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Add-On Instruction Walkthrough: PAL-EIP

EiploDataMapping_PAL_EIP

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Purpose

Purpose of this document:

The purpose of this document is to help guide the user through the process of successfully integrating the EiploDataMapping_PAL_EIP Add-On Instruction into their Studio 5000 project.

Purpose of this Add-On Instruction:

The EiploDataMapping_PAL_EIP Add-On Instruction unpacks raw Input Data (T->O) from an array and maps this data into meaningful device related status tags for the user. Likewise, the Add-On Instruction also maps meaningful device related command tags and packs the data into the raw Output Data (O->T) array. The purpose of the Add-On Instruction is to simplify the mapping (packing/unpacking) of raw Input/Output Data. For the operation of the device, the user must provide their own logic.

Notes

Note: For the most current mapping and descriptions of the Input and Output Data for the PAL-EIP, see Chapter 3 of the NITRA Pneumatic Automation Link (PAL) User Manual.

Note: While images used in this document may differ slightly from what a user might see in their software as a result of updates to the Add-On Instruction, the process outlined in the document should be the same.

Note: The following items were used to create this document and are referenced in the walkthrough:

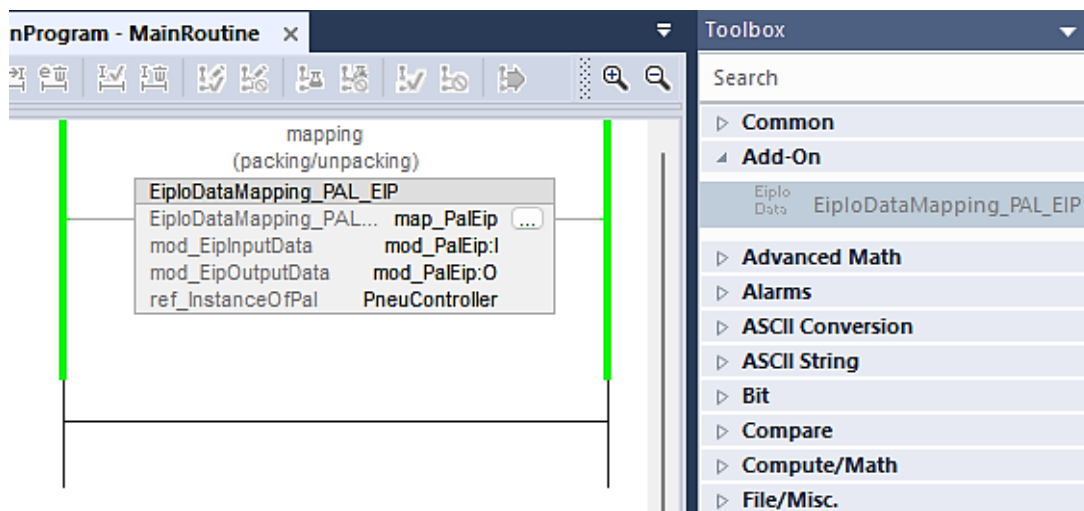
- *Part Number: PAL-EIP*
- *EDS File: NITRA_PAL_Rev1_0.eds*
- *Add-On Instruction File: EiploDataMapping_PAL_EIP_AOI.L5X*
- *Add-On Instruction Name: EiploDataMapping_PAL_EIP*
- *Studio 5000 version: 37.00.00*
 - *IMPORTANT: In version 36 of Studio 5000, the mnemonics for some instructions were changed/updated by Rockwell. When using a version of Studio 5000 earlier than version 36 with this Add-On Instruction, the user may need to change these instructions from the NEW mnemonic to the OLD mnemonic. A table showing affected instructions can be found in the [Reference](#) section of this document.*

Introduction

The Add-On Instruction for the PAL-EIP removes the cumbersome task of having to map the IO Messaging data to/from generic array elements into/out of specific and meaningful tags. This helps you as a user to get integrated faster.

This walkthrough will cover:

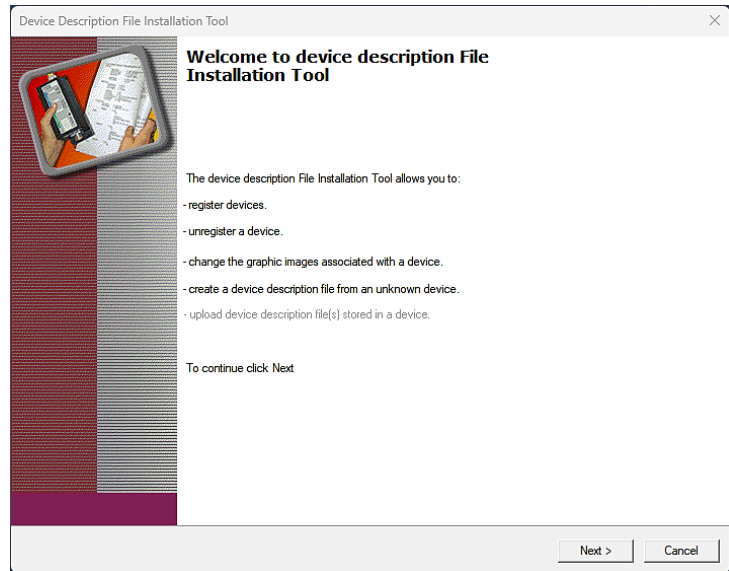
- Registering the EDS file for the PAL-EIP
- Creating a new module (IO Messaging adapter) in Studio 5000
- Importing the Add-On Instruction
- Placing the Add-On Instruction into the Studio 5000 project.



