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Add-On Instruction Walkthrough: GS4-CM-ENETIP

EiploDataMapping_GS4_CM_ENETIP

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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_GS4_CM_ENETIP Add-On Instruction into their Studio 5000 project.

Purpose of this Add-On Instruction:

The EiploDataMapping_GS4_CM_ENETIP 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 GS4-CM-ENETIP, see Appendix B of the GS4 Series Drives 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: GS4-CM-ENETIP*
- *EDS File: GS4_CM_ENETIP_Rev4_5.eds*
- *Add-On Instruction File: EiploDataMapping_GS4_CM_ENETIP_AOI.L5X*
- *Add-On Instruction Name: EiploDataMapping_GS4_CM_ENETIP*
- *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 GS4-CM-ENETIP 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:

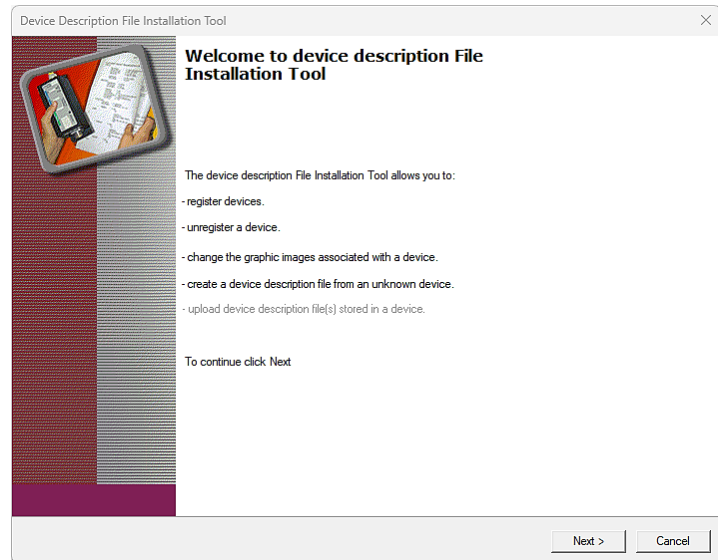
- Registering the EDS file for the GS4-CM-ENETIP
- Creating a new module (IO Messaging adapter) in Studio 5000
- Importing the Add-On Instruction
- Placing the Add-On Instruction into the Studio 5000 project.

mapping (packing/unpacking)		
EipIoDataMapping_GS4_CM_ENETIP	MyDrive	
EipIoDataMapping_GS4_CM_ENET...	myGS4:I	(sts_Stop)
mod_EipInputData	myGS4:O	(sts_DecelDuringStop)
mod_EipOutputData		(sts_Standby)
cmd_Stop	0	(sts_Run)
cmd_Run	1	(sts_Fwd)
cmd_Jog	0	(sts_TransitioningRevToFwd)
cmd_DirectionCommand	0	(sts_TransitioningFwdToRev)
cmd_NthAccelDecel	0	(sts_Rev)
cmd_NthStepSpeedFrequency	0	(sts_JogActive)
cmd_EnableBitFunction_6_11	0	(sts_FreqFromComm)
cmd_FrequencyCommand	45.0	(sts_FreqFromAnalogOrDiscrete)
cmd_ExternalFaultTrigger	0	(sts_CommandFromCommKeypad)
cmd_ResetCommand	0	(sts_ParametersLocked)
cmd_ExternalInterruption	0	(sts_DriveStopped)
sts_WarningCode	0	(sts_DriveRunning)
sts_FaultCode	0	
sts_FreqCommand_PIDSetpoint	45.0	
sts_OutputFrequency	45.0	
sts_OutputCurrent	0.0	
sts_DcBusVoltage	341.8	
sts_OutputVoltage	19.1	
sts_MultiSpeed_PIDStepNumber	0	
sts_DigitalInputCounterValue	0	
sts_PowerFactorAngle	-89.2	
sts_ActualMotorSpeed	1350	
sts_PowerOutput	0	

Register EDS File

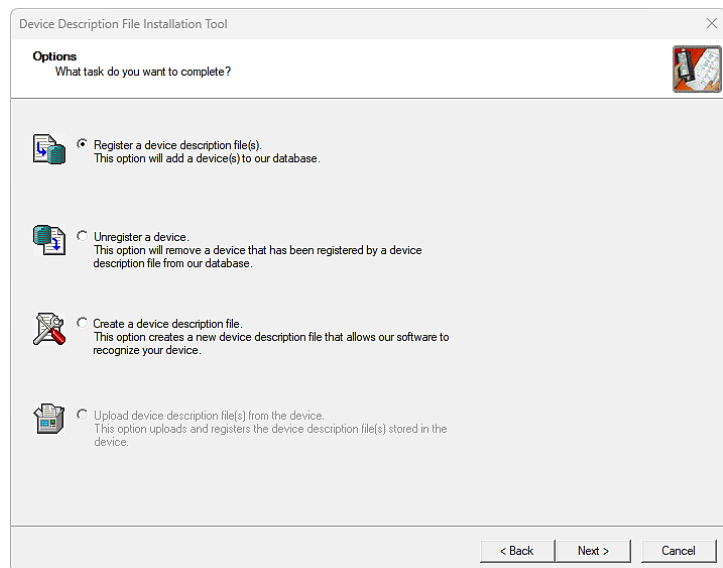
25Step 1: Open Rockwell Automation's Device Description File Installation tool (EDS Wizard) from the tools Menu in Studio 5000 and register the EDS file for the GS4-CM-ENETIP.

