



This document will cover an Add on Instruction (AOI) for the Logix Designer software package from Rockwell Automation. This AOI acquires the current fault log from a Banner SC10, SC26, or XS26 controller. This document will show you how to install and use the AOI to activate acquire the fault log. Contact Banner Engineering with any questions that you have.

## Components

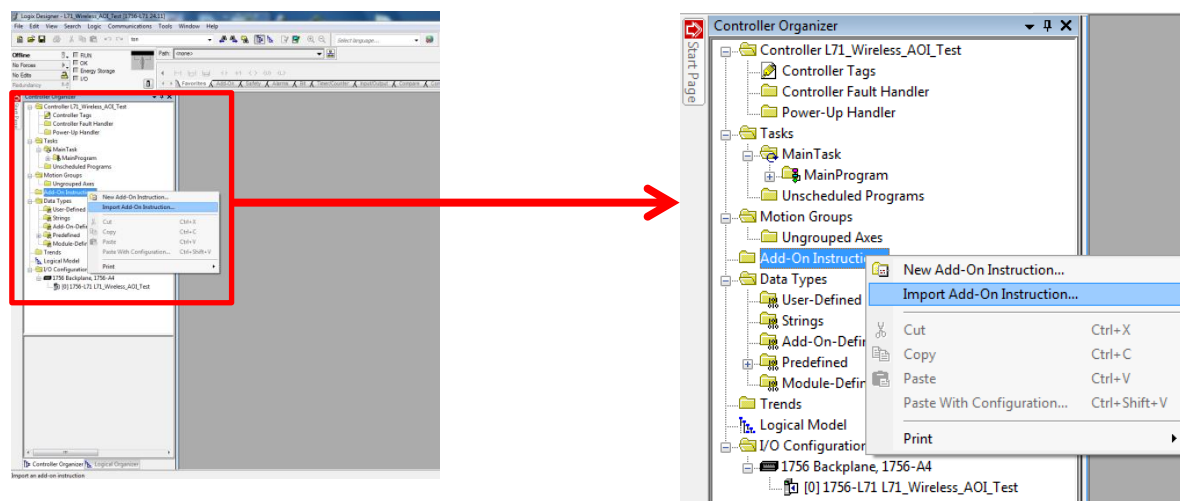
AOI: Banner\_XS26\_Fault\_Log\_Read.L5X

UDT: Banner\_Fault\_Log\_UDT.L5X

## Installation Process

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

1. Open up a project.
2. Right click on the Add-On Instruction folder in the Controller Organizer window. Select the Import Add-On Instruction option.



3. A standard windows selection box will appear. Navigate to the correct file location. Select the Banner\_XS26\_Fault\_Log\_Read.L5X. This is for the AOI. Press the Open button to start the AOI import into the Logix Designer software.

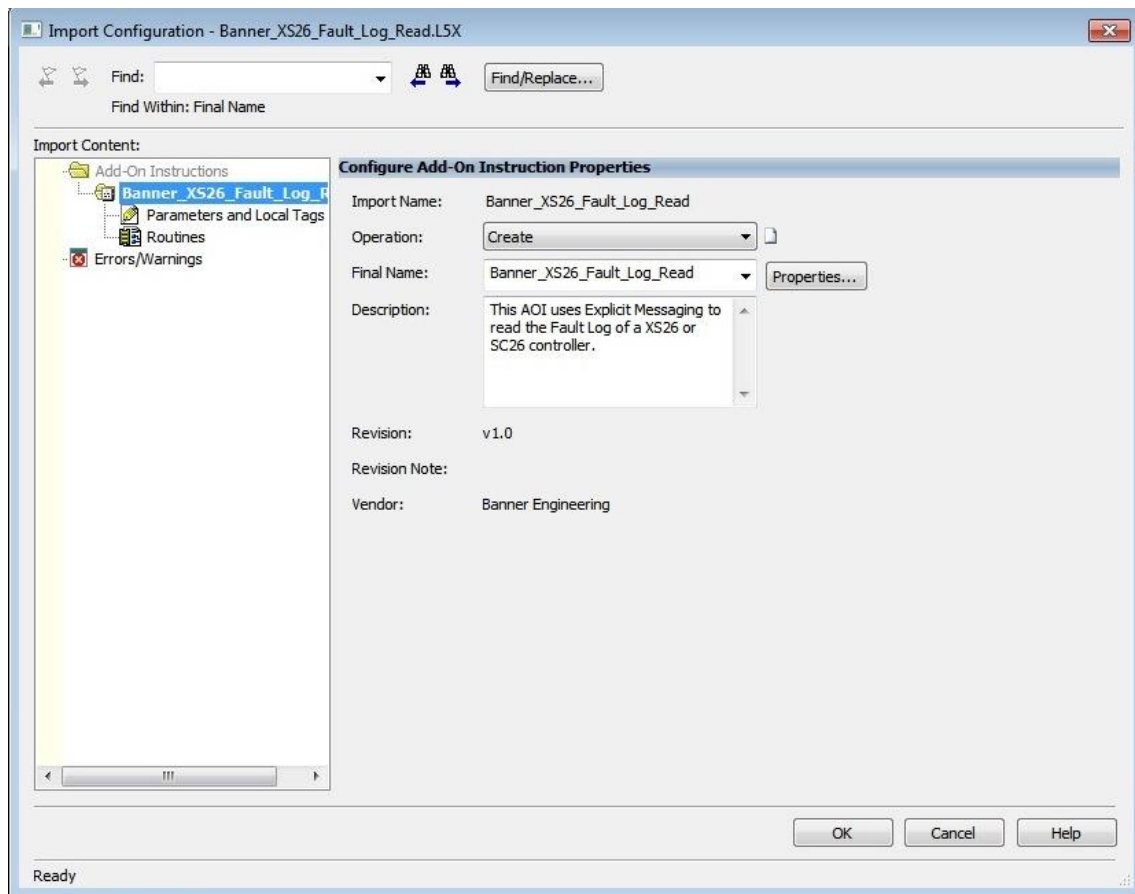
Banner\_XS26\_Fault\_Log\_Read.L5X 11/21/2016 10:06 ... Logix Designer X... 6 KB

