# 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.
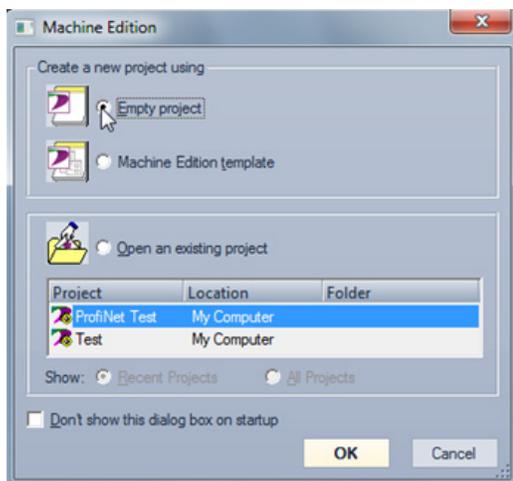


Select a project name. Click 'OK' when finished.
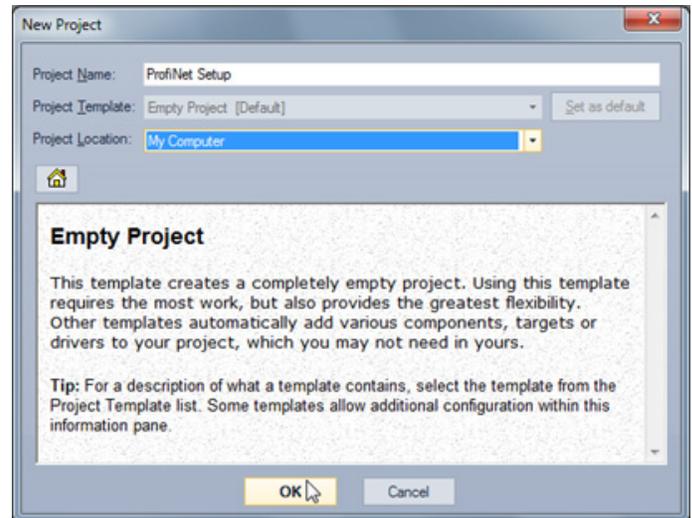


The final step in the initial setup process is to select the project platform. Navigate to Project → Add Target → GE Intelligent Platforms Controller → PACSystems RX3i.

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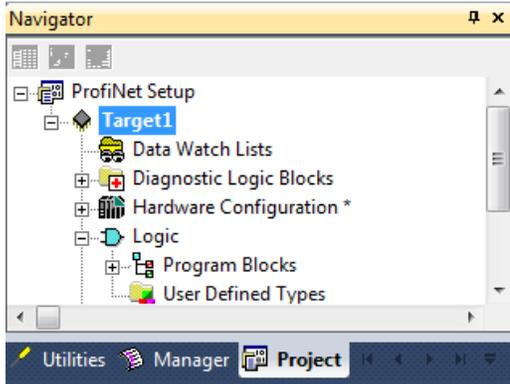


### Defining the GE PLC Modules

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.
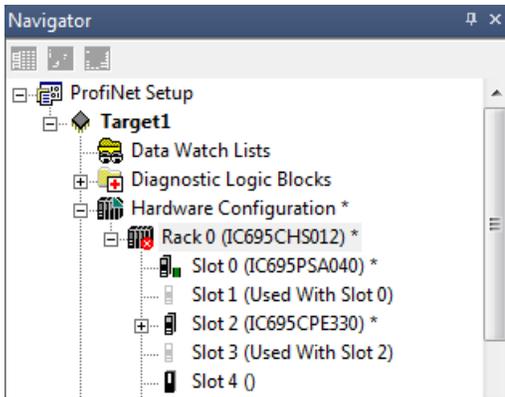


In the example shown in this document, the backplane, from left to right, consists of a DC power supply (PSD040), CPU (CPE305), and a ProfiNet (PNC001) control module. Following are steps to change the default configuration.

