Data Function

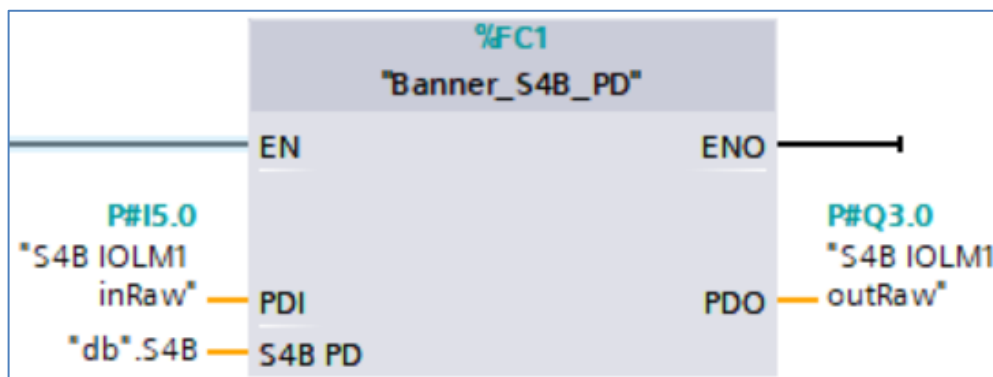
7. Go to PLC Tags. Add a new tag table, then create a new tag to represent the raw Process Data Out to be sent from the IO-Link Master. In this example, Tag table_1 was created, then the tag "S4B IOLM1 01 outRaw" was created using a Data Type of "Banner_S4B_PDORaw". This naming convention calls out the type of sensor in question as well as the specific IO-Link Master and port number where the sensor is connected. A different IO-Link Master might be named IOLM2 or IOLM3, for instance, and other specific sensors may be connected to different port numbers. The "Q" address found in step 5 is tied to this new tag. Similarly, we need to make a tag for the Process Data In. Here the name "S4B IOLM1 01 inRaw" was chosen, with a Data Type of Word. The "I" address from step 9 is used.

▶ S4B IOLM1 inRaw	"Banner_S4B_PDORaw"	%I5.0
▶ S4B IOLM1 outRaw	"Banner_S4B_PDORaw"	%Q3.0

8. Go to Program blocks. Add a new Data block if necessary. In this example the new data block is named "Banner IO-Link Data".
9. In the new data block, create a new tag to represent the parsed Process Data In and Out for our S4B. The tag name again calls out the type of sensor, the IO-Link Master, and the port number. Use the data type "Banner_S4B_PDIO" for the new tag.

▼ S4B IOLM1 01 PD	"Banner_S4B_PDIO"
▶ PDI	"Banner_S4B_PDI"
▶ PDO	"Banner_S4B_PDO"

10. Add the "Banner_S4B_PD" function to an OB ladder. Link the "PDI" to the raw Process Data In variable from step 7. Link the "PDO" to the raw Process Data Out variable from step 7. Link "S4B PD" to the parsed Process Data variable from step 9.



11. Process Data setup is complete.
12. Compile and download the configuration to the PLC, then go online. Open the "Banner IO-Link Data" data block and click Monitor all. You should see parsed S4B Process Data In.

S4B Process Data Function

S4B Process Data

1. Process Data is broken up into Input (PDI) and Output (PDO).

▼ S4B	"Banner_S4B_PDIO"
■ ► PDI	"Banner_S4B_PDI"
■ ► PDO	"Banner_S4B_PDO"

2. PDI: Data that indicates how the S4B is operating.

▼ PDI	"Banner_S4B_PDI"
■ OSSD Status	Bool
■ Weak Beam Maintenance	Bool
■ Cascaded Units	USInt
■ Configurable IO Pin State	Bool
■ Fixed Blanking Enabled	Bool
■ Vibration Tolerance Enabled	Bool
■ Fault Lockout	Bool
■ Diagnostic Error Code	USInt
■ ► Host	"Banner_S4B_Host_Guest"
■ ► Guest 1	"Banner_S4B_Host_Guest"
■ ► Guest 2	"Banner_S4B_Host_Guest"
■ ► Guest 3	"Banner_S4B_Host_Guest"

▼ Host	"Banner_S4B_Host_Guest"
■ Reduced Resolution Enabled	Bool
■ Status	USInt
■ Indicator State	USInt
■ Measurement	USInt
■ First Channel Blocked	USInt
■ Number of Channels Blocked	USInt
■ Zone 1 Status	USInt
■ Zone 2 Status	USInt
■ Zone 3 Status	USInt

S4B Process Data Function

3. PDO: The Indicator lights on top of the various units can be overridden using the process data out. Use a number (1 to 9) to activate the correct override setting for the variable.

▼ PDO		"Banner_S4B_PDO"
■	Override Indicator State Host	USInt
■	Override Indicator State Guest 1	USInt
■	Override Indicator State Guest 2	USInt
■	Override Indicator State Guest 3	USInt