Register EDS File

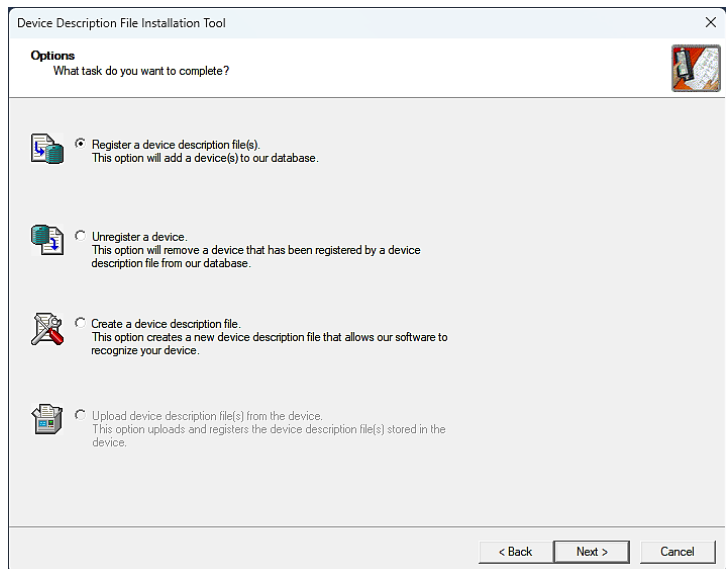
Step 1: Open Rockwell Automation's Device Description File Installation tool (EDS Wizard) from the tools Menu in Studio 5000 and register the EDS file for the PAL-EIP.

Click 'Next'.

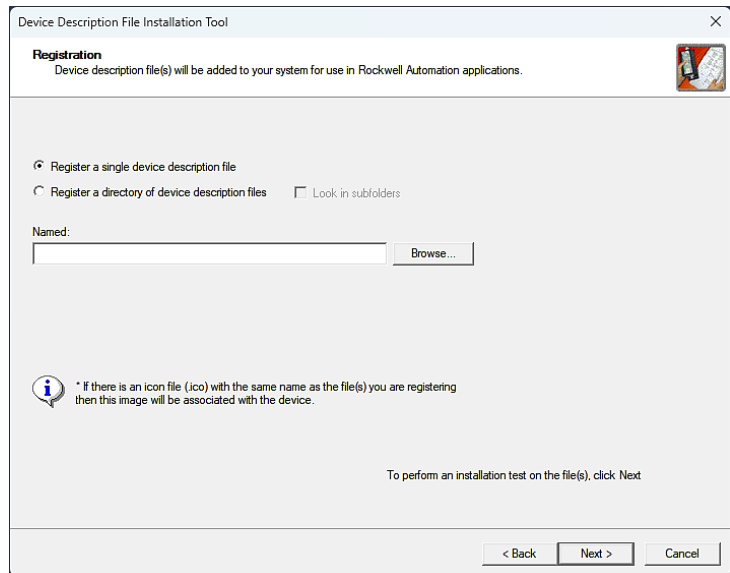


Step 2: Select 'Register an EDS file.'

Click 'Next'.

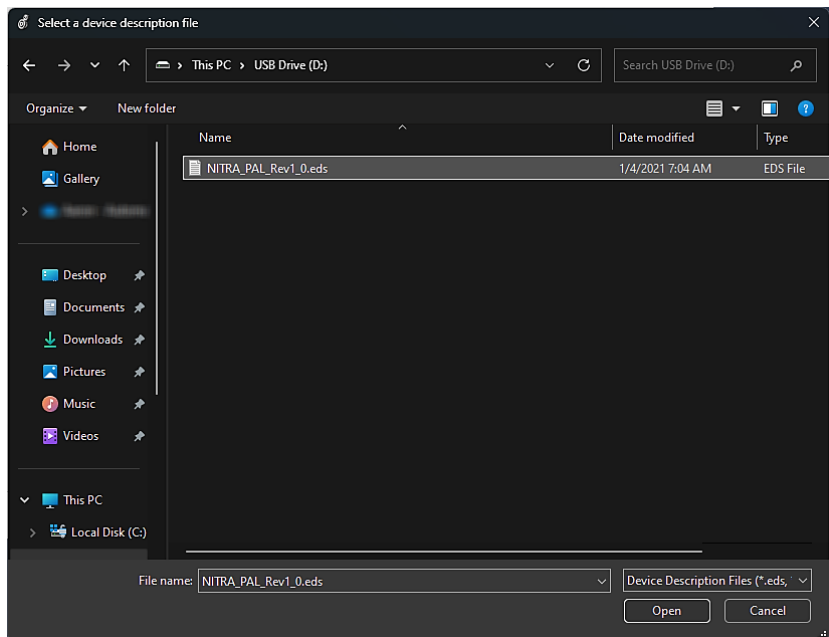


Step 3: Select 'Register a single file'
and 'Browse' to select the directory
where the EDS file resides.



