

Gen IV Controller ProfiNet Instructions

Many AIMCO controllers are available with an optional ProfiNet interface. A common use is interfacing them to a GE PLC. This document shows the steps required to set up the PLC and controller for a ProfiNet connection.

Equipment/Software

- ProfiNet capable controller from AIMCO
 - Generation 4 controller (PN: iEC4EGVPxxx).
 - Anybus PROFINET IO Module
- GE PACSystems RX3i PLC controller
- GE IC695PNC001-AK RX3i ProfiNet Control Module
- GE Proficy Machine Edition v8.6
- 5 Ethernet cables
- 1 Ethernet switch

Hardware Setup

- Connect an Ethernet cable from the GE PLC CPU module to the Ethernet switch.
- Connect an Ethernet cable from the GE ProfiNet control module to the Ethernet switch.
- Connect an Ethernet cable from the Gen 4 controller Ethernet port to the Ethernet switch.
- Connect an Ethernet cable from the PROFINET IO module on the Gen 4 controller to the Ethernet switch.
- Connect an Ethernet cable from the PC to the Ethernet switch.

Initial Setup

Defining the CPE305 Module for the PLC

After the GE Proficy Machine Edition software is initialized, select 'Empty project.' Don't be concerned with any highlighted existing projects. Click 'OK' when finished.



Select a project name. Click 'OK' when finished.

roject Name:	ProfiNet Setup	
roject Template:	Empty Project [Default]	• Set as default
roject Location:	My Computer	•
a		
This templa requires the Other temp drivers to y	te creates a completely empty pre most work, but also provides the lates automatically add various co our project, which you may not n scription of what a template contains, a	oject. Using this template e greatest flexibility. omponents, targets or ueed in yours. select the template from the

The final step in the initial setup process is to select the project platform. Navigate to Project \rightarrow Add Target \rightarrow GE Intelligent Platforms Controller \rightarrow PACSystems RX3i.



At this point, the user can specify a target name in the 'Navigator' field, but for this example, the default entry will be used.



Defining the GE PLC Modules

In the 'Navigator' window with the 'Project' tab selected, expand 'Hardware Configuration'. This is where we set the configuration of the backplane. The default arrangement is shown below.



In the example shown in this document, the backplane, from left to right, consists of a DC power supply (PSD040), CPU (CPE305), and a ProfiNet (PNC001) control module. Following are steps to change the default configuration. Right click on Slot 0 and select 'Replace Module'



When the Catalog dialog box appears, select 'IC695PSD040 – 24VDC 40W Power Supply' and click 'OK' when finished.

Catalog		×
Power Supplies Ce	entral Processing Unit	
Catalog Number	Description	
IC695PSA040	Universal 120/240 VAC, 125VDC 40W Power Supply	Cancel
IC695PSA140	Multifunctional 120/240VAC, 125VDC 40W Power Supply	
IC695PSD040	24VDC 40W Power Supply	
IC695PSD140	Multifunctional 24VDC 40W Power Supply	

Slot 1 is now free and the CPE module can be placed accordingly (simply drag and drop into slot 1). Right click on slot 1 and select 'Replace Module.'



When the Catalog box appears, select 'IC695CPE305 – PACSystems Single Slot CPU 5 MB w/ Ethernet' and click 'OK' when finished.

(Catalog		×
	Central Processing Ur	nit	
			ОК
	Catalog Number	Description	Cancel
	IC695CPE 305	PACSystems RX3i Single Slot CPU 5 MB w/ Ethernet	
	IC695CMU310	PACSystems RX3i MaxOn CPU	
	IC695CPU310	PACSystems RX3i CPU 10 MB	
	IC695CPE310	PACSystems RX3i CPU 10 MB w/ Ethernet	
	IC695CPU315	PACSystems RX3i 1000MHz Celeron-M CPU 20 MB	
	IC695CPU320	PACSystems RX3i 1000MHz Celeron-M CPU 64 MB	
	IC695CPE330	PACSystems RX3i 1GHz Redundancy CPU 64 MB w/Ethernet	
	IC695CRU320	PACSystems RX3i 1000MHz Celeron-M Redundancy CPU 64 MB	
	IC695CRU320QP	PACSystems RX3i 1000MHz Celeron-M Quad Redundancy CPU	
	IC695NIU001	PACSystems RX3i NIU	

Click 'Yes' to keep the current settings for common parameters.