Click 'Next'.

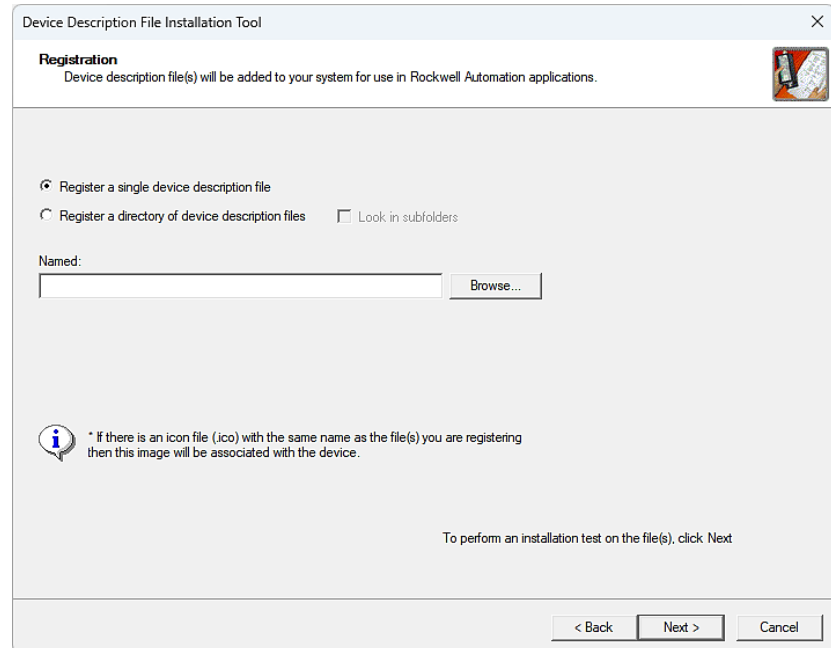


Step 2: Select 'Register an EDS file.'

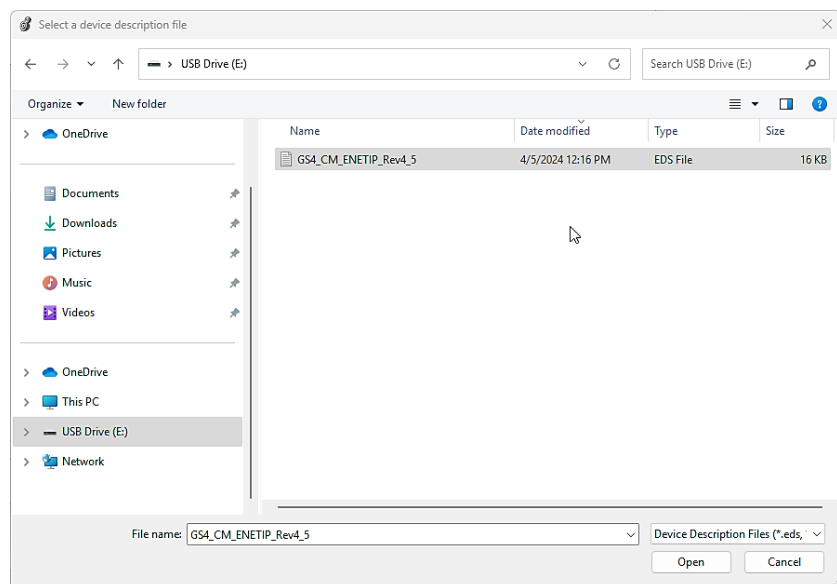
Click 'Next'.



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

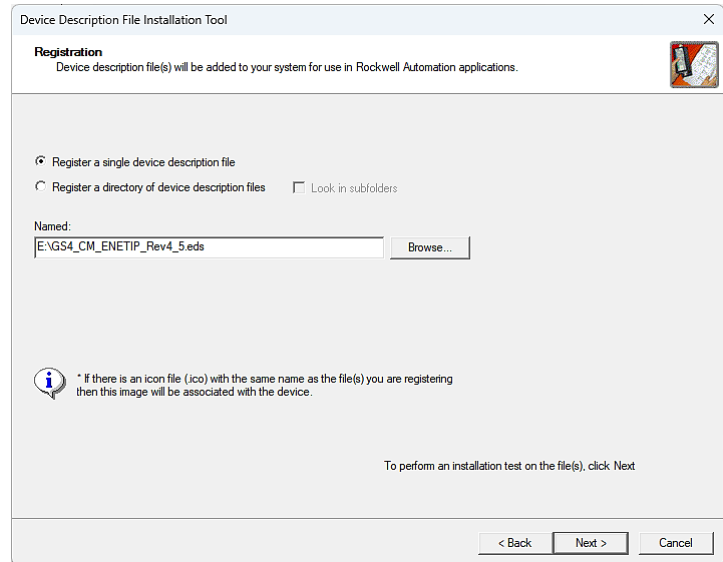


Step 4: Select the EDS file.
Click 'Open'



