

GE
Automation & Controls
Programmable Control Products

PACSystems Industrial PROFINET Managed Ethernet Switches MRP Application Guide

GFK-3070
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GFL-002



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Chapter 1 Introduction

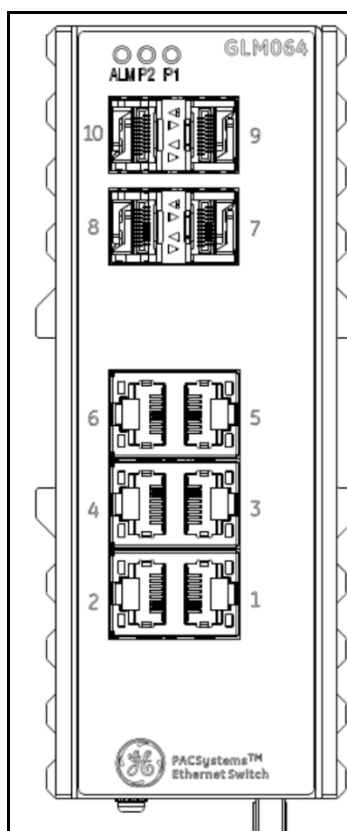


Figure 1: GLM064

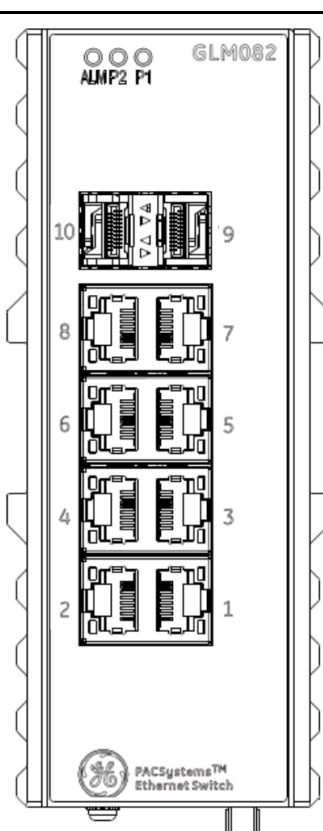


Figure 2: GLM082

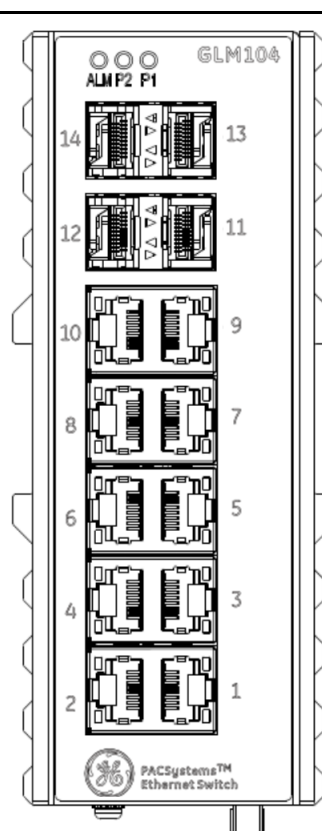


Figure 3: GLM104

The PACSystems GLM series Industrial Ethernet Switches deliver high quality Ethernet operation over a wide temperature range and can tolerate an extended power input range. These switches are ideal for harsh environments and mission critical applications. They may be DIN-rail mounted or panel-mounted.

Applications include:

- Virtual LANs (VLANs)
- Access Control List Security (ACL)
- Failover Ring Protection
- Quality of Service (QoS) features
- Internet Group Management Protocol (IGMP)

This document includes a product overview and covers installation, configuration, operation and diagnostics.

1.1 Revisions in this Manual

Rev	Date	Description
	Aug-2019	<ul style="list-style-type: none"> Initial release.

1.2 PACSystems Documentation

PACSystems Manuals

<i>PACSystems RX7i, RX3i and RSTi-EP CPU Reference Manual</i>	GFK-2222
<i>PACSystems RX7i, RX3i and RSTi-EP CPU Programmer's Reference Manual</i>	GFK-2950
<i>PACSystems RX7i, RX3i and RSTi-EP TCP/IP Ethernet Communications User Manual</i>	GFK-2224
<i>PACSystems TCP/IP Ethernet Communications Station Manager User Manual</i>	GFK-2225
<i>PACSystems Memory Xchange Modules User's Manual</i>	GFK-2300
<i>PACSystems Hot Standby CPU Redundancy User Manual</i>	GFK-2308
<i>Proficy Machine Edition Logic Developer Getting Started</i>	GFK-1918
<i>Proficy Process Systems Getting Started Guide</i>	GFK-2487
<i>PACSystems RXi, RX3i, RX7i and RSTi-EP Controller Secure Deployment Guide</i>	GFK-2830
<i>PACSystems RX3i Systems Manual</i>	GFK-2314
<i>PACSystems RX3i Ethernet Network Interface Unit User's Manual</i>	GFK-2439
<i>PACSystems RX3i PROFINET Scanner Manual</i>	GFK-2737
<i>PACSystems RX3i & RSTi-EP PROFINET I/O Controller Manual</i>	GFK-2571
<i>PACSystems Industrial PROFINET Managed Ethernet Switches Important Product Information (IPI)</i>	GFK-3028
<i>PACSystems Industrial PROFINET Managed Ethernet Switches User's Manual</i>	GFK-3030
<i>PACSystems Industrial PROFINET Managed Ethernet Switches CLI Command Reference Guide</i>	GFK-3061
<i>PACSystems Industrial PROFINET Managed Ethernet Switches Web Configuration Tool Guide</i>	GFK-3062
<i>PACSystems Industrial PROFINET Managed Ethernet Switches Secure Deployment Guide (SDG)</i>	GFK-3063
<i>PACSystems Industrial PROFINET Managed Ethernet Switches Installation & Maintenance Requirements</i>	GFK-3098

In addition to these manuals, datasheets and product update documents describe individual modules and product revisions. The most recent PACSystems documentation is available on the GE Intelligent Platforms support website <http://geautomation.com/support>.

Chapter 2 Summary Overview

2.1 Overview

This Application Guide provides for following application scenarios.

1. Single PROFINET_MRP Ring: In this application scenario, GLM switch act the role of MRC to cooperate with manager device, for providing the ring protection.
2. Multiple PROFINET-MRP Ring: In this application scenario, GLM switch act as role of MRC, to expend the ring protected network without the need of controller and allow IO-Controller to focus the process control.
3. PROFINET-MRP Main Ring couples multiple PROFINET-MRP Subrings: GLM switch is capable to support communicating two rings connected with each other. The various topologies derived from Dual MRP fit for most of the PROFINET applications.
4. Multiple PROFINET MRP Ring and Subring: Via the capability of supporting of MRM & MRC roles, the network design can be flexible and cost effective according to variant application environment
5. PROFINET-MRP Main Ring couples with coupled two PROFINET-MRP Subring: In the application scenario, GLM switch is capable of conducting the network protection without IO-C involved.
6. PROFINET System Redundancy: This section will show how to use RingV2 and MRPe to setup the network topology which can support system redundancy and media redundancy.

Network topology, configuration and implementation of these application scenario are described in following sections.

Chapter 3 Single PROFINET-MRP Ring

3.1 Network Topology

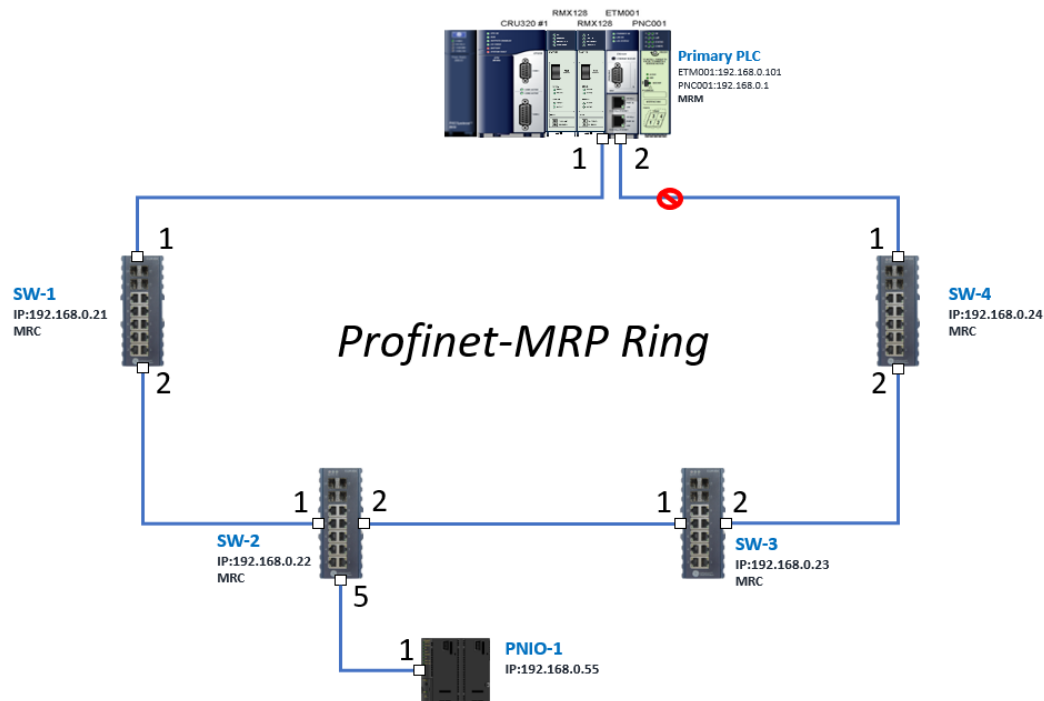


Figure 4

3.2 Hardware Configuration

On the CRU320, the I/O data can be set to "STOP", "RUN OUTPUT DISABLE" or "RUN I/O Enable" states by a switch imbedded on CRU320. During the configuration, the switches on both 2 CRU320s must be set to "STOP"

3.2.1 Project Open

To start the software Proficy Machine Edition, please follow the steps below:

(1) Click [Start] -> [Proficy] -> [Proficy Machine Edition] -> [Proficy Machine Edition].



Figure 5

(2) Select the empty project and click [OK].

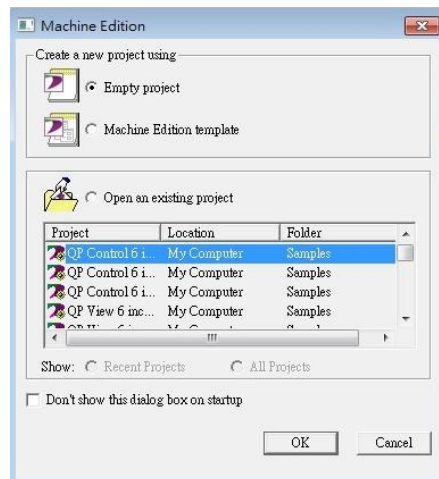


Figure 6

(3) Set the project name and click [OK]

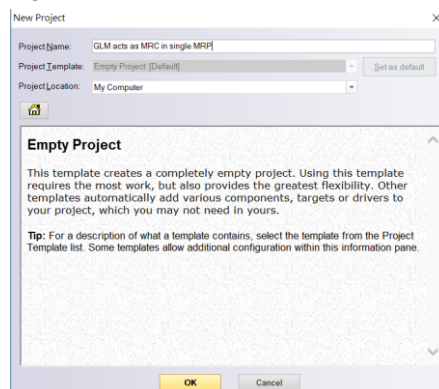


Figure 7

3.2.2 I/O Controller Setting

Next step is to add a target for this project. Click right button on project name “GLM acts as MRC in single MRC group” and select [Add Target] -> [GE Intelligent Platforms Controller] -> [PACSystems RX3i].

The PACSystems RX3i is the I/O Controller to be tested.

