
APPLICATION NOTE

AC500 V3 UPGRADE OF PROJECTS WITH PROFINET TO AUTOMATION BUILDER 2.6

MANUAL STEPS TO BE DONE AFTER
UPGRADE OF A PROJECT TO AB 2.6 WITH
PROFINET



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1 Introduction

1.1 Scope of the document

The PROFINET IO controller stack and AC500 PROFINET library have change from Automation Builder 2.5 and earlier in Automation Builder 2.6.0 and later.

This was necessary for future development and PROFINET certification.

This document describes which manual steps have to be performed to adapt the project in Automation Builder 2.6.0 regarding the used PROFINET components.

1.2 Compatibility

The application note explained in this document has been used with the below engineering system versions. They should also work with other versions, nevertheless some small adaptations may be necessary for future versions.

- AC500 V3 PLC
- Automation Builder 2.6.0 or newer

1.3 Overview

Communication modules

	Interface	Name	Device Number	Date	Firmware Type	State	Firmware Version	Required Versions	Info
▶	1	CM579-PNIO			CM579-PNIO	✱	2.8.9.21	3.0.1.21	Update required.

The screenshot shows the Automation Builder interface. On the left, the 'Devices' tree is expanded, showing the 'CM579_PNIO_1 (CM579-PNIO)' module. A red arrow points from this module to the ladder logic on the right. The ladder logic is titled 'CM579PnioRead_0' and shows a call to the 'CM579PnioRead' function block. The function block has inputs for 'xPnioRead' (Execute), 'PnioDeviceName' (Device), 'DevSlot' (1), 'DevSubSlot' (1), 'DevIdx' (1), 'Data' (aData), and 'DataMax' (4). The function block has outputs for 'Done', 'Busy', 'Error', 'ErrorID', 'AddErrorID', 'StatusCode', 'AddVal1', 'AddVal2', and 'DataLen'. The variable 'aData' is connected to the 'Data' input of the function block.

2 PROFINET changes between AB 2.5 and AB 2.6

The PROFINET stack has changed for future development and PROFINET certification.

	AB 2.5. and earlier	AB 2.6.0 and later	Remark
FW in CM579-PNIO communication module	V 2.8.x.x	V3.0.1.21	FW upgrade mandatory
3rd party devices		GSDML files need to be reinstalled into the device repository.	Fix planned for AB2.6.1
VLAN feature	Supported	Not supported any more according to PROFINET guidelines	Newest PROFINET guidelines
Library	AC500_PnioCntrl	AC500_CM579Profinet	Will be replaced by project upgrade
Prefix of Function blocks	PnioCntrl	CM579Pnio	Can be replaced by "search and replace" PnioCntrl -> CM579Pnio
Input Slot → Device	Slot	Device (Interface to the IO-driver) = name of the device in the device tree	Manual adaption of all used function blocks necessary
Input / output of function blocks		Have changed some input / output names and/or types	Manual adaption of the application program is necessary. See chapter 2.3.4 and 2.4.2

2.1 CM579-PNIO communication module FW update

Using Automation Builder 2.6. onwards the firmware of the CM579-PNIO communication module needs to be updated to **FW Version 3.0.1.21** at least.

CM579-PNIO with FW Version 3.0.x.x cannot be used in AC500 PLCs with CPU FW versions lower than 3.6.0.842.

The VLAN feature is not supported with FW Version 3.0.1.21 any more according to PROFINET guidelines.

2.2 3rd party PROFINET devices

In Automation Builder 2.6.0 the GSDML files of all 3rd party PROFINET devices need to be reinstalled into the device repository again. (Tools > Device Repository > Install...)

After that a project update needs to be performed.

This will be fixed in AB 2.6.1. Then the manual reinstallation will not be necessary anymore.

2.3 AC500 PROFINET Library

The library “AC500_PnioCntrl.library” will be changed by a project update to “AC500_CM579Profinet.library”.

2.3.1 Replace the type of all Pnio function blocks: PnioCntrl → CM579Pnio

Prefix of all Function Blocks and Global Variable list has changed from “PnioCntrl” to “CM579Pnio”.