The last step in the configuration is to add the ProfiNet control module. Right click on Slot 2 and select 'Add Module.'



When the Catalog box appears, click on the 'Bus Controller' tab and select 'IC695PNC001 – RX3i PROFINET Controller (2 SFP)'. Click 'OK' when finished.

Catalog		X
Central Processing Un	it Specialty Modules	
Discrete Input Discre	ete Output Discrete Mixed Analog Input Analog Output	
Analog Mixed Comm	unications Bus Controller Motion Power Supplies	
Catalog Number	Description	Cancel
IC693BEM321	90-30 Fanuc I/O Link Module (Master)	
IC693BEM331	90-30 Genius Bus Controller (GBC)	
IC693BEM341	90-30 2.5 MHz FIP Bus Controller	
IC693DNM200	90-30 DeviceNet Master	
IC694BEM321	90-30 Fanuc I/O Link Module (Master)	
IC694BEM331	RX3i Genius Bus Controller (GBC)	
IC694DNM200	RX3i DeviceNet Master	
IC695PBM300	RX3i Profibus Master	
IC695PNC001	RX3i PROFINET Controller (2 SFP)	

Setting up the Connection

Now that the backplane slots are configured properly, the communication between the ProfiNet and CPE module must be configured.

Configuring the CPE Connection

The CPE module needs to be configured such that it can communicate with the PC. This examples use an Ethernet connection to do so. Expand Slot 1 and right click on 'Configure'.



The PLC in this example has IP address 10.10.13.201 (if this is a new device, check for the default IP address value). Set the IP address to this value with subnet 255.255.255.0.

Control I/O InfoViewer (0.1.0)		
Settings		
Parameters	Values	
Configuration Mode	TCP/IP	
Adapter Name	0.1.0	
IP Address	10.10.13.201	
Subnet Mask	255.255.255.0	
Gateway IP Address	0.0.0.0	
Status Address	%100001	
Length	80	
I/O Scan Set	1	

Lastly, right click on 'Target1' and select 'Properties.'



The properties of any device are shown in the 'Inspector' window. From this menu, scroll down to the bottom and enter IP address 10.10.13.201. Hit enter when finished.

Inspector

nspector 4		
Name	Target1	
Туре	GE IP Controller	
Description		
Documentation Address		
Family	PACSystems RX3i	
Controller Target Name	ProfiNetSetup1	
Update Rate (ms)	250	
Sweep Time (ms)	Offline	
Controller Status	Offline	
Scheduling Mode	Normal	
Force Compact PVT	True	
Enable Shared Variables	False	
Process System Enabled	False	
DLB Heartbeat (ms)	1000	
Enhanced Security	False	
Compression Level	Normal	
Physical Port	ETHERNET	
IP Address	10.10.13.201	
⊞Additional Configuration		
Inspector		

Configuring the ProfiNet Connection

The PLC controller needs to have a Device name set by an external configuration tool. The 'PROFINET DCP' scan tool ships with the GE Machine Edition software and is what will be used in this example. Select the 'Utilities' tab at the bottom of the 'Navigator' window.



Double click 'Profinet DCP' to bring up the discovery tool. From the drop down menu, select 'Local Area Connection' and press the 'Refresh Device List' button. This should list all the Profinet devices on the network.

Connection Settings					
Connection: Local Area	Connection		•	Refresh Device List	
Status: No Errors					
Device Name	 IP Address 	Vendor	Device T	уре	
	0.0.0		trial Networks ABCC-PR		
iolan-controller01	192.168. 0.	1 GE Intellige	ent Platforms IC695PNC	001	
Selection Properties					
Selection Properties MAC Address: 00-30-1	1-0B-FC-91	IP Address: 0.0.0.	0	Identify Device	
Selection Properties MAC Address: 00-30-1 Device Role: Device	1-08-FC-91	IP Address: 0.0.0. Subnet Mask: 0.0.0.	0	Identify Device	
Selection Properties MAC Address: 00-30-1 Device Role: Device Vendor ID: 010C	I-08-FC-91	IP Address: 0.0.0. Subnet Mask: 0.0.0. Gateway: 0.0.0.	0 0	Identify Device	

The GE PNC001 scanner card has a Device Name of 'iolan-controller01' and is at IP address 192.168.0.1. If the Gen 4 controller has never been configured it will not have a Device Name or IP address yet. The Gen 4 controller will always show up as HMS Industrial Networks ABCC-PRT (2-Port). Select the controller and press the 'Edit Device' button.

