QUICKNOTE

How to use AOIs with the ESR2 module

Rev	Date	File Name
1.0	2/6/2014	How to use AOIs with the ESR2 module

- Product concerned: SST Backplane communication module.
- Product version: See below minimum requirements
- Environment: Windows 7 and upper
- Related documents:
  C:\Program Files (x86)\BradCommunications\SST Backplane Communication Module\Help
  - 715-0097___SST-ESR2-CLX-RLL And SST-SR4-CLX-RLL User Reference.pdf
  - 717-0039___MODBUS on Ethernet TCP_IP Protocol Reference Guide.pdf
  - 717-0055___Industrial Ethernet Protocol Reference Guide.pdf
- Restriction : See below minimum requirements

The information in this document is reliable at the time of the drafting. At any time, Molex can decide to change this information.

Minimum requirements when using the communication module’s AOI:

With Generic profile:

- Rockwell RSLogix 5000 Version 16 or later
- Firmware version 2.10.2.0 or higher.
- Product CD 2.3.0 (Product Install 1.9.0.0/ Configuration tool 1.6.15) or higher.

With AOP:

- Rockwell RSLogix 5000 Version 16 or later
- Firmware version 2.12.1.0 or higher.
- Product CD 2.5 (Product Install 1.9.5.0/ Configuration tool 1.6.20) or higher.

How to know the module firmware version:

To check the firmware version, unplug and plug the module into the ControlLogix Rack, the module’s LCD will display “BOOT” and shortly after will scroll the firmware version.
If the version of firmware is good, you can skip to configuration step. But, if the firmware version is not compatible with AOI requirements defined above, you need to upgrade the firmware version before starting the module configuration (See related documents)

Latest Firmware / Software / AOI / AOP available from: http://www.molex.com/link/brad_download.html

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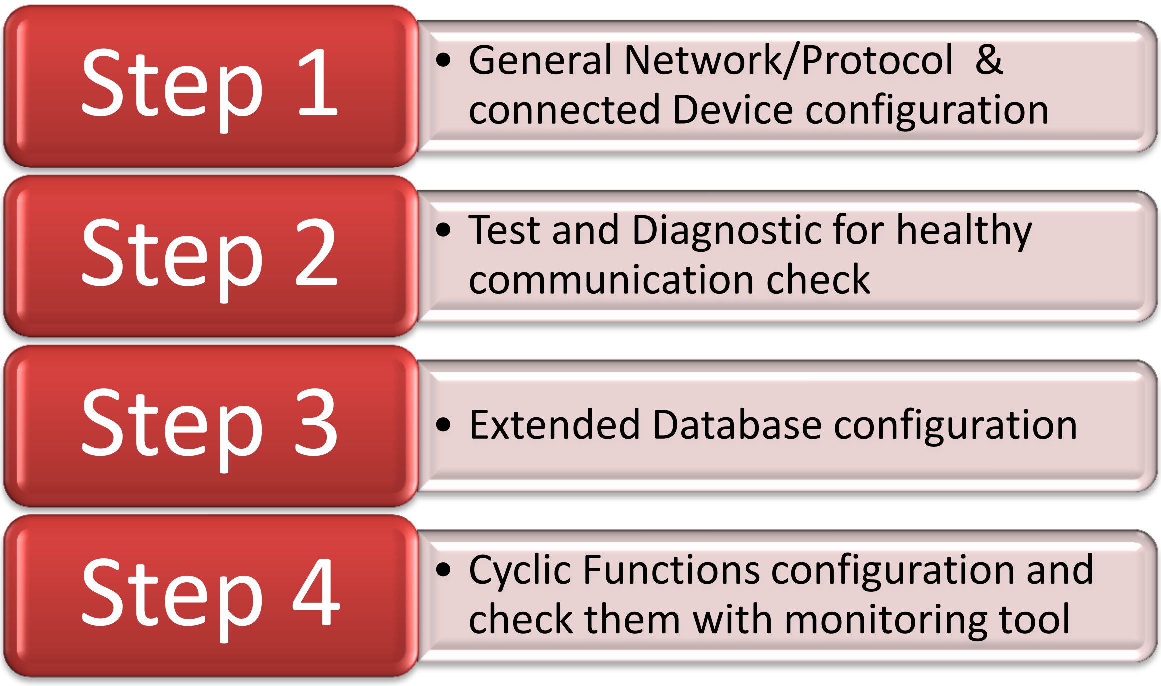
1. Add-On-Instruction Support

The Add-On-Instruction feature allows:

- Direct mapping of the module's entire database (extended database) to the ControlLogix IO table without running any additional CIP messages.
- Dynamic cyclic function management

2. SST Backplane communication module console configuration

We consider that you have configured the network/protocol and connected devices with a healthy communication.



Step 1
- General Network/Protocol & connected Device configuration

Step 2
- Test and Diagnostic for healthy communication check

Step 3
- Extended Database configuration

Step 4
- Cyclic Functions configuration and check them with monitoring tool

In this chapter, we will be focused on the "Step 3: Extended Database configuration" only.

For more information about the other steps, please refer to the ESR2 user reference 715-0097___SST-ESR2-CLX-RLL And SST-SR4-CLX-RLL User Reference.pdf located under C:\Program Files (x86)\BradCommunications\SST Backplane Communication Module\Help

Database Mapping:

The ESR2 module can be configured in either of the two supported database configurations “Default address mapping” and “Extended address mapping”.

Extended Address Mapping:

The Extended addressing mode provides direct access to the modules 30208 Words database. It provides the flexibility to map the entire 30208 Words database or select a location applicable to the network and map it to the ControlLogix.
The mapping should be done in two locations.

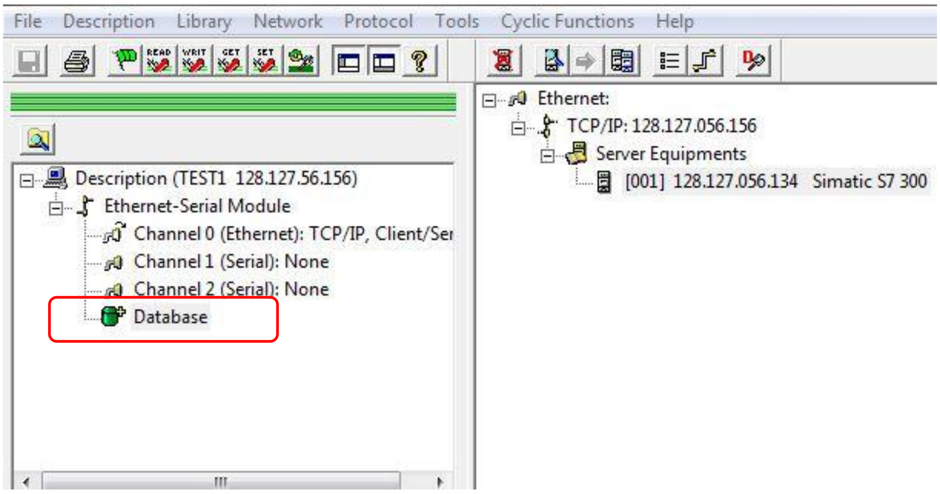
- Console SST backplane (Database Configuration)
- ControlLogix configuration tool (AOI CLX2000 configuration)

AOI ladder logic code is used to directly access the mapped database to the ControlLogix. For that the AOI to work properly, it verifies if the mapping in both locations matches. Mismatch mapping will result to AOI unable to perform proper data exchanges.

The extended addressing mode also allows dynamic management of cyclic function using the mapped Command and State word in the database. Database address 30720-31743 is reserved for cyclic function management.

Configuration of data sizes:

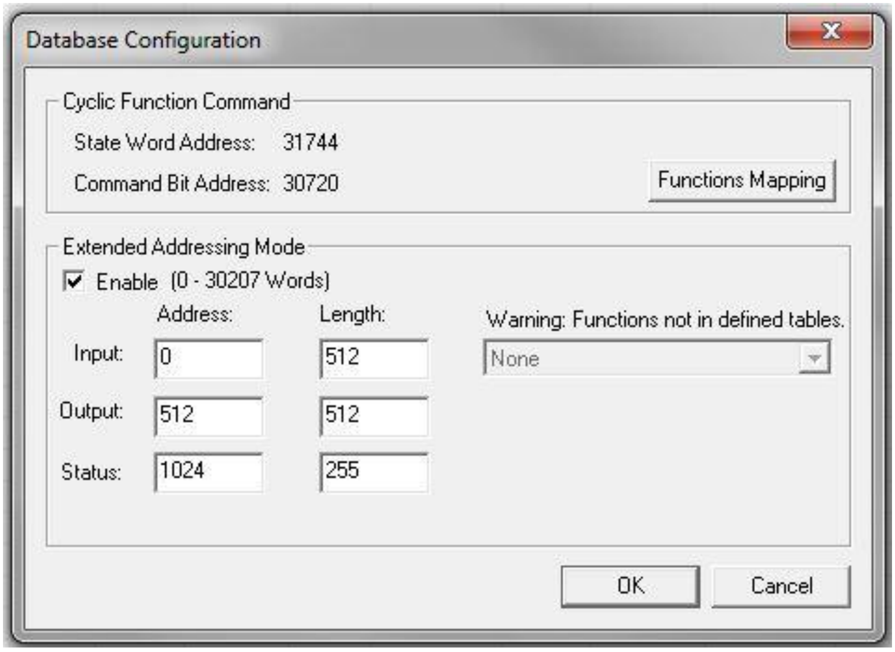
Double click on Database



Description (TEST1 128.127.56.156)
Ethernet-Serial Module
Channel 0 (Ethernet): TCP/IP, Client/Ser
Channel 1 (Serial): None
Channel 2 (Serial): None
Database

Ethernet:
TCP/IP: 128.127.056.156
Server Equipments
[001] 128.127.056.134 Simatic S7 300

Check “Enable” box to configure the beginning address and length for Inputs, outputs and status.



Cyclic Function Command

State Word Address: 31744

Command Bit Address: 30720

Extended Addressing Mode

☑ Enable (0 - 30207 Words)

	Address:	Length:
Input:	0	512
Output:	512	512
Status:	1024	255

Warning: Functions not in defined tables.

None

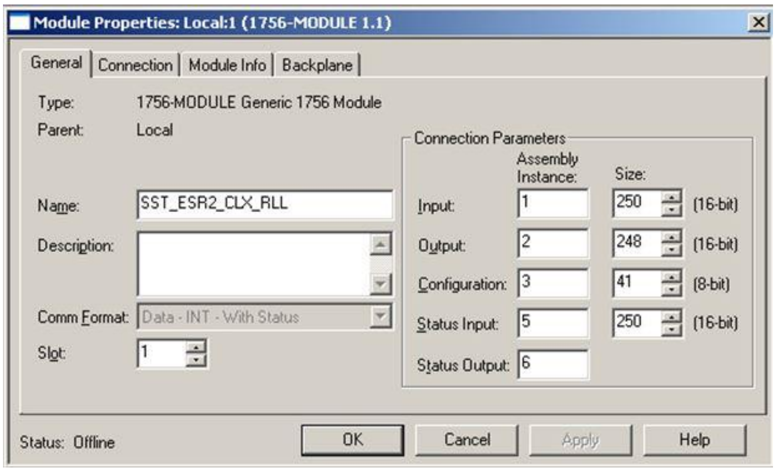
Once done, click on OK and initialize the configuration (to load the new configuration into the ESR2 module).

3. Logix5000 configuration

3.1. Using Generic profile (1756 Generic Profile) and AOI for IO data management.

In this chapter, we will see how to use the direct mapping of the module’s entire database to the ControlLogix IO table without running any additional CIP messages.