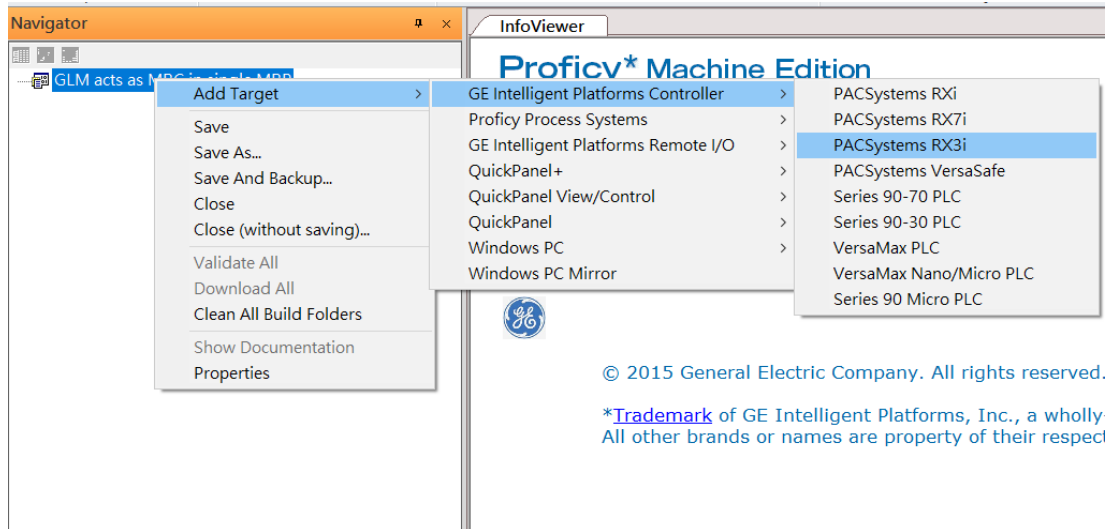


Figure 8

Originally the I/O Controller is described as the rack with 12 slots, each slot can be regarded as the chassis for device installation such as power card, communication module, or bus controller. However, there are only 7 chassis can be used in the I/O Controller CRU320. Thus, replace the rack for 7 slots.

Click right button on “Rack0 (IC695CHS012)” and select [Replace Rack...]

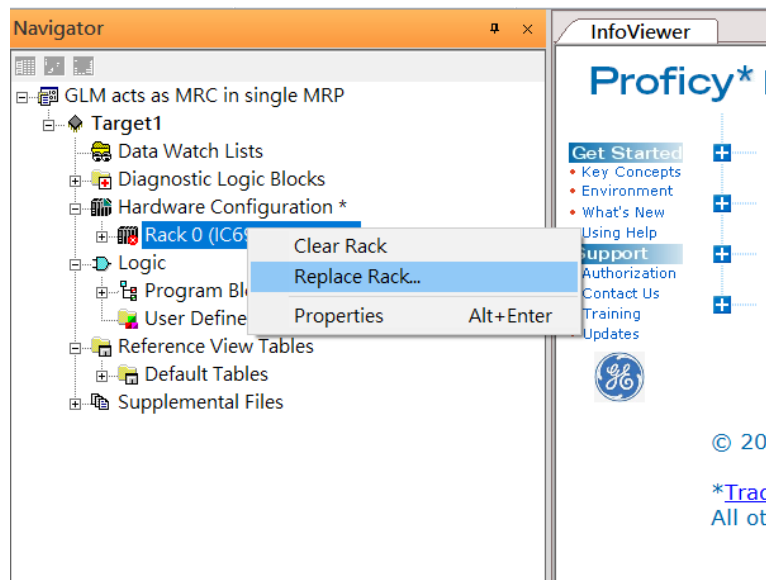


Figure 9

Select “IC695CHS007” and click [OK]

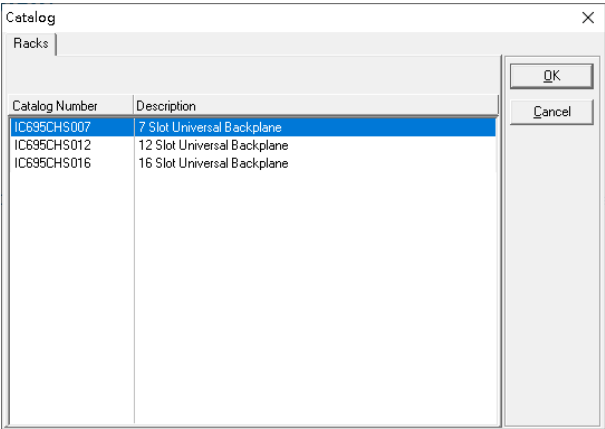


Figure 10

After the rack and the number of slots is defined, select the corresponding devices into the slots according to the I/O Controller. The following picture is the current installation for each device on the I/O Controller .



Figure 11

From left to right, the installed devices on the I/O Controller are listed in Table 1.

Table 1. Devices on I/O Controller

Device Type	Device Name	Chassis index
Power Card	PSD140	0
Central Processing Unit	CRU320	1 ~ 2
Communication Module	RMX128	3
Communication Module	RMX128	4
Communication Module	ETM001	5
Bus Controller	PNC001	6

Now, add the module into the slots by the current devices on the I/O Controller, the chassis index is corresponding to the slot index.

First, replace the power card. Click slot 0 and click the right button, select [Replace Module ...], and specify the installed power card, PSD140, then click [OK]

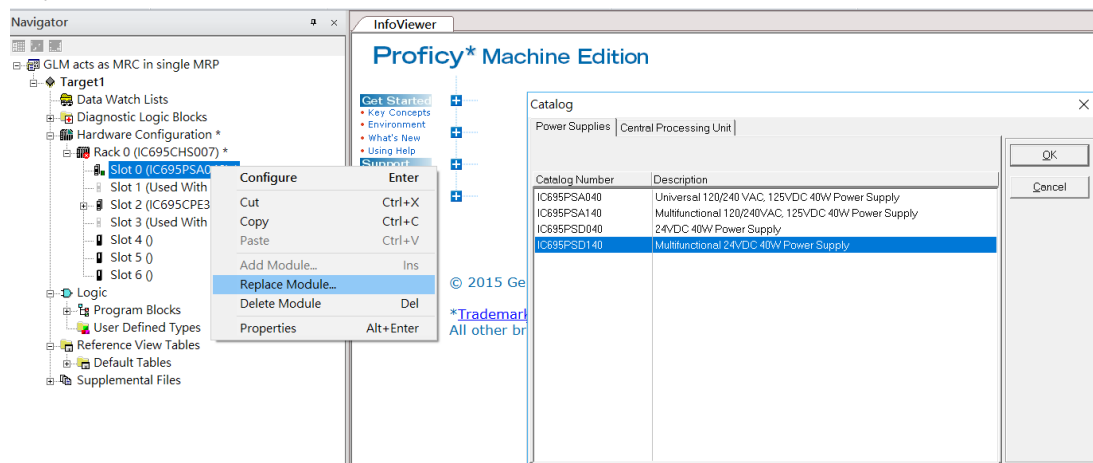


Figure 12

Slot 0 is replaced by current power card, PSD140

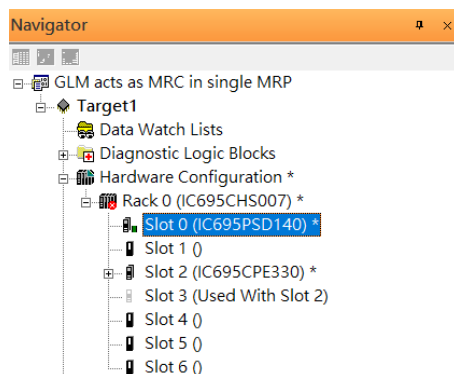


Figure 13

For slot 1 and 2, 2 chassis (1 and 2) is occupied by the Central Processing Unit, CRU320. To integrate slot 1 and 2, pull the slot 2 to slot 1. Now the slot 2 is cleaned.

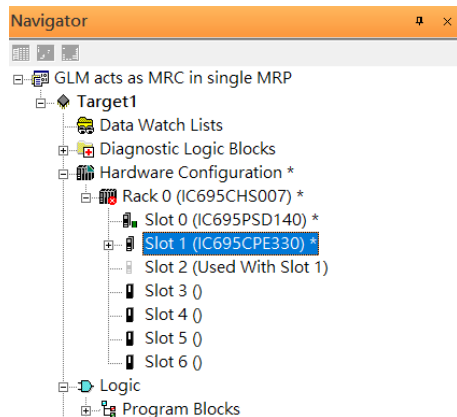


Figure 14

To select the Central Processing Unit, click slot 1 and click the right button, select [Replace Module ...] to choose CRU320

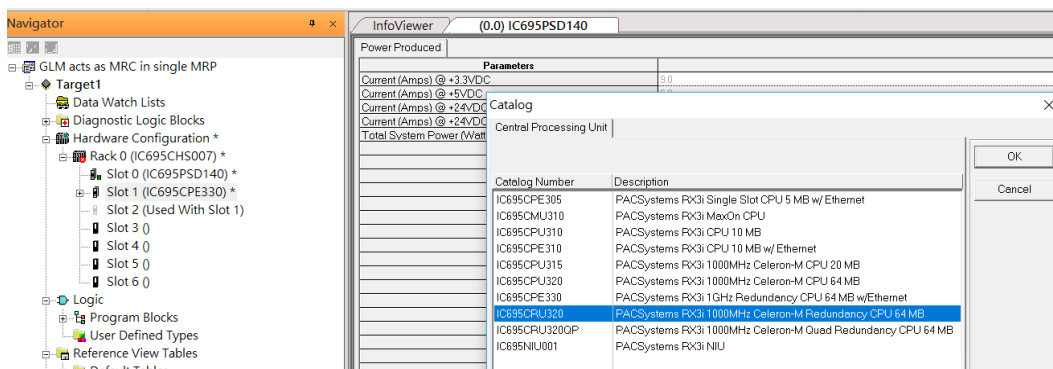


Figure 15

Then choose [No].

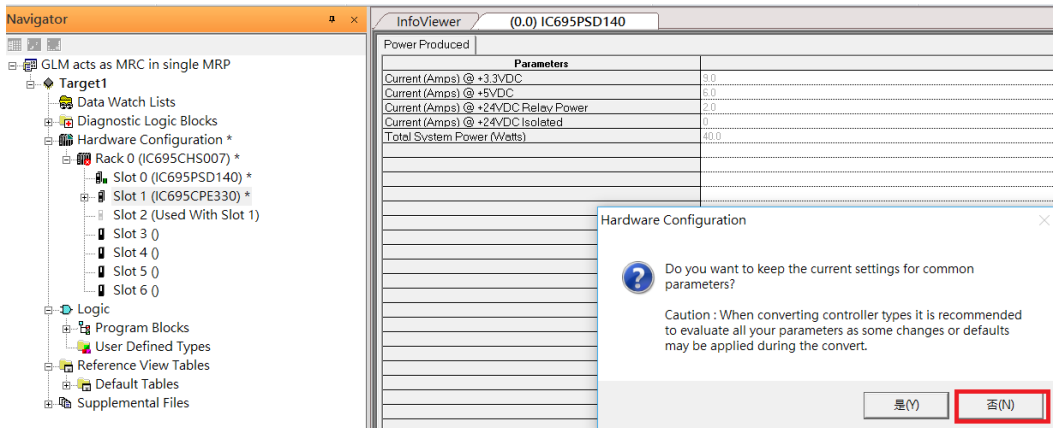


Figure 16

Now the CRU320 is specified.

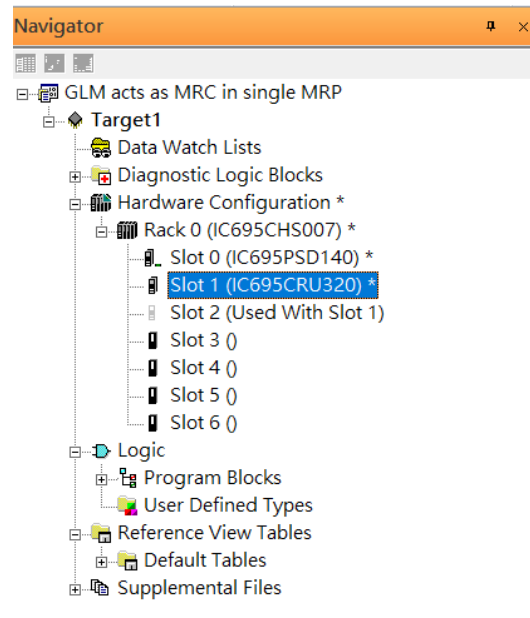


Figure 17

Next is to add RMX128 module for slot 3. Click the right button on slot 3, select [Add Module ...]