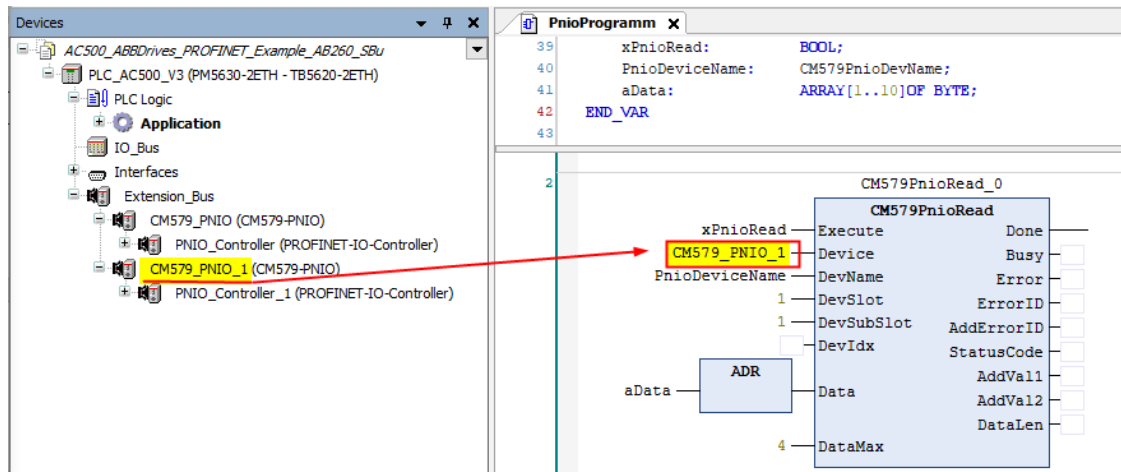
To adapt existing applications a search and replace can be done to exchange **PnioCntrl** by **CM579Pnio**.

2.3.2 Replace the input “Slot” of all function blocks: Slot → Device

The input “Slot” of all PROFINET function blocks has changed to “Device”. The type has changed from “byte” to “AC500_IoDrvCM579Profinet.IDeviceCM579Profinet”.

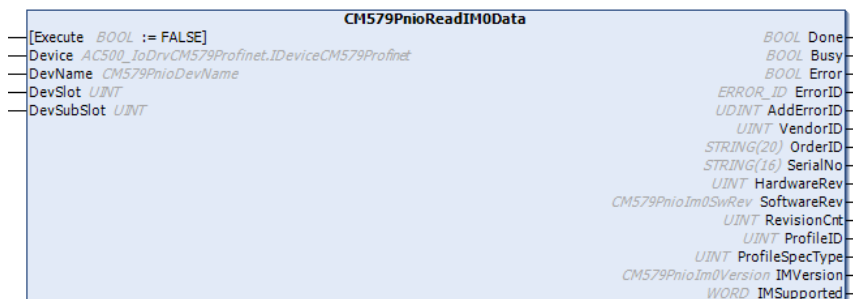
This is the interface to the IO driver. It is automatically “declared” in the device tree.

Just put the name of the CM579-PNIO communication module (in the device tree) to the input “Device”



2.3.3 Function block PnioCtrlGetDevIM0Data → CM579PnioReadIM0Data

The function block PnioCtrlGetDevIM0Data has changed its name to CM579PnioReadIM0Data. It also has an additional input “DevSubSlot“, which is mandatory.



2.3.4 Changes of function block input / output types and names of the AC500_CM579Profinet library

The following table shows the differences of the function blocks inputs / outputs marked in red.

2.3.4.1 Read

Name AB2.5	Input / Output	Type
PnioCntrl Read		
Inputs		
	Execute	BOOL
	Slot	BYTE
	DevName	STRING(80)
	DevApi	DWORD
	DevSlot	WORD
	DevSubSlot	WORD
	DevIdx	WORD
	Data	POINTER TO BYTE
	DataMax	WORD
Outputs		
	Done	BOOL
	Busy	BOOL
	Error	BOOL
	ErrorID	ERROR_ID
	AddErrNo	UDINT
	Status	DWORD
	AddVal1	WORD
	AddVal2	WORD
	DataLen	WORD

Name AB2.6	Input / Output	Type	Comment
CM579Pnio Read			EXTENDS AbbETrig
Inputs			
	Execute	BOOL	
	Device	IDeviceCM579Profinet	
	DevName	CM579PnioDevName = STRING(240)	240 is defined by Profinet Standard
	...		API was removed
	DevSlot	UINT	
	DevSubSlot	UINT	
	DevIdx	UINT	
	Data	POINTER TO BYTE	
	DataMax	UINT	
Outputs			
	Done	BOOL	
	Busy	BOOL	
	Error	BOOL	
	ErrorID	ERROR_ID	
	AddErrorID	UDINT	
	StatusCode	UDINT	
	AddVal1	UINT	
	AddVal2	UINT	
	DataLen	UINT	