Add the Generic profile to the configuration



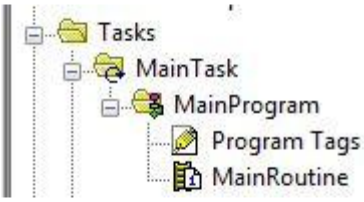
Type: 1756-MODULE Generic 1756 Module
Parent: Local
Name: SST_ESR2_CLX_RLL
Description:
Comm Format: Data - INT - With Status
Slot: 1

Connection Parameters

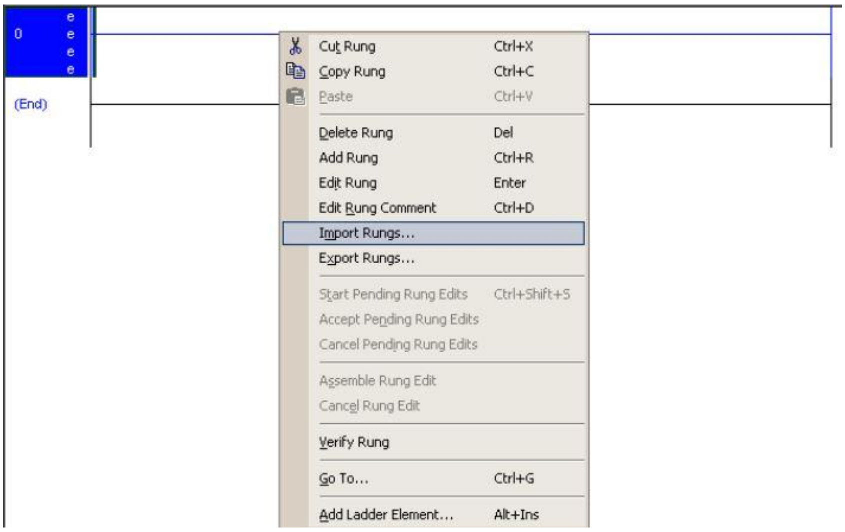
	Assembly Instance:	Size:	
Input:	1	250	(16-bit)
Output:	2	248	(16-bit)
Configuration:	3	41	(8-bit)
Status Input:	5	250	(16-bit)
Status Output:	6		

Status: Offline

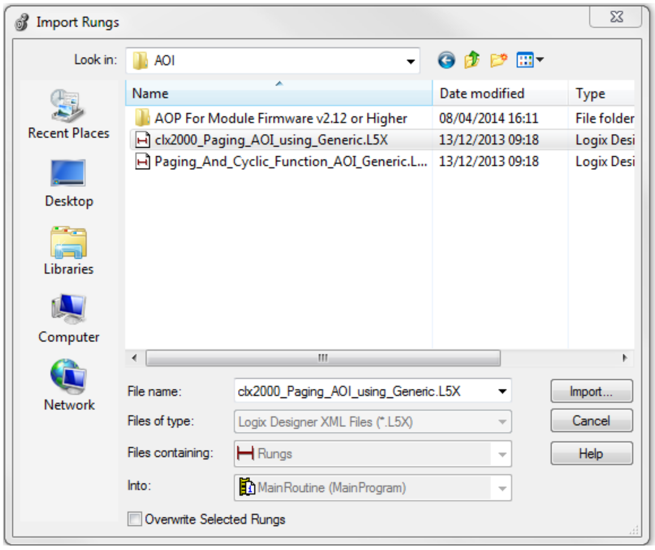
In RSLogix 5000 Task-> MainTask, double click on MainRoutine



Select a rung as below and right-click on rung and select “Import Rung…”



Browse for the ….L5X file as below and select it and select Import…. (The file is located under the directory C:\Program Files (x86)\BradCommunications\SST Backplane Communication Module\Ladder Sample Code For ControlLogix\AOI)



Look in: AOI

Name	Date modified	Type
AOP For Module Firmware v2.12 or Higher	08/04/2014 16:11	File folder
clx2000_Paging_AOI_using_Generic.L5X	13/12/2013 09:18	Logix Desi
Paging_And_Cyclic_Function_AOI_Generic.L...	13/12/2013 09:18	Logix Desi

File name: clx2000_Paging_AOI_using_Generic.L5X

Files of type: Logix Designer XML Files (*.L5X)

Files containing: Rungs

Into: MainRoutine (MainProgram)

□ Overwrite Selected Rungs

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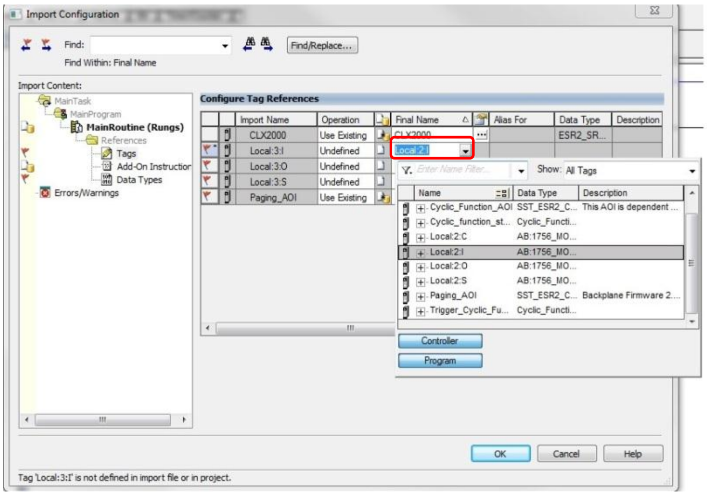
Update Tags Local:3:I, Local:3:O,Local:3:S to the appropriate slot where your ESR2 module is located. (Local:x:I, Local:x:O, Local:x:S)



Find Within: Final Name

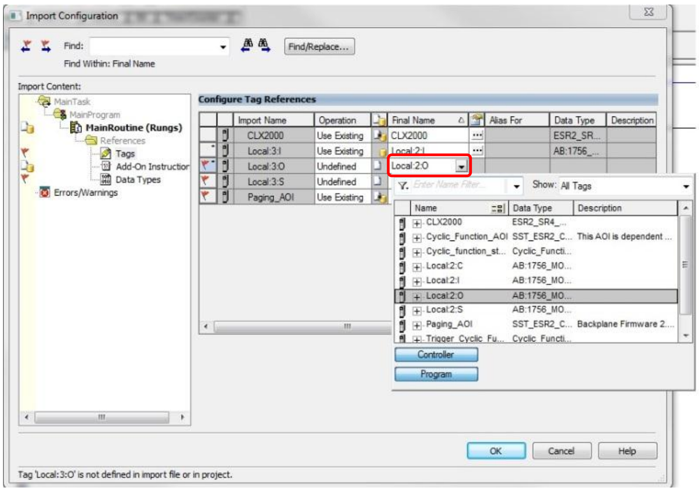
Configure Tag References

Import Name	Operation	Final Name	Alias For	Data Type	Description
CLX2000	Use Existing	CLX2000		ESR2_SR...	
Local:3:I	Undefined	Local:2:I			
Local:3:O	Undefined				
Local:3:S	Undefined				
Paging_AOI	Use Existing				

Show: All Tags

Name	Data Type	Description
Cyclic_Function_AOI	SST_ESR2_C...	This AOI is dependent ...
Cyclic_function_st...	Cyclic_Functi...	
Local:2:C	AB:1756_MO...	
Local:2:I	AB:1756_MO...	
Local:2:O	AB:1756_MO...	
Local:2:S	AB:1756_MO...	
Paging_AOI	SST_ESR2_C...	Backplane Firmware 2....
Trigger_Cyclic_Fu...	Cyclic_Functi...	

Tag 'Local:3:I' is not defined in import file or in project.



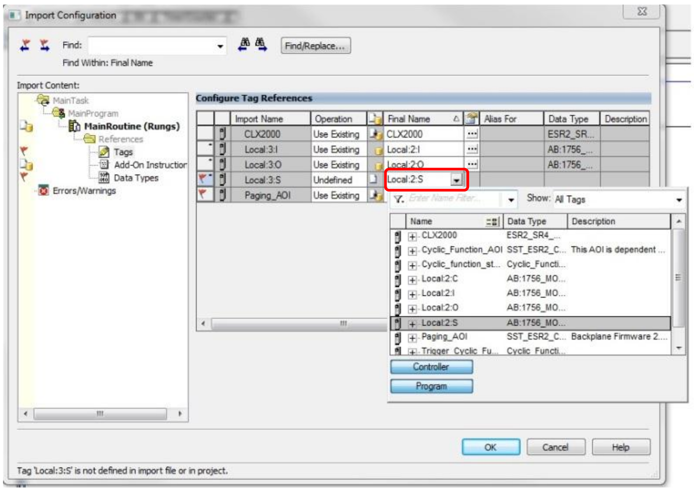
Configure Tag References

Import Name	Operation	Final Name	Alias For	Data Type	Description
CLX2000	Use Existing	CLX2000		ESR2_SR...	
Local:3:I	Use Existing	Local:2:I		AB:1756_...	
Local:3:O	Undefined	Local:2:O			
Local:3:S	Undefined				
Paging_AOI	Use Existing				

Show: All Tags

Name	Data Type	Description
CLX2000	ESR2_SR4_...	
Cyclic_Function_AOI	SST_ESR2_C...	This AOI is dependent ...
Cyclic_function_st...	Cyclic_Functi...	
Local:2:C	AB:1756_MO...	
Local:2:I	AB:1756_MO...	
Local:2:O	AB:1756_MO...	
Local:2:S	AB:1756_MO...	
Paging_AOI	SST_ESR2_C...	Backplane Firmware 2....
Trigger_Cyclic_Fu...	Cyclic_Functi...	

Tag 'Local:3:O' is not defined in import file or in project.



Configure Tag References

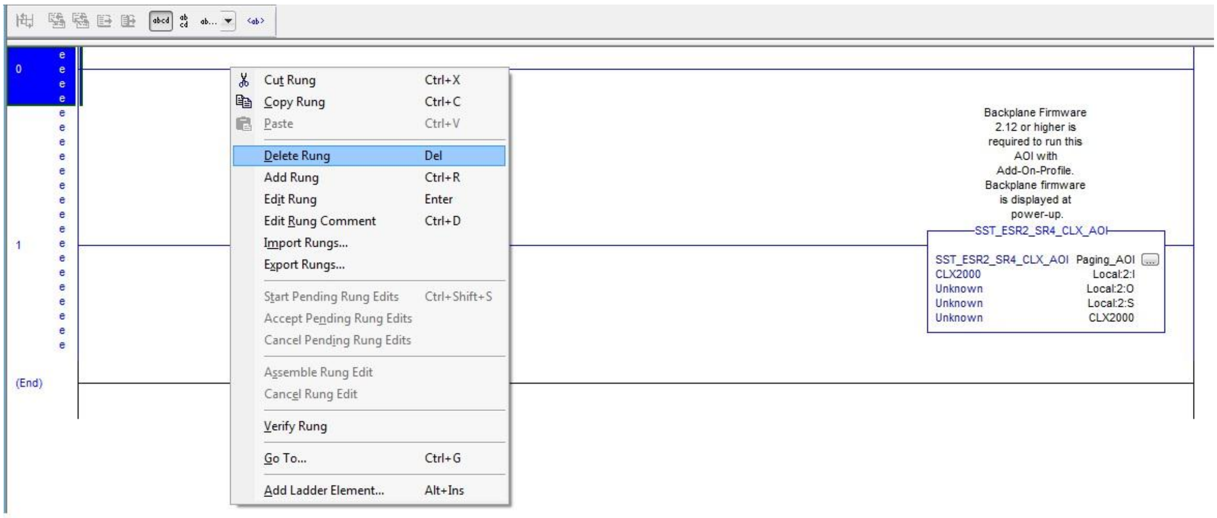
Import Name	Operation	Final Name	Alias For	Data Type	Description
CLX2000	Use Existing	CLX2000		ESR2_SR...	
Local:3:I	Use Existing	Local:2:I		AB:1756_...	
Local:3:O	Use Existing	Local:2:O		AB:1756_...	
Local:3:S	Undefined	Local:2:S			
Paging_AOI	Use Existing				

Show: All Tags

Name	Data Type	Description
CLX2000	ESR2_SR4_...	
Cyclic_Function_AOI	SST_ESR2_C...	This AOI is dependent ...
Cyclic_function_st...	Cyclic_Functi...	
Local:2:C	AB:1756_MO...	
Local:2:I	AB:1756_MO...	
Local:2:O	AB:1756_MO...	
Local:2:S	AB:1756_MO...	
Paging_AOI	SST_ESR2_C...	Backplane Firmware 2....
Trigger_Cyclic_Fu...	Cyclic_Functi...	

Tag 'Local:3:S' is not defined in import file or in project.

Delete the empty rung as shown below



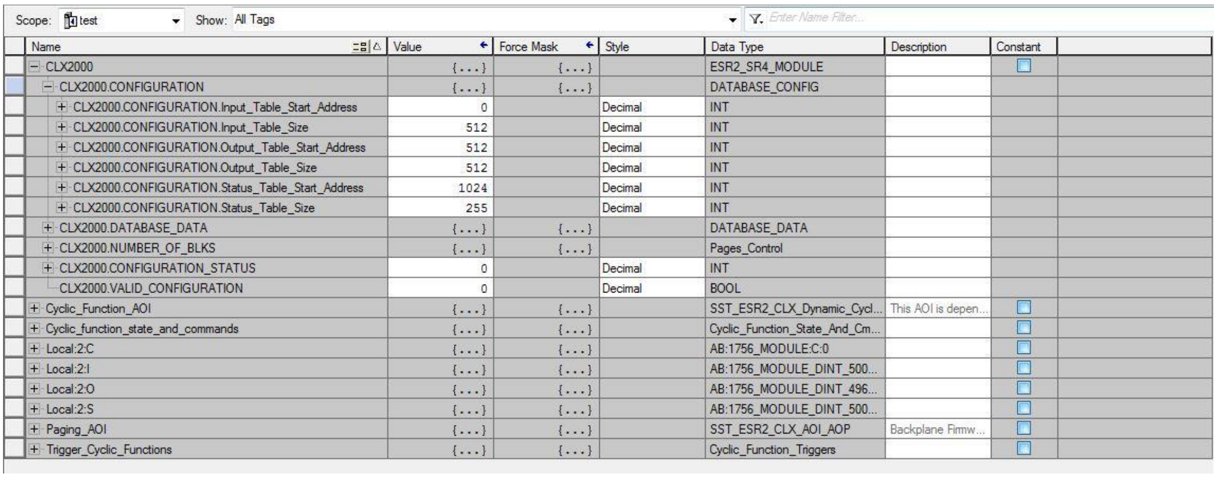
Backplane Firmware 2.12 or higher is required to run this AOI with Add-On-Profile. Backplane firmware is displayed at power-up.

SST_ESR2_SR4_CLX_AOI
SST_ESR2_SR4_CLX_AOI Paging_AOI
CLX2000 Local:2:I
Unknown Local:2:O
Unknown Local:2:S
Unknown CLX2000

Under Controller Tags, go to the CLX2000 tag. Expand CLX2000.CONFIGURATION with the same value defined in SST backplane console (Database extended mapping).

Note: *The AOI instruction will not run if there is a mismatch between the CONFIGURATION tags and the database settings in console configuration. A mismatch is indicated when Tag CLX2000.VALID_CONFIGURATION = 0. Expand Tag CLX2000 and it's the very last member of this structure. The AOI Tag CLX2000.VALID_CONFIGURATION = 1 condition must be met before the AOI will execute.*

INPUT Table Start Address	= 0
INPUT Table size	= 512
OUTPUT Table Start Address	= 512
OUTPUT Table Size	= 512
STATUS Table Start Address	= 1024
STATUS Table Size	= 255



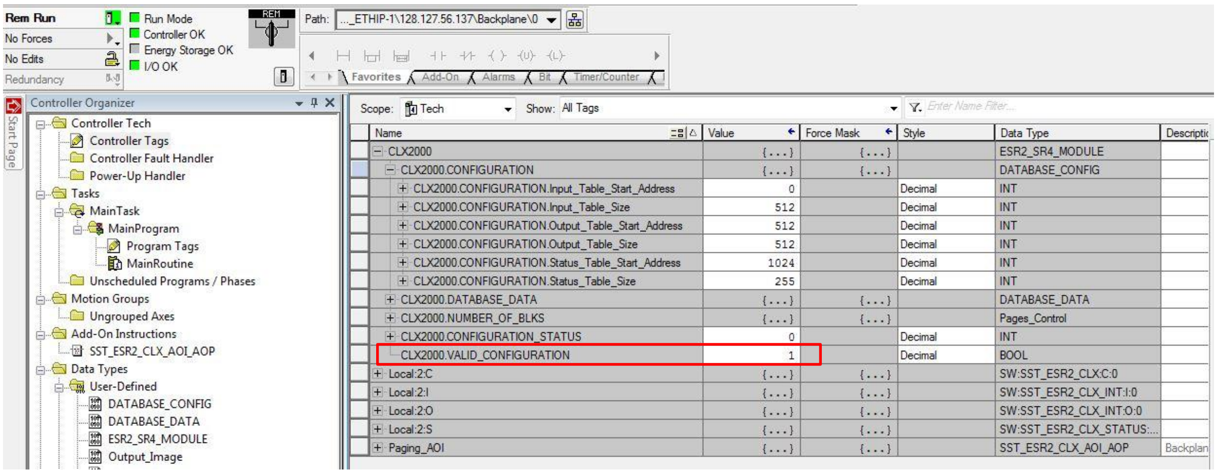
Scope: test Show: All Tags Enter Name Filter...

Name	Value	Force Mask	Style	Data Type	Description	Constant
CLX2000	{...}	{...}		ESR2_SR4_MODULE		☐
CLX2000.CONFIGURATION	{...}	{...}		DATABASE_CONFIG		
CLX2000.CONFIGURATION.Input_Table_Start_Address	0		Decimal	INT		
CLX2000.CONFIGURATION.Input_Table_Size	512		Decimal	INT		
CLX2000.CONFIGURATION.Output_Table_Start_Address	512		Decimal	INT		
CLX2000.CONFIGURATION.Output_Table_Size	512		Decimal	INT		
CLX2000.CONFIGURATION.Status_Table_Start_Address	1024		Decimal	INT		
CLX2000.CONFIGURATION.Status_Table_Size	255		Decimal	INT		
CLX2000.DATABASE_DATA	{...}	{...}		DATABASE_DATA		
CLX2000.NUMBER_OF_BLKS	{...}	{...}		Pages_Control		
CLX2000.CONFIGURATION_STATUS	0		Decimal	INT		
CLX2000.VALID_CONFIGURATION	0		Decimal	BOOL		
Cyclic_Function_AOI	{...}	{...}		SST_ESR2_CLX_Dynamic_Cycl...	This AOI is depen...	☐
Cyclic_function_state_and_commands	{...}	{...}		Cyclic_Function_State_And_Cm...		☐
Local:2:C	{...}	{...}		AB:1756_MODULE:C:0		☐
Local:2:I	{...}	{...}		AB:1756_MODULE_DINT_500...		☐
Local:2:O	{...}	{...}		AB:1756_MODULE_DINT_496...		☐
Local:2:S	{...}	{...}		AB:1756_MODULE_DINT_500...		☐
Paging_AOI	{...}	{...}		SST_ESR2_CLX_AOI_AOP	Backplane Firmw...	☐
Trigger_Cyclic_Functions	{...}	{...}		Cyclic_Function_Triggers		☐

Save the configuration file and download it to the CLX Module.

Once the configuration is downloaded to the PLC and after activating the Run mode, the value of CLX2000.VALID_CONFIGURATION have to be 1 (to confirm that the extended database size configured in the SST console matchs the sizes configured in ControlLogix tool).

You will find the data under CLX2000.DATABASE_DATA



Path: ..._ETHIP-1\128.127.56.137\Backplane\0

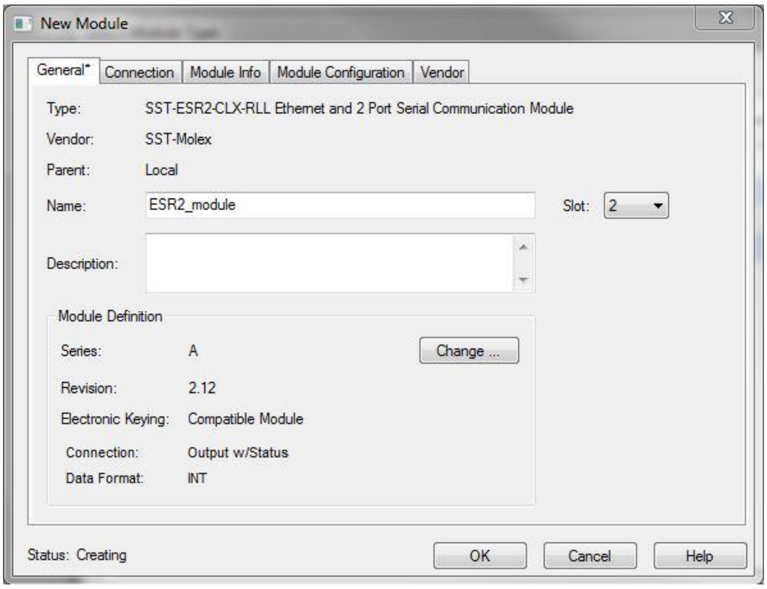
Scope: Tech Show: All Tags Enter Name Filter...

Name	Value	Force Mask	Style	Data Type	Descriptic
CLX2000	{...}	{...}		ESR2_SR4_MODULE	
CLX2000.CONFIGURATION	{...}	{...}		DATABASE_CONFIG	
CLX2000.CONFIGURATION.Input_Table_Start_Address	0		Decimal	INT	
CLX2000.CONFIGURATION.Input_Table_Size	512		Decimal	INT	
CLX2000.CONFIGURATION.Output_Table_Start_Address	512		Decimal	INT	
CLX2000.CONFIGURATION.Output_Table_Size	512		Decimal	INT	
CLX2000.CONFIGURATION.Status_Table_Start_Address	1024		Decimal	INT	
CLX2000.CONFIGURATION.Status_Table_Size	255		Decimal	INT	
CLX2000.DATABASE_DATA	{...}	{...}		DATABASE_DATA	
CLX2000.NUMBER_OF_BLKS	{...}	{...}		Pages_Control	
CLX2000.CONFIGURATION_STATUS	0		Decimal	INT	
CLX2000.VALID_CONFIGURATION	1		Decimal	BOOL	
Local:2:C	{...}	{...}		SW:SST_ESR2_CLX:C:0	
Local:2:I	{...}	{...}		SW:SST_ESR2_CLX_INT:I:0	
Local:2:O	{...}	{...}		SW:SST_ESR2_CLX_INT:O:0	
Local:2:S	{...}	{...}		SW:SST_ESR2_CLX_STATUS:...	
Paging_AOI	{...}	{...}		SST_ESR2_CLX_AOI_AOP	Backplan

3.2. Using the AOP and AOI for IO data management.

In this chapter, we will see how to use the direct mapping of the module's entire database to the ControlLogix IO table without running any additional CIP messages.

Add the AOP to the configuration – Refer the user's manual for more information



Type: SST-ESR2-CLX-RLL Ethernet and 2 Port Serial Communication Module

Vendor: SST-Molex

Parent: Local

Name: ESR2_module

Slot: 2

Description:

Module Definition

Series: A

Revision: 2.12

Electronic Keying: Compatible Module

Connection: Output w/Status

Data Format: INT

Status: Creating

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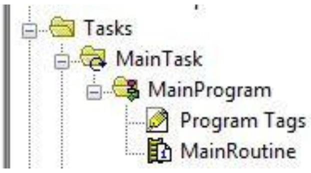
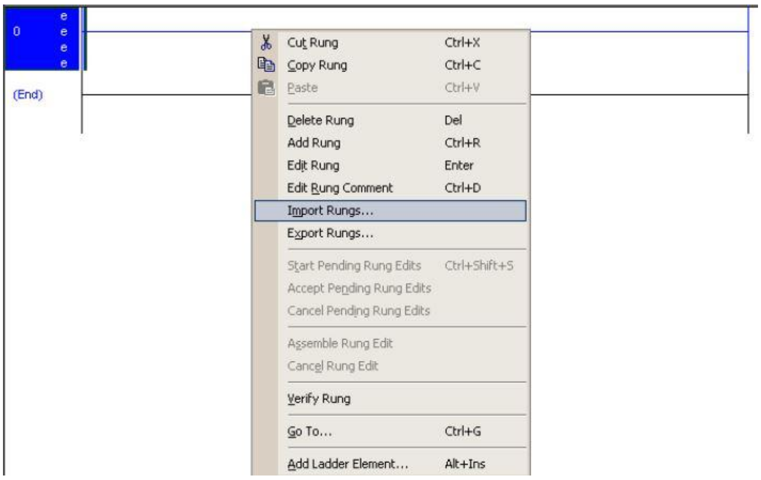
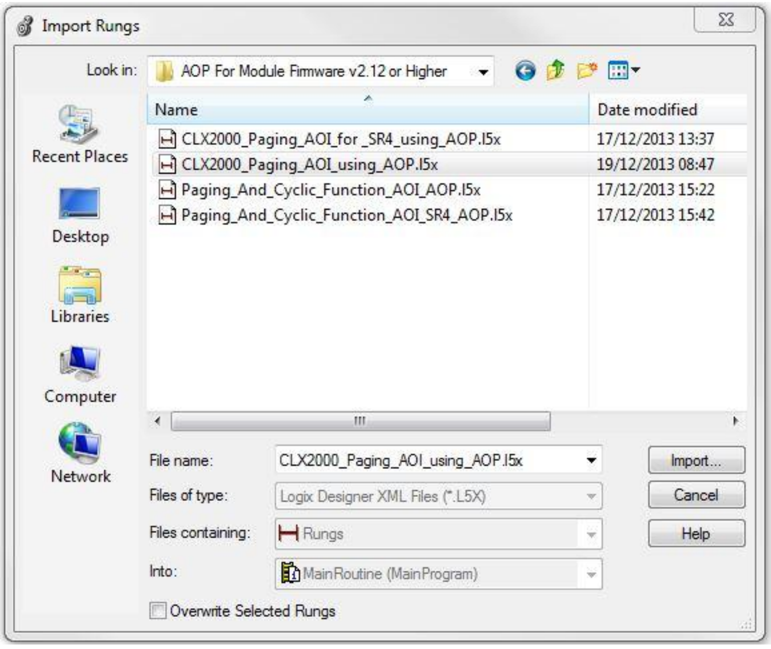
In RSLogix 5000 Task->MainTask, double click on MainRoutine