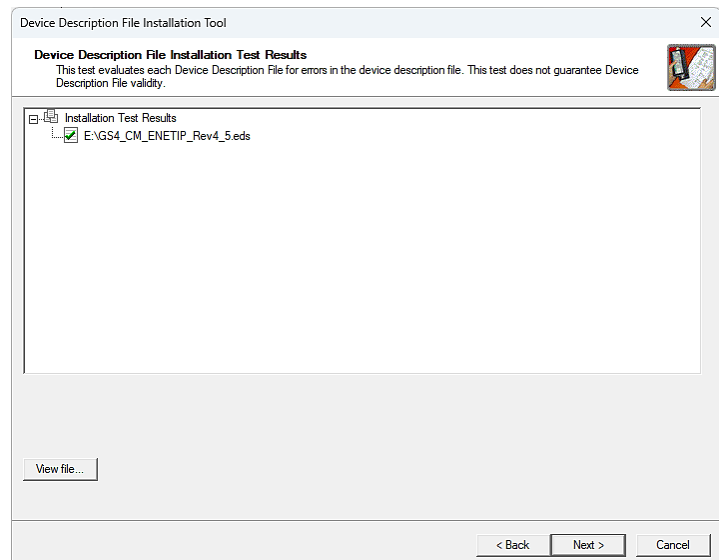
Step 5: The Named field should show the directory path to the EDS file.

Click 'Next'.



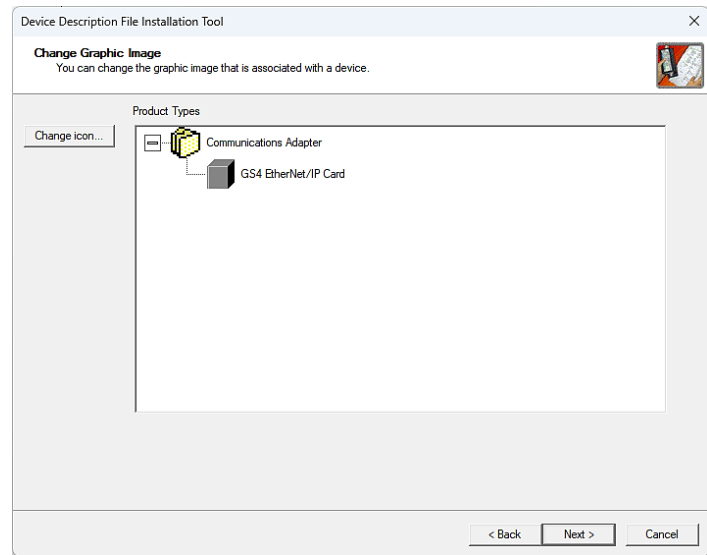
Step 6: The Device Description File Installation Tool (EDS File Wizard) will evaluate the EDS file. The green checkmark indicates a valid EDS file.

Click 'Next'.



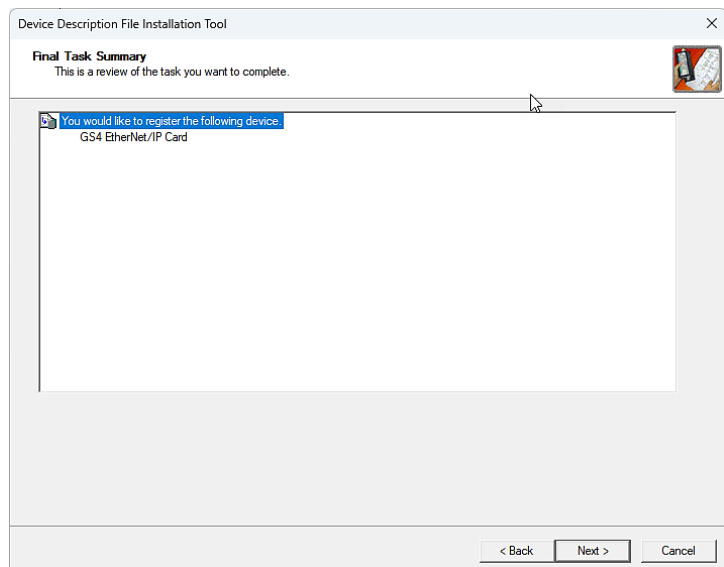
Step 7: The Device Description File Installation Tool (EDS Wizard) allows for the icon of the device to be changed. This step can be skipped.

Click 'Next'.