Vendor Name: HMS Industrial Networks		Vendor ID: 010C	
MAC Address: 00-30-11-0B-FC-91		Device ID: 0009	Identify Device
Device Type: ABCC-PRT (2-Port)		Device Role: Device	
Device Name			
tc-1			Set Device Name
P Address			
IP Address:	0.0.0.0		
Subnet Mask:	0.0.0.0		Set IP Information
Gateway:	0.0.0.0		
Reset device to fa	actory settings		
			Reset Device
			*

For simplicity, set the device name to 'tc-1' and hit 'Set Device Name,' then 'Exit.' The Gen 4 controller now has a device name but not an IP address.

Connection S	iettings			
Connection: Local Are		Connection	Refresh Device List	
Status:	No Errors			
Device Nam	e 🔺	IP Address	Vendor	Device Type
olan-controlle	r01	192.168. 0. 1	GE Intelligent Platforms	IC695PNC001
c-1			HMS Industrial Networks	ABCC-PRT (2-Port
Selection Pro MAC Address	perties s: 00-30-11	-0B-FC-91	IP Address: 0.0.0.0	Identify Device

Close the Profinet DCP utility.

Now that the UEC has a device name (tc-1), we can add it to our project. Navigate to the PNC001 card in the hardware configuration, right click on it and select 'Launch Discovery Tool'.

Nevigetor	* ×	
121		
🖻 🧱 Diagnostic Logic Blocks	-	
- Inactive Blocks	1	
Hardware Configuration *		
E) Shet 0 (Classic Plant)		
W Shits (COSCPERE)	1	
A- B 544 2 00005014000014		
Sket 3 ()	Configure	Enter
- Skot 4 ()		
- Sket 5 ()	Cut	CM+X
- Sket 6 ()	Copy	CHI+C
Siet 7 ()	Paste	Ctel+V
Sket 9 ()	Add Module	les
G++ 10.0	Restace Module	
	Delete Module	Del
Voltes S Manager El Miljett	Add IO-Device	In
methoding Shot 1 - Base y	Change LAN	
ownloading Slot 1 - Fault	Launch Discovery Tool	
ownloading: Slot 1 - Module	Managa LAVis	

Click 'Refresh Device List' and the controller (tc-1) should show up as 'Not assigned.'

Right click on the PNC001 card in the hardware configuration and select 'Add I/O Device.'

Navigator	# X	
11 20 R		
inactive Blocks		
E - Hardware Configuration		
E Reck 0 (006950H5012)		
- Sket 0 (0CE05PSD040)		
⊞- Ø Sket 1 (CE95CPE305)		
- Sket 2 ()cto/si/viccool	Configure	Enter
- Skot 4 () - Skot 5 ()	Cut	Ctrl+X
D Skot 6 ()	Copy	Ctrl+C
· 📄	Paste	Ctrl+V
s 🥖 Utilities 🖄 Manager 🚰 Project	Add Module	Ins
Feedback Zone	Replace Module	
Downloading: Slot 1 - User Downloading: Slot 1 - Fault	Delete Module	Del
Downloading: Slot 1 - Serie Downloading: Slot 1 - Note	Add 10-Device	lins.
Downloading: Slot 1 - Power	Change LAN	

Select ABCC-PRT2P device from HMS Industrial Networks and click 'OK.' If it isn't listed you will need to import the GSD file which can be found on the controllers web interface.



This will add a new device with the default device name of 'abcc-prt-2-port.' Edit the properties of this device and change its Device Name to tc-1 to match the controller we have on the network. This will also assign an IP address to the Device name.