2.3.4.2 Write

Name AB 2.5	Input / Output	Type
PnioCntrl Write		
Inputs		
	Execute	BOOL
	Slot	BYTE
	DevName	STRING(80)
	DevApi	DWORD
	DevSlot	WORD
	DevSubSlot	WORD
	DevIdx	WORD
	Data	POINTER TO BYTE
	DataLen	WORD
Outputs		
	Done	BOOL
	Busy	BOOL
	Error	BOOL
	ErrorID	ERROR_ID
	AddErrNo	UDINT
	Status	DWORD
	AddVal1	WORD
	AddVal2	WORD

Name AB 2.6	Input / Output	Type	Comment
CM579Pnio Write			EXTENDS AbbETrig
Inputs			
	Execute	BOOL	
	Device	IDeviceCM579 Profinet	
	DevName	CM579PnioDevName = STRING(240)	
	...		API removed
	DevSlot	UINT	
	DevSubSlot	UINT	
	DevIdx	UINT	
	Data	POINTER TO BYTE	
	DataLen	UINT	
Outputs			
	Done	BOOL	
	Busy	BOOL	
	Error	BOOL	
	ErrorID	ERROR_ID	
	AddErrorID	UDINT	
	StatusCode	UDINT	
	AddVal1	UINT	
	AddVal2	UINT	

2.3.4.3 StartCom

Name AB 2.5	Input / Output	Type
PnioCtrl StartCom		
Inputs		
	Execute	BOOL
	Slot	BYTE
Outputs		
	Done	BOOL
	Busy	BOOL
	Error	BOOL
	ErrorID	ERROR_ID
	AddErrNo	UDINT

Name AB 2.6	Input / Output	Type	Comment
CM579Pnio StartCom			EXTENDS AbbETrig
Inputs			
	Execute	BOOL	
	Device	IDeviceCM579 Profinet	
Outputs			
	Done	BOOL	
	Busy	BOOL	
	Error	BOOL	
	ErrorID	ERROR_ID	
	AddErrorID	UDINT	

2.3.4.4 StopCom

Name AB 2.5	Input / Output	Type
PnioCntrl StopCom		
Inputs		
	Execute	BOOL
	Slot	BYTE
Outputs		
	Done	BOOL
	Busy	BOOL
	Error	BOOL
	ErrorID	ERROR_ID
	AddErrNo	UDINT

Name AB 2.6	Input / Output	Type	Comment
CM579Pnio StopCom			EXTENDS AbbETrig
Inputs			
	Execute	BOOL	
	Device	IDeviceCM579 Profinet	
Outputs			
	Done	BOOL	
	Busy	BOOL	
	Error	BOOL	
	ErrorID	ERROR_ID	
	AddErrorID	UDINT	

2.3.4.5 GetDevIM0Data / ReadIM0Data

Name AB 2.5	Input / Output	Type
PnioCtrl- GetDevIM0Data		
Inputs		
	Execute	BOOL
	Slot	BYTE
	DevName	STRING(80)
	DevSlot	WORD
Outputs		
	Done	BOOL
	Busy	BOOL
	Error	BOOL
	ErrorID	ERROR_ID
	AddErrNo	UDINT
	VendorId	WORD
	OrderId	STRING(20)
	SerNo	STRING(16)
	HwRev	WORD
	SwRev	PniolmSwRevType
	RevCnt	WORD
	ProfileId	WORD
	ProfileSpec	WORD
	ImVersion	PniolmVersionType
	ImSupported	WORD

Name AB 2.6	Input / Output	Type	Comment
CM579Pnio- ReadIM0Data			EXTENDS AbbETrig
Inputs			
	Execute	BOOL	
	Device	IDeviceCM579Profinet	
	DevName	CM579PnioDevName = STRING(240)	
	DevSlot	UINT	
	DevSubSlot	UINT	I&M data are defined for Submodules
Outputs			
	Done	BOOL	
	Busy	BOOL	
	Error	BOOL	
	ErrorID	ERROR_ID	
	AddErrorID	UDINT	
	VendorID	UINT	
	OrderID	STRING(20)	
	SerialNo	STRING(16)	
	HardwareRev	UINT	
	SoftwareRev	CM579Pniolm0SwRev	
	RevisionCnt	UINT	
	ProfileID	UINT	
	ProfileSpecType	UINT	
	IMVersion	CM579Pniolm0Version	
	IMSupported	WORD	