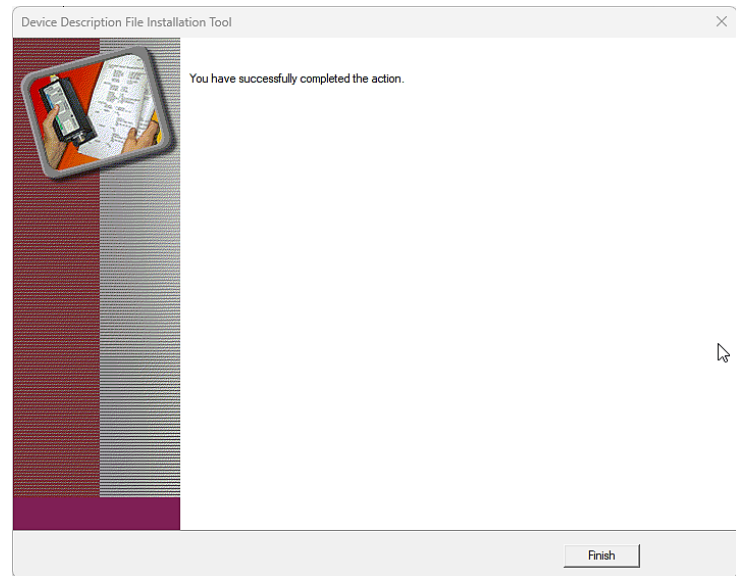
Step 8: Confirm that the EDS file being registered corresponds to the intended device.

Click 'Next'.



Step 9: The EDS file has been successfully registered.

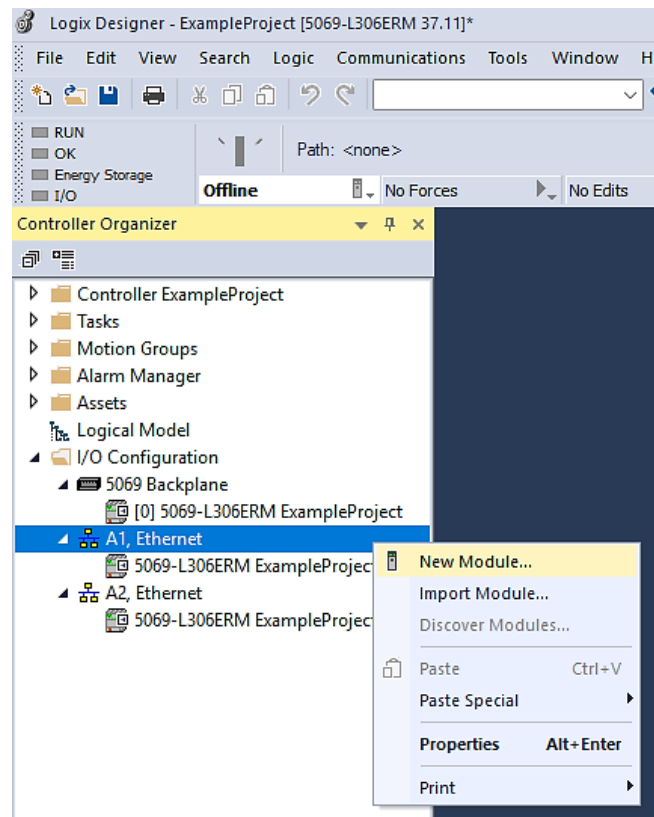
Click 'Finish'.



Create New Module

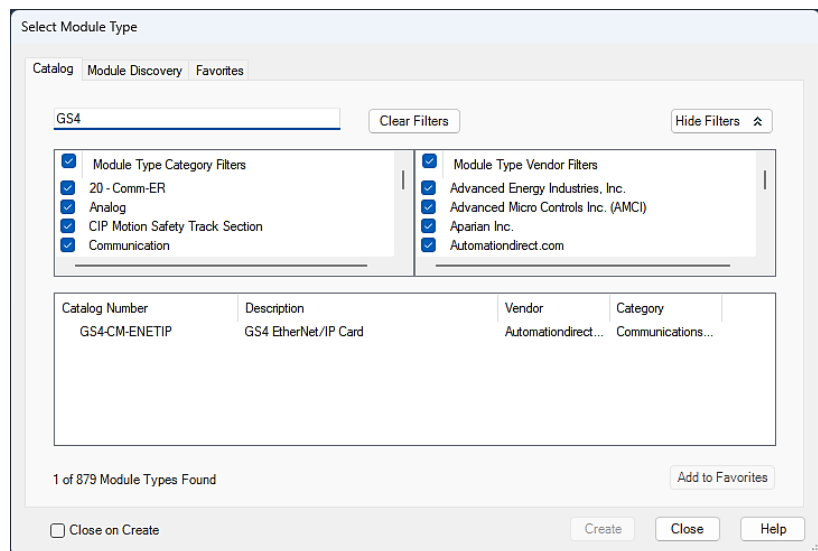
Step 1: In the Studio 5000 project, right-click on the network adapter that is connected to the GS4-CM-ENETIP.

Select 'New Module'.



Step 2: Type the first few characters of part number in the filter field. The GS4-CM-ENETIP 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 GS4-CM-ENETIP

Click 'OK'.

The 'New Module' dialog box is shown with the 'General' tab selected. The 'Name' field is set to 'MyGS4'. The 'Ethernet Address' is set to 'IP Address' with the value '10.11.0.50'. The 'Module Definition' section shows 'Revision: 1.001', 'Electronic Keying: Compatible Module', and 'Connections: Drive Control and Status'. The status bar at the bottom indicates 'Status: Creating'.