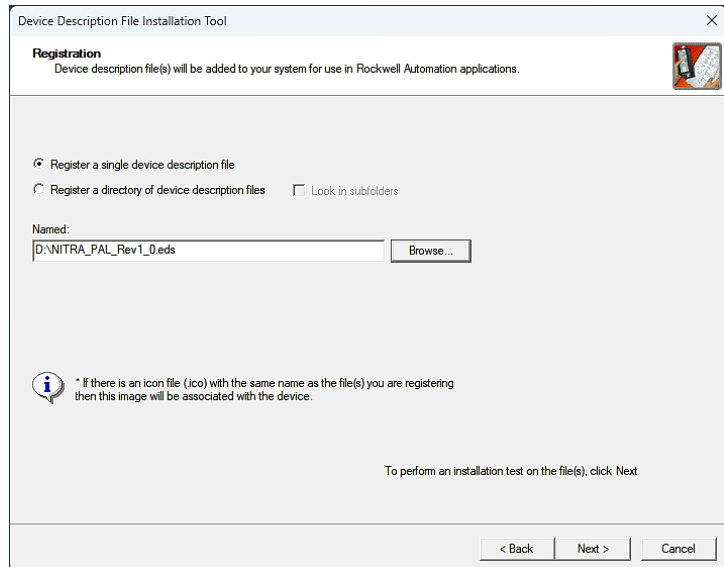
Step 4: Select the EDS file.

Click 'Open'



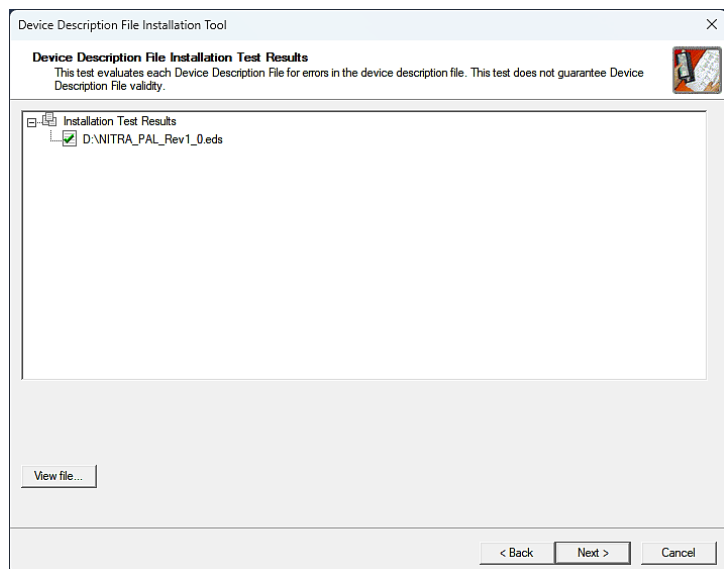
Step 5: The Named field should show the directory path to the EDS file.

Click 'Next'.



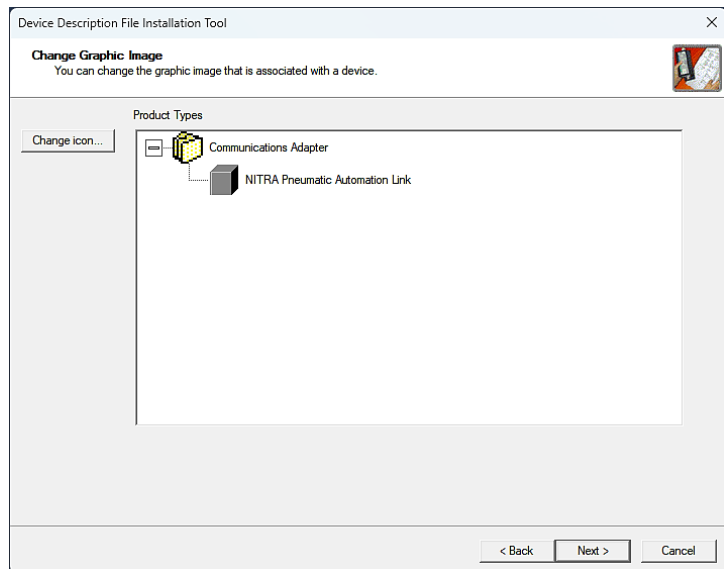
Step 6: The Device Description File Installation Tool (EDS File Wizard) will evaluate the EDS file. The green checkmark indicates a valid EDS file.

Click 'Next'.



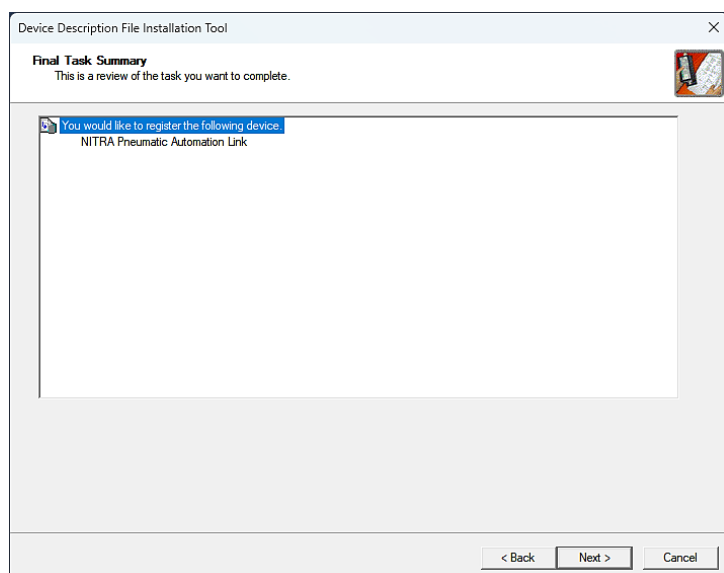
Step 7: The Device Description File Installation Tool (EDS Wizard) allows for the icon of the device to be changed. This step can be skipped.

Click 'Next'.