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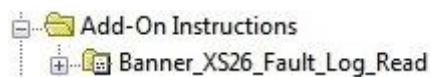
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4. The Import Configuration window will pop up. Press the OK button to complete the import process.



5. The AOI will now be located in the Add-On Instructions area of the Logix Designer software.



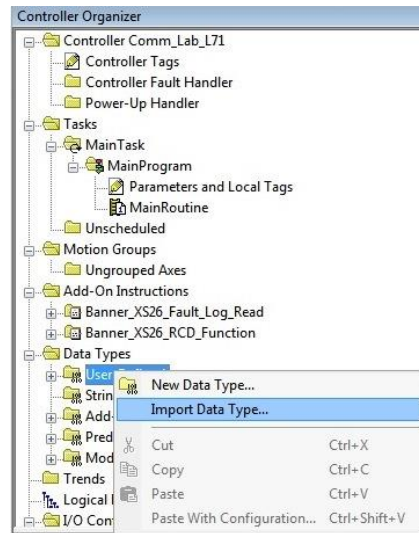
6. Next an UDT needs to be installed.

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7. Right click on the User Defined folder (in the Data Types folder) in the Controller Organizer window. Select the Import Data Type option.

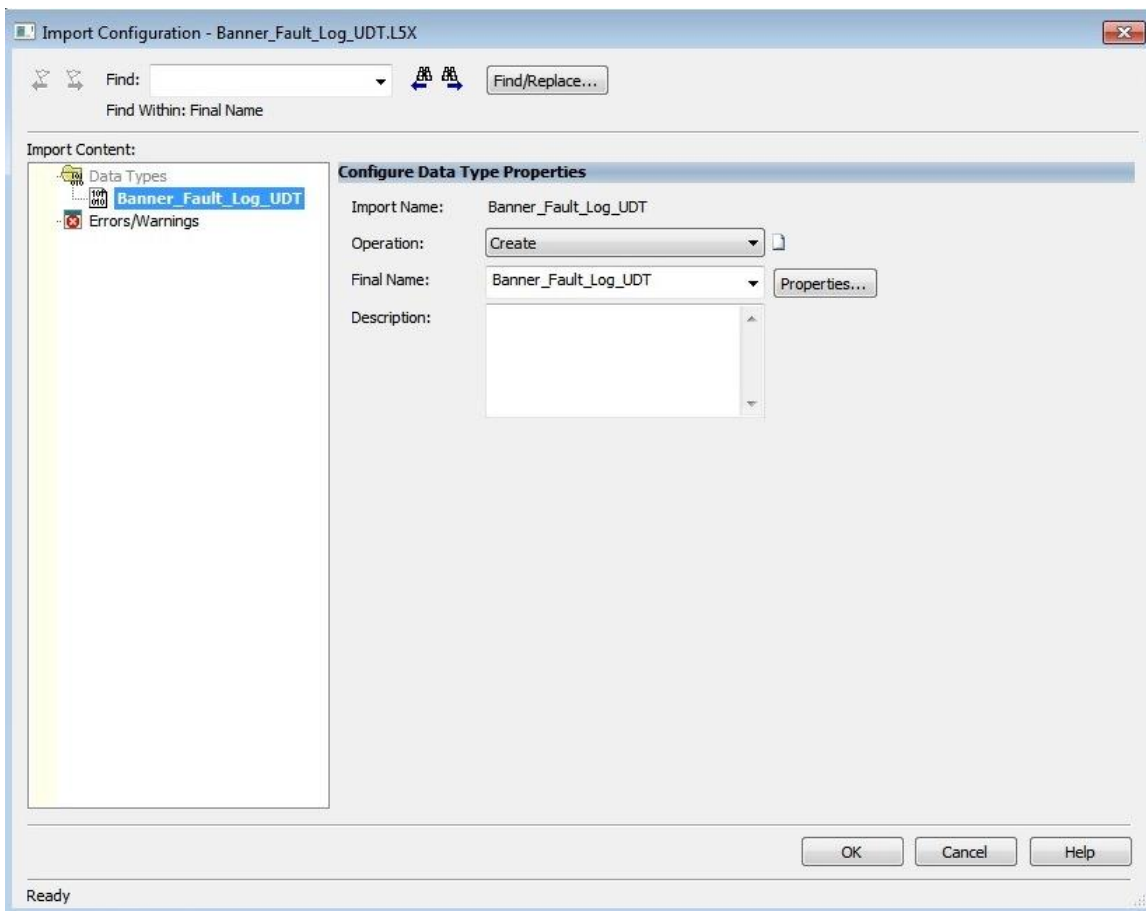


8. A standard windows selection box will appear. Navigate to the correct file location. Select the Banner\_Fault\_Log\_UDT.L5X. This is for the UDT. Press the Open button to start the UDT import into the Logix Designer software.





9. The Import Configuration window will pop up. Press the OK button to complete the import process.



10. All items for the System have now been installed.

## **Fault Log AOI – How to Use**

Follow the steps below to use the Input AOI.

1. Create an Ethernet connection to a Banner Safety Controller. In this example I have a connection to a XS26 unit. I labeled the connection XS26\_FID2 in the PLC. If you look in the controller tags you should see an input and output data array associated to XS26\_FID2.

	+ XS26_FID2:I			_000C:XS26_B9089D71:I:0