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

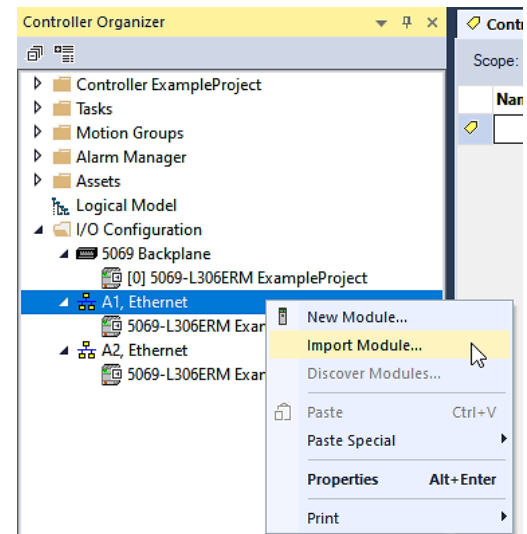
Step 5: Take note of the Module-Define Data Types created for the Input Data and Output Data arrays:

- _0294:GS4_CM_ENETIP_E8411017:I:0
- _0294:GS4_CM_ENETIP_E771E08B: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.

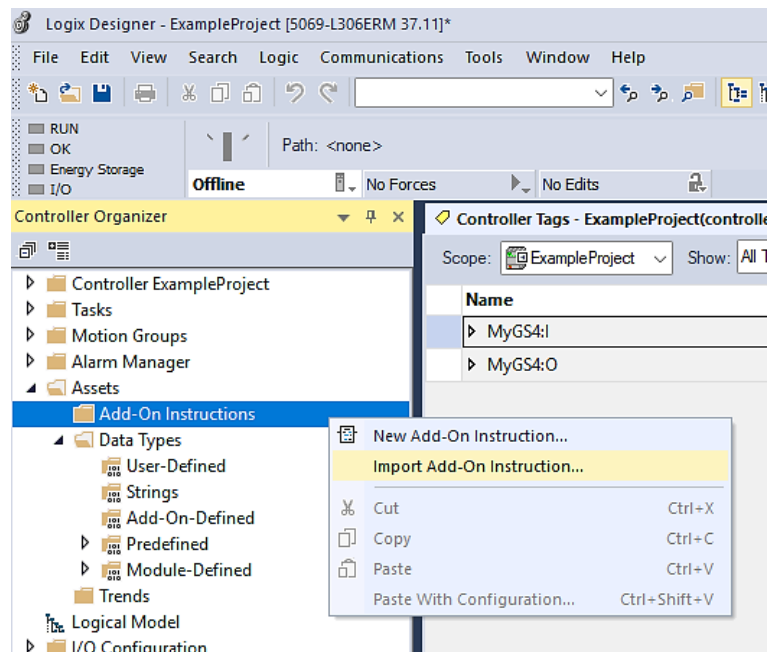
Name	Value	Data Type
MyGS4:I	{..._0294:GS4_CM_ENETIP_E8411017:I:0}	
MyGS4:O	{..._0294:GS4_CM_ENETIP_E771E08B:O:0}	

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.