Right click on Slot 0 and select 'Replace Module'
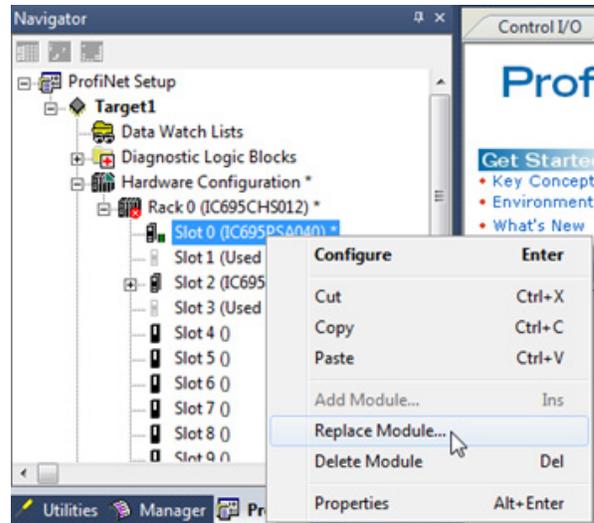


When the Catalog dialog box appears, select 'IC695PSD040 – 24VDC 40W Power Supply' and click 'OK' when finished.
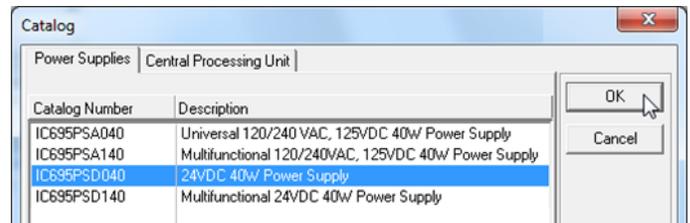


Slot 1 is now free and the CPE module can be placed accordingly (simply drag and drop into slot 1). Right click on slot 1 and select 'Replace Module.'
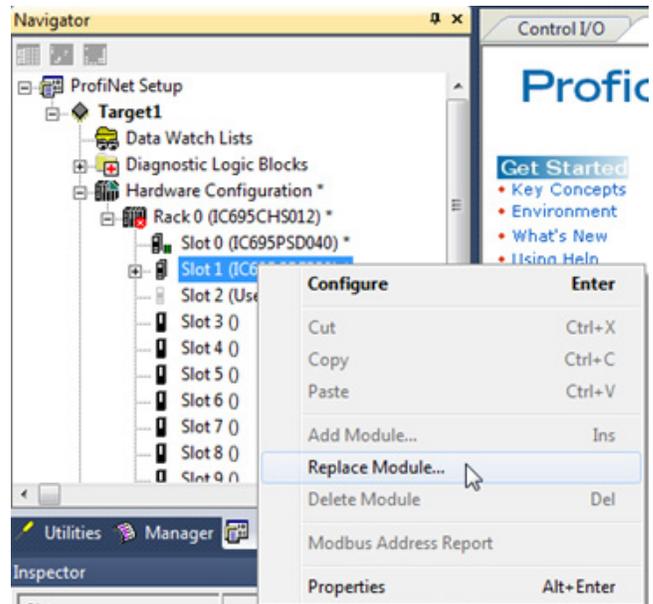
When the Catalog box appears, select 'IC695CPE305 – PACSystems Single Slot CPU 5 MB w/ Ethernet' and click 'OK' when finished.
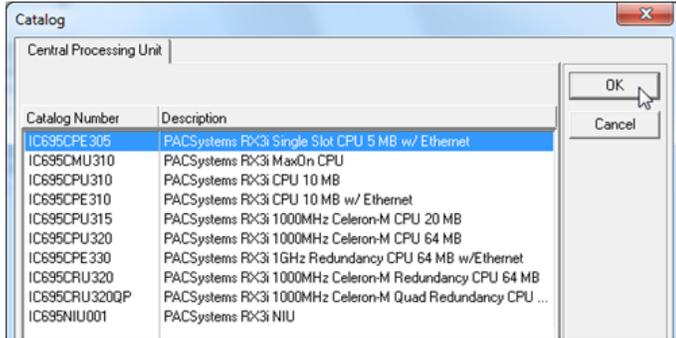


Click 'Yes' to keep the current settings for common parameters.