Inspector	
IO-Device	
Device Number	3
Update Rate (ms)	128
Reference Variable	<none></none>
Network Identification	
IO LAN	LAN01
Device Name	tc-1
Device Description	
IP Address	192.168.0.2
⊡General	
GSDML	GSDML-V2.3-HMS-ABCC-PRT2P-20140703.xml
Device Type	RT
Device Access Point ID	DAP V1.0
Group IO Beferences	True

Group IO References

Expand Slot 2 and right click on 'tc-1 (#1) [RT]' and select 'Change Module List.' Add (in order) 3 'Output 1 word,' 2 'Output 2 word,' and 7 'Input 1 word.' Click 'OK' to save. These settings are determined by the Gen 4 controller IO default values. The size of the elements & order (from output to input) must match the settings on the Gen 4 controller.

lew module lodules car lodules car	to be moved by dragging the conject by dragging	ging a module to them to an empty them to an empty	tom to	the list of available modules on the right to an empty row. ow. while holding the Ctri key down				
Location	Content	Status		B hput/Output				
)	RT	Fixed	E	Output 1 byte Output 1 word Output 2 word				
1	Output 1 word	New						
2	Output 1 word	New		Output 4 word Input 1 byte Input 1 word Input 1 word Input 1 word				
3	Output 1 word	New						
1	Output 2 word	New	-					
5	Output 2 word	New		Input 4 word				
5	Input 1 word	New						
7	Input 1 word	New						
8	Input 1 word	New		Outer Number				
9	Input 1 word	New		Description Installand				
10	Input 1 word	New		input I word				
11	Input 1 word	New						
12	Input 1 word	New						
3								

The controller (tc-1) should now show up as 'Assigned.'

Connection	Settings								
Connection	Local Area Conne	ction	•	Refresh Device Lis					
LAN:	LAN01						•		
Status:	No Errors								
Status	Device Name /		IP Address	Vendor GE intelligent Platforms HMS Industrial Networks		Device Type IC695PNC001 ABCC PRT (2 Pot			
0			192.168. 0. 1						
🕑 to-1									
Filters (2/2)		Selection Properties MAC Address: 00-30-11-08-FC-91 Device Role: Device					Identify Devic		
Filters (2/2) med	MAC Address: 00-30-1 Device Role: Device	11-0B-FC-91	IP Address: Subnet Mask:	192.168.0.2 255.255.255.0		-		

Downloading the Configuration

The settings are now ready to be downloaded to the PLC. Make sure to take note of the symbol next to the target during this process. .



Target symbol showing current state of target is offline.

In order to download any settings into the PLC controller, the PC must first be communicating with the PLC. To do so, right click on 'Target1' and select 'Go Online.'





Notice that the target symbol has changed to online/monitor mode and also indicates that the current settings do not match the existing PLC settings.

Since the settings are not equal, right click on 'Target1' and navigate to 'Online Commands' and select 'Set Programmer Mode.'





Notice now that the target is in online/programmer mode, but it still shows that the settings are not equal.

This is because the current settings still need to be downloaded to the existing settings on the PLC. For the final step, right click on 'Target1' and select 'Download to Controller.'



For this example, we will not be changing anything other than the default settings shown in the 'Download to Controller' dialog box. Simply click 'OK' when the download dialog box appears.

Download to Controller [10.10.13.201]
Project: ProfiNet Setup
Target: Target1
Hardware Configuration and Motion
Initial/Forced Values
Controller Supplemental Files
Active Profiles
I
Write ALL items to flash memory
Write to both redundant controllers
Ok Cancel Help

🔷 Target1

Once the process finishes, 'Target1' indicates online/programmer mode and that you have the same settings on both the PC and PLC.

Below are the default settings for Anybus on the Gen 4 controller. From the Home screen, navigate to 'Controller' \rightarrow 'IO' and select either 'ANYBUS Inputs' or 'ANYBUS Outputs.'





To verify that the communication is successful, navigate to the 'Default Tables' in the Proficy Machine Edition software and either look at the analog inputs coming in from the ANYBUS Outputs on the Gen 4 controller or force the analog outputs to the ANYBUS inputs. Make sure to start the PLC controller first.



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