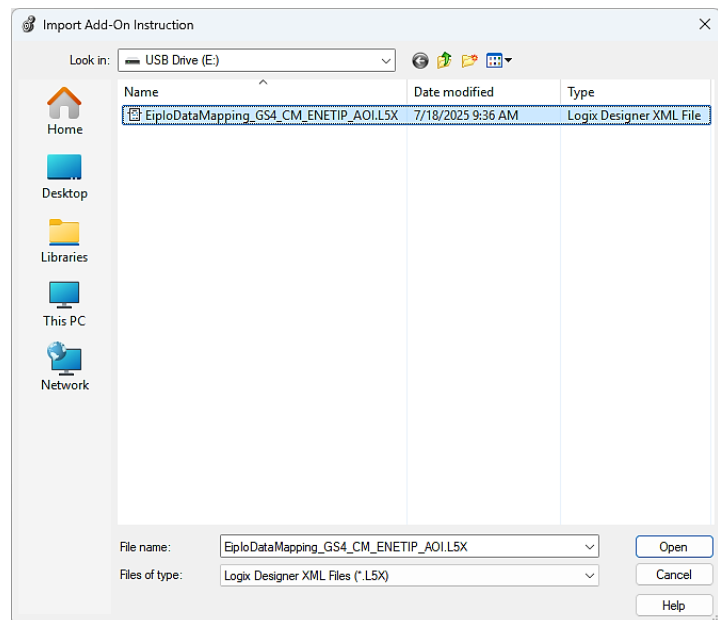


Import Add-On Instruction

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

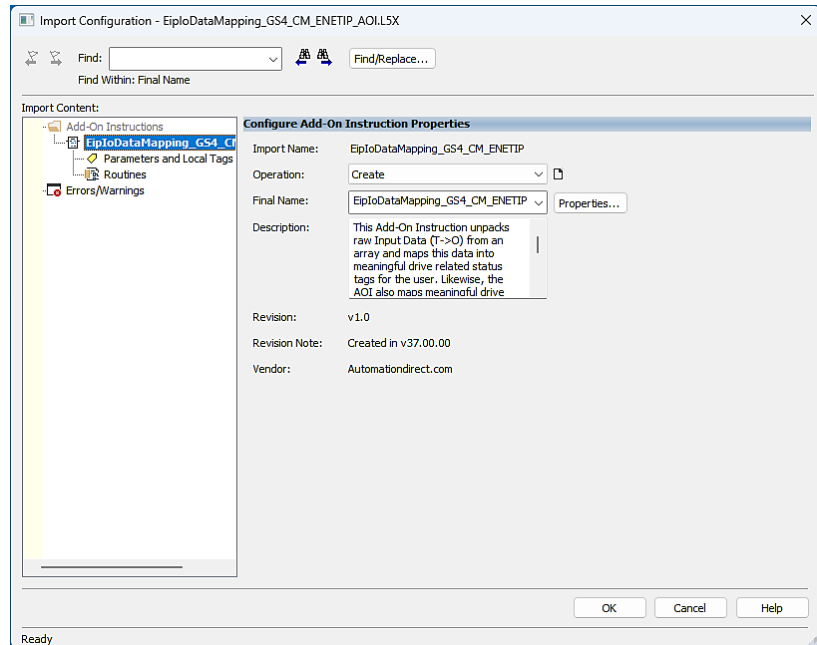


Step 2: Select the directory where the Add-On Instruction file resides. Click 'Open'.

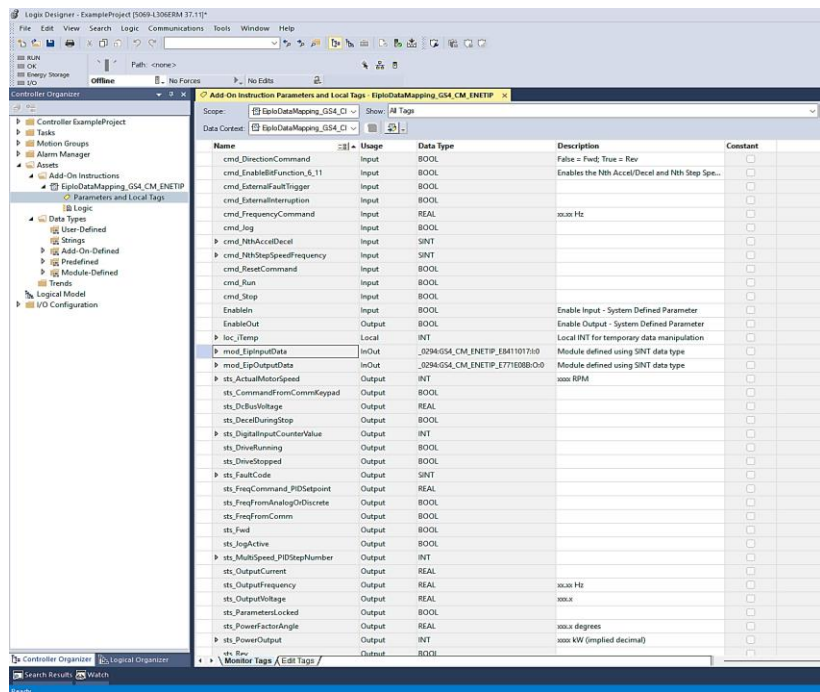


Step 3: The Import Configuration window opens.

Click 'OK'.

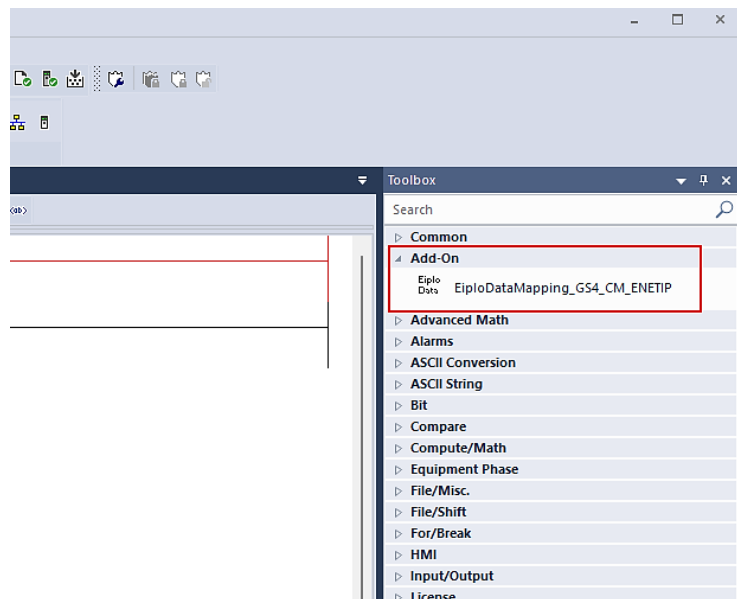


Step 4: The import successfully brings in the Parameters, Local Tags, and Logic that makes up the Add-On Instruction.



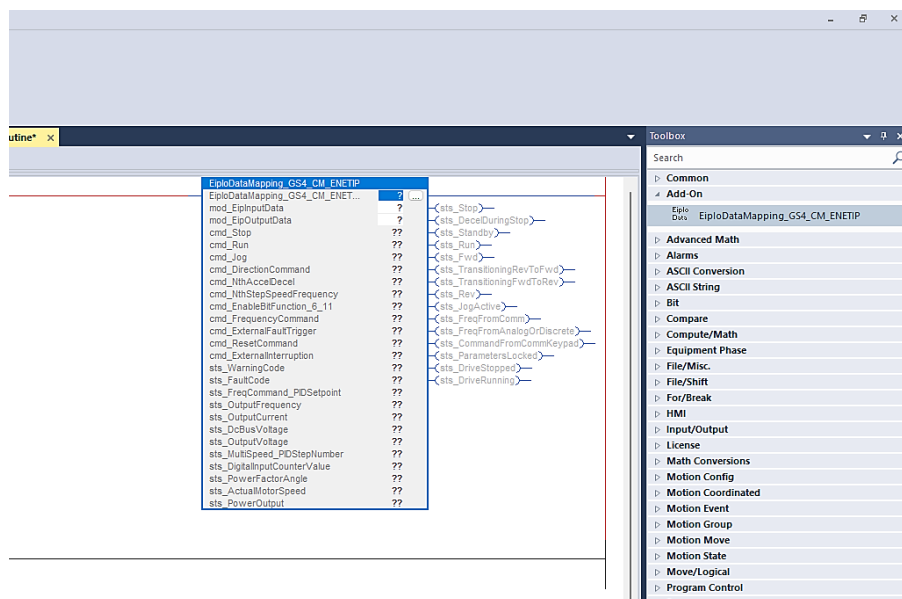
Use Add-On Instruction in Project

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

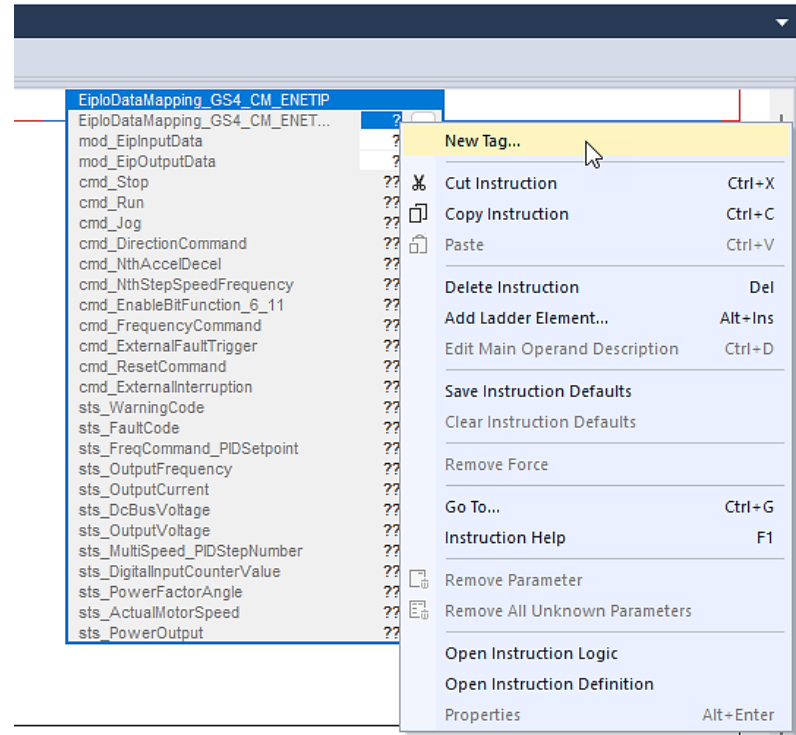


Step 2: Three fields within the Add-On Instruction are required to be completed:

- 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 Type corresponding to the module Output Data.



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

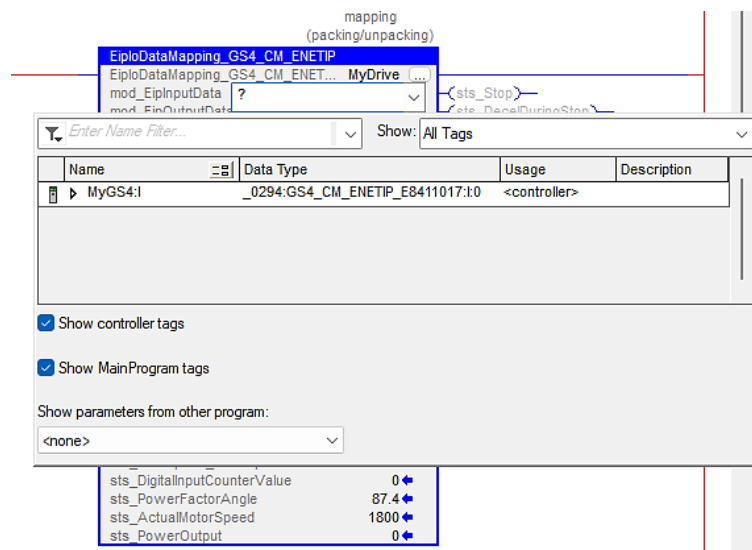


Provide a Tag Name for the newly created instance of the Add-On Instruction.

The 'New Tag' dialog box is shown with the following fields and values:

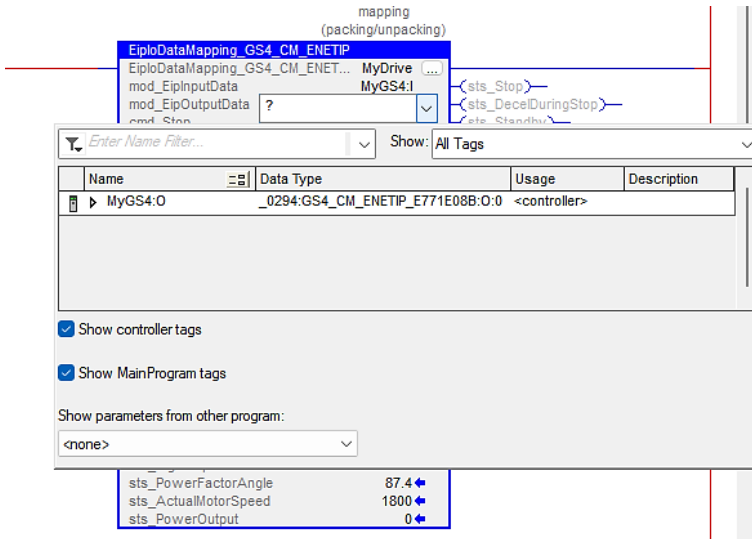
- Name: MyDrive
- Description: (empty)
- Usage: <controller>
- Type: Base
- Alias For: (empty)
- Data Type: EiploDataMapping_GS4_CM_EN
- Parameter Connection: (empty)
- Scope: ExampleProject
- External Access: Read/Write
- OPC UA Access: None
- Style: (empty)
- Constant: ☐
- Sequencing: ☐
- Open Configuration: ☐
- Open Parameter Connections: ☐

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: _0294:GS4_CM_ENETIP_E8411017: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: _0294:GS4_CM_ENETIP_E771E08B:O:0

The object 'MyDrive' has been created with each of the associated structure members defined by the Add-On Instruction.

Controller Tags - ExampleProject(controller) x			
Scope: ExampleProject		Show: All Tags	
Name	Value	Data Type	
MyDrive		{...} EiploDataMapping_GS4_CM_ENETIP	
MyDrive.EnableIn	1	BOOL	
MyDrive.EnableOut	0	BOOL	
MyDrive.cmd_Stop	0	BOOL	
MyDrive.cmd_Run	0	BOOL	
MyDrive.cmd_Jog	0	BOOL	
MyDrive.cmd_DirectionCommand	0	BOOL	
MyDrive.cmd_NthAccelDecel	0	SINT	
MyDrive.cmd_NthStepSpeedFrequency	0	SINT	
MyDrive.cmd_EnableBitFunction_6_11	0	BOOL	
MyDrive.cmd_FrequencyCommand	0.0	REAL	
MyDrive.cmd_ExternalFaultTrigger	0	BOOL	
MyDrive.cmd_ResetCommand	0	BOOL	
MyDrive.cmd_ExternalInterruption	0	BOOL	
MyDrive.sts_WarningCode	0	SINT	
MyDrive.sts_FaultCode	0	SINT	
MyDrive.sts_Stop	0	BOOL	
MyDrive.sts_DecelDuringStop	0	BOOL	
MyDrive.sts_Standby	0	BOOL	
MyDrive.sts_Run	0	BOOL	
MyDrive.sts_Fwd	0	BOOL	

Step 6: Download the project to the CPU and observe the mapping of the EtherNet/IP IO Data.

mapping (packing/unpacking)			
EiploDataMapping_GS4_CM_ENETIP	MyDrive	...	
mod_EipInputData	MyGS4:I	{sts_Stop}	
mod_EipOutputData	MyGS4:O	{sts_DecelDuringStop}	
cmd_Stop	0	{sts_Standby}	
cmd_Run	1	{sts_Run}	
cmd_Jog	0	{sts_Fwd}	
cmd_DirectionCommand	0	{sts_TransitioningRevToFwd}	
cmd_NthAccelDecel	0	{sts_TransitioningFwdToRev}	
cmd_NthStepSpeedFrequency	0	{sts_Rev}	
cmd_EnableBitFunction_6_11	0	{sts_JogActive}	
cmd_FrequencyCommand	60.0	{sts_FreqFromComm}	
cmd_ExternalFaultTrigger	0	{sts_FreqFromAnalogOrDiscrete}	
cmd_ResetCommand	0	{sts_CommandFromCommKeypad}	
cmd_ExternalInterruption	0	{sts_ParametersLocked}	
sts_WarningCode	0	{sts_DriveStopped}	
sts_FaultCode	0	{sts_DriveRunning}	
sts_FreqCommand_PIDSetpoint	60.0		
sts_OutputFrequency	60.0		
sts_OutputCurrent	0.01		
sts_DcBusVoltage	342.4		
sts_OutputVoltage	22.2		
sts_MultiSpeed_PIDStepNumber	0		
sts_DigitalInputCounterValue	0		
sts_PowerFactorAngle	88.6		
sts_ActualMotorSpeed	1800		
sts_PowerOutput	0		

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