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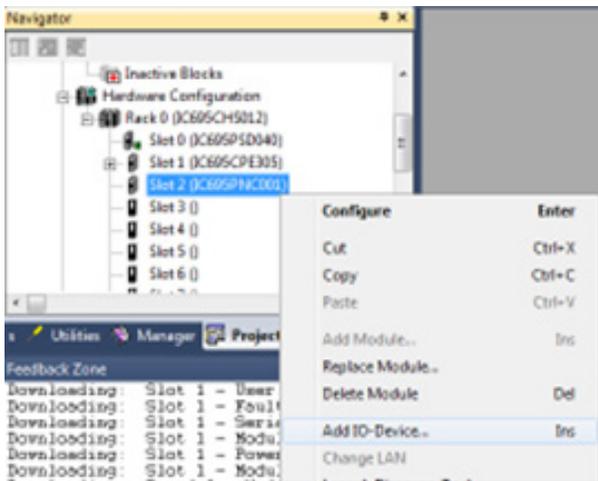


When the Catalog box appears, click on the 'Bus Controller' tab and select 'IC695PNC001 – RX3i PROFINET Controller (2 SFP)'. Click 'OK' when finished.
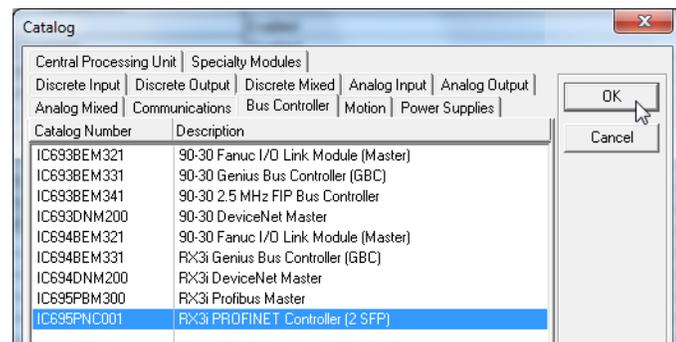
## Setting up the Connection

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'.
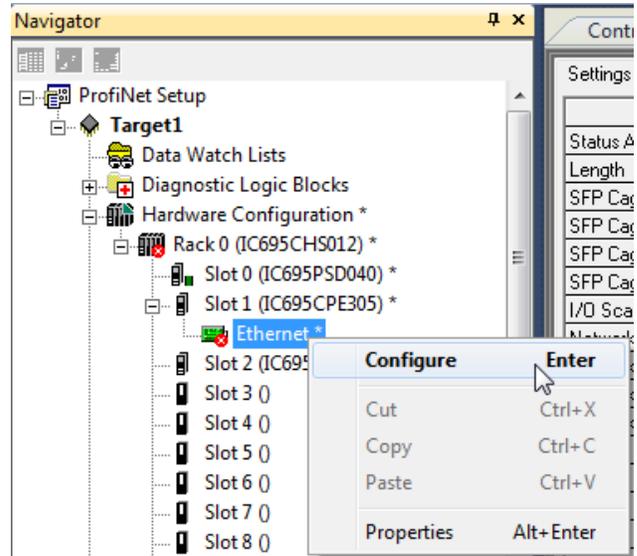


The PLC in this example has IP address 10.10.13.201 (if this is a new device, check for the default IP address value). Set the IP address to this value with subnet 255.255.255.0.

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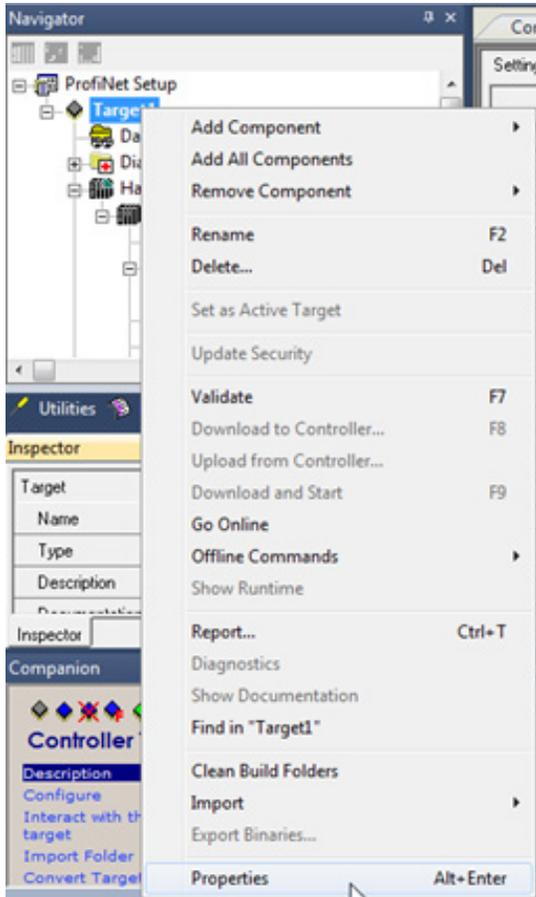