	+ XS26_FID2:O			_000C:XS26_9A6CE27A:O:0

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2. Create a new data tag for use with the AOI. In this example it is called XS26\_Fault\_Log. The data type for this is Banner\_Fault\_Log\_UDT and it should have a Dimension (Dim) of 10. The array should look similar to the below example image.

<input type="checkbox"/>	XS26_Fault_Log			Banner_Fault_Log_UDT[10]
<input type="checkbox"/>	+ XS26_Fault_Log[0]			Banner_Fault_Log_UDT
<input type="checkbox"/>	+ XS26_Fault_Log[1]			Banner_Fault_Log_UDT
<input type="checkbox"/>	+ XS26_Fault_Log[2]			Banner_Fault_Log_UDT
<input type="checkbox"/>	+ XS26_Fault_Log[3]			Banner_Fault_Log_UDT
<input type="checkbox"/>	+ XS26_Fault_Log[4]			Banner_Fault_Log_UDT
<input type="checkbox"/>	+ XS26_Fault_Log[5]			Banner_Fault_Log_UDT
<input type="checkbox"/>	+ XS26_Fault_Log[6]			Banner_Fault_Log_UDT
<input type="checkbox"/>	+ XS26_Fault_Log[7]			Banner_Fault_Log_UDT
<input type="checkbox"/>	+ XS26_Fault_Log[8]			Banner_Fault_Log_UDT
<input type="checkbox"/>	+ XS26_Fault_Log[9]			Banner_Fault_Log_UDT

3. Next create a bool data tag. This will be used to activate the XS26 Fault Read AOI. In this example it is called Get\_Fault\_Log.

<input type="checkbox"/>	Get_Fault_Log	0	Decimal	BOOL
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4. Create ten MESSAGE Data Type variables. In this example they are labeled Fault\_Log\_1 through Fault\_Log\_10.