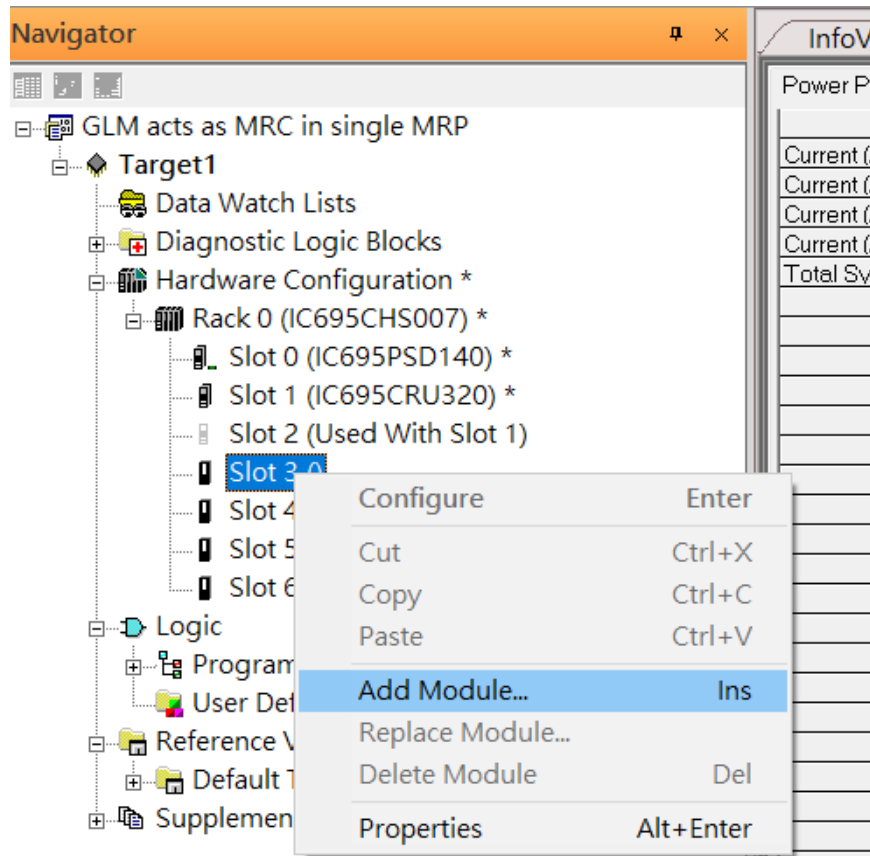


Figure 18

According to the current installation on the I/O Controller, the RMX128 shall be select.
Select [Communications] -> [IC695RMX128] and click [OK]

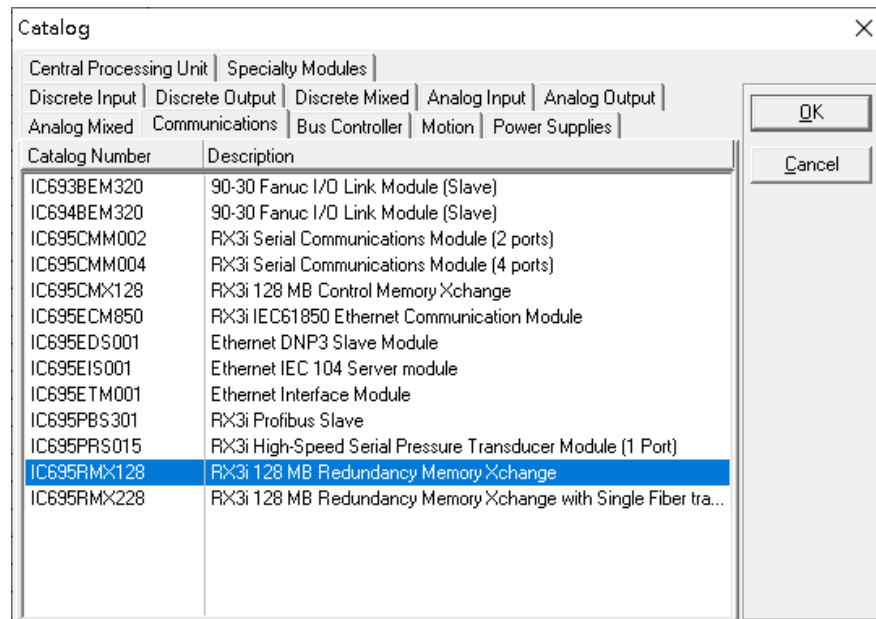


Figure 19

Now the RMX128 is ready on slot 3.

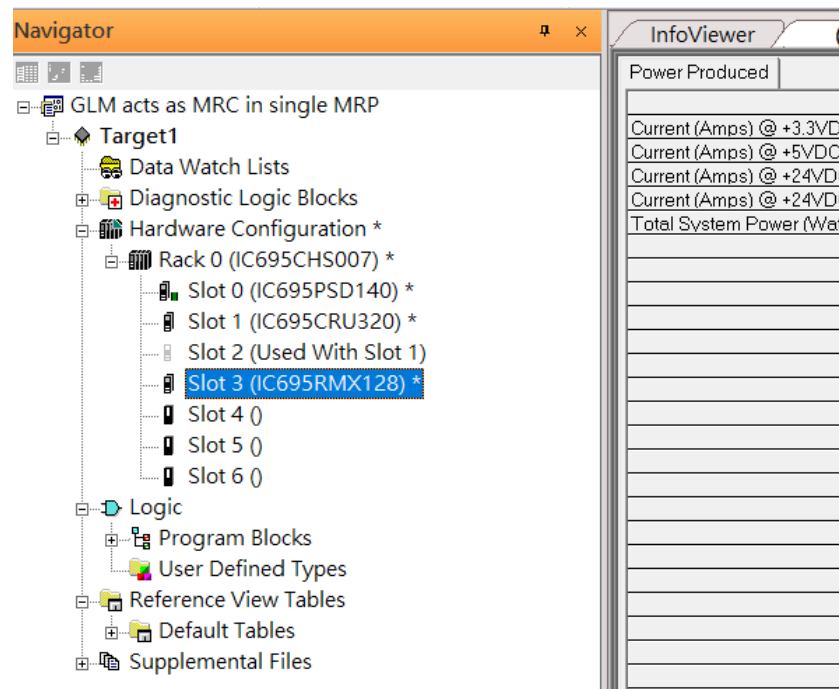


Figure 20

Continuously, select RMX128 for slot 4. Click the right button on slot 4, select [Add Module ...], select [Communications] -> [IC695RMX128] and click [OK]

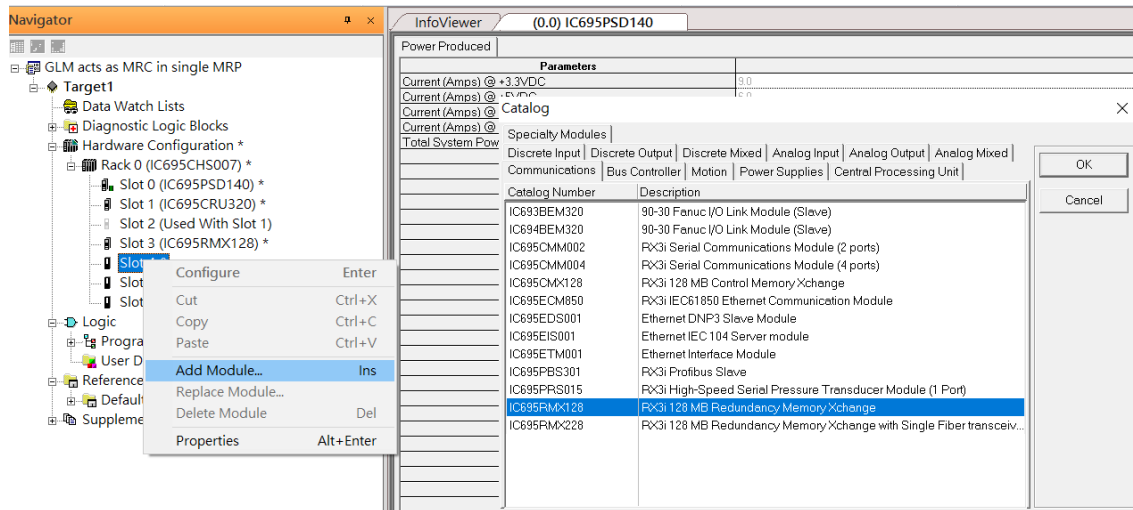


Figure 21

Continuously, select ETM001 for slot 5. Click the right button on slot 5, select [Add Module ...], select [Communications] -> [IC695ETM001] and click [OK]

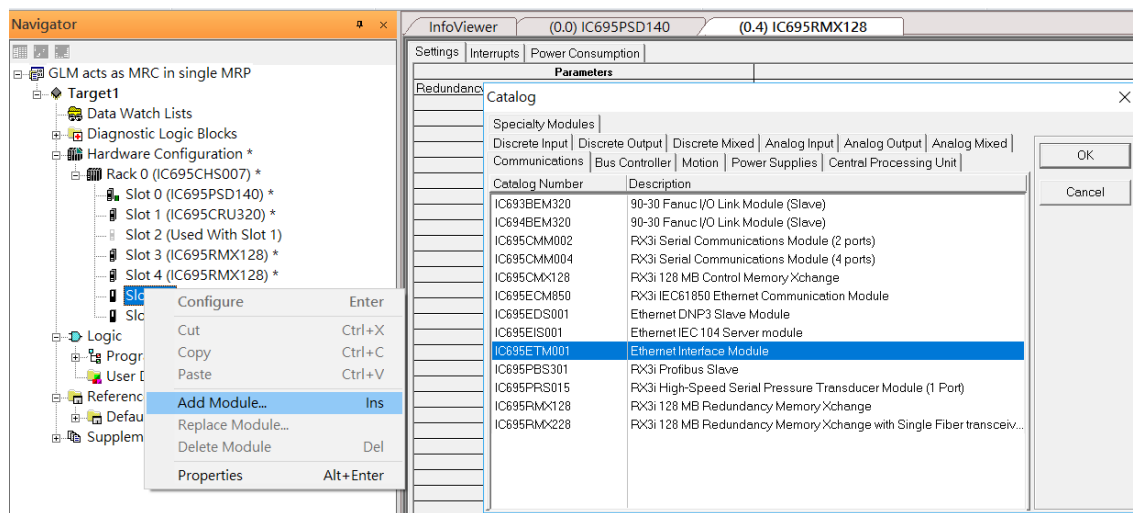


Figure 22

It should be noted that the ETM001 is the management device for Proficy Machine Edition. The communication interface is Ethernet network. The IP address and Subnet Mask shall be specified.

In the following picture, the IP address 192.168.0.101 and mask 255.255.255.0 is specified on ETM001.

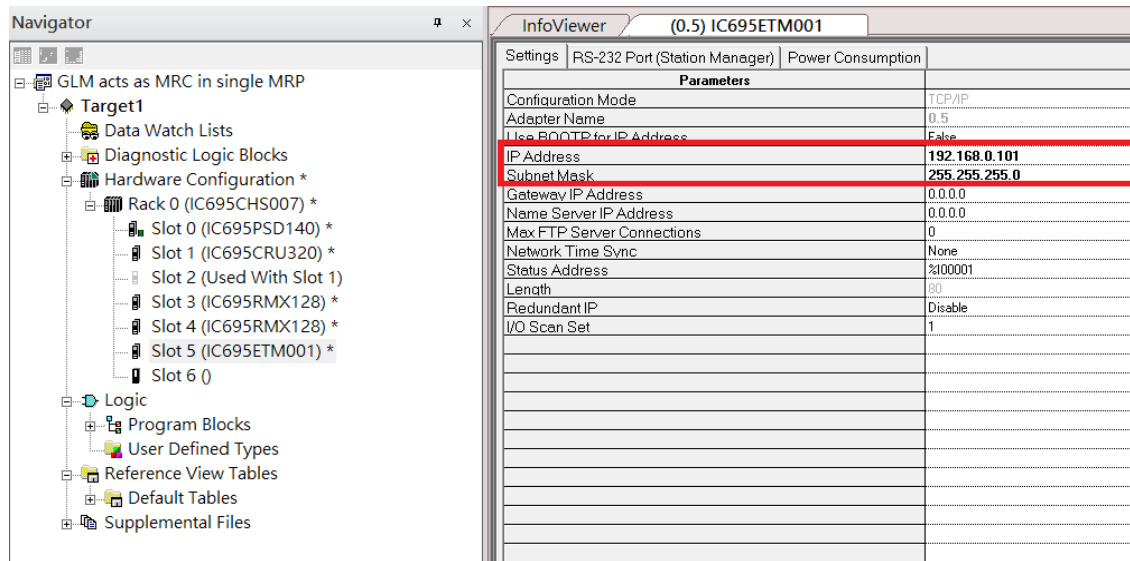


Figure 23

Continuously, select PNC001 for slot 6. Click slot 6 and click the right button, select [Add Module ...], specify the installed Bus Controller, PNC001 and click [OK]

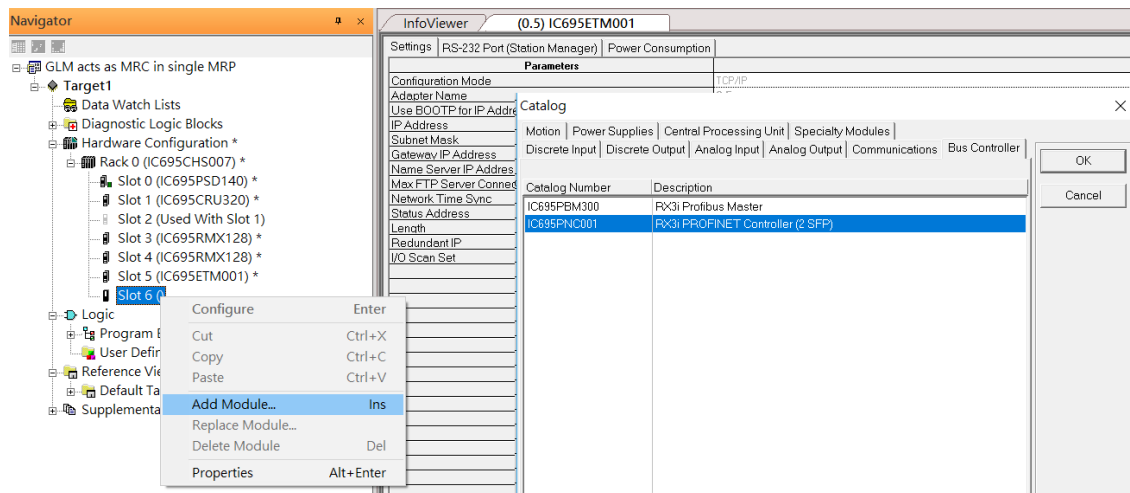


Figure 24

Now all the devices on the I/O Controller are ready on the slots on the rack, the following picture is the current status, and we shall save it.