2.3.4.6 GetDevState

Name AB 2.5	Input / Output	Type
PnioCntrl GetDevState		
Inputs		
	Execute	BOOL
	Slot	BYTE
	DevName	STRING(80)
Outputs		
	Done	BOOL
	Busy	BOOL
	Error	BOOL
	ErrorID	ERROR_ID
	AddErrNo	UDINT
	Mac	ARRAY [1..6] OF BYTE
	Ip	DWORD
	Vendor	WORD
	Device	WORD
	Alarm	BOOL
	Active	BOOL
	Flags	DWORD

Name AB 2.6	Input / Output	Type	Comment
CM579Pnio GetDevState			EXTENDS AbbETrig
Inputs			
	Execute	BOOL	
	Device	IDeviceCM579Profinet	
	DevName	CM579PnioDevName = STRING(240)	
Outputs			
	Done	BOOL	
	Busy	BOOL	
	Error	BOOL	
	ErrorID	ERROR_ID	
	AddErrorID	UDINT	
	MacAddr	ARRAY [1..6] OF BYTE	
	IpAddr	UDINT	
	VendorID	UINT	
	DeviceID	UINT	
	...		Alarm removed
	Active	BOOL	
	DiagFlags	DWORD	

2.3.4.7 GetCntrlState

Name AB2.5	Input / Output	Type
PnioCntrlGetCntrlState		
Inputs		
	Execute	BOOL
	Slot	BYTE
Outputs		
	Done	BOOL
	Busy	BOOL
	Error	BOOL
	ErrorID	ERROR_ID
	AddErrNo	UDINT
	Communication-COS	UDINT
	MstState	PNIO_MST_STATE_TYPE
	CommErno	PNIO_COMM_ERNO_TYPE
	NumErrs	DWORD
	Version	WORD
	Watchdog	WORD
	SlaveState	UDINT
	NumConfigSlaves	UDINT
	NumActiveSlaves	UDINT
	NumDiagSlaves	UDINT

Name AB2.6	Input / Output	Type	Comment
CM579PnioGetCntrlState			EXTENDS AbbETrig
Inputs			
	Execute	BOOL	
	Device	IDeviceCM579Profinet	
Outputs			
	Done	BOOL	
	Busy	BOOL	
	Error	BOOL	
	ErrorID	ERROR_ID	
	AddErrorID	UDINT	
	...		Communication-COS removed
	CommState	CM579PnioCommState	
	CommError	UDINT	
	NumErrors	UDINT	
	...		Version removed
	...		Watchdog removed
	DeviceState	CM579PnioDeviceState	
	NumDevices Config	UDINT	
	NumDevices Active	UDINT	
	NumDevicesDiag	UDINT	

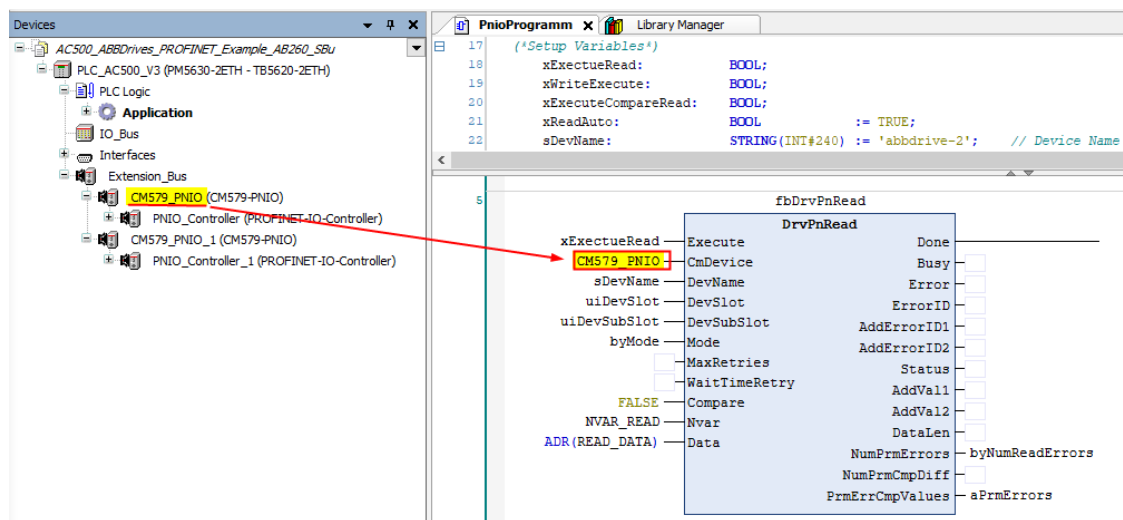
2.4 AC500 Drives library - PROFINET function blocks

The two PROFINET function blocks of the AC500_Drives library have been adapted according to the function blocks in the AC500_CM579Profinet library.