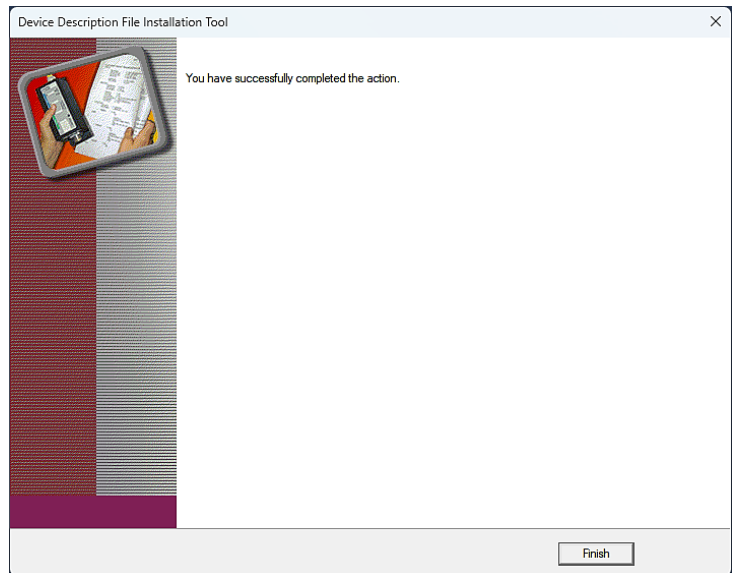
Step 8: Confirm that the EDS file being registered corresponds to the intended device.

Click 'Next'.



Step 9: The EDS file has been successfully registered.

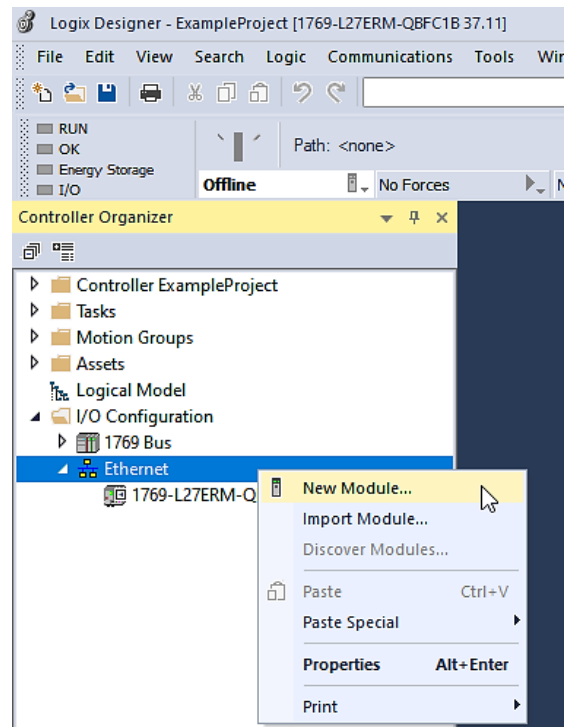
Click 'Finish'.



Create New Module

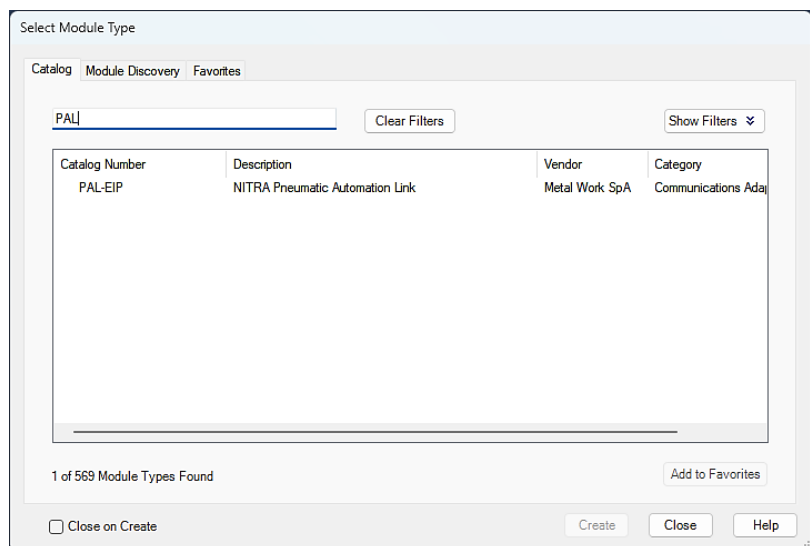
Step 1: In the Studio 5000 project, right-click on the network adapter that is connected to the PAL-EIP.

Select 'New Module'.



Step 2: Type the first few characters of part number in the filter field. The PAL-EIP catalog number shows in the results.

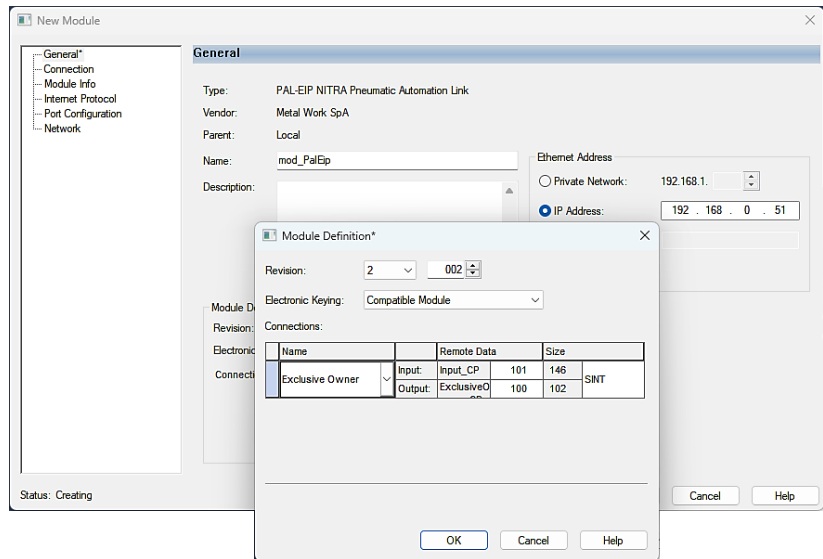
Select the result and click 'Create'.