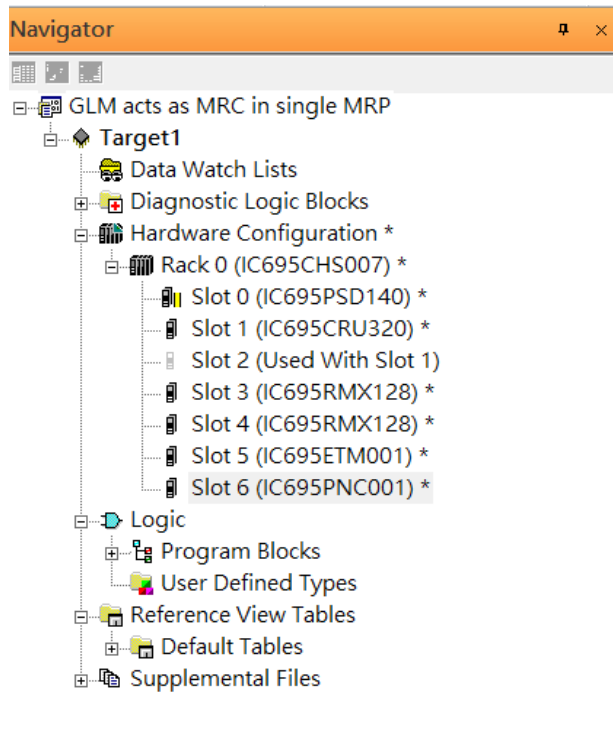


Figure 25

3.2.3 I/O Device Setting

This section introduces the I/O Device integration. To configure the I/O Device, the GSDML file is necessary. Now we create another interface to load the GSDML file by using [Toolchest].

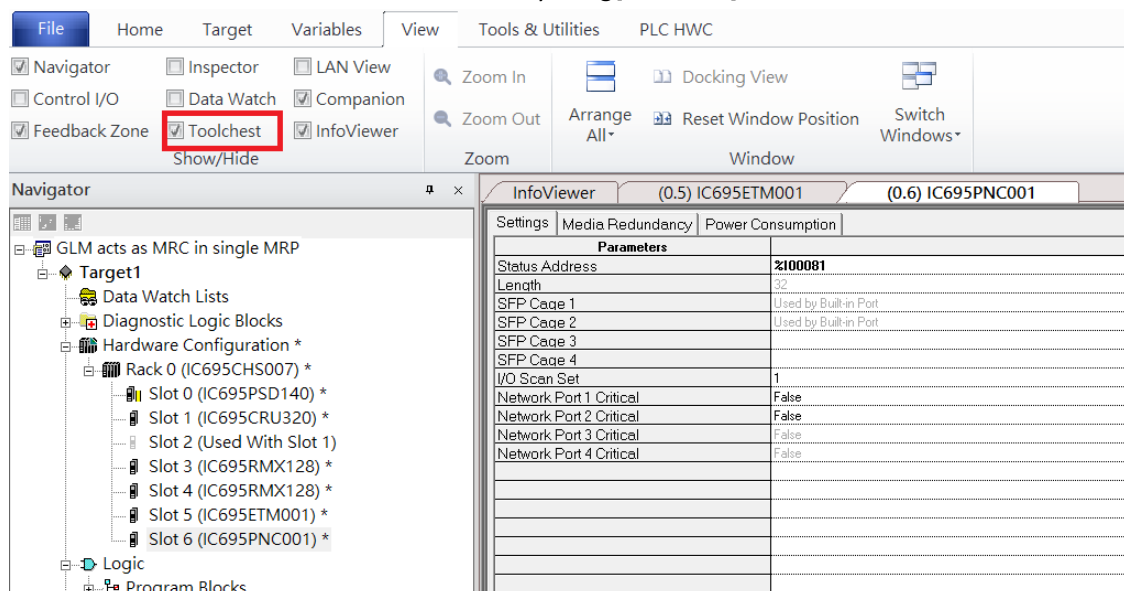


Figure 26

As shown in the following picture, a new interface is created on the right-hand side.

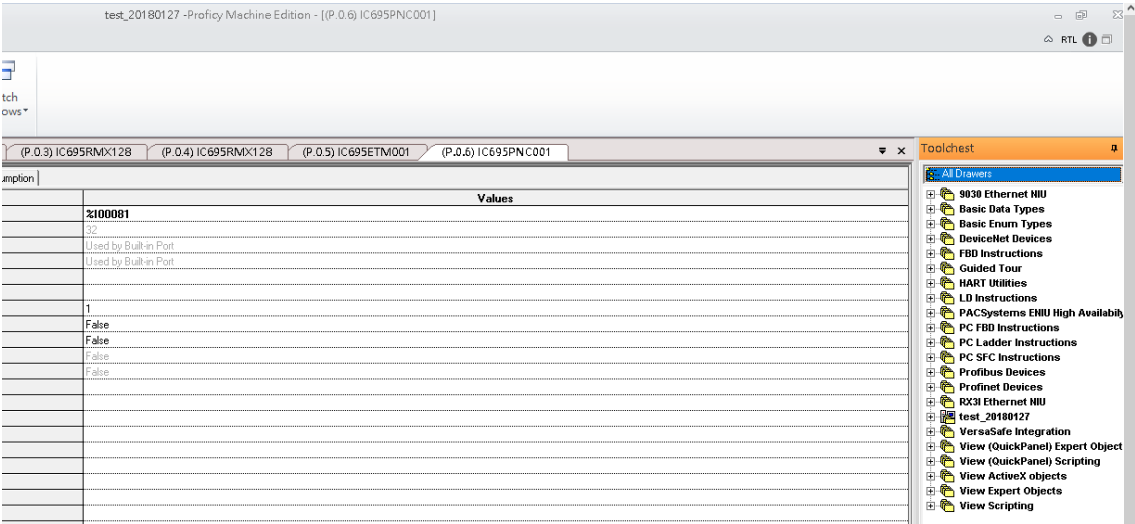


Figure 27

Select Profinet Devices.

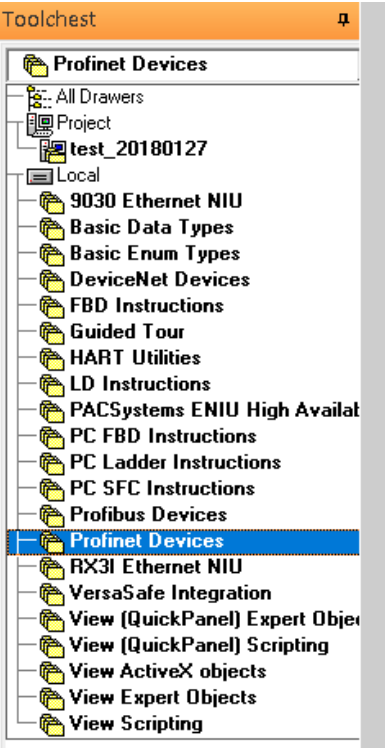


Figure 28

Click right button, select [Assistants] -> [Import GSDML File ...]

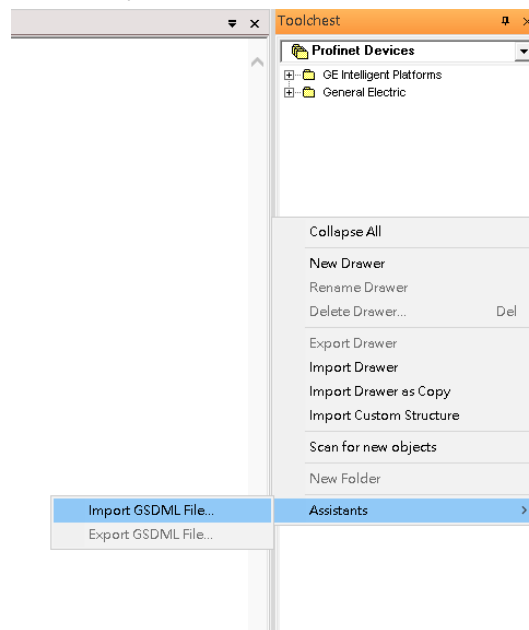
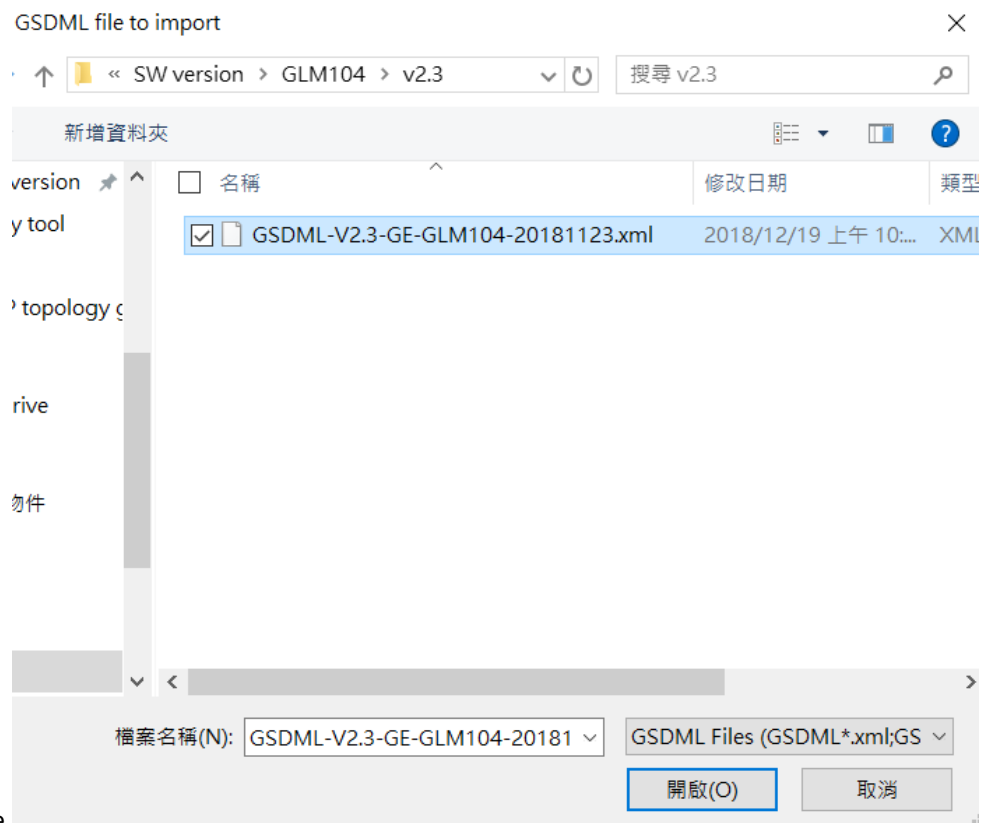


Figure 29



Select the GSDML File.

Figure 30

Then the corresponding I/O Device of GSDML File is added in the [Toolchest].

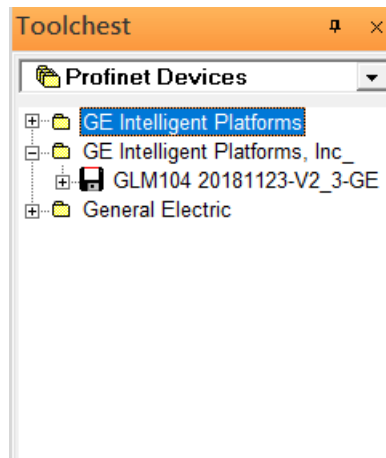


Figure 31

In this application setup, there are five I/O devices and one I/O controller. I/O devices are 4 switches and one GE VersaMax PROFINET I/O Scanner.