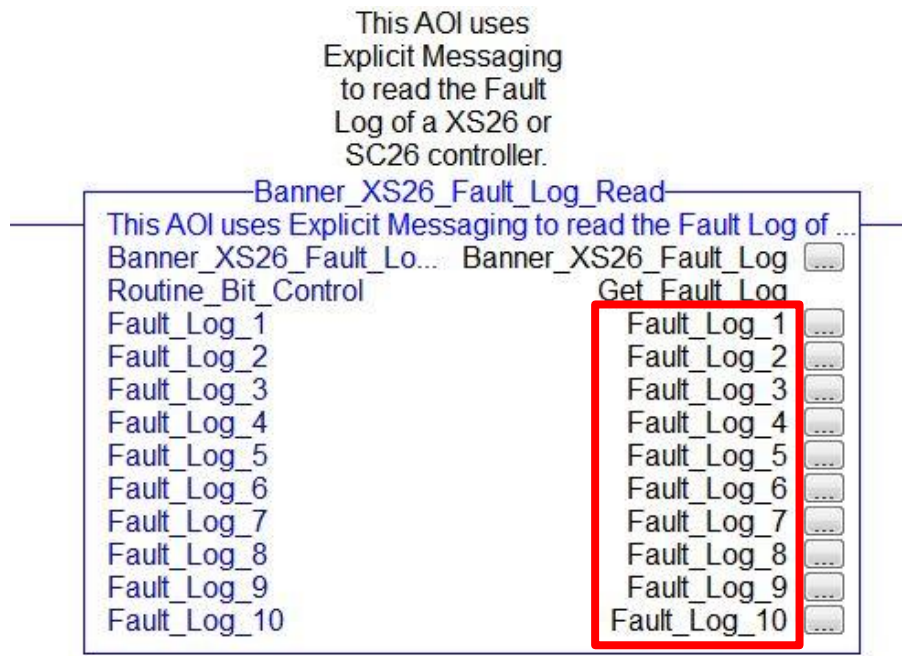
<input type="checkbox"/>	+ Fault_Log_1	{...}	{...}	MESSAGE
<input type="checkbox"/>	+ Fault_Log_2	{...}	{...}	MESSAGE
<input type="checkbox"/>	+ Fault_Log_3	{...}	{...}	MESSAGE
<input type="checkbox"/>	+ Fault_Log_4	{...}	{...}	MESSAGE
<input type="checkbox"/>	+ Fault_Log_5	{...}	{...}	MESSAGE
<input type="checkbox"/>	+ Fault_Log_6	{...}	{...}	MESSAGE
<input type="checkbox"/>	+ Fault_Log_7	{...}	{...}	MESSAGE
<input type="checkbox"/>	+ Fault_Log_8	{...}	{...}	MESSAGE
<input type="checkbox"/>	+ Fault_Log_9	{...}	{...}	MESSAGE
<input type="checkbox"/>	+ Fault_Log_10	{...}	{...}	MESSAGE



- Now create a rung with the AOI Banner\_XS26\_Fault\_Log\_Read on it. Notice that in this example that the line is activated via the Get\_Fault\_Log variable. This allows for control of the activation of this AOI. User should create additional logic to determine when the fault log should be read from the controller. This should never be done every scan. The AOI turns off the Get\_Fault\_Log after it has completed its operation.



- Link the Fault\_Log\_1 through Fault\_Log\_10 message variables as shown below. You will also need to create and link an AOI variable.





- Press the ... button to the right of Fault\_Log\_1. This will open up the message configuration window. The AOI is really just 10 MSG commands. The Fault\_Log\_1 configures the command to gather the data for the first fault log. Class and Instance must be configured as shown below exactly. Attribute and Destination Element vary depending on which log you are working with. Example: for Fault\_Log\_1 you need to enter Attribute as 1 and link the Destination Element to XS26\_Fault\_Log[0]. For Fault\_Log\_2 enter Attribute as 2 and Destination Element as XS26\_Fault\_Log[1]. All of the other fault logs are configured in a similar manner.

Message Configuration - Fault\_Log\_1

Configuration Communication Tag

Message Type: CIP Generic

Service Type: Get Attribute Single

Source Element:

Source Length: 0 (Bytes)

Service Code: e (Hex) Class: 71 (Hex)

Destination Element: XS26\_Fault\_Log[0]

Instance: 1 Attribute: 1 (Hex)

New Tag...

☐ Enable ☐ Enable Waiting ☐ Start ☐ Done Done Length: 0

☐ Error Code: Extended Error Code: ☐ Timed Out

Error Path: XS26\_FID2

Error Text:

OK Cancel Apply Help





8. Press the Communications tab. Press the Browse button and select the XS26 module. In this example the XS26 was called XS26\_FID2. After that is completed press the OK button to save your changes. These modifications are stored into the message variables.

A screenshot of the "Message Configuration - Fault\_Log\_1" dialog box. The "Configuration" tab is selected. The "Path" field is set to "XS26\_FID2" and has a "Browse..." button next to it. Below the path field is a dropdown menu showing "XS26\_FID2". There is a "Broadcast:" checkbox and a dropdown menu. The "Communication Method" section has two radio buttons: "CIP" (selected) and "DH+"; a "Channel:" dropdown menu set to "A"; a "Destination Link:" spinner box set to "0"; a "CIP With Source ID" radio button; a "Source Link:" spinner box set to "0"; a "Destination Node:" spinner box set to "0" with "(Octal)" next to it. At the bottom of this section are three checkboxes: "Connected" (checked), "Cache Connections" (unchecked), and "Large Connection" (unchecked). The bottom of the dialog has four radio buttons: "Enable" (selected), "Enable Waiting", "Start", and "Done"; a "Done Length: 0" field; an "Error Code:" label; an "Extended Error Code:" label; a "Timed Out" checkbox (unchecked); and a "Help" button. At the very bottom are "OK", "Cancel", "Apply", and "Help" buttons. The "Error Path" field is set to "XS26\_FID2" and the "Error Text" field is empty.

9. Repeat steps 7 & 8 for all 10 message variables.
10. At this point the AOI has been configured and can be used.





## Appendix A

This section will go over the UDT Banner\_Fault\_Log\_UDT in detail. The UDT is used to create a variable in which the information from the Fault Log will be written.

1. Open the Banner\_Fault\_Log\_UDT.

Name:	Banner_Fault_Log_UDT																								
Description:																									
Members:																									
	<table><thead><tr><th>Name</th><th>Data Type</th><th>Description</th></tr></thead><tbody><tr><td>Time_Stamp</td><td>DINT</td><td></td></tr><tr><td>Name_Length</td><td>DINT</td><td></td></tr><tr><td>Name</td><td>SINT[12]</td><td></td></tr><tr><td>Error_Code</td><td>INT</td><td></td></tr><tr><td>Advanced_Error_Code</td><td>INT</td><td></td></tr><tr><td>Error_Index</td><td>INT</td><td></td></tr><tr><td>Reserved</td><td>DINT</td><td></td></tr></tbody></table>	Name	Data Type	Description	Time_Stamp	DINT		Name_Length	DINT		Name	SINT[12]		Error_Code	INT		Advanced_Error_Code	INT		Error_Index	INT		Reserved	DINT	
Name	Data Type	Description																							
Time_Stamp	DINT																								
Name_Length	DINT																								
Name	SINT[12]																								
Error_Code	INT																								
Advanced_Error_Code	INT																								
Error_Index	INT																								
Reserved	DINT																								

- a. **Time\_Stamp** represents the number of seconds since power up.
- b. **Name\_Length** is the variable that tells the user how many characters long the error message is.
- c. **Name** is the variable that gives the name of the device that has erred out. Each instance of the array is one ASCII character. Convert the value given to ASCII to create the error message.
- d. **Error\_Code** variable that just stores the upper section of the error code.
- e. **Advanced\_Error\_Code** variable that just stores the lower section of the error code.
- f. **Error\_Index** variable that has the full error code number.
- g. **Reserved**



2. Below is an example of what a fault log looks like in the Logix Designer software.

- XS26_Fault_Log	{...}	{...}		Banner_Fault_Log_UDT[10]
- XS26_Fault_Log[0]	{...}	{...}		Banner_Fault_Log_UDT
+ XS26_Fault_Log[0].Time_Stamp	559		Decimal	DINT
+ XS26_Fault_Log[0].Name_Length	3		Decimal	DINT
- XS26_Fault_Log[0].Name	{...}	{...}	Decimal	SINT[12]
+ XS26_Fault_Log[0].Name[0]	'G'		ASCII	SINT
+ XS26_Fault_Log[0].Name[1]	'S'		ASCII	SINT
+ XS26_Fault_Log[0].Name[2]	'1'		ASCII	SINT
+ XS26_Fault_Log[0].Name[3]	'00'		ASCII	SINT
+ XS26_Fault_Log[0].Name[4]	'00'		ASCII	SINT
+ XS26_Fault_Log[0].Name[5]	'00'		ASCII	SINT
+ XS26_Fault_Log[0].Name[6]	'00'		ASCII	SINT
+ XS26_Fault_Log[0].Name[7]	'00'		ASCII	SINT
+ XS26_Fault_Log[0].Name[8]	'00'		ASCII	SINT
+ XS26_Fault_Log[0].Name[9]	'00'		ASCII	SINT
+ XS26_Fault_Log[0].Name[10]	'00'		ASCII	SINT
+ XS26_Fault_Log[0].Name[11]	'00'		ASCII	SINT
+ XS26_Fault_Log[0].Error_Code	2		Decimal	INT
+ XS26_Fault_Log[0].Advanced_...	2		Decimal	INT
+ XS26_Fault_Log[0].Error_Index	202		Decimal	INT
+ XS26_Fault_Log[0].Reserved	1		Decimal	DINT

3. Use the Fault Code Table listed in the XS26 Controller Manual or use Appendix C to cross reference the Error Code, Advanced Error Code, and Error Index meanings. Error Code is the number before the decimal point, while Advanced Error Code is the number after the decimal point. The previous sentence should be used to understand the numbers listed in the Fault Code Table.



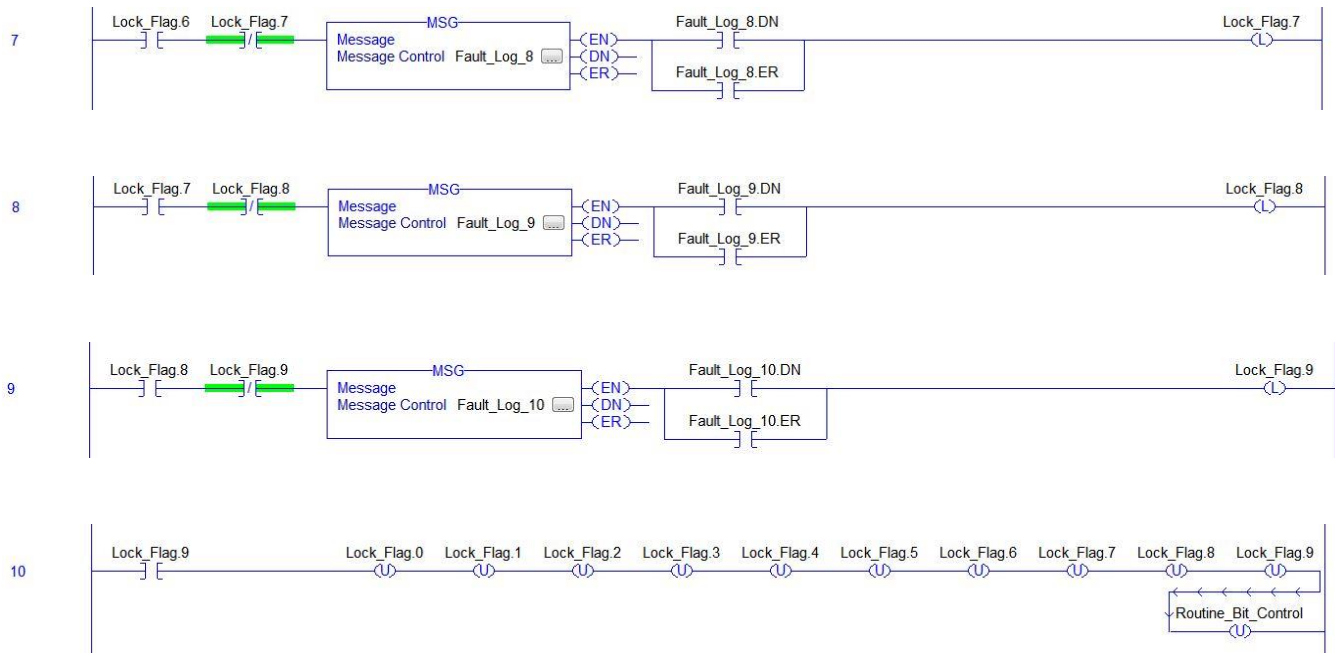
## Appendix B

This section shows each rung of the AOI. Each rung is a message command that gathers one fault log. It is critical that the Message variable is configured correctly or the AOI will not be able to gather the data. The configuration is shown as part of the Installation section (Part 7 is the start). After the AOI gathers all ten data items the variables used for the AOI are reset and the AOI is deactivated.



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## Appendix C

The below tables are taken from the XS26 Instruction manual. They are shown here for reference.

Fault Code	Displayed Message	Additional Message	Steps to resolve
1.1	Output Fault	Check for shorts	A Safety Output appears On when it should be Off: <ul style="list-style-type: none"><li>• Check for a short to the external voltage source</li><li>• Check the DC common wire size connected to the Safety Output loads. The wire must be a heavy-gauge wire or be as short as possible to minimize resistance and voltage drop. If necessary, use a separate DC common wire for each pair of outputs and/or avoid sharing this DC common return path with other devices (see <a href="#">Common Wire Installation</a> on page 95)</li></ul>
1.2	Output Fault	Check for shorts	A Safety Output is sensing a fault to another voltage source while the output is On: <ul style="list-style-type: none"><li>• Check for a short between Safety Outputs</li><li>• Check for a short to the external voltage source</li><li>• Check load device compatibility</li><li>• Check the DC common wire size connected to the Safety Output loads. The wire must be a heavy-gauge wire or be as short as possible to minimize resistance and voltage drop. If necessary, use a separate DC common wire for each pair of outputs and/or avoid sharing this DC common return path with other devices (see <a href="#">Common Wire Installation</a> on page 95)</li></ul>
1.3 – 1.8	Internal Fault	-	Internal failure—Contact Banner Engineering (see <a href="#">Repairs and Warranty Service</a> on page 118)
1.9	Output Fault	Internal Relay Failure	<ul style="list-style-type: none"><li>• Replace Relay module</li></ul>
1.10	Output Fault	Check Input Timing	Sequence timing error: <ul style="list-style-type: none"><li>• Perform a System Reset to clear the fault</li></ul>



Fault Code	Displayed Message	Additional Message	Steps to resolve
2.1	Concurrency Fault	Cycle Input	On a dual-channel input with both inputs in the Run state, one input went to the Stop state then back to Run: <ul style="list-style-type: none"> <li>• Check the wiring</li> <li>• Check the input signals</li> <li>• Consider adjusting the debounce times</li> </ul>
2.2	Simultaneity Fault	Cycle Input	On a dual-channel input, one input went into the Run state but the other input did not follow within 3 seconds: <ul style="list-style-type: none"> <li>• Check the wiring</li> <li>• Check the input signal timing</li> </ul>
2.3 or 2.5	Concurrency Fault	Cycle Input	On a complementary pair with both inputs in the Run state, one of the inputs changed to Stop then back to Run: <ul style="list-style-type: none"> <li>• Check the wiring</li> <li>• Check the input signals</li> <li>• Check the power supply providing input signals</li> <li>• Consider adjusting the debounce times</li> </ul>
2.4 or 2.6	Simultaneity Fault	Cycle Input	On a complementary pair, one input went into the Run state but the other input did not follow within the time limit: <ul style="list-style-type: none"> <li>• Check the wiring</li> <li>• Check the input signal timing</li> </ul>
2.7	Internal Fault	Check Terminal xx	Internal failure—Contact Banner Engineering (see <i>Repairs and Warranty Service</i> on page 118)
2.8 – 2.9	Input Fault	Check Terminal xx	Input stuck high: <ul style="list-style-type: none"> <li>• Check for shorts to other inputs or other voltage sources</li> <li>• Check the input device compatibility</li> </ul>
2.10	Input Fault	Check Terminal xx	<ul style="list-style-type: none"> <li>• Check for a short between inputs</li> </ul>
2.11 – 2.12	Input Fault	Check Terminal xx	<ul style="list-style-type: none"> <li>• Check for a short to ground</li> </ul>
2.13	Input Fault	Check Terminal xx	Input stuck low <ul style="list-style-type: none"> <li>• Check for a short to ground</li> </ul>
2.14	Input Fault	Check Terminal xx	Missing test pulses: <ul style="list-style-type: none"> <li>• Check for a short to other inputs or other voltage sources</li> </ul>
2.15	Open Lead	Check Terminal xx	<ul style="list-style-type: none"> <li>• Check for an open lead</li> </ul>
2.16 – 2.18	Input Fault	Check Terminal xx	Missing test pulses: <ul style="list-style-type: none"> <li>• Check for a short to other inputs or other voltage sources</li> </ul>
2.19	Open Lead	Check Terminal xx	<ul style="list-style-type: none"> <li>• Check for an open lead</li> </ul>
2.20	Input Fault	Check Terminal xx	Missing test pulses: <ul style="list-style-type: none"> <li>• Check for a short to ground</li> </ul>
2.21	Open Lead	Check Terminal xx	<ul style="list-style-type: none"> <li>• Check for an open lead</li> </ul>
2.22 – 2.23	Input Fault	Check Terminal xx	<ul style="list-style-type: none"> <li>• Check for an unstable signal on the input</li> </ul>
2.24	Input Activated While Bypassed	Perform System Reset	A Two-Hand Control input was activated (turned On) while it was bypassed.
2.25	Input Fault	Monitoring Timer Expired Before AVM Closed	After the associated Safety Output turned Off, the AVM input did not close before its AVM monitoring time expired: <ul style="list-style-type: none"> <li>• The AVM may be disconnected. Check the wiring to the AVM</li> <li>• Either the AVM is disconnected, or its response to the Safety Output turning Off is too slow</li> <li>• Check the wiring to the AVM</li> <li>• Check the timing setting; increase the setting if necessary</li> <li>• Contact Banner Engineering</li> </ul>
2.26	Input Fault	AVM Not Closed When Output Turned On	The AVM input was open, but should have been closed, when the associated Safety Output was commanded On: <ul style="list-style-type: none"> <li>• The AVM may be disconnected. Check the wiring to the AVM</li> </ul>
3.1	EDMxx Fault	Check Terminal xx	EDM contact opened prior to turning On the Safety Outputs: <ul style="list-style-type: none"> <li>• Check for a stuck On contactor or relay</li> <li>• Check for an open wire</li> </ul>

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Fault Code	Displayed Message	Additional Message	Steps to resolve
3.2	EDMxx Fault	Check Terminal xx	EDM contact(s) failed to close within 250 ms after the Safety Outputs turned Off: <ul style="list-style-type: none"> <li>Check for a slow or stuck On contactor or relay</li> <li>Check for an open wire</li> </ul>
3.3	EDMxx Fault	Check Terminal xx	EDM contact(s) opened prior to turning On the Safety Outputs: <ul style="list-style-type: none"> <li>Check for a stuck On contactor or relay</li> <li>Check for an open wire</li> </ul>
3.4	EDMxx Fault	Check Terminal xx	EDM contact pair mismatched for longer than 250 ms: <ul style="list-style-type: none"> <li>Check for a slow or stuck On contactor or relay</li> <li>Check for an open wire</li> </ul>
3.5	EDMxx Fault	Check Terminal xx	<ul style="list-style-type: none"> <li>Check for an unstable signal on the Input</li> </ul>
3.6	EDMxx Fault	Check Terminal xx	<ul style="list-style-type: none"> <li>Check for a short to ground</li> </ul>
3.7	EDMxx Fault	Check Terminal xx	<ul style="list-style-type: none"> <li>Check for a short between Inputs</li> </ul>
3.8	AVMxx Fault	Perform System Reset	After this Safety Output turned Off, an AVM input associated with this output did not close before its AVM monitoring time expired: <ul style="list-style-type: none"> <li>The AVM may be disconnected or its response to the Safety Output turning Off may be too slow</li> <li>Check the AVM Input and then perform a System Reset to clear the fault</li> </ul>
3.9	Input Fault	AVM Not Closed When Output Turned On	The AVM input was open, but should have been closed, when the associated Safety Output was commanded On: <ul style="list-style-type: none"> <li>The AVM may be disconnected. Check the wiring to the AVM</li> </ul>
4.1	Supply Voltage Low	Check the power supply	The supply voltage dropped below the rated voltage for longer than 6 ms: <ul style="list-style-type: none"> <li>Check the power supply voltage and current rating</li> <li>Check for an overload on the outputs that might cause the power supply to limit the current</li> </ul>
4.2	Internal Fault		A configuration parameter has become corrupt. To fix the configuration: <ul style="list-style-type: none"> <li>Replace the configuration by using a backup copy of the configuration</li> <li>Recreate the configuration using the PC Interface and write it to the Controller</li> </ul>
4.3 – 4.11	Internal Fault	-	Internal failure—Contact Banner Engineering (see <a href="#">Repairs and Warranty Service</a> on page 118).
4.12	Configuration Timeout	Check Configuration	The Safety Controller was left in Configuration mode for more than one hour without pressing any keys.
4.13	Configuration Timeout	Check Configuration	The Safety Controller was left in Configuration mode for more than one hour without receiving any commands from the PC Interface.
4.14	Configuration Unconfirmed	Confirm Configuration	The Configuration was not confirmed after being edited: <ul style="list-style-type: none"> <li>Confirm configuration using the PC Interface</li> </ul>
4.15 – 4.19	Internal Fault	-	Internal failure—Contact Banner Engineering (see <a href="#">Repairs and Warranty Service</a> on page 118).
4.20	Unassigned Terminal in Use	Check Terminal xx	This terminal is not mapped to any device in the present configuration and should not be active: <ul style="list-style-type: none"> <li>Check the wiring</li> </ul>
4.21 – 4.34	Internal Fault	-	Internal failure—Contact Banner Engineering (see <a href="#">Repairs and Warranty Service</a> on page 118).
4.35	Overtemperature	-	An internal overtemperature condition has occurred.
4.36 – 4.39	Internal Fault	-	Internal failure—Contact Banner Engineering (see <a href="#">Repairs and Warranty Service</a> on page 118).
4.40-4.41	Module Communication Failure	Check module power	An output expansion module lost contact with the Base Controller.
4.42	Module Mismatch	-	The expansion module detected does not match the Controller configuration.
4.43	Module Communication Failure	Check module power	An expansion module lost contact with the Base Controller.
4.44-4.45	Internal Fault	-	Internal failure—Contact Banner Engineering (see <a href="#">Repairs and Warranty Service</a> on page 118).
4.46-4.47	Internal Fault	-	Internal failure—Contact Banner Engineering (see <a href="#">Repairs and Warranty Service</a> on page 118).
4.48	Unused output	Check output wiring	An output is detected but it is not part of the Controller Configuration.

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Fault Code	Displayed Message	Additional Message	Steps to resolve
4.49 – 4.55	Internal Fault	-	Internal failure—Contact Banner Engineering (see <a href="#">Repairs and Warranty Service</a> on page 118).
4.56	Display Comm Failure	-	Display Communication Failure: <ul style="list-style-type: none"><li>• Cycle power to the Controller. If fault code persists, contact Banner Engineering (see <a href="#">Repairs and Warranty Service</a> on page 118)</li></ul>
4.57 – 4.59	Internal Fault	-	Internal failure—Contact Banner Engineering (see <a href="#">Repairs and Warranty Service</a> on page 118).
4.60	Output Fault	Check for shorts	An output terminal detected a short. Check output fault for details.
5.1 – 5.3	Internal Fault	-	Internal failure—Contact Banner Engineering (see <a href="#">Repairs and Warranty Service</a> on page 118)
6.xx	Internal Fault	-	Invalid configuration data. Possible internal failure: <ul style="list-style-type: none"><li>• Try writing a new configuration to the Controller</li></ul>

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