Step 3: In the New Module window, provide the following:

- A name for the device
- The IP address of the PAL-EIP
- Select the Exclusive Owner Connection

Click 'OK'.

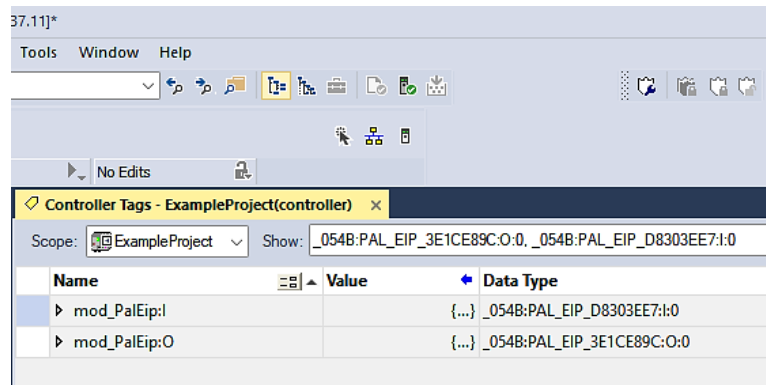


Step 4: Close the 'Select Module Type' window.

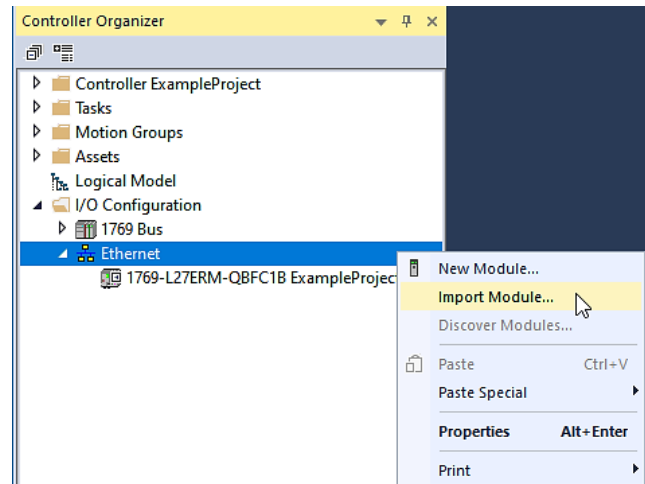
Step 5: Take note of the Module-Define Data Types created for the Input Data and Output Data arrays:

- _054B:PAL_EIP_D8303EE7:I:0
- _054B:PAL_EIP_3E1CE89C:O:0

These Module-Define Data Types will be referenced by the Add-On Instruction for data mapping. A mismatch of these Module-Defined Data Types between the module definition and the Add-On Instruction will lead to errors.

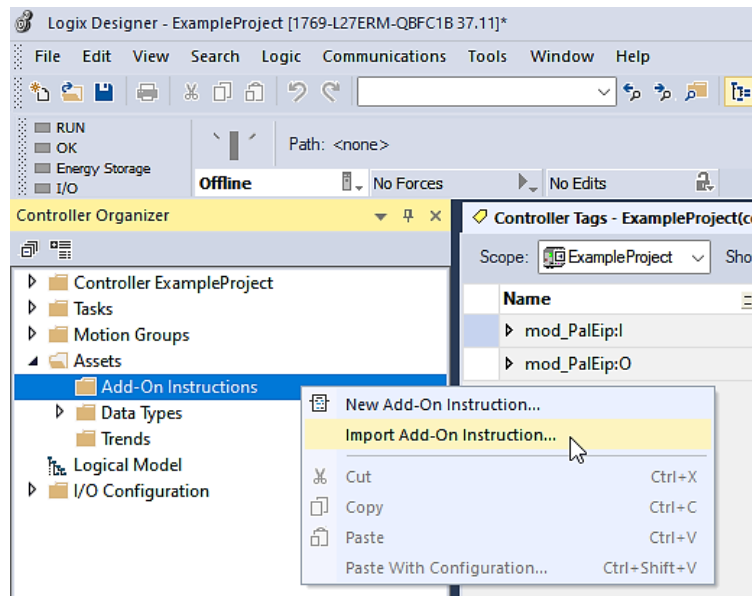


Note: If for any reason the Module-Defined Data Types created in the project do NOT match those shown in the walkthrough, delete the newly created module and use the 'Import Module' feature in the Controller Organizer to import the MODULE definition included in the Add-On Instruction download.

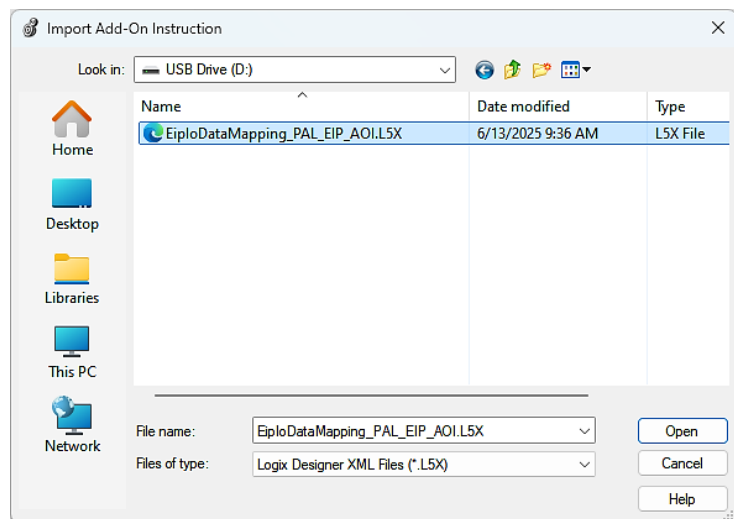


Import Add-On Instruction

Step 1: From the Controller Organizer window, right-click on 'Add-On Instructions' and select 'Import Add-On Instruction.'