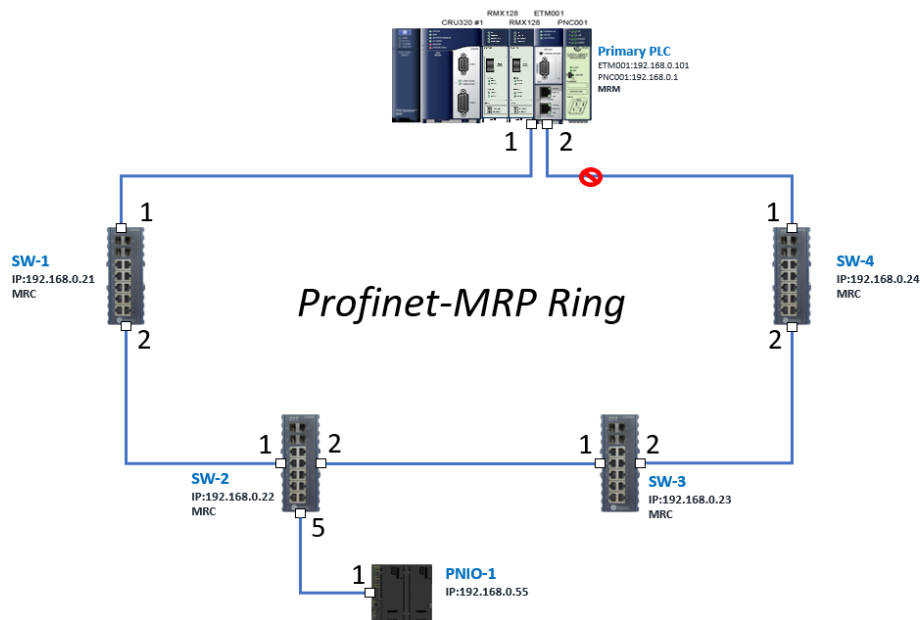


Figure 32

The I/O Device is connected to the Bus Controller on the I/O Controller. Click the slot 6 and click the right button to add the I/O Device on the PNC001.

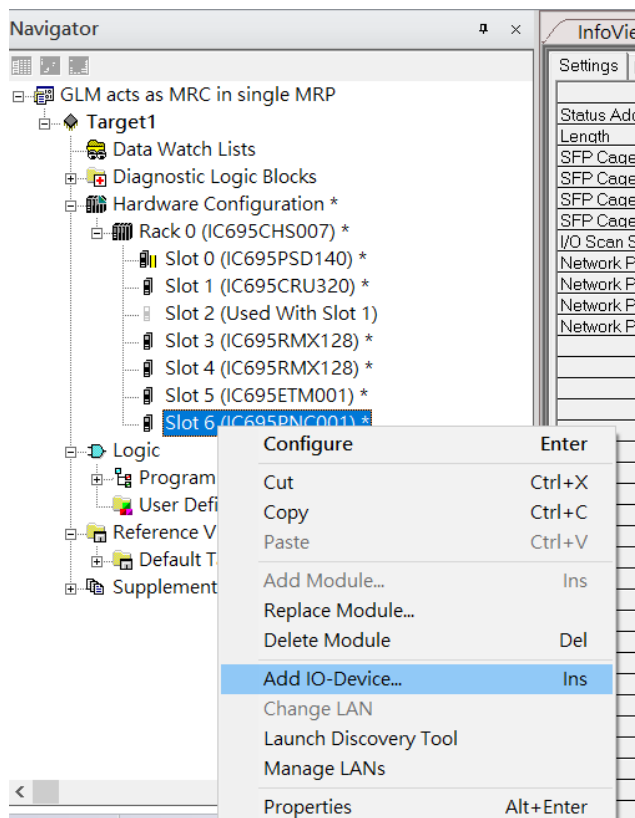


Figure 33

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

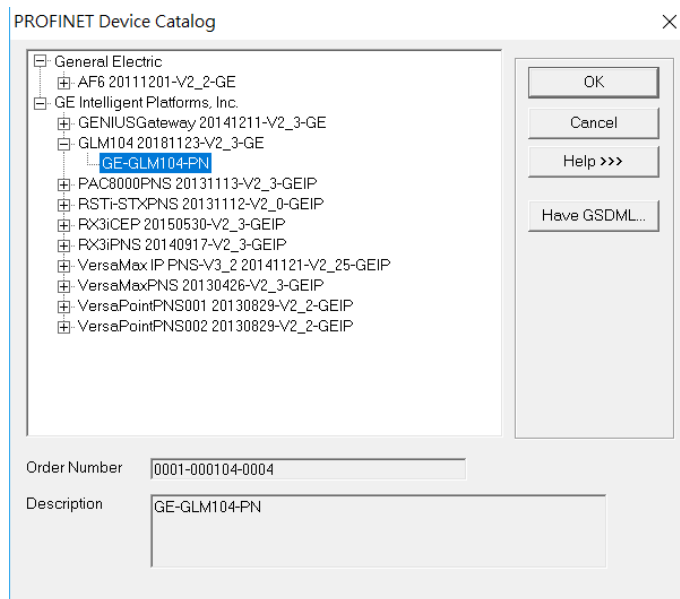


Figure 34

Now the I/O device GLM104(SW1) is ready and is a sub slot on PNC001.

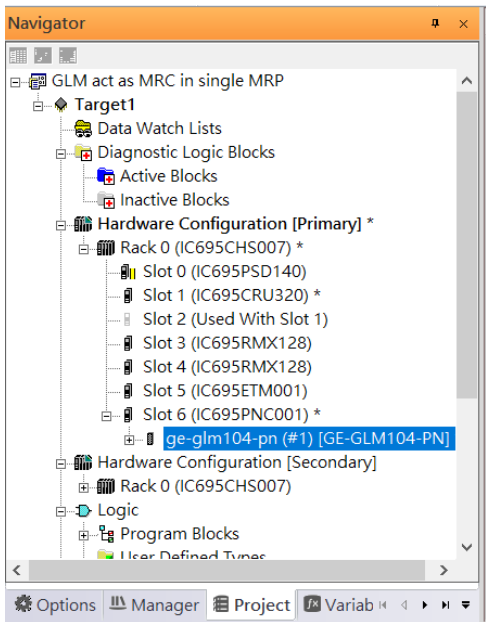


Figure 35

Then add the second I/O device in the PNC001.

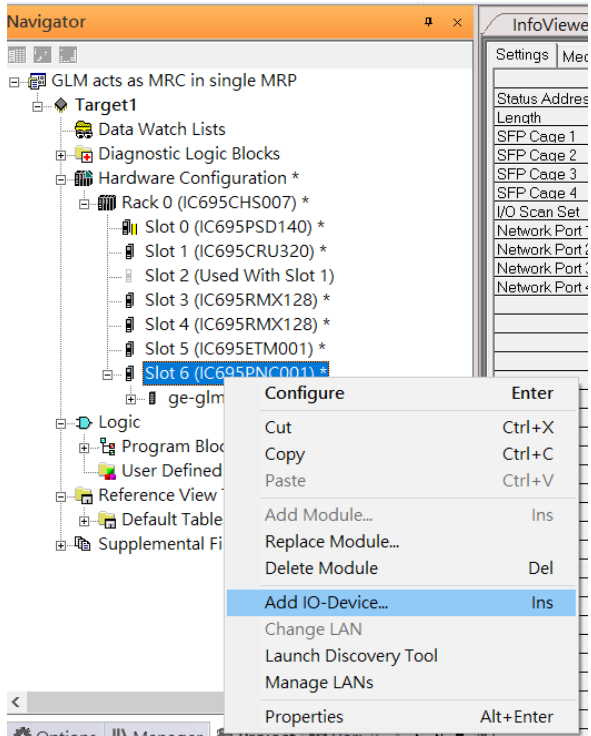


Figure 36

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

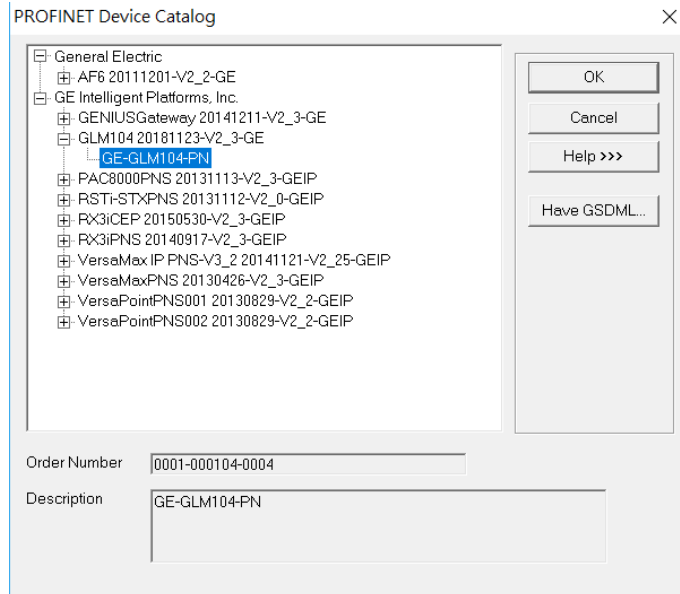


Figure 37

Now the I/O device GLM104(SW2) is ready and is a sub slot on PNC001.

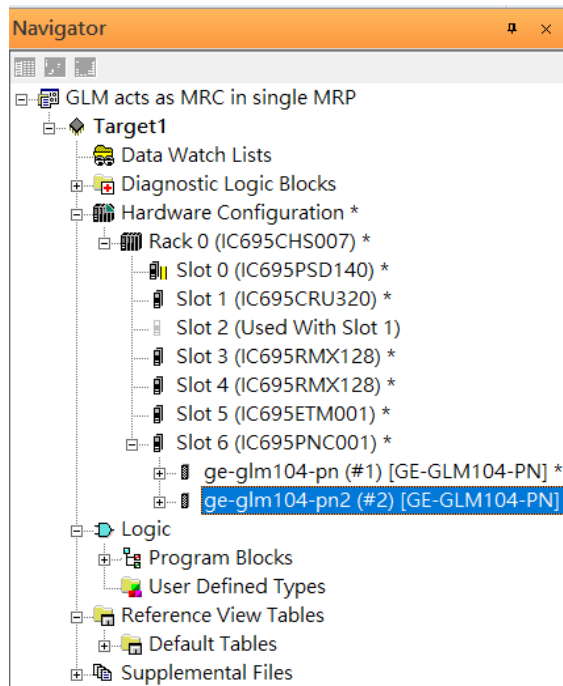


Figure 38

Then add the third I/O device in the PNC001.

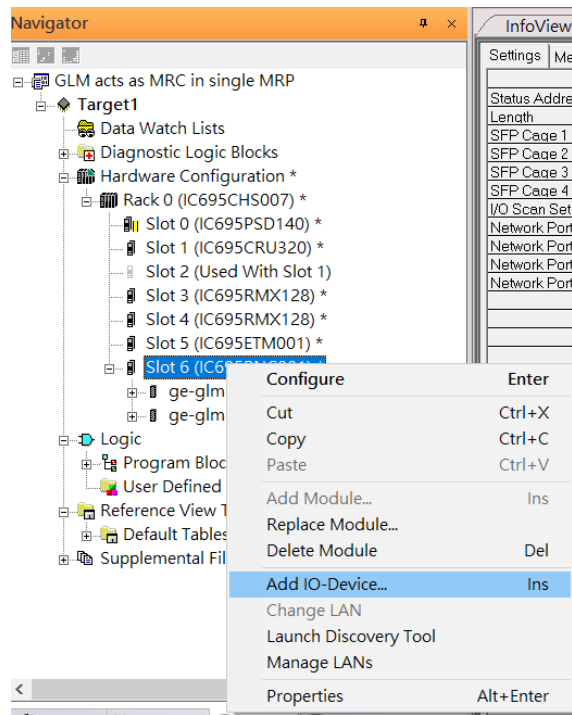


Figure 39

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE] -> [GE-GLM104-PN] and click [OK]

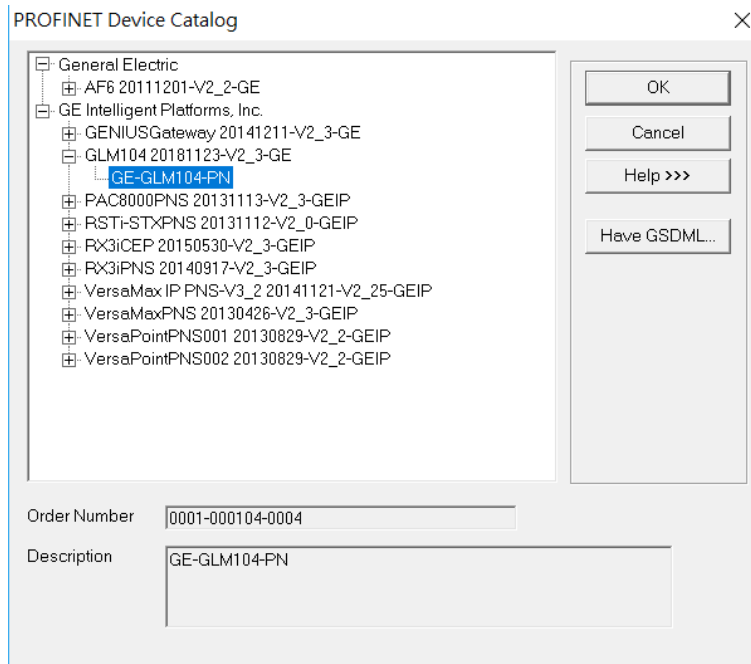


Figure 40

Now the I/O device GLM104(SW3) is ready and is a sub slot on PNC001.

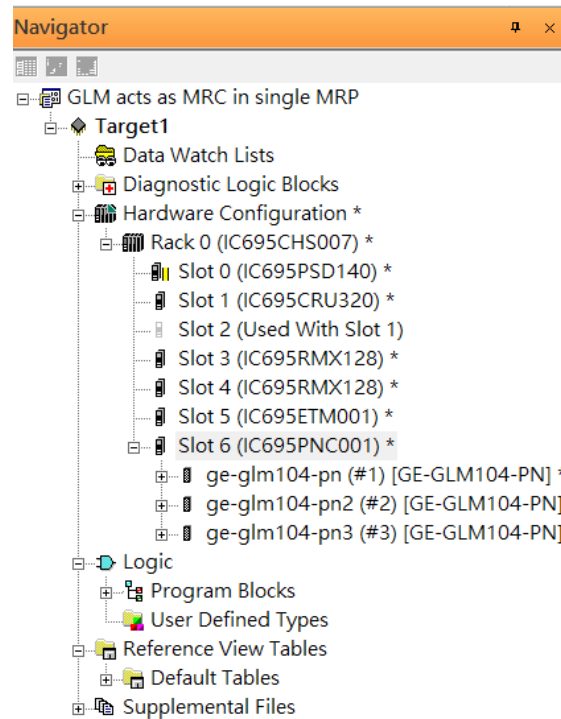


Figure 41

Then add the fourth I/O device in the PNC001

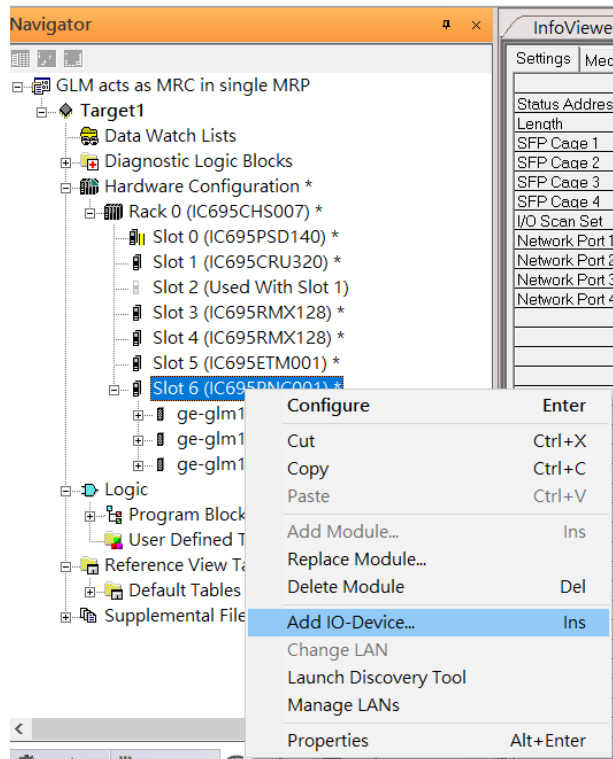


Figure 42

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

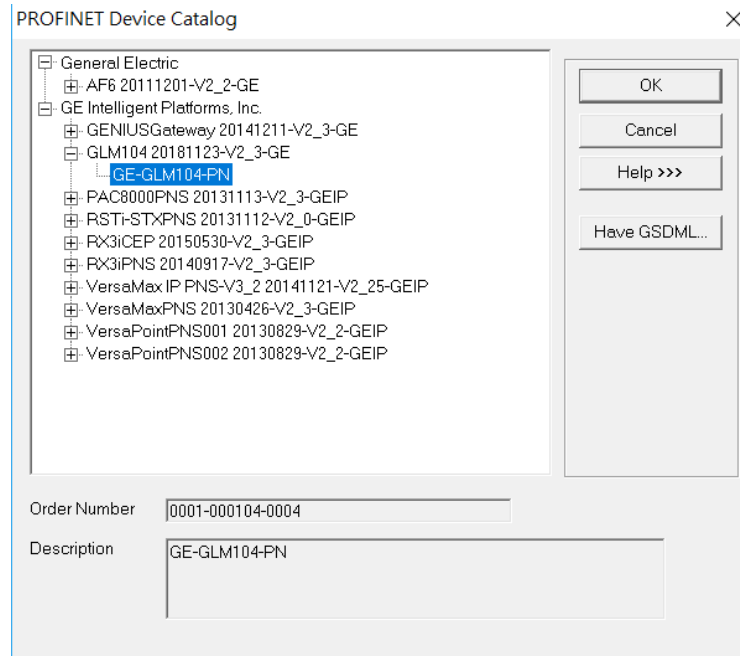


Figure 43

Now the I/O device GLM104(SW4) is ready and is a sub slot on PNC001.

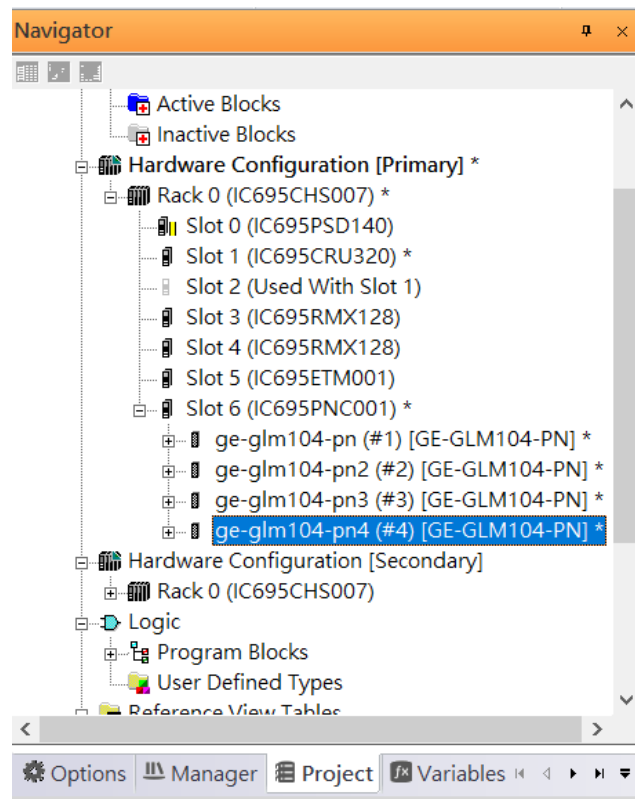


Figure 44

Then add the fifth I/O device in the PNC001.

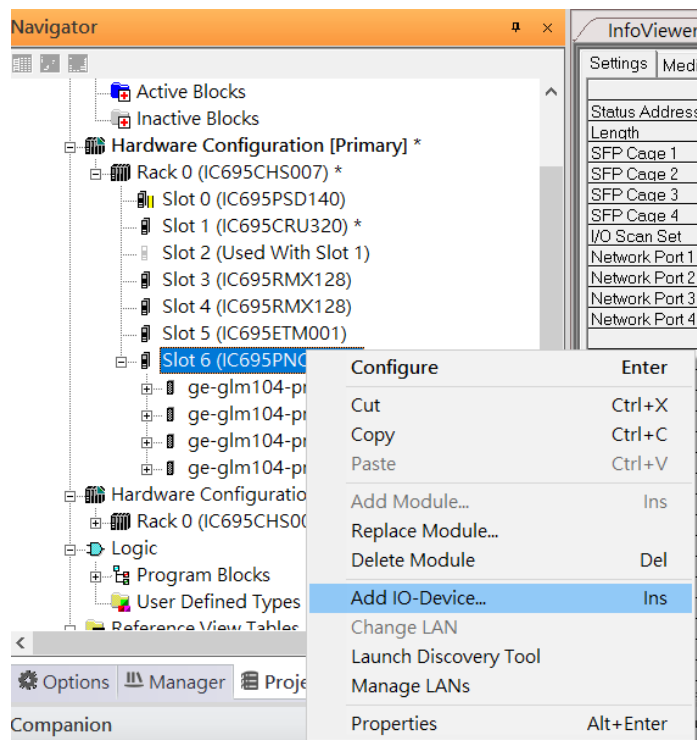


Figure 45

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [VersaMaxPNS 20130426-V2_3-GEIP] -> [VersaMax PROFINET IO Scanner (2 RJ-45 Copper connectors)] and click[OK]

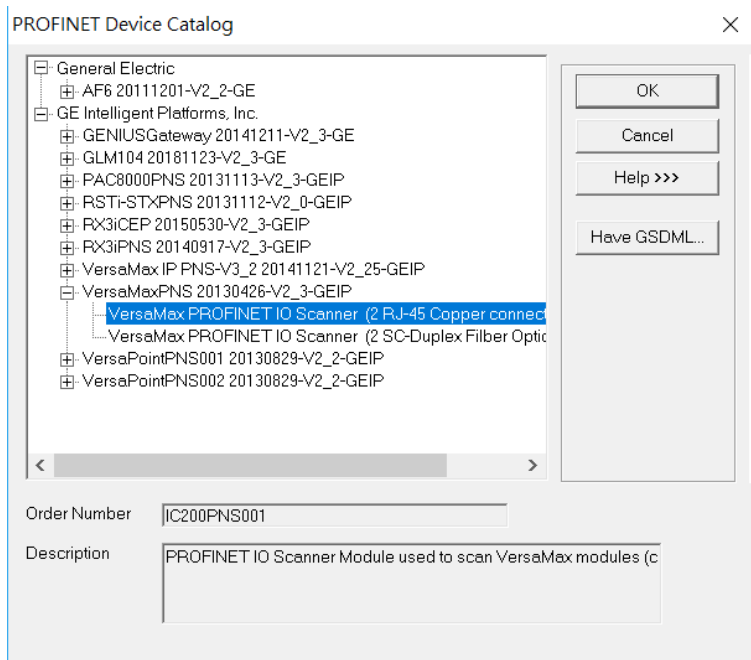


Figure 46

Now the I/O device VersaMax PROFINET IO Scanner is ready and is a subslot on PNC001.

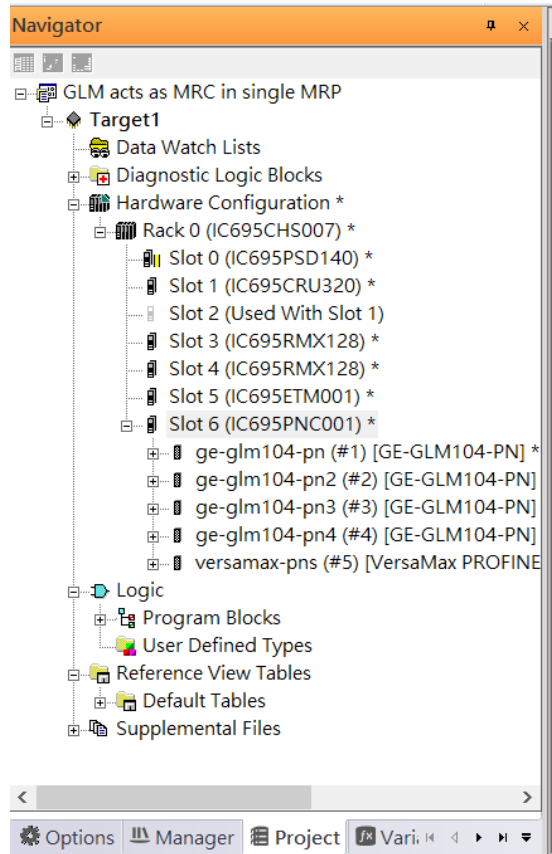


Figure 47

3.2.4 DCP Set Command

To configure the setting or monitor the status on the I/O Device, the communication interface is also based on Ethernet network. We can specify the IP address and the device name from I/O Controller via the DCP (Discovery and Configuration Protocol).

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn, and click the right button. Select [Properties], see the following picture.

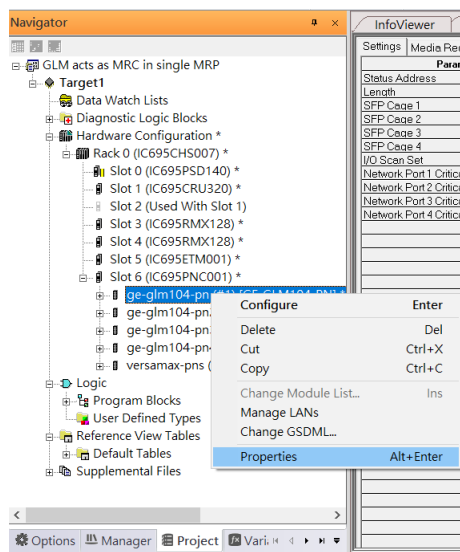


Figure 48

In this table, the I/O Device name can be specified in field [Device Name], and the IP address can be set in field [IP address]. We modify device name to “ge-glm104-pn-sw-1” and IP address to “192.168.0.21” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-1” later.

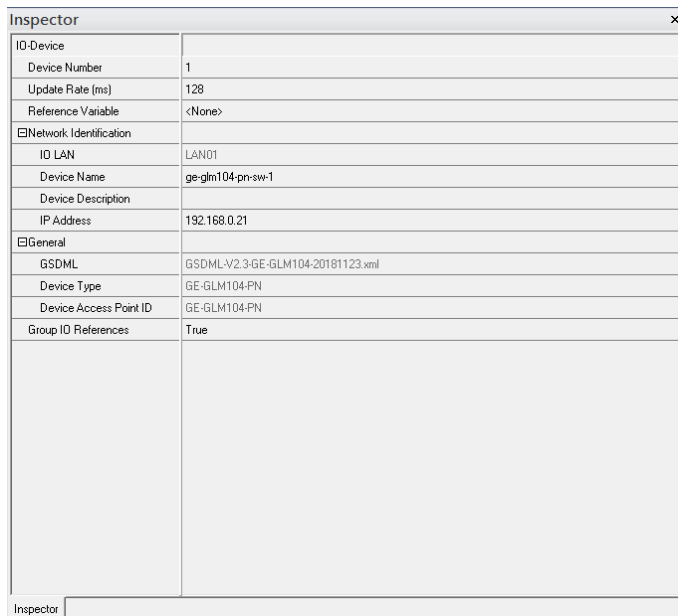


Figure 49

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn2, and click the right button. Select [Properties], see the following picture.

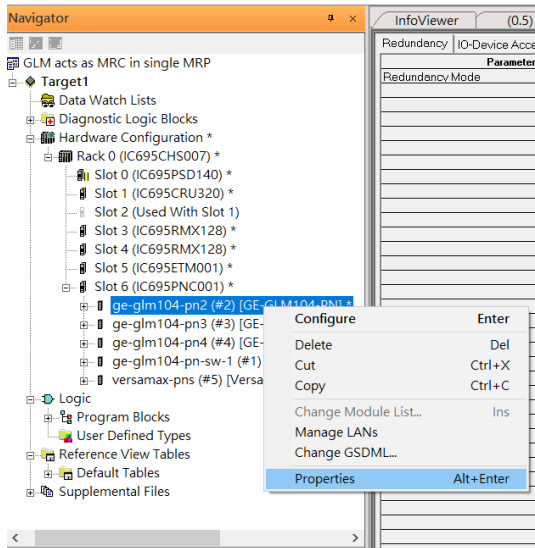


Figure 50

We modify device name to “ge-glm104-pn-sw-2” and IP address to “192.168.0.22” then we use I/O Device DiscoveryTool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-2” later.

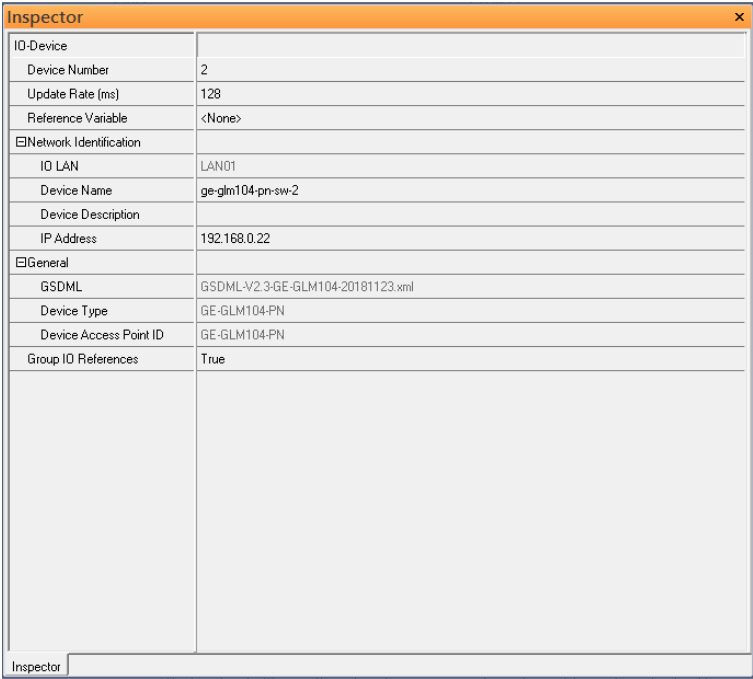


Figure 51

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn3, and click the right button. Select [Properties], see the following picture.

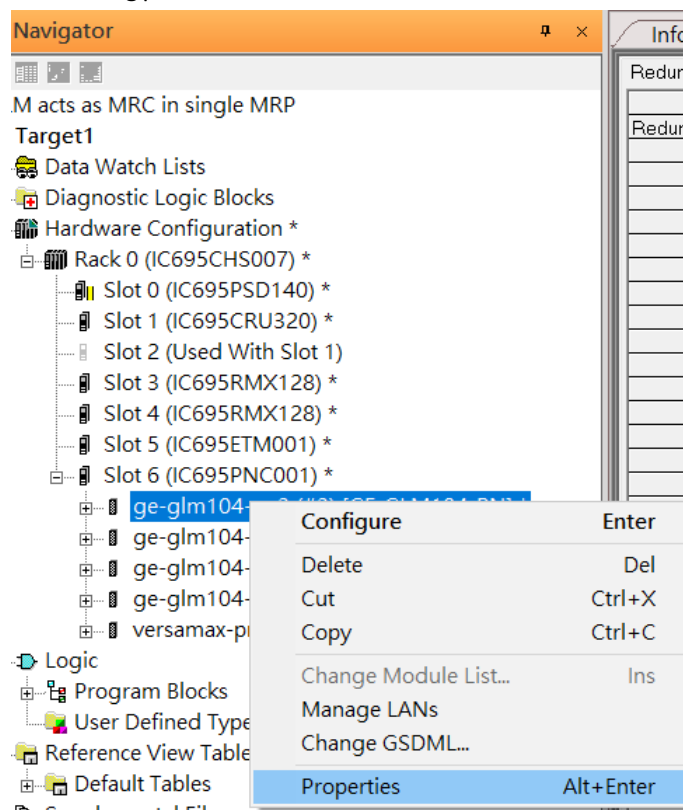


Figure 52

We modify device name to “ge-glm104-pn-sw-3” and IP address to “192.168.0.23” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-3” later.

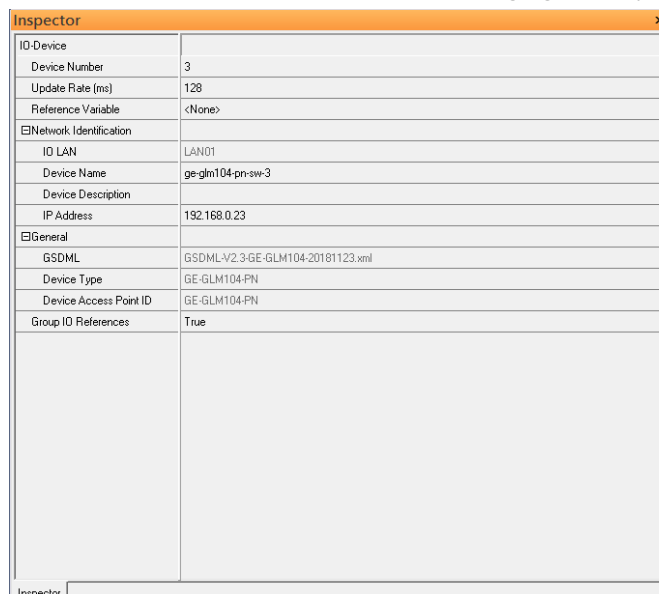


Figure 53

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn4, and click the right button. Select [Properties], see the following picture.

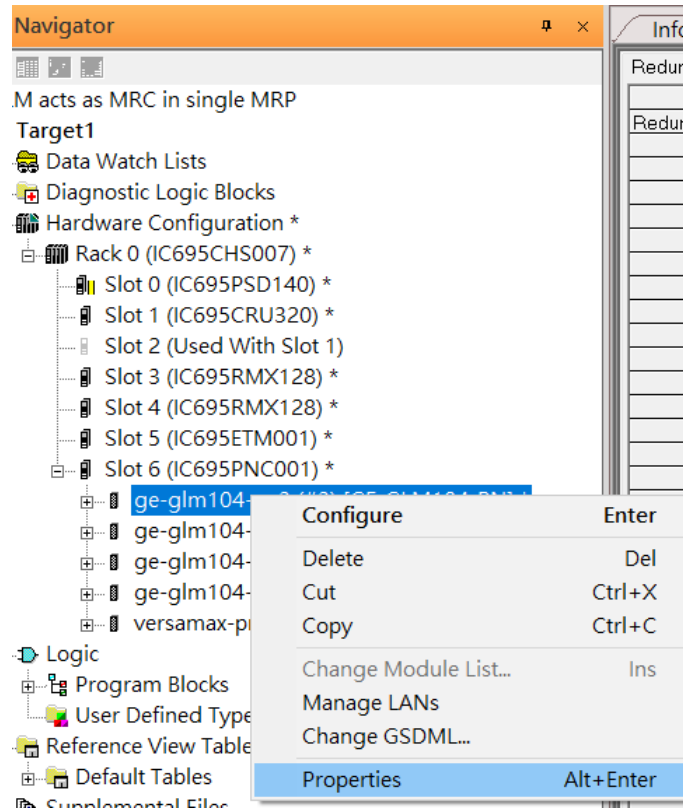


Figure 54

We modify device name to “ge-glm104-pn-sw-4” and IP address to “192.168.0.24” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-4” later.

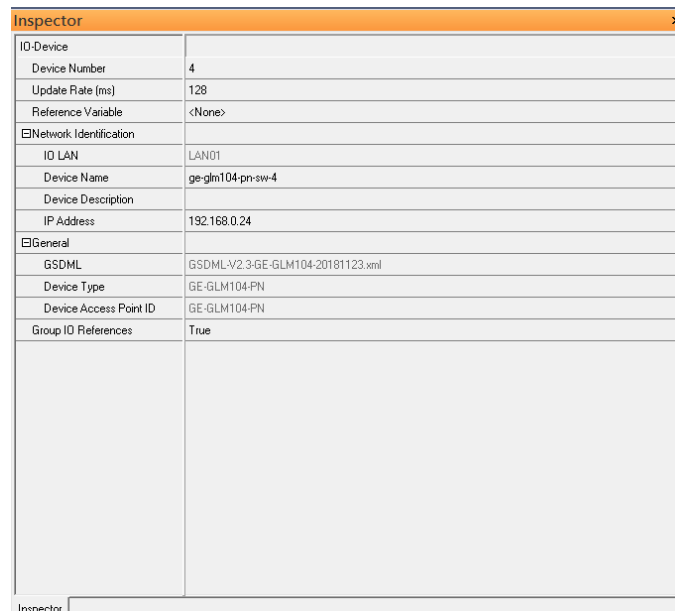


Figure 55

Under the slot 6, PNC001, select the I/O Device, versamax-pns, and click the right button. Select [Properties], see the following picture.

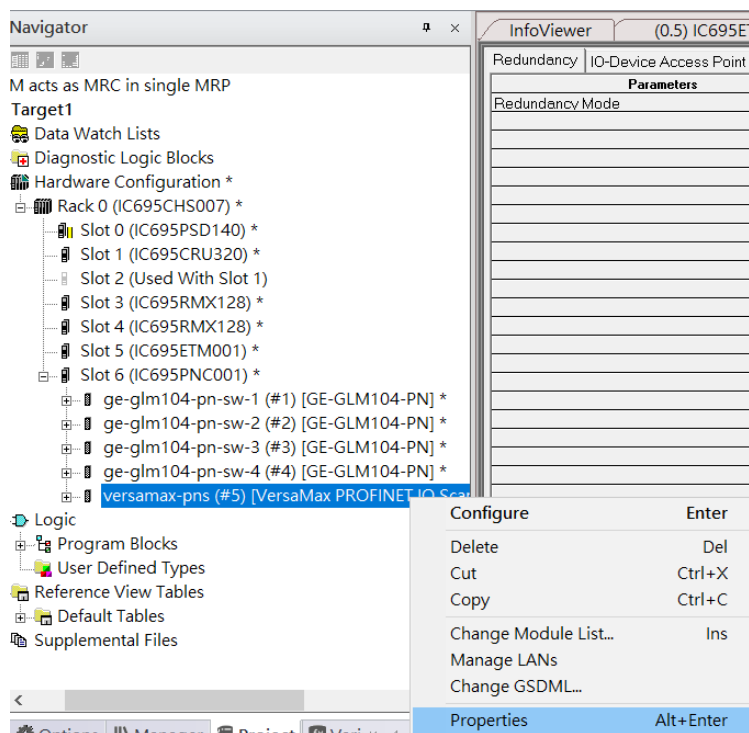


Figure 56

We modify device name to “versamax-pns-pnio-1” and IP address to “192.168.0.55” then we use I/O Device DiscoveryTool to observed an I/O Device and set I/O Device’s name to “versamax-pns-pnio-1” later.

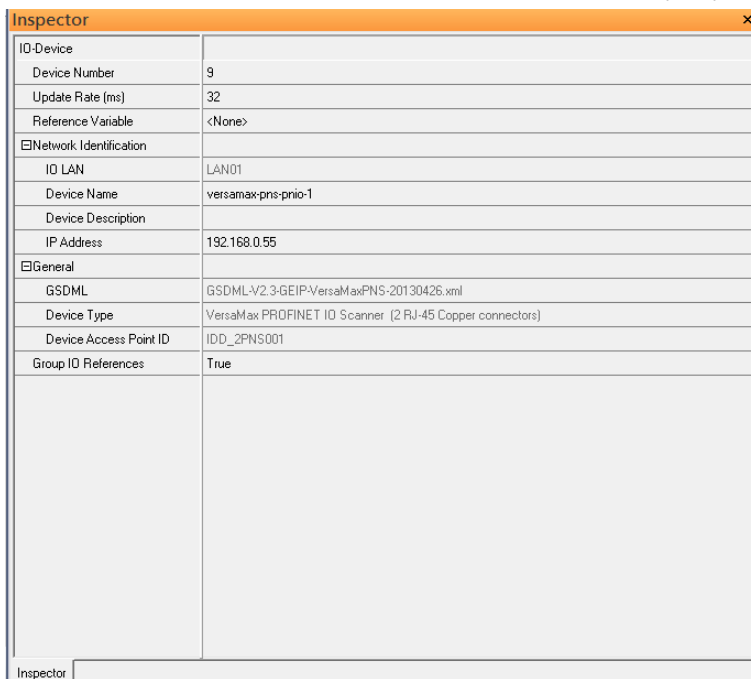
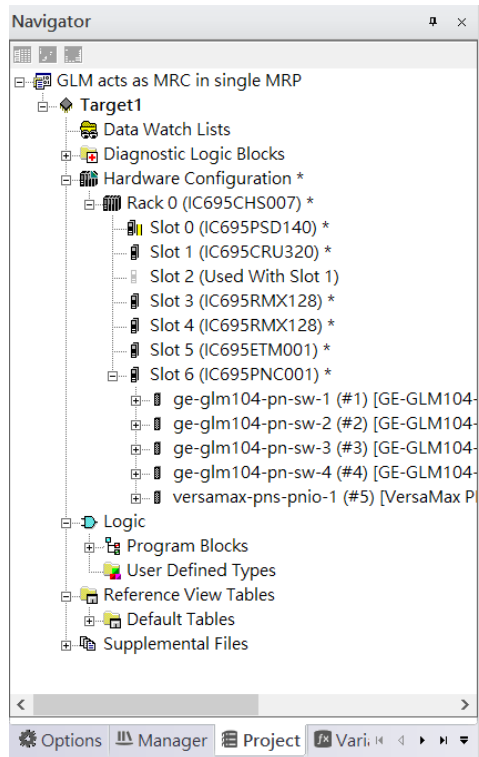


Figure 57

Now all the devices have been changed their device name and IP address like the following picture.

**Figure 58**

3.2.5 I/O Device Scan

The Proficy Machine Edition also supports the function to scan the connected I/O Devices. First the observed I/O Device shall be connected to the ETM001 on the [Primary] hardware configuration, then using the function [Launch Discovery Tool].

Note: Before we finish downloading the configuration to CRU320, need to unplug the block port according to the hardware topology to avoid loop.

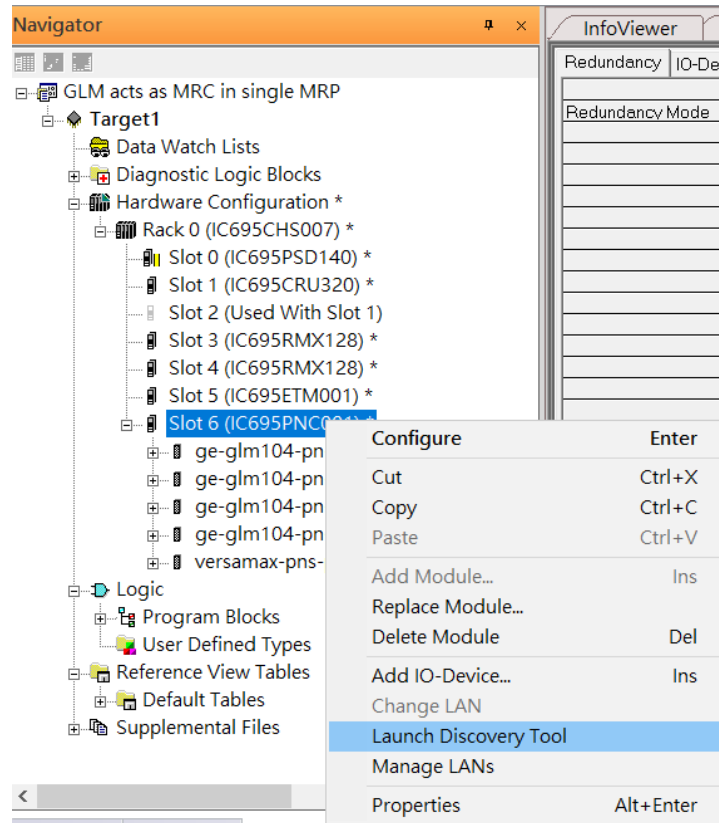


Figure 59

The tool is shown in the following picture, then press [Refresh Device List].

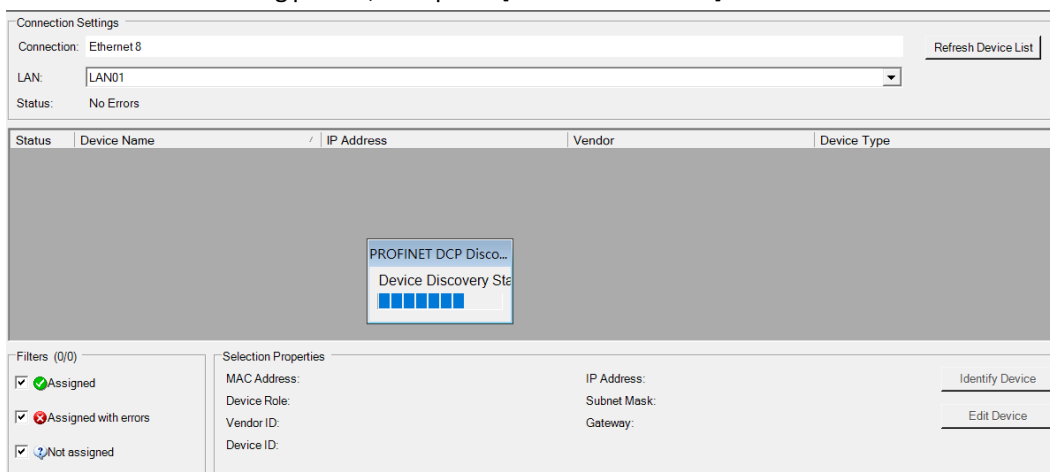


Figure 60

Then the connected I/O Device is listed in the following table.

Connection Settings

Connection:

Ethernet 8

Refresh Device List

LAN:

LAN01

Status:

No Errors

Status	Device Name	IP Address	Vendor	Device Type
	ge-glm104-pn	192. 0. 2. 1	GE Intelligent Platforms, Inc.	GE-GLM104-PN
	ge-glm104-pn	192. 0. 2. 1	GE Intelligent Platforms, Inc.	GE-GLM104-PN
	ge-glm104-pn	192. 0. 2. 1	GE Intelligent Platforms, Inc.	GE-GLM104-PN
	ge-glm104-pn	192. 0. 2. 1	GE Intelligent Platforms, Inc.	GE-GLM104-PN
	iolan-controller01	192.168. 0. 1	GE Intelligent Platforms, Inc.	IC695PNC001
	versamax-pns	192.168. 1. 55	GE Intelligent Platforms, Inc.	IC200PNS001

Filters (6/6)

☒ Assigned

☒ Assigned with errors

☒ Not assigned

Selection Properties

MAC Address:

00-05-65-72-FB-D0

IP Address:

192.0.2.1

Identify Device

Device Role:

Device

Subnet Mask:

255.255.255.0

Vendor ID:

015A

Gateway:

0.0.0.0

Edit Device

Device ID:

0104

Figure 61

There are I/O Devices and their status are in “Not assigned”. We need to change their device name to and IP address. Use [Identify Device] to make sure which device we set according to the hardware topology. Then start to set SW-1 device name and IP address.

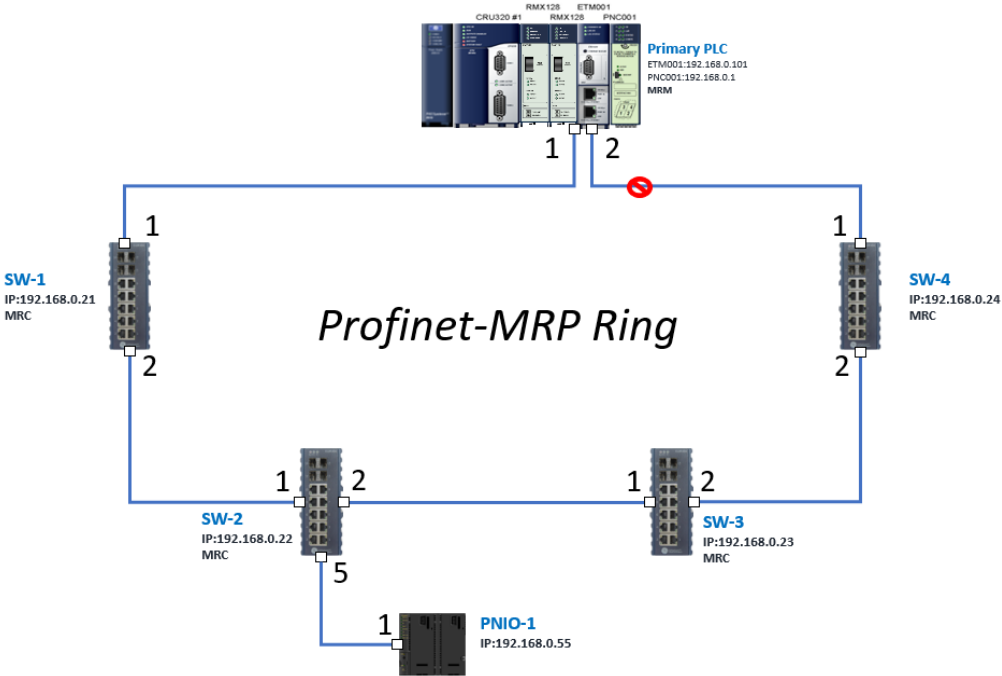


Figure 62

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-1” and click [Set Device Name] button, then set IP Address to “192.168.0.21”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name:** GE Intelligent Platforms, Inc.
- Vendor ID:** 015A
- MAC Address:** 00-05-65-72-FB-D0
- Device ID:** 0104
- