

Banner Safety Controller ISD

9/30/2022

This document covers the installation and use of a function block for Beckhoff's TwinCAT software package. This function block handles the software ISD Read feature for a Banner Safety Controller (XS26).

Components

Banner_ISD_Read_v1 (PLCopenXML format)

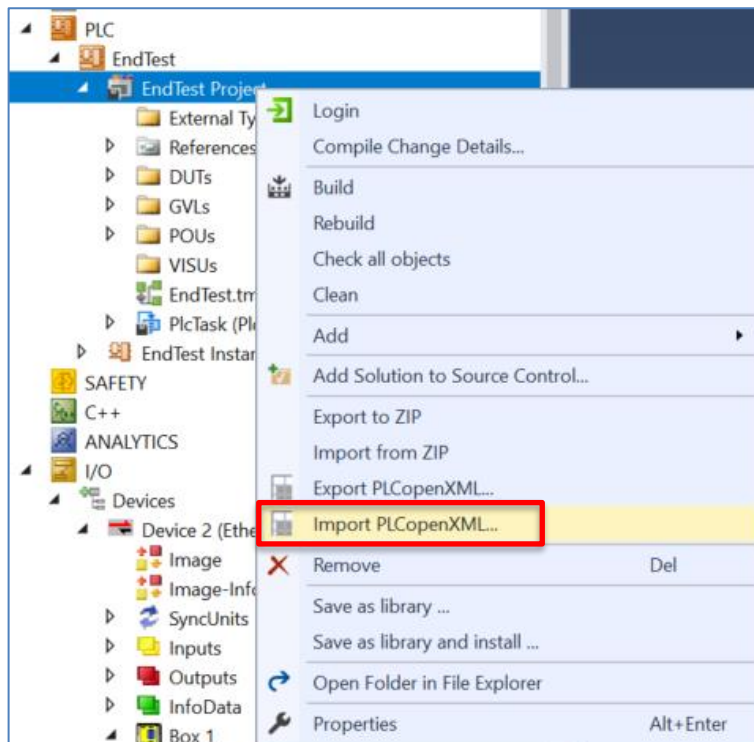
Items Packaged in Fault Log

Banner_ISD_Read_v1 (FB)

Banner_ISD_Device_Data (STRUCT)

Installation Instructions

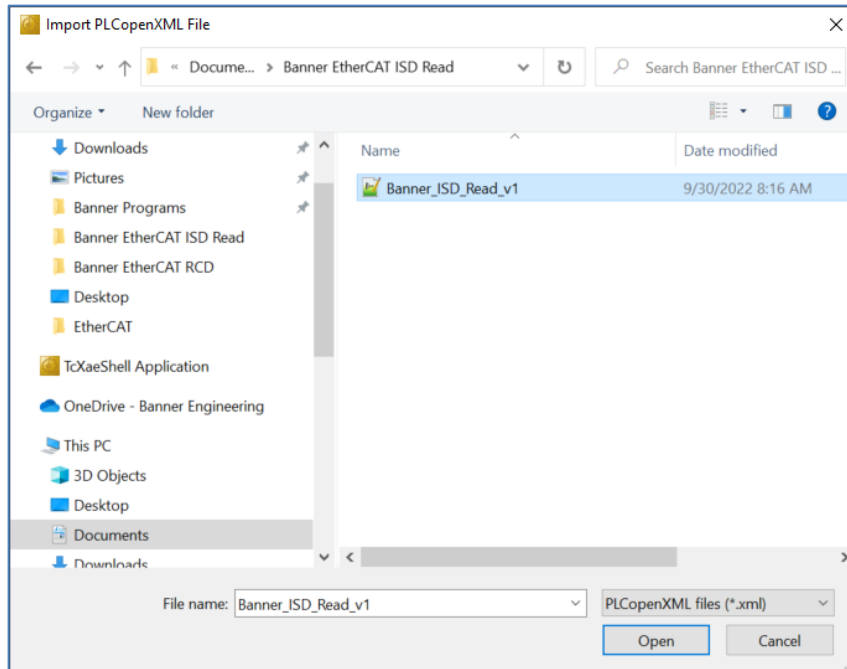
1. Open a project.
2. Right click under PLC. Look for the Import PLCopenXML and select this option. A new window will open.



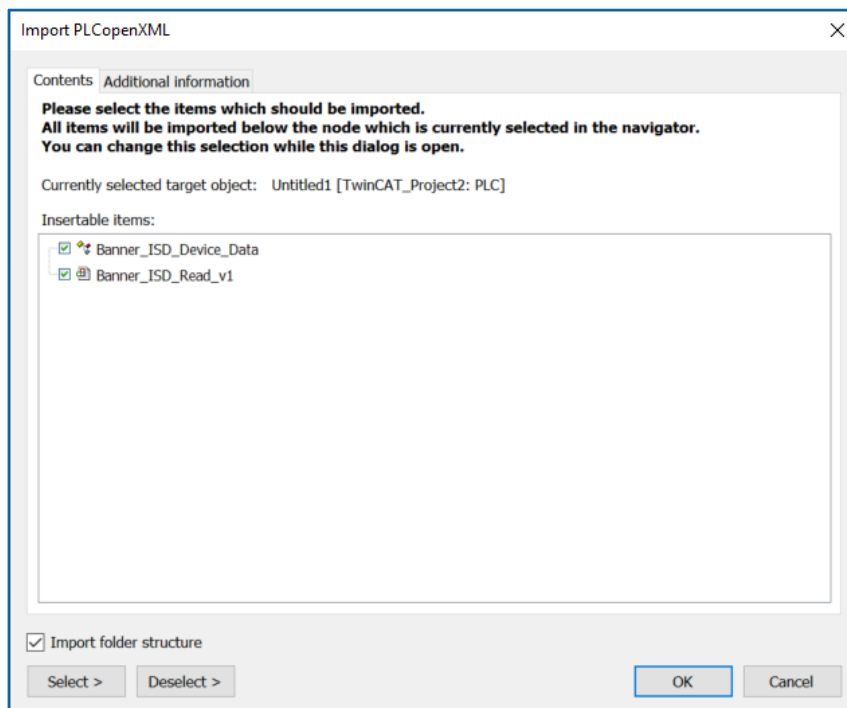
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ISD Function Block

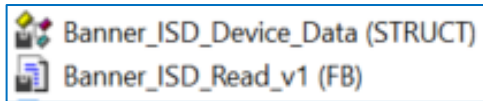
3. Navigate to the location that the file was stored in and select Banner_ISD_Read_v1. This is an XML file.



4. A window will pop up stating what files will be imported. There should be two items.



- Two items have now been added to the PLC section in Solution Explorer.



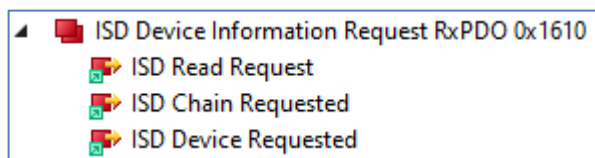
- Move the items to the necessary location in the project (optional: make a folder for it).
- Export the Tags from the Safety Controller if that is not yet to be done (see relevant document for this process). Many of the items that need to be linked in step 9 use the exported tags from the controller. Alternatively, these can manually be configured.
- Next step is to create a variable of the type of Banner_ISD_Read_v1 in the program the function block will be called in. Also create a variable that will activate the ISD with a type of UINT. In this example the names fbXS26ISD and xs26Control2 are used. An additional two optional variables can be created. They should be called xs26Chain and xs26Device. These are used to tell the function block what chain and device that the routine should read.

```
fbXS26ISD      : Banner_ISD_Read_v1;  
xs26Control2   : UINT;  
xs26Chain      : UINT;  
xs26Device     : UINT;
```

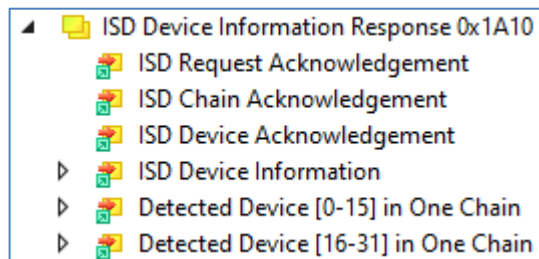
9. Finally add some structured text code into the program. The code should look like what is shown below. The Chain and Device tags should have values assigned first.

```
//ISD Function Block
fbXS26ISD(isdRequest := Box_1_GVL.Box_1_ISD_Request,
          isdChain := Box_1_GVL.Box_1_ISD_Chain,
          isdDevice := Box_1_GVL.Box_1_ISD_Device,
          control:= xs26Control2,
          isdRequestACK := Box_1_GVL.Box_1_ISD_Request_Ack,
          isdChainAck := Box_1_GVL.Box_1_ISD_Chain_Ack,
          isdDeviceACK := Box_1_GVL.Box_1_ISD_Device_Ack,
          Info := Box_1_GVL.Box_1_ISD_Device_Info,
          inChain := xs26Chain,
          inDevice := xs26Device);
```

- a. isdRequest: Link to ISD Read Request.



- b. isdChain: Link to ISD Chain Requested.
 c. isdDevice: Link to ISD Device Requested.
 d. control: Link to tag created in step 8.
 e. isdRequestACK: Link to ISD Request Acknowledgement.



- f. isdChainAck: Link to ISD Chain Acknowledgement.
 g. isdDeviceAck: Link to ISD Device Acknowledgement.
 h. Info: Link to ISD Device Information.
 i. inChain: Link to tag created in step 8.
 j. inDevice: Link to tag created in step 8.

****Note:** many of the tags above are automatically generated during the tag import if that feature is used.

10. The variable xs26Control2 controls the operation of the function block. If xs26Control2 is set to a value of 1 then the individual device data for the chain selected will be gathered. The ISD data is stored in the fbXS26ISD.Data (shown below).

TwinCAT_XS26.Untitled1.MAIN.fbXS26ISD		
Expression	Type	Value
Data	Banner_ISD_Device_Data	
Safety_Input_Fault	BOOL	FALSE
Sensor_Not_Paired	BOOL	FALSE
ISD_Data_Error	BOOL	FALSE
Wrong_Actuator	BOOL	FALSE
Marginal_Range	BOOL	FALSE
Actuator_Detected	BOOL	TRUE
Output_Error	BOOL	FALSE
Input1	BOOL	TRUE
Input2	BOOL	TRUE
Local_Reset_Expected	BOOL	FALSE
Operating_Voltage_Warning	BOOL	FALSE
Operating_Voltage_Error	BOOL	FALSE
Output1	BOOL	TRUE
Output2	BOOL	TRUE
Power_Cycle_Required	BOOL	FALSE
Fault_Tolerant_Output	BOOL	TRUE
Local_Reset_Unit	BOOL	FALSE
Cascadable	BOOL	TRUE
High_Level_Coding	BOOL	FALSE

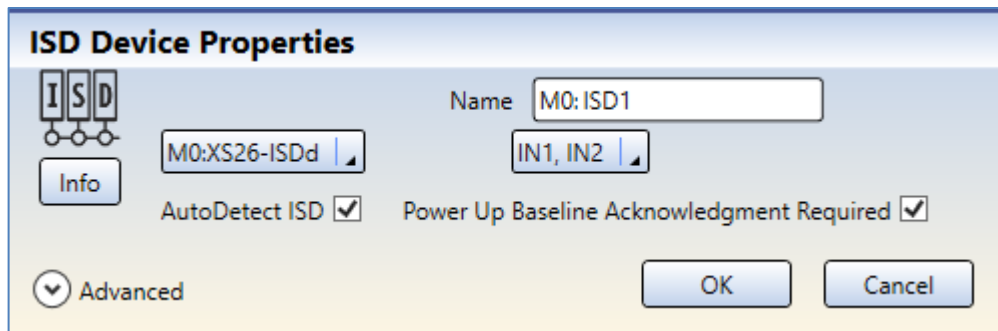
11. If xs26Control2 has a value of 2 then the type of devices in a chain selected are found. The data is found in tag created for Detected Device [0-15] in One Chain and Detected Device [16-31] in One Chain.

Box_1_ISD_Detected_Device1	Banner_ISD_Device_1_16	
Device	ARRAY [1..16] OF USINT	
Device[1]	USINT	1
Device[2]	USINT	1
Device[3]	USINT	7
Device[4]	USINT	0
Device[5]	USINT	0
Device[6]	USINT	0
Device[7]	USINT	0

ISD Device Information Response 0x1A10	
ISD Request Acknowledgement	
ISD Chain Acknowledgement	
ISD Device Acknowledgement	
ISD Device Information	
Detected Device [0-15] in One Chain	
Detected Device [16-31] in One Chain	

ID	ISD Type
1	ISD Si-RF
7	ISD E-Stop
9	ISD Connect

12. If the optional setting “Power up Baseline Acknowledgement Required” is selected in the Banner Safety Controller software it is necessary to use command 4 (after a command 2) in xs26Control2 to finalize the ISD Chain configuration.



The screenshot shows the "ISD Device Properties" dialog box. It features a title bar with the text "ISD Device Properties". Below the title bar, there is a logo consisting of three vertical bars labeled "I", "S", and "D" connected by a horizontal line. To the right of the logo is a text field labeled "Name" containing the text "M0:ISD1". Below the logo is a button labeled "Info". To the right of the "Info" button is a dropdown menu showing "M0:XS26-ISDd". To the right of the dropdown menu is another dropdown menu showing "IN1, IN2". Below these elements are two checkboxes: "AutoDetect ISD" and "Power Up Baseline Acknowledgment Required", both of which are checked. At the bottom left, there is a button labeled "Advanced" with a downward arrow. At the bottom right, there are two buttons labeled "OK" and "Cancel".