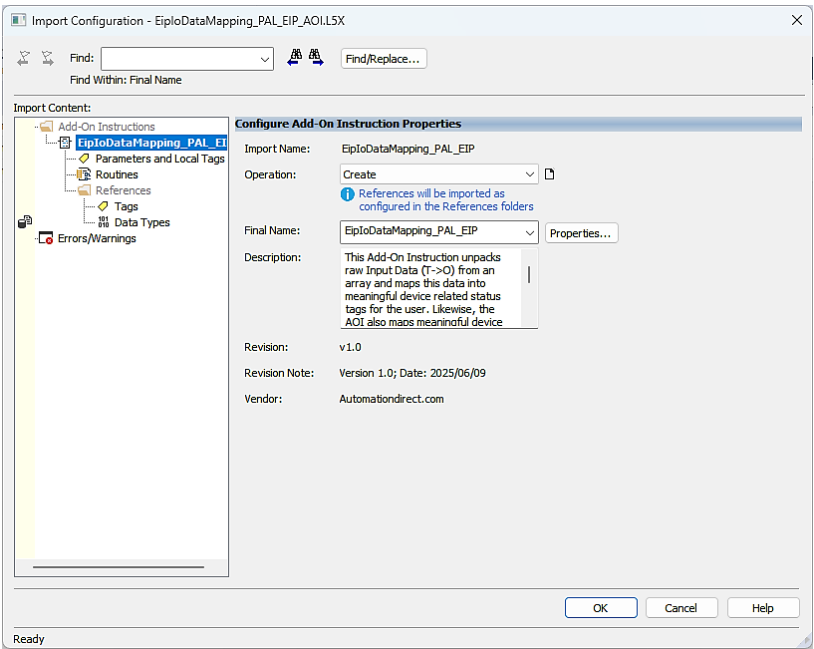


Step 2: Select the directory where the Add-On Instruction file resides. Click 'Open'.

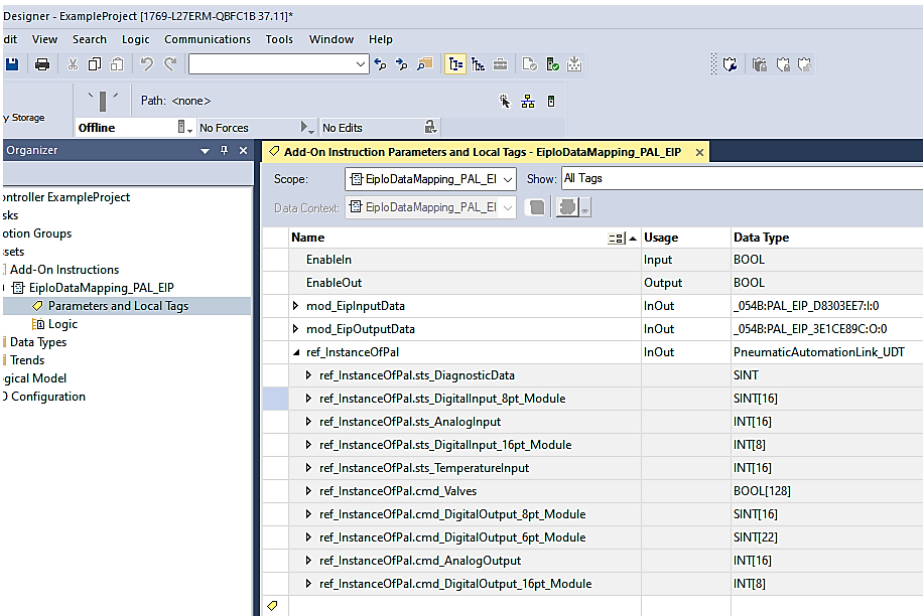


Step 3: The Import Configuration window opens.

Click 'OK'.

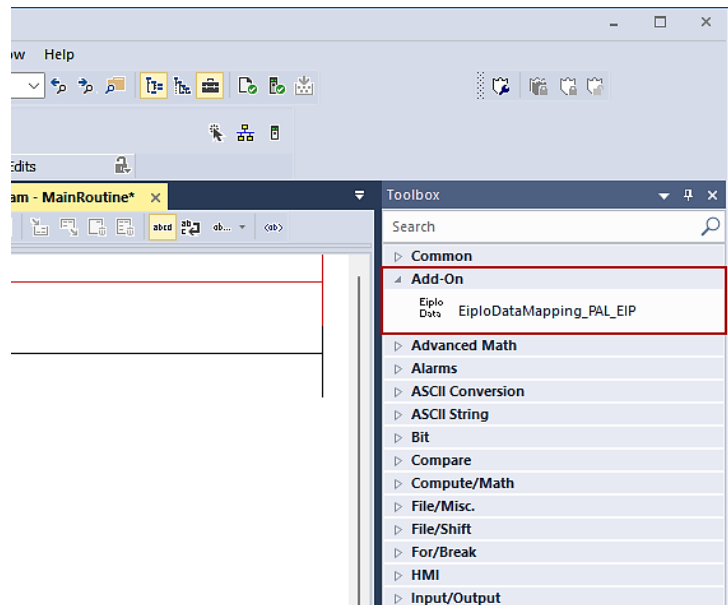


Step 4: The import successfully brings in the Parameters, Local Tags, and Logic that makes up the Add-On Instruction.



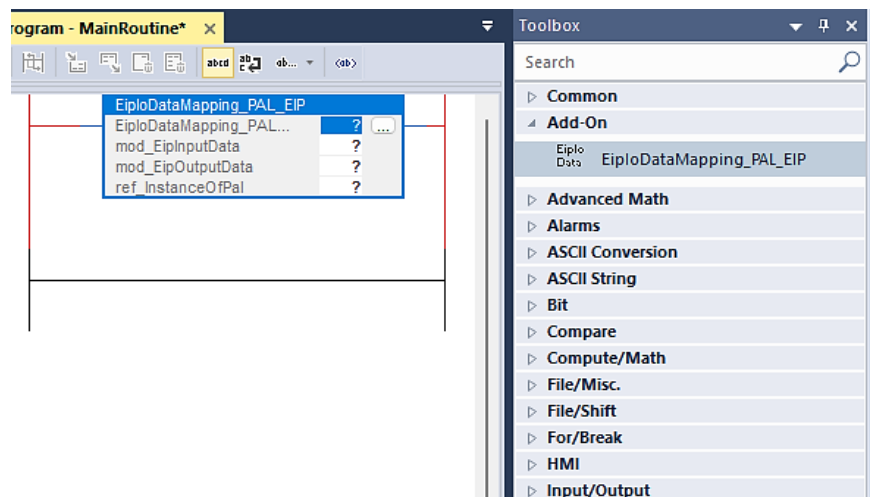
Use Add-On Instruction in Project

Step 1: From the Main Program – Main Routine, drag the Add-On Instruction into the ladder from the ‘Add-On’ instruction category.

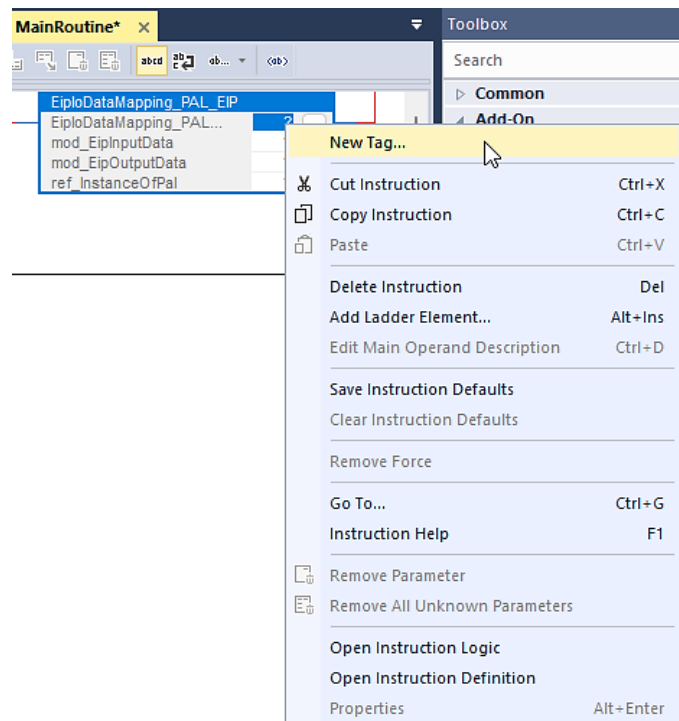


Step 2: Three fields within the Add-On Instruction are required to be completed:

- Specify/create a tag for the instantiated Add-On Instruction.
- Provide the source of the Input Data that will be passed to the Add-On Instruction. This will be the Module-Defined Data Type corresponding to the module Input Data.
- Provide the destination of the Output Data that will be returned from the Add-On Instruction. This will be the Module-Defined Data Tupe corresponding to the module Output Data.



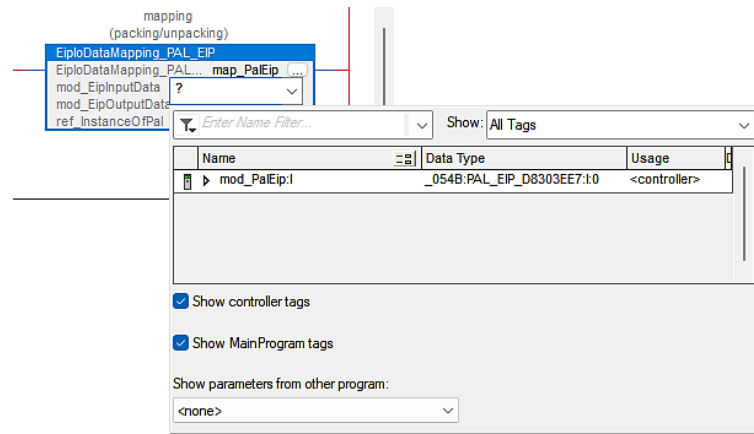
Step 3: Right-click on the name field of the Add-On Instruction and select 'New Tag...'



Provide a Tag Name for the newly created instance of the Add-On Instruction.

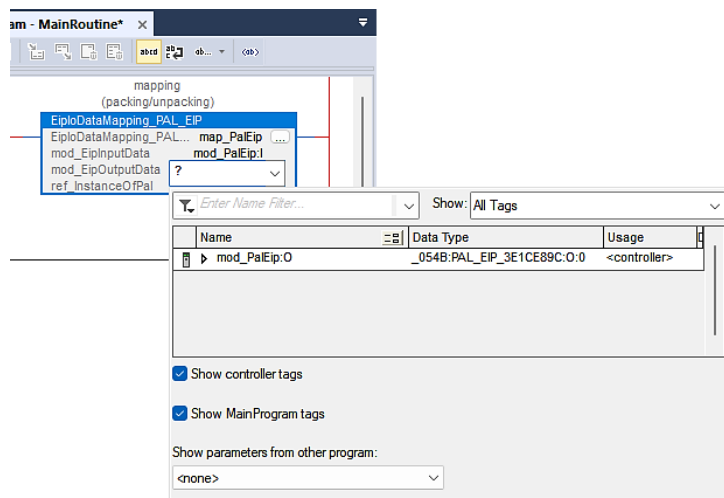
A screenshot of the 'New Tag' dialog box. The 'Name' field contains 'map_PalEip'. The 'Description' field is empty. The 'Usage' dropdown is set to '<controller>'. The 'Type' dropdown is set to 'Base'. The 'Alias For' field is empty. The 'Data Type' dropdown is set to 'EiploDataMapping_PAL_EIP'. The 'Parameter Connection' field is empty. The 'Scope' dropdown is set to 'ExampleProject'. The 'External Access' dropdown is set to 'Read/Write'. The 'Style' dropdown is set to 'Read/Write'. There are four unchecked checkboxes at the bottom: 'Constant', 'Sequencing', 'Open Configuration', and 'Open Parameter Connections'. On the right side, there are buttons for 'Create', 'Cancel', and 'Help'.

Step 4: In the 'mod_EipInputData' field, select the Module-Defined Data Type that corresponds to the module's Input Data.



The Module-Defined Data Type is: _054B:PAL_EIP_D8303EE7:I:0

Step 5: In the 'mod_EipOutputData' field, select the Module-Defined Data Type that corresponds to the module's Output Data.



The Module-Defined Data Type is: _054B:PAL_EIP_3E1CE89C:O:0

Step6: In the ‘ref_InstanceOfPal’ field, create a new tag of the data type PneumaticAutomationLink_UDT.

New Tag

Name:

PneuController

Create

Description:

Cancel

Usage:

<controller>

Type:

Base

Connection...

Alias For:

Data Type:

PneumaticAutomationLink_UDT

Parameter Connection:

Scope:

ExampleProject

External Access:

Read/Write

Style:

☐ Constant

☐ Sequencing

☐ Open Configuration

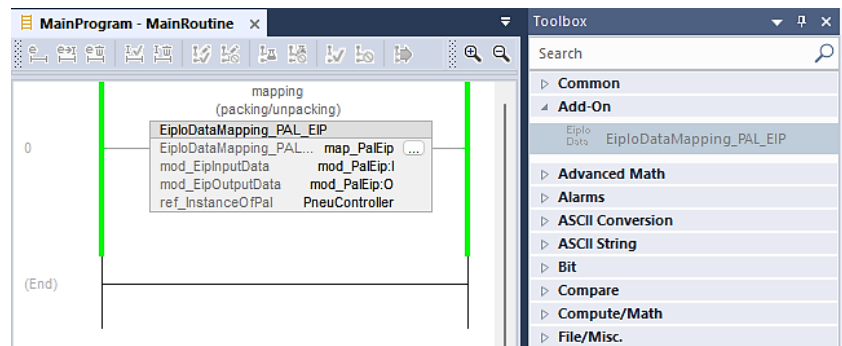
☐ Open Parameter Connections

Help

The object ‘PneuController’ has been created with each of the associated structure members defined by the Add-On Instruction.

Controller Tags - ExampleProject(controller)	
Scope: ExampleProject	Show: PneumaticAutomationLink_UDT
Name	Data Type
▲ PneuController	PneumaticAutomationLink_UDT
▶ PneuController.sts_DiagnosticData	SINT
▶ PneuController.sts_DigitalInput_8pt_Module	SINT[16]
▶ PneuController.sts_AnalogInput	INT[16]
▶ PneuController.sts_DigitalInput_16pt_Module	INT[8]
▶ PneuController.sts_TemperatureInput	INT[16]
▶ PneuController.cmd_Valves	BOOL[128]
▶ PneuController.cmd_DigitalOutput_8pt_Module	SINT[16]
▶ PneuController.cmd_DigitalOutput_6pt_Module	SINT[22]
▶ PneuController.cmd_AnalogOutput	INT[16]
▶ PneuController.cmd_DigitalOutput_16pt_Module	INT[8]

Step 7: Download the project to the CPU and observe the mapping of the EtherNet/IP IO Data.



Reference

Studio 5000 Instruction Mnemonic Update Table

In version 36 of Studio 5000, the mnemonics for some instructions were updated by Rockwell to align with IEC-61131-3 and PLCopen standards.

Instruction	Mnemonic in versions 35 and earlier	Mnemonic in versions 36 and later
Arc Cosine	ACS	ACOS
Arc Sine	ASN	ASIN
Arc Tangent	ATN	ATAN
Convert to BCD	TOD	TO_BCD
Convert to Integer	FRD	BCD_TO
Equal To	EQU	EQ
Greater Than	GRT	GT
Greater Than or Equal To	GEQ	GE
Less Than or Equal To	LEQ	LE
Less Than	LES	LT
Limit	LIM	LIMIT
Move	MOV	MOVE
Not Equal To	NEQ	NE
Square Root	SQR	SQRT
Truncate	TRN	TRUNC
X to the Power of Y	XPY	EXPT