Select a rung as below and right-click on rung and select "Import Rung…"



Browse for the ….L5X file as below and select it and select Import…. (the file is located under the directory C:\Program Files (x86)\BradCommunications\SST Backplane Communication Module\Ladder Sample Code For ControlLogix\AOI\AOP For Module Firmware v2.12 or Higher



Name	Date modified
CLX2000_Paging_AOI_for _SR4_using_AOP.l5x	17/12/2013 13:37
CLX2000_Paging_AOI_using_AOP.l5x	19/12/2013 08:47
Paging_And_Cyclic_Function_AOI_AOP.l5x	17/12/2013 15:22
Paging_And_Cyclic_Function_AOI_SR4_AOP.l5x	17/12/2013 15:42

File name: CLX2000_Paging_AOI_using_AOP.l5x

Files of type: Logix Designer XML Files (*.L5X)

Files containing: Rungs

Into: MainRoutine (MainProgram)

□ Overwrite Selected Rungs

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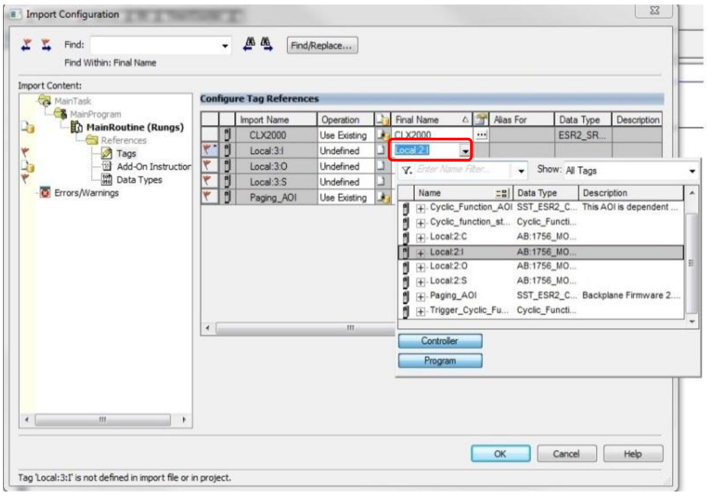
How to use AOIs with the ESR2 module

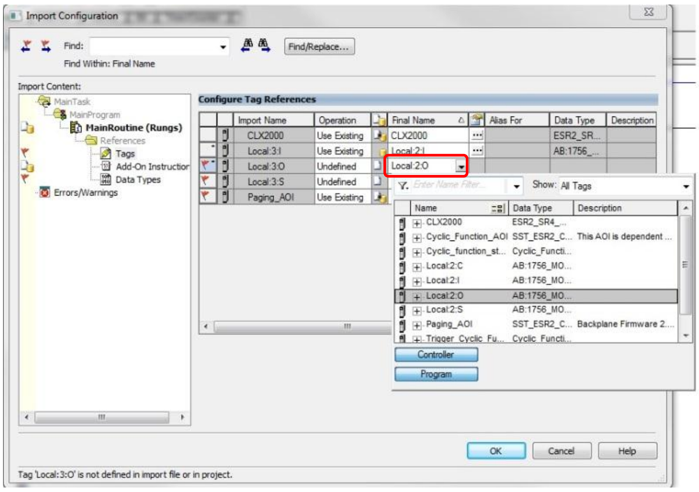
Update Tags Local:3:I, Local:3:O,Local:3:S to the appropriate slot where the ESR2 module is located (Local:x:I, Local:x:O, Local:x:S)



Import Name	Operation	Final Name	Alias For	Data Type	Description
CLX2000	Use Existing	CLX2000		ESR2_SR...	
Local:3:I	Undefined	Local:2:I			
Local:3:O	Undefined				
Local:3:S	Undefined				
Paging_AOI	Use Existing				

Name	Data Type	Description
Cyclic_Function_AOI	SST_ESR2_C...	This AOI is dependent ...
Cyclic_function_st...	Cyclic_Functi...	
Local:2:C	AB:1756_MO...	
Local:2:I	AB:1756_MO...	
Local:2:O	AB:1756_MO...	
Local:2:S	AB:1756_MO...	
Paging_AOI	SST_ESR2_C...	Backplane Firmware 2....
Trigger_Cyclic_Fu...	Cyclic_Functi...	

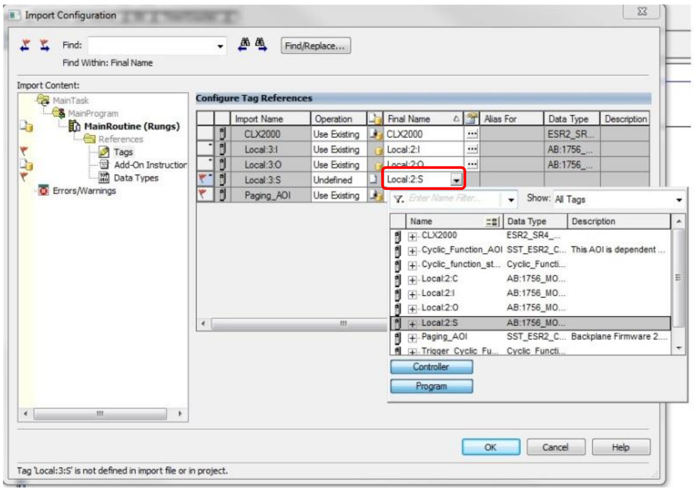
Tag 'Local:3:I' is not defined in import file or in project.



Import Name	Operation	Final Name	Alias For	Data Type	Description
CLX2000	Use Existing	CLX2000		ESR2_SR...	
Local:3:I	Use Existing	Local:2:I		AB:1756_...	
Local:3:O	Undefined	Local:2:O			
Local:3:S	Undefined				
Paging_AOI	Use Existing				

Name	Data Type	Description
CLX2000	ESR2_SR4_...	
Cyclic_Function_AOI	SST_ESR2_C...	This AOI is dependent ...
Cyclic_function_st...	Cyclic_Functi...	
Local:2:C	AB:1756_MO...	
Local:2:I	AB:1756_MO...	
Local:2:O	AB:1756_MO...	
Local:2:S	AB:1756_MO...	
Paging_AOI	SST_ESR2_C...	Backplane Firmware 2....
Trigger_Cyclic_Fu...	Cyclic_Functi...	

Tag 'Local:3:O' is not defined in import file or in project.



Import Name	Operation	Final Name	Alias For	Data Type	Description
CLX2000	Use Existing	CLX2000		ESR2_SR...	
Local:3:I	Use Existing	Local:2:I		AB:1756_...	
Local:3:O	Use Existing	Local:2:O		AB:1756_...	
Local:3:S	Undefined	Local:2:S			
Paging_AOI	Use Existing				

Name	Data Type	Description
CLX2000	ESR2_SR4_...	
Cyclic_Function_AOI	SST_ESR2_C...	This AOI is dependent ...
Cyclic_function_st...	Cyclic_Functi...	
Local:2:C	AB:1756_MO...	
Local:2:I	AB:1756_MO...	
Local:2:O	AB:1756_MO...	
Local:2:S	AB:1756_MO...	
Paging_AOI	SST_ESR2_C...	Backplane Firmware 2....
Trigger_Cyclic_Fu...	Cyclic_Functi...	

Tag 'Local:3:S' is not defined in import file or in project.

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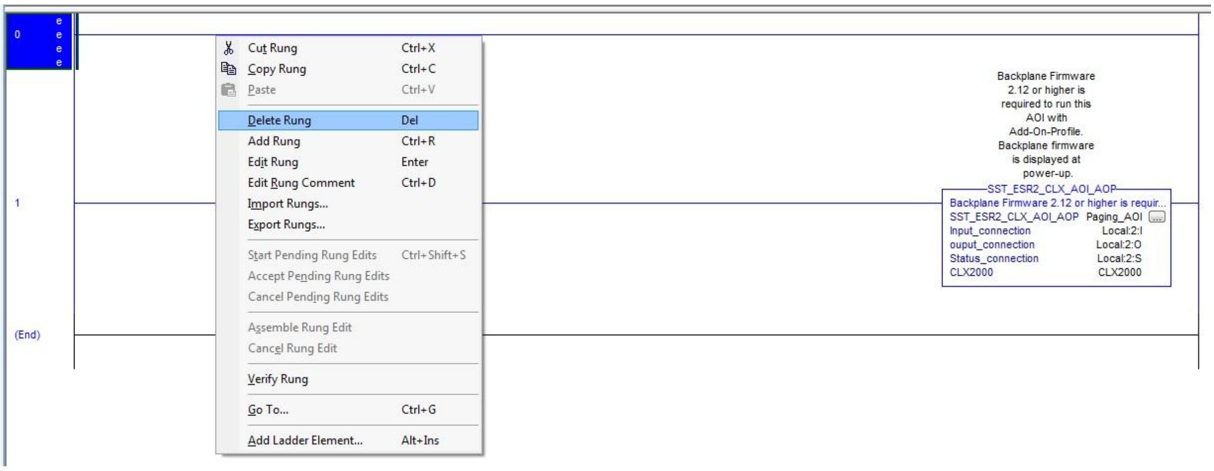
How to use AOIs with the ESR2 module

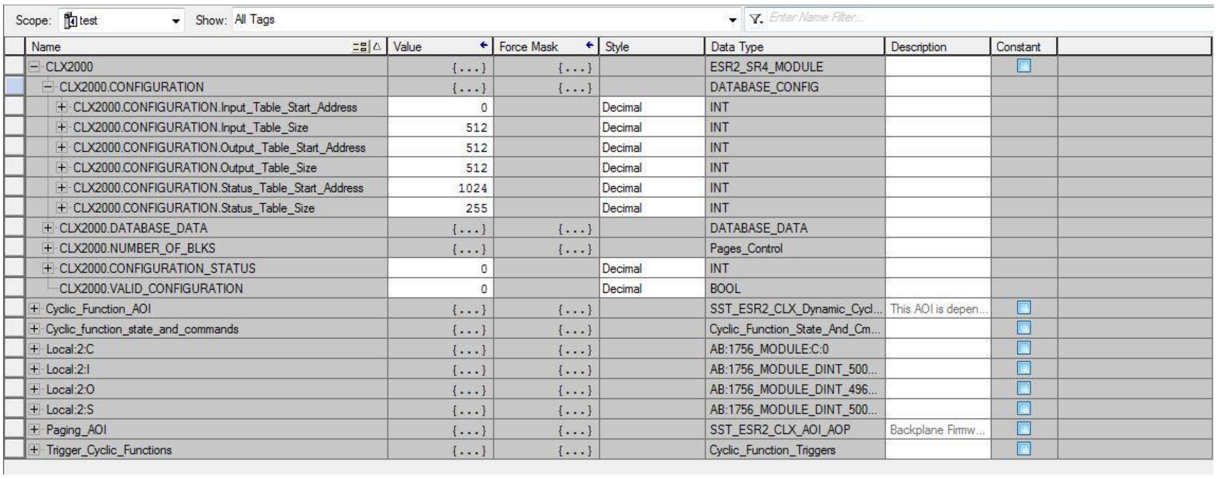
Delete the empty rung as shown below


0
1
(End)
Cut Rung Ctrl+X
Copy Rung Ctrl+C
Paste Ctrl+V
Delete Rung Del
Add Rung Ctrl+R
Edit Rung Enter
Edit Rung Comment Ctrl+D
Import Rungs...
Export Rungs...
Start Pending Rung Edits Ctrl+Shift+S
Accept Pending Rung Edits
Cancel Pending Rung Edits
Assemble Rung Edit
Cancel Rung Edit
Verify Rung
Go To... Ctrl+G
Add Ladder Element... Alt+Ins
Backplane Firmware 2.12 or higher is required to run this AOI with Add-On-Profile. Backplane firmware is displayed at power-up.
SST_ESR2_CLX_AOI_AOP
Backplane Firmware 2.12 or higher is requir...
SST_ESR2_CLX_AOI_AOP Paging_AOI
Input_connection Local:2:I
ouput_connection Local:2:O
Status_connection Local:2:S
CLX2000 CLX2000

Under Controller Tags, go to the CLX2000 tag. Expand CLX2000.CONFIGURATION with the same value defined in SST backplane console (Database extended mapping).

Note : *The AOI instruction will not run if there is a mismatch between the CONFIGURATION tags and the database settings in console configuration. A mismatch is indicated when Tag CLX2000.VALID_CONFIGURATION = 0. Expand Tag CLX2000 and it's the very last member of this structure. The AOI Tag CLX2000.VALID_CONFIGURATION = 1 condition must be met before the AOI will execute.*

INPUT Table Start Address	= 0
INPUT Table size	= 512
OUTPUT Table Start Address	= 512
OUTPUT Table Size	= 512
STATUS Table Start Address	= 1024
STATUS Table Size	= 255



Scope: test Show: All Tags Enter Name Filter...

Name	Value	Force Mask	Style	Data Type	Description	Constant
− CLX2000	{...}	{...}		ESR2_SR4_MODULE		□
− CLX2000.CONFIGURATION	{...}	{...}		DATABASE_CONFIG		
+ CLX2000.CONFIGURATION.Input_Table_Start_Address	0		Decimal	INT		
+ CLX2000.CONFIGURATION.Input_Table_Size	512		Decimal	INT		
+ CLX2000.CONFIGURATION.Output_Table_Start_Address	512		Decimal	INT		
+ CLX2000.CONFIGURATION.Output_Table_Size	512		Decimal	INT		
+ CLX2000.CONFIGURATION.Status_Table_Start_Address	1024		Decimal	INT		
+ CLX2000.CONFIGURATION.Status_Table_Size	255		Decimal	INT		
+ CLX2000.DATABASE_DATA	{...}	{...}		DATABASE_DATA		
+ CLX2000.NUMBER_OF_BLKS	{...}	{...}		Pages_Control		
+ CLX2000.CONFIGURATION_STATUS	0		Decimal	INT		
CLX2000.VALID_CONFIGURATION	0		Decimal	BOOL		
+ Cyclic_Function_AOI	{...}	{...}		SST_ESR2_CLX_Dynamic_Cycl...	This AOI is depen...	□
+ Cyclic_function_state_and_commands	{...}	{...}		Cyclic_Function_State_And_Cm...		□
+ Local:2:C	{...}	{...}		AB:1756_MODULE:C:0		□
+ Local:2:I	{...}	{...}		AB:1756_MODULE_DINT_500...		□
+ Local:2:O	{...}	{...}		AB:1756_MODULE_DINT_496...		□
+ Local:2:S	{...}	{...}		AB:1756_MODULE_DINT_500...		□
+ Paging_AOI	{...}	{...}		SST_ESR2_CLX_AOI_AOP	Backplane Firmw...	□
+ Trigger_Cyclic_Functions	{...}	{...}		Cyclic_Function_Triggers		□

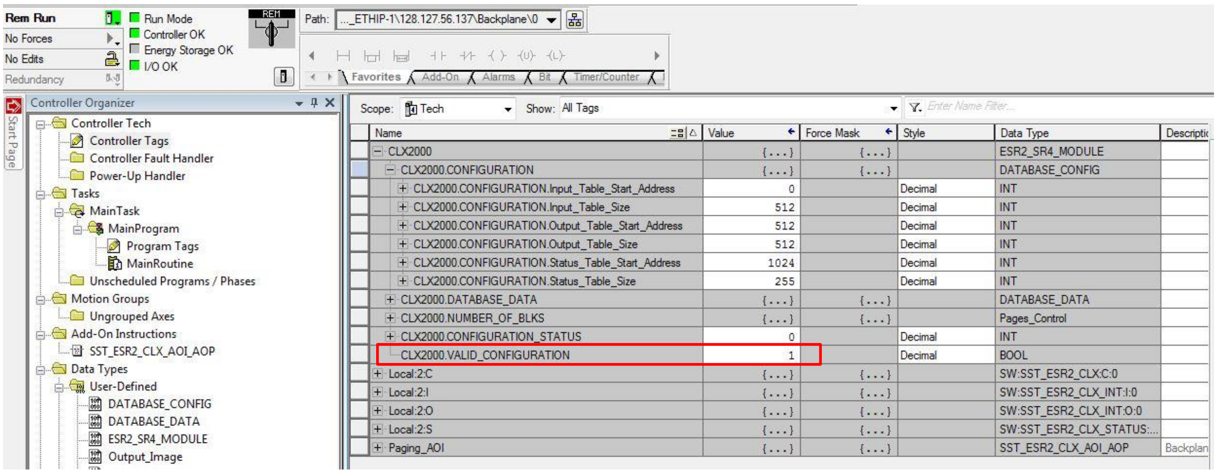
Save the configuration file and download it to the CLX Module.

QUICKNOTE

How to use AOIs with the ESR2 module

Once the configuration is downloaded to the PLC and after activating the Run mode, the value of CLX2000.VALID_CONFIGURATION have to be 1 (to confirm that the extended database size configured in the SST console matches the sizes configured in ControlLogix tool).

You will find the data under CLX2000.DATABASE_DATA



Scope: Tech   Show: All Tags

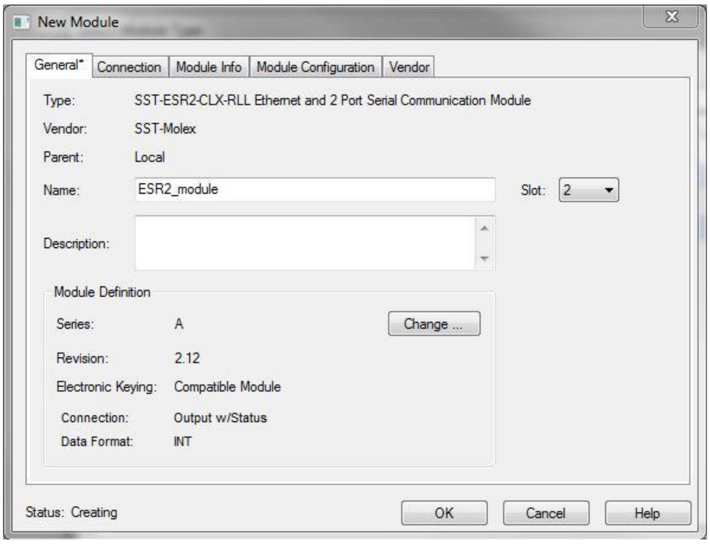
Name	Value	Force Mask	Style	Data Type	Descriptic
CLX2000	{...}	{...}		ESR2_SR4_MODULE	
CLX2000.CONFIGURATION	{...}	{...}		DATABASE_CONFIG	
CLX2000.CONFIGURATION.Input_Table_Start_Address	0		Decimal	INT	
CLX2000.CONFIGURATION.Input_Table_Size	512		Decimal	INT	
CLX2000.CONFIGURATION.Output_Table_Start_Address	512		Decimal	INT	
CLX2000.CONFIGURATION.Output_Table_Size	512		Decimal	INT	
CLX2000.CONFIGURATION.Status_Table_Start_Address	1024		Decimal	INT	
CLX2000.CONFIGURATION.Status_Table_Size	255		Decimal	INT	
CLX2000.DATABASE_DATA	{...}	{...}		DATABASE_DATA	
CLX2000.NUMBER_OF_BLKS	{...}	{...}		Pages_Control	
CLX2000.CONFIGURATION_STATUS	0		Decimal	INT	
CLX2000.VALID_CONFIGURATION	1		Decimal	BOOL	
Local:2:C	{...}	{...}		SW:SST_ESR2_CLX:C:0	
Local:2:I	{...}	{...}		SW:SST_ESR2_CLX_INT:I:0	
Local:2:O	{...}	{...}		SW:SST_ESR2_CLX_INT:O:0	
Local:2:S	{...}	{...}		SW:SST_ESR2_CLX_STATUS:...	
Paging_AOI	{...}	{...}		SST_ESR2_CLX_AOI_AOP	Backplan

3.3. Using the AOP and AOIs for IO data and cyclic function management.

In this chapter, we will see how to:

- Use the direct mapping of the module's entire database (extended database) to the ControlLogix IO table without running any additional CIP messages.
- Manage Dynamic cyclic function

Add the Generic profile to the configuration



Type: SST-ESR2-CLX-RLL Ethernet and 2 Port Serial Communication Module
Vendor: SST-Molex
Parent: Local
Name: ESR2_module
Slot: 2
Description:

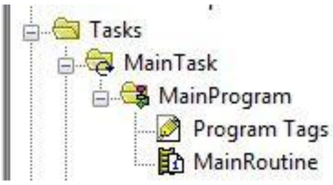
Module Definition
Series: A
Revision: 2.12
Electronic Keying: Compatible Module
Connection: Output w/Status
Data Format: INT

Status: Creating

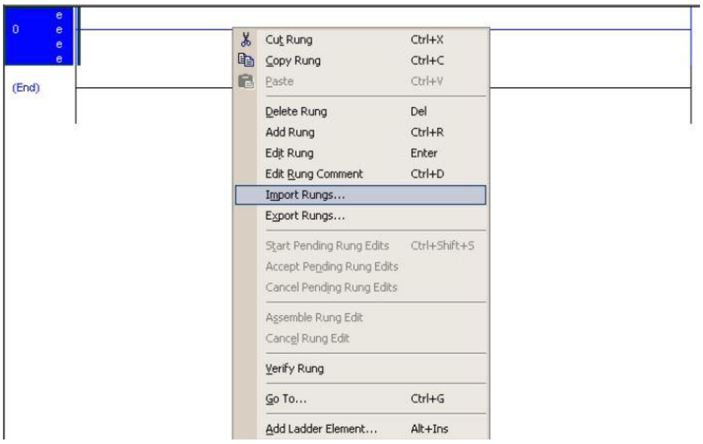
QUICKNOTE

How to use AOIs with the ESR2 module

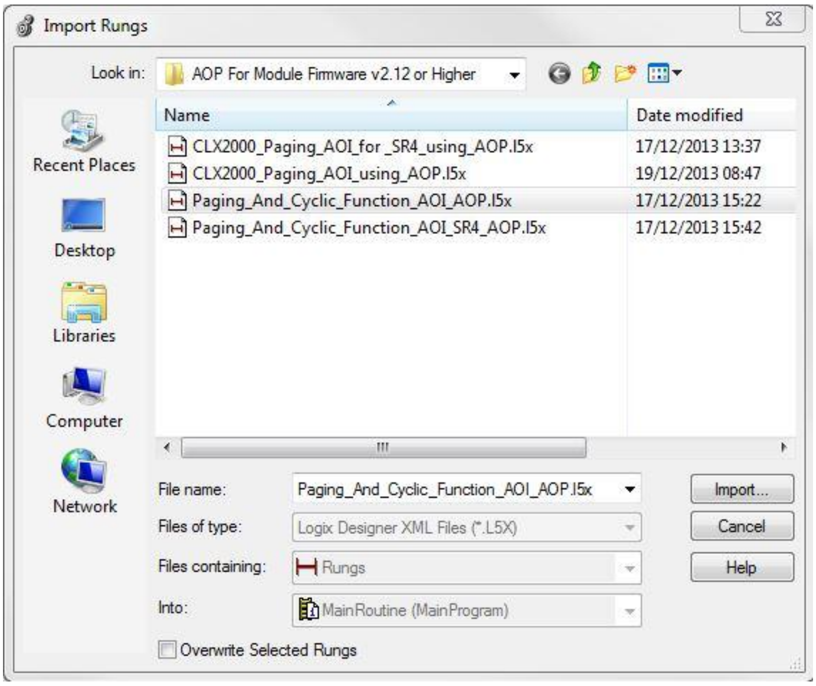
In RSLogix 5000 Task->MainTask, double click on MainRoutine



Select a rung as below and right-click on rung and select "Import Rung…"



Browse for the ….L5X file as below and select it and select Import…. (the file is located under the directory C:\Program Files (x86)\BradCommunications\SST Backplane Communication Module\Ladder Sample Code For ControlLogix\AOI\AOP For Module Firmware v2.12 or Higher



Look in: AOP For Module Firmware v2.12 or Higher

Name	Date modified
CLX2000_Paging_AOI_for _SR4_using_AOP.l5x	17/12/2013 13:37
CLX2000_Paging_AOI_using_AOP.l5x	19/12/2013 08:47
Paging_And_Cyclic_Function_AOI_AOP.l5x	17/12/2013 15:22
Paging_And_Cyclic_Function_AOI_SR4_AOP.l5x	17/12/2013 15:42

File name: Paging_And_Cyclic_Function_AOI_AOP.l5x

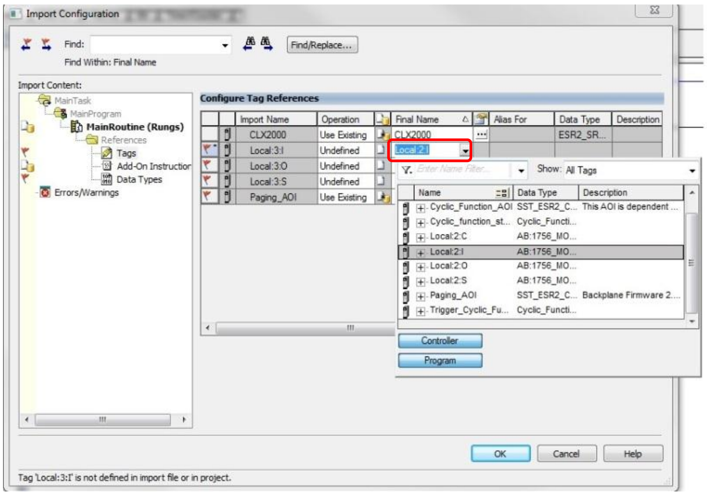
Files of type: Logix Designer XML Files (*.L5X)

Files containing: Rungs

Into: MainRoutine (MainProgram)

□ Overwrite Selected Rungs

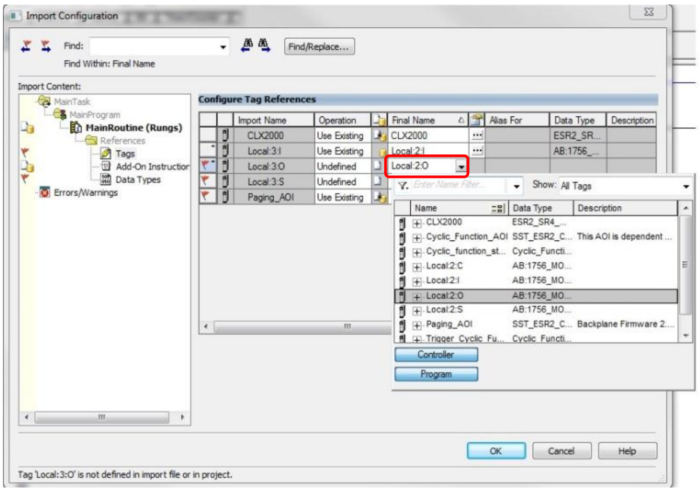
Update Tags Local:3:I, Local:3:O,Local:3:S to the appropriate slot (Local:x:I, Local:x:O, Local:x:S)



Import Name	Operation	Final Name	Alias For	Data Type	Description
CLX2000	Use Existing	CLX2000		ESR2_SR...	
Local:3:I	Undefined	Local:2:I			
Local:3:O	Undefined				
Local:3:S	Undefined				
Paging_AOI	Use Existing				

Name	Data Type	Description
Cyclic_Function_AOI	SST_ESR2_C...	This AOI is dependent ...
Cyclic_function_st...	Cyclic_Functi...	
Local:2:C	AB:1756_MO...	
Local:2:I	AB:1756_MO...	
Local:2:O	AB:1756_MO...	
Local:2:S	AB:1756_MO...	
Paging_AOI	SST_ESR2_C...	Backplane Firmware 2...
Trigger_Cyclic_Fu...	Cyclic_Functi...	

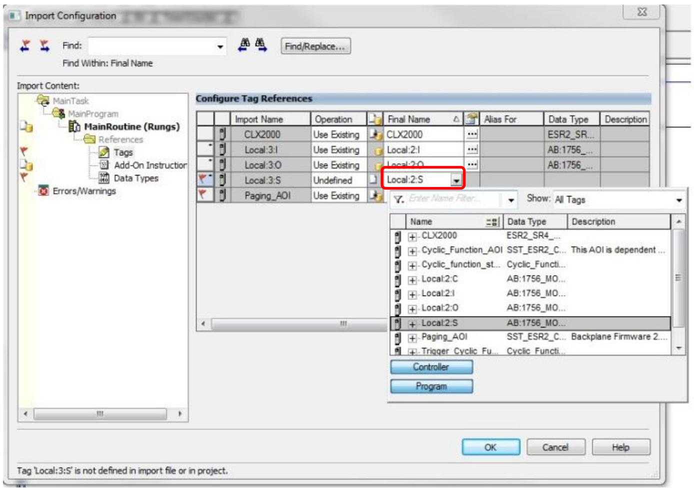
Tag 'Local:3:I' is not defined in import file or in project.



Import Name	Operation	Final Name	Alias For	Data Type	Description
CLX2000	Use Existing	CLX2000		ESR2_SR...	
Local:3:I	Use Existing	Local:2:I		AB:1756_...	
Local:3:O	Undefined	Local:2:O			
Local:3:S	Undefined				
Paging_AOI	Use Existing				

Name	Data Type	Description
CLX2000	ESR2_SR4_...	
Cyclic_Function_AOI	SST_ESR2_C...	This AOI is dependent ...
Cyclic_function_st...	Cyclic_Functi...	
Local:2:C	AB:1756_MO...	
Local:2:I	AB:1756_MO...	
Local:2:O	AB:1756_MO...	
Local:2:S	AB:1756_MO...	
Paging_AOI	SST_ESR2_C...	Backplane Firmware 2...
Trigger_Cyclic_Fu...	Cyclic_Functi...	

Tag 'Local:3:O' is not defined in import file or in project.

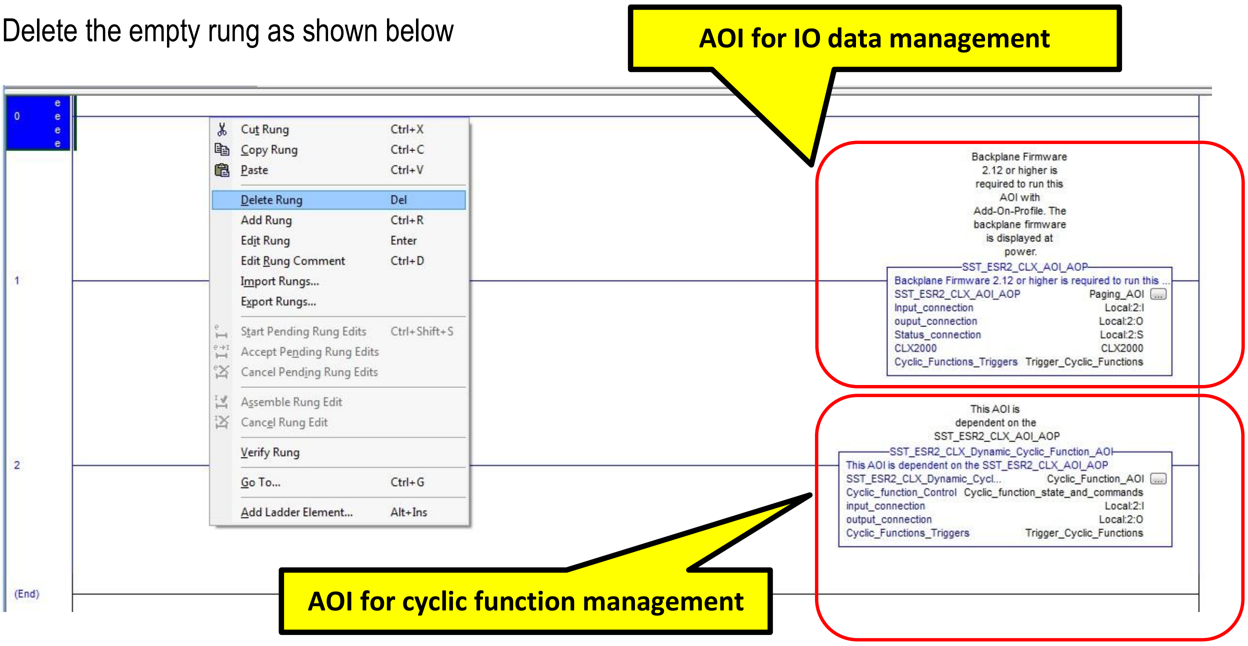


Import Name	Operation	Final Name	Alias For	Data Type	Description
CLX2000	Use Existing	CLX2000		ESR2_SR...	
Local:3:I	Use Existing	Local:2:I		AB:1756_...	
Local:3:O	Use Existing	Local:2:O		AB:1756_...	
Local:3:S	Undefined	Local:2:S			
Paging_AOI	Use Existing				

Name	Data Type	Description
CLX2000	ESR2_SR4_...	
Cyclic_Function_AOI	SST_ESR2_C...	This AOI is dependent ...
Cyclic_function_st...	Cyclic_Functi...	
Local:2:C	AB:1756_MO...	
Local:2:I	AB:1756_MO...	
Local:2:O	AB:1756_MO...	
Local:2:S	AB:1756_MO...	
Paging_AOI	SST_ESR2_C...	Backplane Firmware 2...
Trigger_Cyclic_Fu...	Cyclic_Functi...	

Tag 'Local:3:S' is not defined in import file or in project.

Delete the empty rung as shown below


0
Cut Rung Ctrl+X
Copy Rung Ctrl+C
Paste Ctrl+V
Delete Rung Del
Add Rung Ctrl+R
Edit Rung Enter
Edit Rung Comment Ctrl+D
Import Rungs...
Export Rungs...
Start Pending Rung Edits Ctrl+Shift+S
Accept Pending Rung Edits
Cancel Pending Rung Edits
Assemble Rung Edit
Cancel Rung Edit
Verify Rung
Go To... Ctrl+G
Add Ladder Element... Alt+Ins
1
2
(End)
Backplane Firmware 2.12 or higher is required to run this AOI with Add-On-Profile. The backplane firmware is displayed at power.
SST_ESR2_CLX_AOI_AOP
Backplane Firmware 2.12 or higher is required to run this ...
SST_ESR2_CLX_AOI_AOP Paging_AOI
Input_connection Local:2:I
ouput_connection Local:2:O
Status_connection Local:2:S
CLX2000 CLX2000
Cyclic_Functions_Triggers Trigger_Cyclic_Functions
This AOI is dependent on the SST_ESR2_CLX_AOI_AOP
SST_ESR2_CLX_Dynamic_Cyclic_Function_AOI
This AOI is dependent on the SST_ESR2_CLX_AOI_AOP
SST_ESR2_CLX_Dynamic_Cycl... Cyclic_Function_AOI
Cyclic_function_Control Cyclic_function_state_and_commands
input_connection Local:2:I
output_connection Local:2:O
Cyclic_Functions_Triggers Trigger_Cyclic_Functions

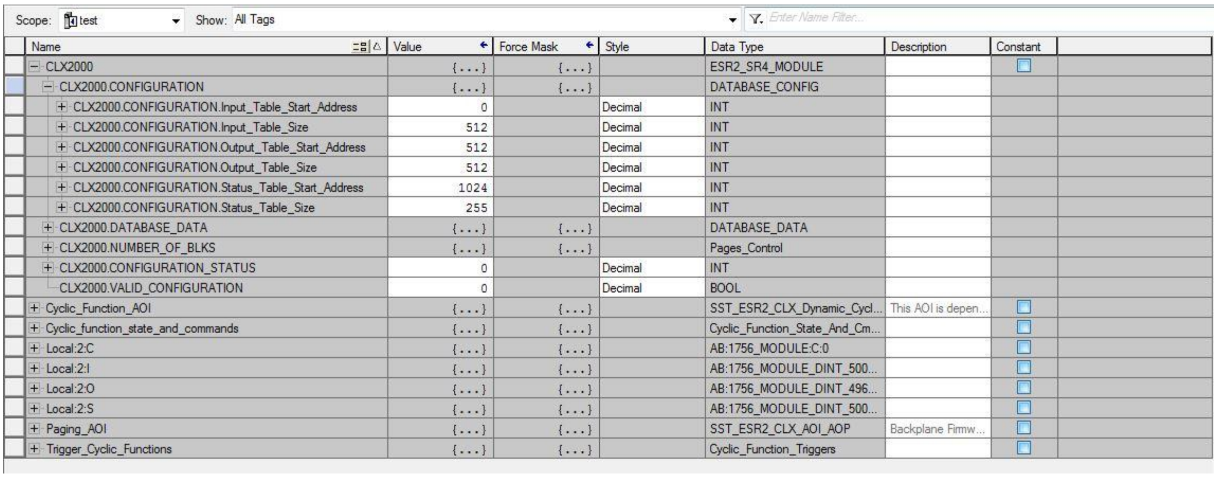
AOI for IO data management

AOI for cyclic function management

Under Controller Tags, go to the CLX2000 tag. Expand CLX2000.CONFIGURATION with the same value defined in SST backplane console (Database extended mapping).

Note : *The AOI instruction will not run if there is a mismatch between the CONFIGURATION tags and the database settings in console configuration. A mismatch is indicated when Tag CLX2000.VALID_CONFIGURATION = 0. Expand Tag CLX2000 and it's the very last member of this structure. The AOI Tag CLX2000.VALID_CONFIGURATION = 1 condition must be met before the AOI will execute.*

INPUT Table Start Address	= 0
INPUT Table size	= 512
OUTPUT Table Start Address	= 512
OUTPUT Table Size	= 512
STATUS Table Start Address	= 1024
STATUS Table Size	= 255



Scope: test Show: All Tags

Name	Value	Force Mask	Style	Data Type	Description	Constant
CLX2000	{...}	{...}		ESR2_SR4_MODULE		□
CLX2000.CONFIGURATION	{...}	{...}		DATABASE_CONFIG		
CLX2000.CONFIGURATION.Input_Table_Start_Address	0		Decimal	INT		
CLX2000.CONFIGURATION.Input_Table_Size	512		Decimal	INT		
CLX2000.CONFIGURATION.Output_Table_Start_Address	512		Decimal	INT		
CLX2000.CONFIGURATION.Output_Table_Size	512		Decimal	INT		
CLX2000.CONFIGURATION.Status_Table_Start_Address	1024		Decimal	INT		
CLX2000.CONFIGURATION.Status_Table_Size	255		Decimal	INT		
CLX2000.DATABASE_DATA	{...}	{...}		DATABASE_DATA		
CLX2000.NUMBER_OF_BLKS	{...}	{...}		Pages_Control		
CLX2000.CONFIGURATION_STATUS	0		Decimal	INT		
CLX2000.VALID_CONFIGURATION	0		Decimal	BOOL		
Cyclic_Function_AOI	{...}	{...}		SST_ESR2_CLX_Dynamic_Cycl...	This AOI is depen...	□
Cyclic_function_state_and_commands	{...}	{...}		Cyclic_Function_State_And_Cm...		□
Local:2:C	{...}	{...}		AB:1756_MODULE:C:0		□
Local:2:I	{...}	{...}		AB:1756_MODULE_DINT_500...		□
Local:2:O	{...}	{...}		AB:1756_MODULE_DINT_496...		□
Local:2:S	{...}	{...}		AB:1756_MODULE_DINT_500...		□
Paging_AOI	{...}	{...}		SST_ESR2_CLX_AOI_AOP	Backplane Firmw...	□
Trigger_Cyclic_Functions	{...}	{...}		Cyclic_Function_Triggers		□

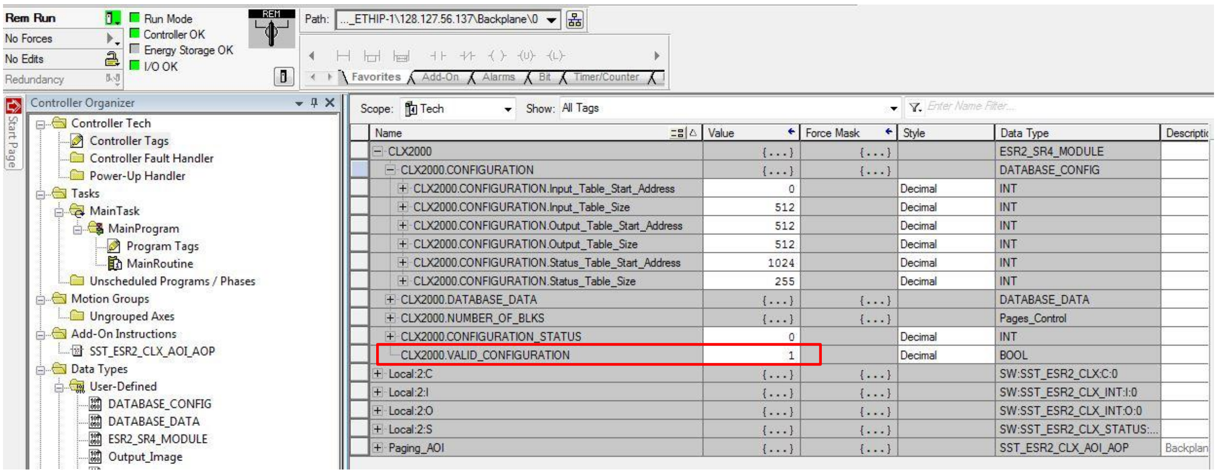
Save the configuration file and download it to the CLX Module.

QUICKNOTE

How to use AOIs with the ESR2 module

Once the configuration is downloaded to the PLC and after activating the Run mode, the value of CLX2000.VALID_CONFIGURATION have to be 1 (to confirm that the extended database size configured in the SST console matchs the sizes configured in ControlLogix tool).

You will find the data under CLX2000.DATABASE_DATA

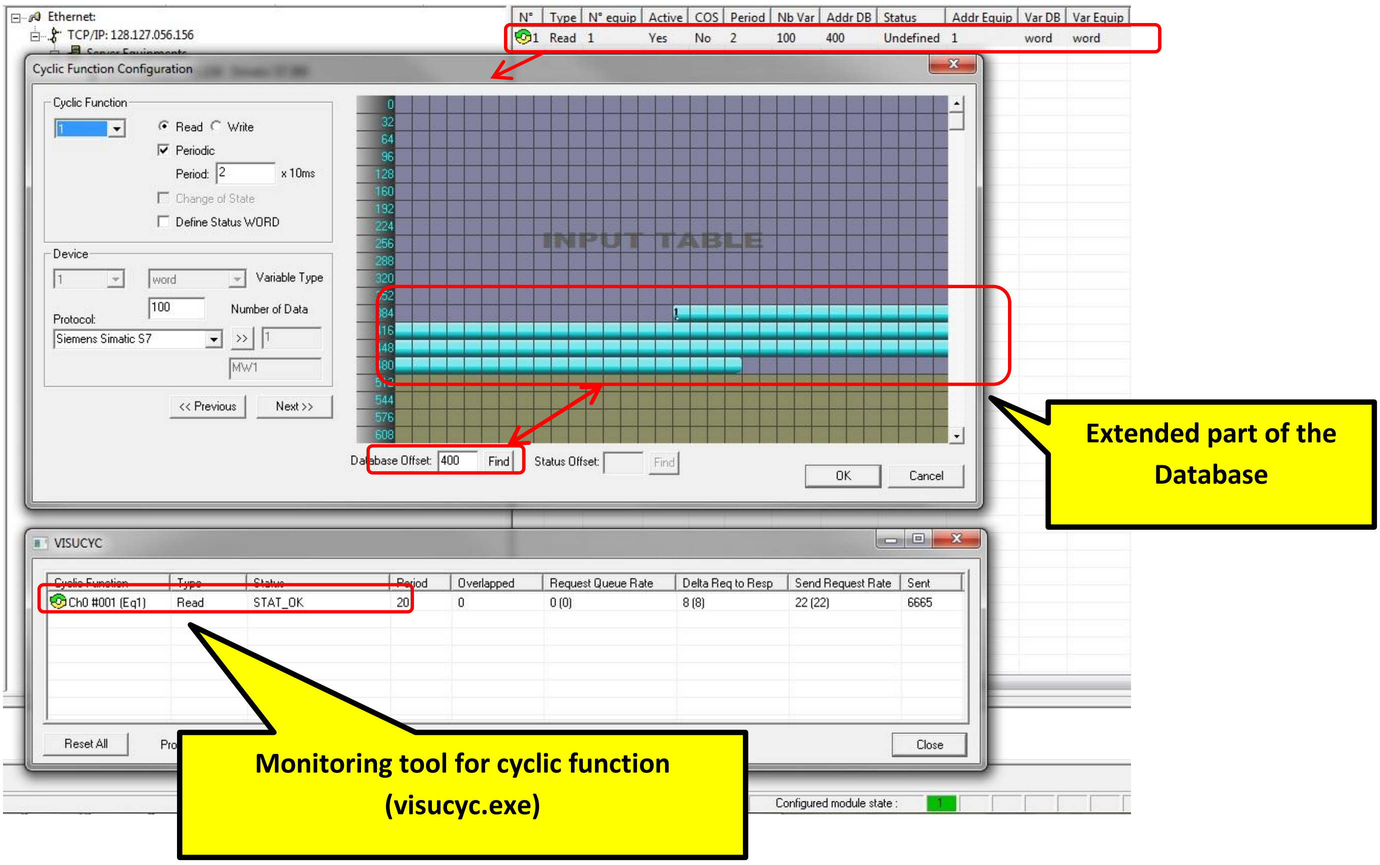


Scope: Tech   Show: All Tags

Name	Value	Force Mask	Style	Data Type	Descriptic
CLX2000	{...}	{...}		ESR2_SR4_MODULE	
CLX2000.CONFIGURATION	{...}	{...}		DATABASE_CONFIG	
CLX2000.CONFIGURATION.Input_Table_Start_Address	0		Decimal	INT	
CLX2000.CONFIGURATION.Input_Table_Size	512		Decimal	INT	
CLX2000.CONFIGURATION.Output_Table_Start_Address	512		Decimal	INT	
CLX2000.CONFIGURATION.Output_Table_Size	512		Decimal	INT	
CLX2000.CONFIGURATION.Status_Table_Start_Address	1024		Decimal	INT	
CLX2000.CONFIGURATION.Status_Table_Size	255		Decimal	INT	
CLX2000.DATABASE_DATA	{...}	{...}		DATABASE_DATA	
CLX2000.NUMBER_OF_BLKS	{...}	{...}		Pages_Control	
CLX2000.CONFIGURATION_STATUS	0		Decimal	INT	
CLX2000.VALID_CONFIGURATION	1		Decimal	BOOL	
Local:2:C	{...}	{...}		SW:SST_ESR2_CLX:C:0	
Local:2:I	{...}	{...}		SW:SST_ESR2_CLX_INT:I:0	
Local:2:O	{...}	{...}		SW:SST_ESR2_CLX_INT:O:0	
Local:2:S	{...}	{...}		SW:SST_ESR2_CLX_STATUS:...	
Paging_AOI	{...}	{...}		SST_ESR2_CLX_AOI_AOP	Backplan

Cyclic functions management:

In our example, you should have functional cyclic function (Status = STAT_OK) before starting the management of cyclic function from Logix5000.



N°	Type	N° equip	Active	COS	Period	Nb Var	Addr DB	Status	Addr Equip	Var DB	Var Equip
1	Read	1	Yes	No	2	100	400	Undefined	1	word	word

Cyclic Function Configuration

Cyclic Function: 1
● Read ○ Write
☑ Periodic
Period: 2 x 10ms
□ Change of State
□ Define Status WORD

Device: 1
word — Variable Type
100 — Number of Data
Protocol: Siemens Simatic S7
>> 1
MW1

<< Previous   Next >>

Database Offset: 400 Find   Status Offset: Find   OK   Cancel

VISUCYC

Cyclic Function	Type	Status	Period	Overlapped	Request Queue Rate	Delta Req to Resp	Send Request Rate	Sent
Ch0 #001 (Eq1)	Read	STAT_OK	20	0	0 (0)	8 (8)	22 (22)	6665

Reset All   Close

Extended part of the Database

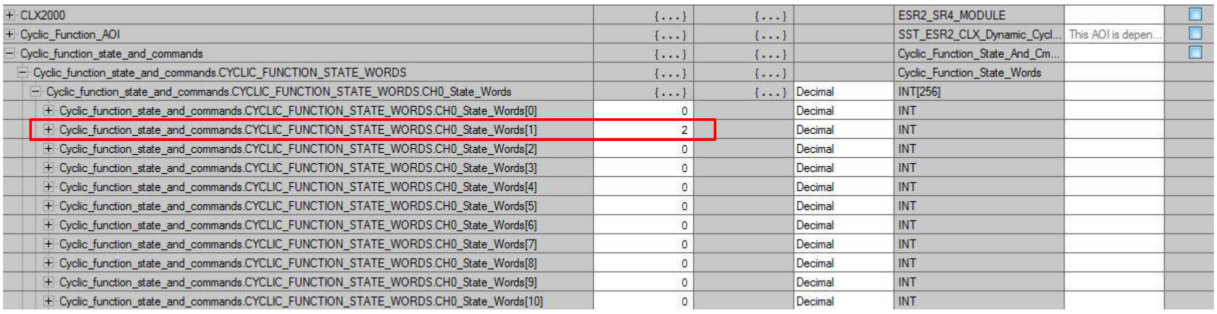
Monitoring tool for cyclic function (visucyc.exe)

QUICKNOTE

How to use AOIs with the ESR2 module

To manage the cyclic functions from Logix5000:

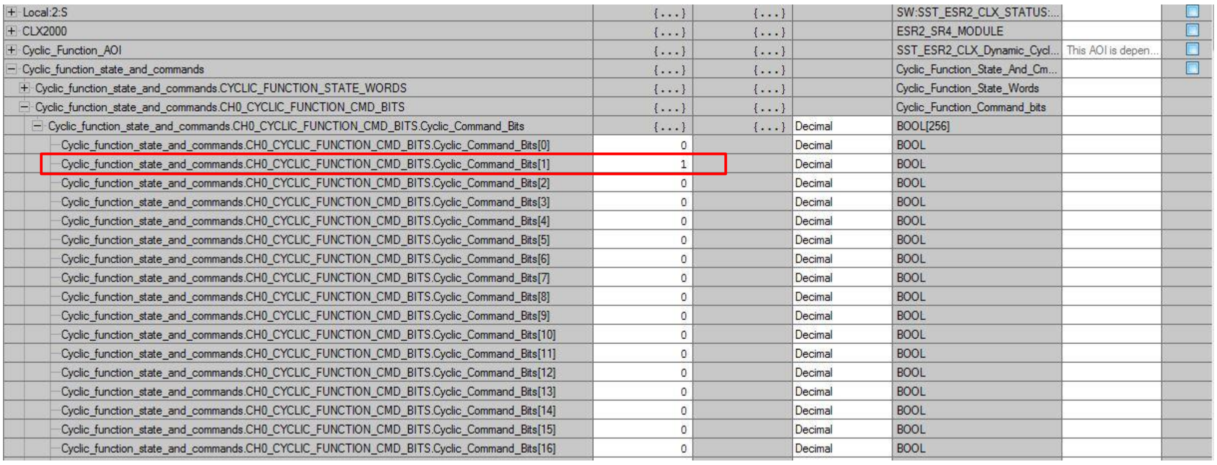
First set the state words for the cyclic functions that to change to a different state. Under the CLX2000 tag, expand CLX2000.CYCLIC_FUNCTION_STATE_WORDS to show all 4 channels. Select the channel to use (for example cyclic functions 1 on channel 0 to be periodically deactivated using command 2).
Available commands values (0 = One-Shot, Periodic Activate = 1, Periodic deactivated = 2, Change of State activated = 3, Change of State deactivated = 4).
CH0_State_Words[1] corresponds to cyclic function 1, CH0_State_Words[255] corresponds to cyclic function 255.



⊞ CLX2000	{...}	{...}		ESR2_SR4_MODULE		□
⊞ Cyclic_Function_AOI	{...}	{...}		SST_ESR2_CLX_Dynamic_Cycl...	This AOI is depen...	□
⊟ Cyclic_function_state_and_commands	{...}	{...}		Cyclic_Function_State_And_Cm...		□
⊟ Cyclic_function_state_and_commands.CYCLIC_FUNCTION_STATE_WORDS	{...}	{...}		Cyclic_Function_State_Words		
⊟ Cyclic_function_state_and_commands.CYCLIC_FUNCTION_STATE_WORDS.CH0_State_Words	{...}	{...}	Decimal	INT[256]		
⊞ Cyclic_function_state_and_commands.CYCLIC_FUNCTION_STATE_WORDS.CH0_State_Words[0]	0		Decimal	INT		
⊞ Cyclic_function_state_and_commands.CYCLIC_FUNCTION_STATE_WORDS.CH0_State_Words[1]	2		Decimal	INT		
⊞ Cyclic_function_state_and_commands.CYCLIC_FUNCTION_STATE_WORDS.CH0_State_Words[2]	0		Decimal	INT		
⊞ Cyclic_function_state_and_commands.CYCLIC_FUNCTION_STATE_WORDS.CH0_State_Words[3]	0		Decimal	INT		
⊞ Cyclic_function_state_and_commands.CYCLIC_FUNCTION_STATE_WORDS.CH0_State_Words[4]	0		Decimal	INT		
⊞ Cyclic_function_state_and_commands.CYCLIC_FUNCTION_STATE_WORDS.CH0_State_Words[5]	0		Decimal	INT		
⊞ Cyclic_function_state_and_commands.CYCLIC_FUNCTION_STATE_WORDS.CH0_State_Words[6]	0		Decimal	INT		
⊞ Cyclic_function_state_and_commands.CYCLIC_FUNCTION_STATE_WORDS.CH0_State_Words[7]	0		Decimal	INT		
⊞ Cyclic_function_state_and_commands.CYCLIC_FUNCTION_STATE_WORDS.CH0_State_Words[8]	0		Decimal	INT		
⊞ Cyclic_function_state_and_commands.CYCLIC_FUNCTION_STATE_WORDS.CH0_State_Words[9]	0		Decimal	INT		
⊞ Cyclic_function_state_and_commands.CYCLIC_FUNCTION_STATE_WORDS.CH0_State_Words[10]	0		Decimal	INT		

Go to the command bit area. Expand CLX2000.CHANNEL_0_CYCLIC_FUNCTION_COMMAND_BITS as below to get to the bit level

Cyclic_Command_bits[1] corresponds to cyclic function 1. Cyclic_Command_bits[255] corresponds to cyclic function 255.

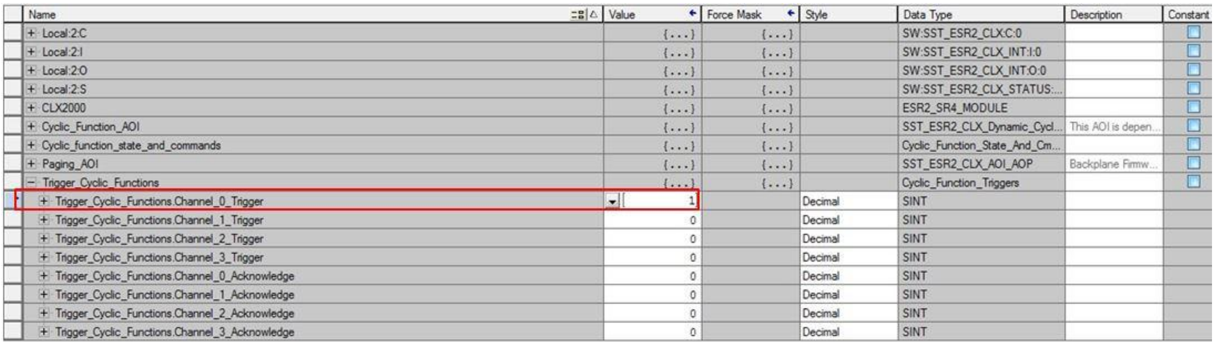


⊞ Local:2:S	{...}	{...}		SW:SST_ESR2_CLX_STATUS:...		□
⊞ CLX2000	{...}	{...}		ESR2_SR4_MODULE		□
⊞ Cyclic_Function_AOI	{...}	{...}		SST_ESR2_CLX_Dynamic_Cycl...	This AOI is depen...	□
⊟ Cyclic_function_state_and_commands	{...}	{...}		Cyclic_Function_State_And_Cm...		□
⊞ Cyclic_function_state_and_commands.CYCLIC_FUNCTION_STATE_WORDS	{...}	{...}		Cyclic_Function_State_Words		
⊟ Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS	{...}	{...}		Cyclic_Function_Command_bits		
⊟ Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits	{...}	{...}	Decimal	BOOL[256]		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[0]	0		Decimal	BOOL		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[1]	1		Decimal	BOOL		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[2]	0		Decimal	BOOL		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[3]	0		Decimal	BOOL		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[4]	0		Decimal	BOOL		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[5]	0		Decimal	BOOL		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[6]	0		Decimal	BOOL		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[7]	0		Decimal	BOOL		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[8]	0		Decimal	BOOL		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[9]	0		Decimal	BOOL		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[10]	0		Decimal	BOOL		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[11]	0		Decimal	BOOL		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[12]	0		Decimal	BOOL		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[13]	0		Decimal	BOOL		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[14]	0		Decimal	BOOL		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[15]	0		Decimal	BOOL		
Cyclic_function_state_and_commands.CH0_CYCLIC_FUNCTION_CMD_BITS.Cyclic_Command_Bits[16]	0		Decimal	BOOL		

QUICKNOTE

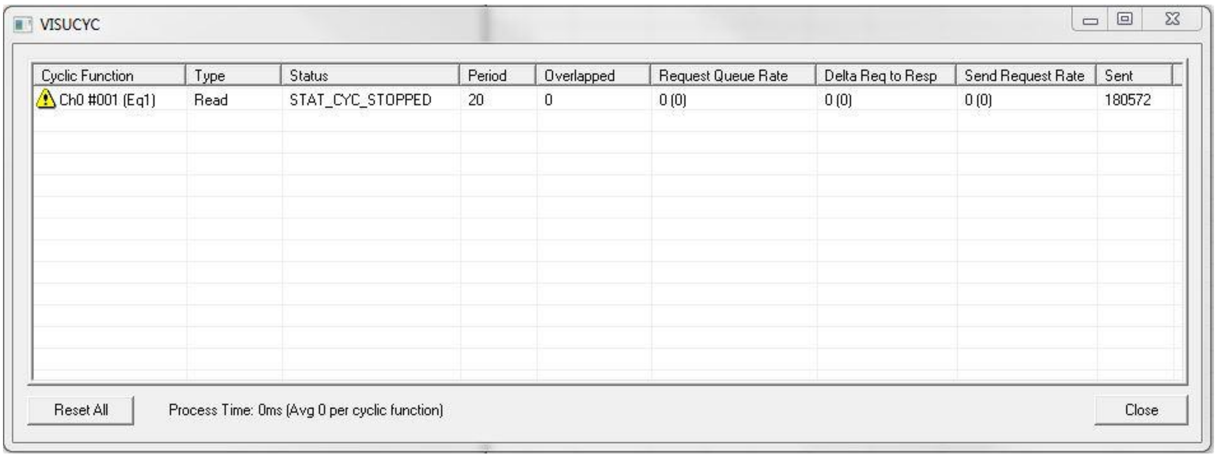
How to use AOIs with the ESR2 module

To change the state of cyclic function, select the CLX2000.CHANNEL_X_TRIGGER where X stands for the channel number.
This trigger and the Cyclic_Function_Bits that were set in previously will clear to zero when cyclic functions have changed state.



Name	Value	Force Mask	Style	Data Type	Description	Constant
+ Local:2:C	{...}	{...}		SW:SST_ESR2_CLX:C:0		☐
+ Local:2:I	{...}	{...}		SW:SST_ESR2_CLX_INT:I:0		☐
+ Local:2:O	{...}	{...}		SW:SST_ESR2_CLX_INT:O:0		☐
+ Local:2:S	{...}	{...}		SW:SST_ESR2_CLX_STATUS:...		☐
+ CLX2000	{...}	{...}		ESR2_SR4_MODULE		☐
+ Cyclic_Function_AOI	{...}	{...}		SST_ESR2_CLX_Dynamic_Cycl...	This AOI is depen...	☐
+ Cyclic_function_state_and_commands	{...}	{...}		Cyclic_Function_State_And_Cm...		☐
+ Paging_AOI	{...}	{...}		SST_ESR2_CLX_AOI_AOP	Backplane Firmw...	☐
− Trigger_Cyclic_Functions	{...}	{...}		Cyclic_Function_Triggers		☐
+ Trigger_Cyclic_Functions.Channel_0_Trigger	1		Decimal	SINT		
+ Trigger_Cyclic_Functions.Channel_1_Trigger	0		Decimal	SINT		
+ Trigger_Cyclic_Functions.Channel_2_Trigger	0		Decimal	SINT		
+ Trigger_Cyclic_Functions.Channel_3_Trigger	0		Decimal	SINT		
+ Trigger_Cyclic_Functions.Channel_0_Acknowledge	0		Decimal	SINT		
+ Trigger_Cyclic_Functions.Channel_1_Acknowledge	0		Decimal	SINT		
+ Trigger_Cyclic_Functions.Channel_2_Acknowledge	0		Decimal	SINT		
+ Trigger_Cyclic_Functions.Channel_3_Acknowledge	0		Decimal	SINT		

The cyclic function state will become “STAT_CYC _STOPPED” as below:



Cyclic Function	Type	Status	Period	Overlapped	Request Queue Rate	Delta Req to Resp	Send Request Rate	Sent
⚠ Ch0 #001 (Eq1)	Read	STAT_CYC_STOPPED	20	0	0 (0)	0 (0)	0 (0)	180572

Process Time: 0ms (Avg 0 per cyclic function)