2.4.1 Replace the input “Slot” of all PROFINET function blocks: Slot → CmDevice

The input “Slot” of all PROFINET function blocks has changed to “CmDevice”.
The type has changed from “BYTE” to “AC500_IoDrvCM579Profinet.IDeviceCM579Profinet”.
This is the interface to the IO driver. It is automatically “declared” in the device tree.

Just put the name of the CM579-PNIO communication module (in the device tree) to the input “Device”



2.4.2 Changes of function block input / output types and names of the AC500_Drives library

The following table shows the differences of the function blocks inputs / outputs marked in red. Only the two function blocks DrvPnWrite and DrvPnRead are affected.

2.4.2.1 DrvPnWrite (AC500_Drives.library)

Name AB2.5	Input / Output	Type
DrvPnWrite		EXTENDS AbbETrig
Inputs		
	Execute	BOOL
	Slot	BYTE
	DevApi	DWORD
	DevName	STRING(240)
	Mode	BYTE
	MaxRetries	BYTE
	WaitTimeRetry	WORD
	Nvar	BYTE
	Data	DWORD
Outputs		
	Done	BOOL
	Busy	BOOL
	Error	BOOL
	ErrorID	ERROR_ID
	AddErrorID1	AC500_PnioCntrl. ERROR_ID
	AddErrorID2	UDINT
	Status	DWORD
	AddVal1	WORD
	AddVal2	WORD
	PackageSize	INT

Name AB2.6	Input / Output	Type	Comment
DrvPnWrite			EXTENDS Ab- bETrig2
Inputs			
	Execute	BOOL	
	CmDevice	AC500_IoDrvCm579 Profinet.IDevice CM579Profinet	
	...		API removed
	DevName	STRING(240)	
	Mode	BYTE	
	MaxRetries	BYTE	
	WaitTimeRetry	WORD	
	Nvar	BYTE	
	Data	DWORD	
Outputs			
	Done	BOOL	
	Busy	BOOL	
	Error	BOOL	
	ErrorID	ERROR_ID	
	AddErrorID1	AC500_CM579Pnio. ERROR_ID	
	AddErrorID2	UDINT	
	Status	DWORD	
	AddVal1	WORD	
	AddVal2	WORD	
	PackageSize	UINT	

2.4.2.2 DrvPnRead (AC500_Drives.library)

Name AB2.5	Input / Output	Type
DrvPnRead		EXTENDS AbbETrig
Inputs		
	Execute	BOOL
	Slot	BYTE
	DevApi	DWORD
	DevName	STRING(240)
	Mode	BYTE
	MaxRetries	BYTE
	WaitTimeRetry	WORD
	Compare	BOOL
	Nvar	BYTE
	Data	DWORD
Outputs		
	Done	BOOL
	Busy	BOOL
	Error	BOOL
	ErrorID	ERROR_ID
	AddErrorID1	AC500_PnioCntrl. ERROR_ID
	AddErrorID2	UDINT
	Status	DWORD
	AddVal1	WORD
	AddVal2	WORD
	DataLen	INT
	NumPrmErrors	BYTE

Name AB2.6	Input / Output	Type	Comment
DrvPnRead			EXTENDS AbbETrig2
Inputs			
	Execute	BOOL	
	CmDevice	AC500_IoDrvCm579 Profinet.IDevice CM579Profinet	
	...		API removed
	DevName	STRING(240)	
	Mode	BYTE	
	MaxRetries	BYTE	
	WaitTimeRetry	WORD	
	Compare	BOOL	
	Nvar	BYTE	
	Data	DWORD	
Outputs			
	Done	BOOL	
	Busy	BOOL	
	Error	BOOL	
	ErrorID	ERROR_ID	
	AddErrorID1	AC500_CM579Pnio. ERROR_ID	
	AddErrorID2	UDINT	
	Status	DWORD	
	AddVal1	WORD	
	AddVal2	WORD	
	DataLen	UINT	
	NumPrmErrors	BYTE	

	NumPrmCmpDiff	BYTE
	PrmErrCmpValues	ARRAY[1..37] of DRV_PDRIVE_ PRM_REQ_ERROR

	NumPrmCmpDiff	BYTE	
	PrmErrCmpValues	ARRAY[1..37] of DRV_PDRIVE_ PRM_REQ_ERROR	

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