The properties of any device are shown in the 'Inspector' window. From this menu, scroll down to the bottom and enter IP address 10.10.13.201. Hit enter when finished.
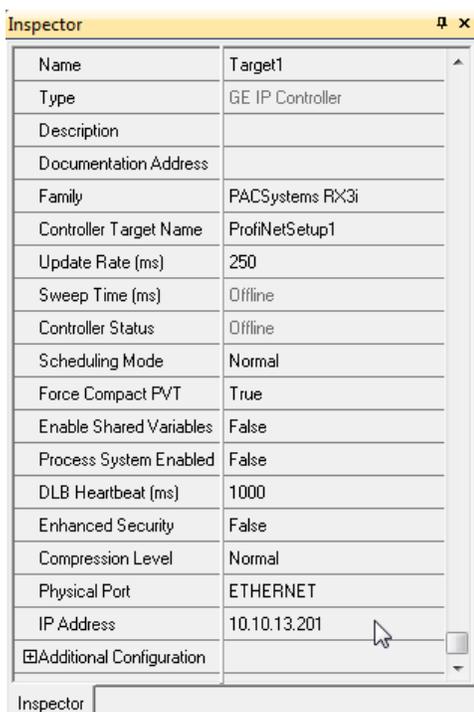


## Configuring the ProfiNet Connection

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.
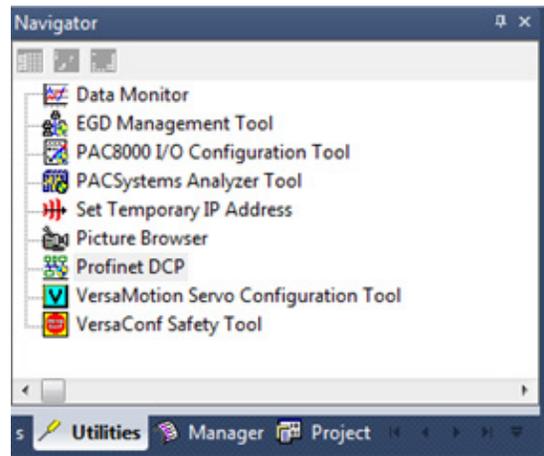


Double click 'Profinet DCP' to bring up the discovery tool. From the drop down menu, select 'Local Area Connection' and press the 'Refresh Device List' button. This should list all the Profinet devices on the network.
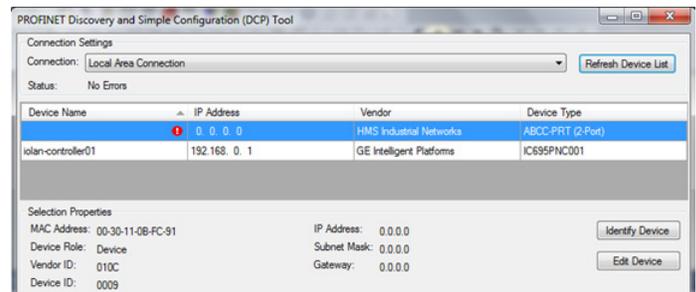


The GE PNC001 scanner card has a Device Name of 'iolan-controller01' and is at IP address 192.168.0.1. If the Gen 4 controller has never been configured it will not have a Device Name or IP address yet. The Gen 4 controller will always show up as HMS Industrial Networks ABCC-PRT (2-Port).

Select the controller and press the 'Edit Device' button.
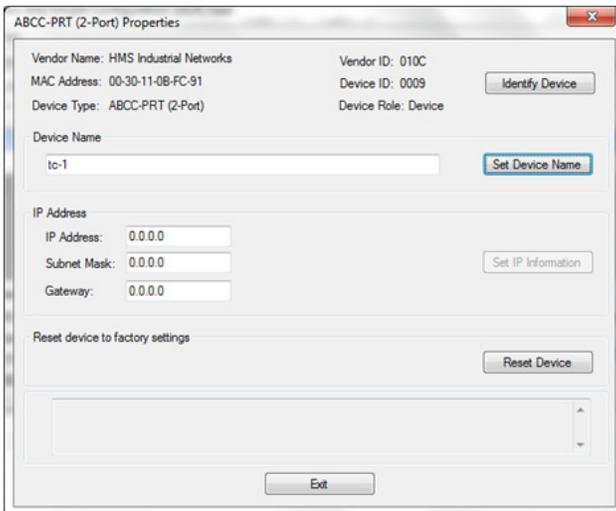


For simplicity, set the device name to 'tc-1' and hit 'Set Device Name,' then 'Exit.' The Gen 4 controller now has a device name but not an IP address.
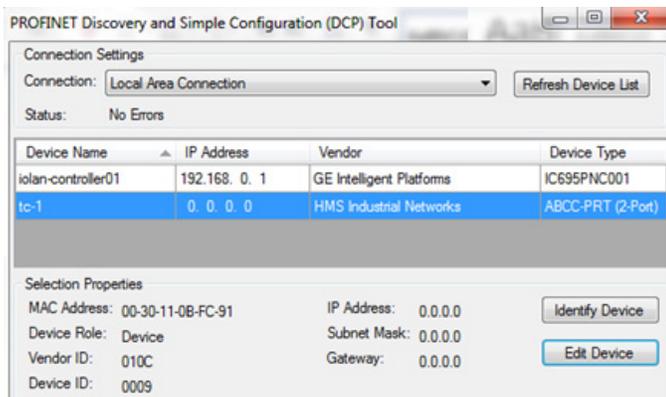


Close the Profinet DCP utility.

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'.
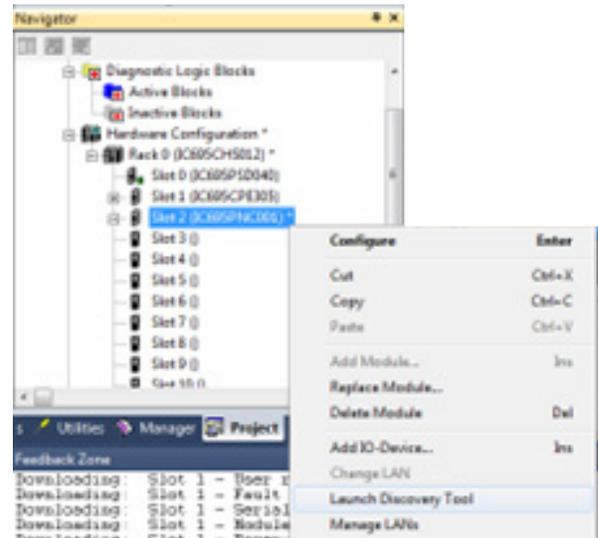


Click 'Refresh Device List' and the controller (tc-1) should show up as 'Not assigned.'

Right click on the PNC001 card in the hardware configuration and select 'Add I/O Device.'
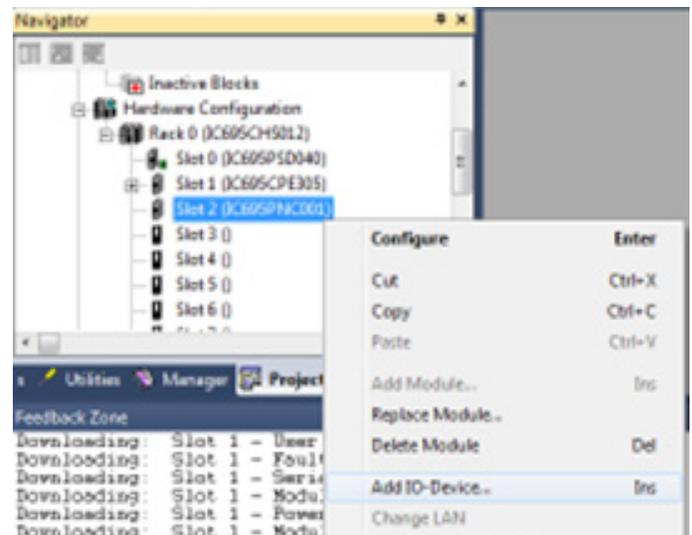
Select ABCC-PRT2P device from HMS Industrial Networks and click 'OK.' If it isn't listed you will need to import the GSD file which can be found on the controllers web interface.
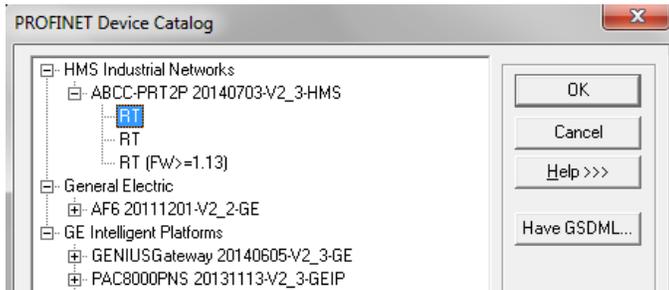


This will add a new device with the default device name of 'abcc-prt-2-port.' Edit the properties of this device and change its Device Name to tc-1 to match the controller we have on the network. This will also assign an IP address to the Device name.
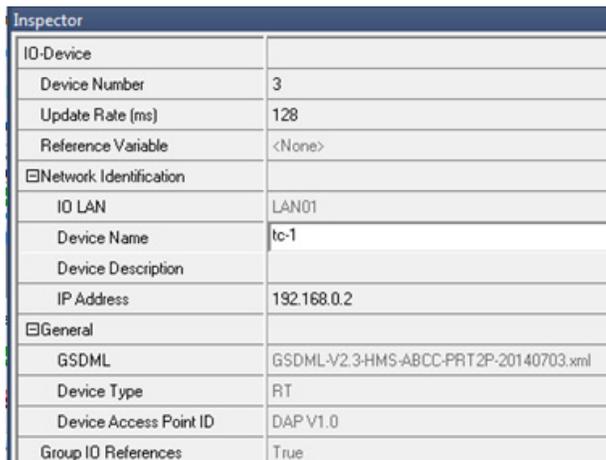


Expand Slot 2 and right click on 'tc-1 (#1) [RT]' and select 'Change Module List.' Add (in order) 3 'Output 1 word,' 2 'Output 2 word,' and 7 'Input 1 word.' Click 'OK' to save. These settings are determined by the Gen 4 controller IO default values. The size of the elements & order (from output to input)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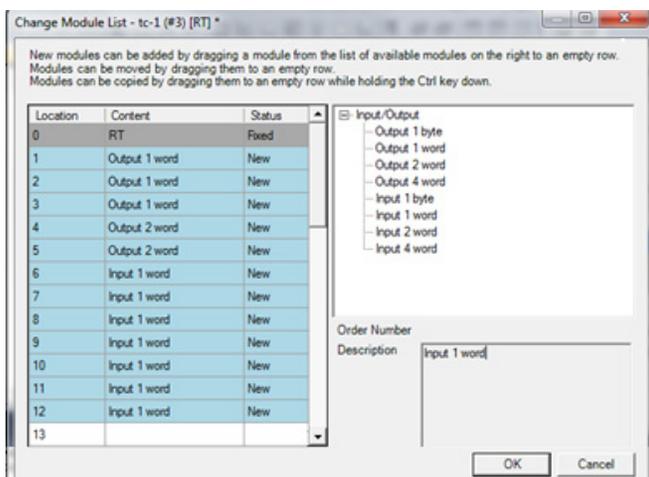


The controller (tc-1) should now show up as 'Assigned.'
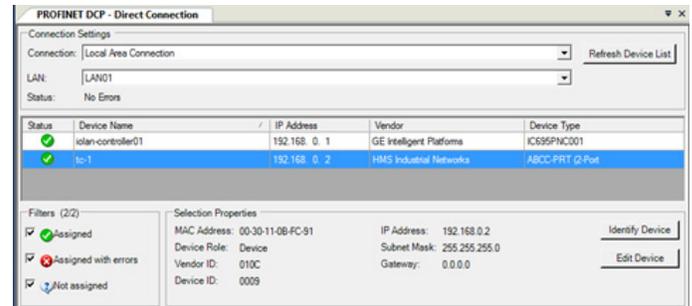


## Downloading the Configuration

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.'



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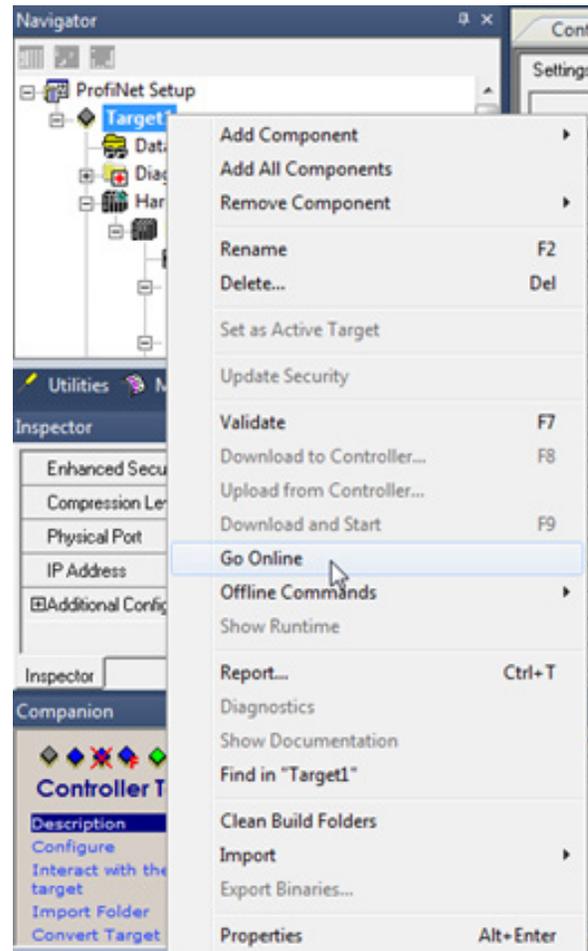
 Notice that the target symbol has changed to online/monitor mode and also indicates that the current settings do not match the existing PLC settings.

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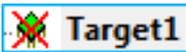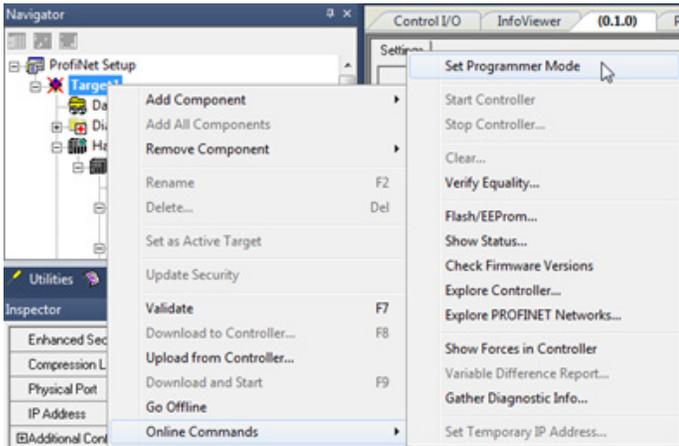


 Notice now that the target is in online/programmer mode, but it still shows that the settings are not equal.

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.'
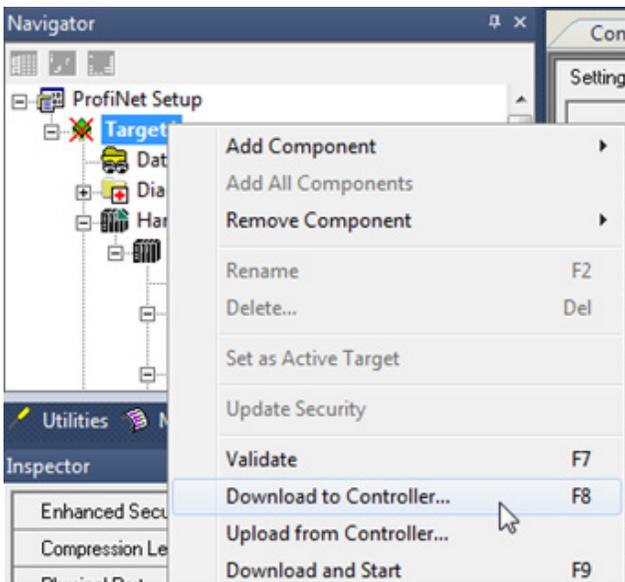


For this example, we will not be changing anything other than the default settings shown in the 'Download to Controller' dialog box. Simply click 'OK' when the download dialog box appears.
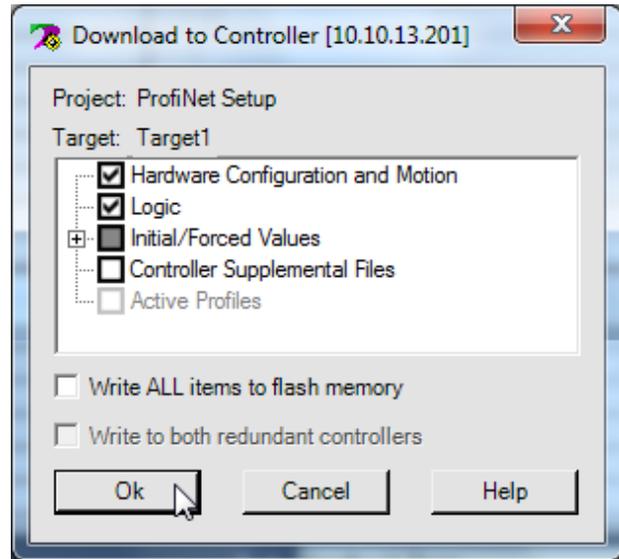


 Once the process finishes, 'Target1' indicates online/programmer mode and that you have the same settings on both the PC and PLC.

Below are the default settings for Anybus on the Gen 4 controller. From the Home screen, navigate to 'Controller' → 'IO' and select either 'ANYBUS Inputs' or 'ANYBUS Outputs.'
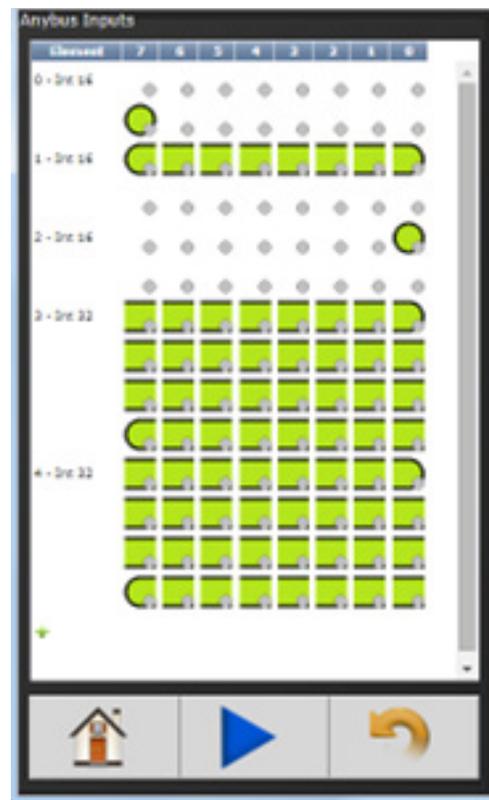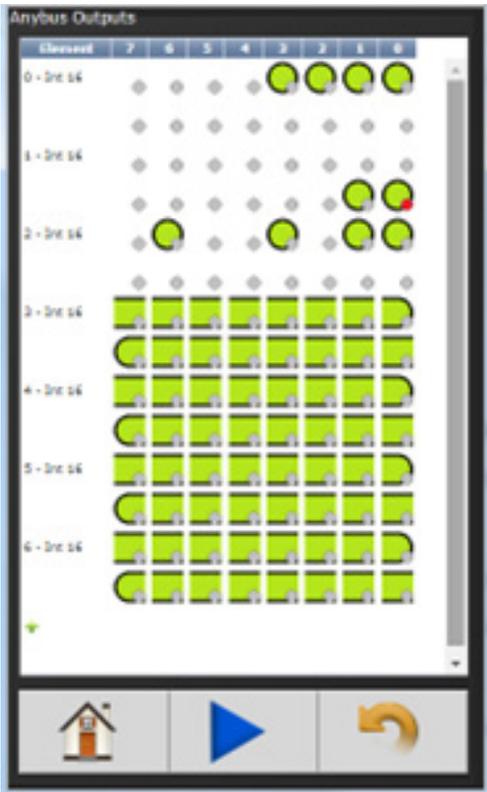
To verify that the communication is successful, navigate to the 'Default Tables' in the Proficy Machine Edition software and either look at the analog inputs coming in from the ANYBUS Outputs on the Gen 4 controller or force the analog outputs to the ANYBUS inputs. Make sure to start the PLC controller first.

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CORPORATE HEADQUARTERS
10000 SE Pine Street
Portland, Oregon 97216
Phone: (503) 254-6600
Toll Free: 1-800-852-1368

AIMCO CORPORATION DE MEXICO SA DE CV
Ave. Cristobal Colon 14529
Chihuahua, Chihuahua. 31125
Mexico
Phone: (01-614) 380-1010

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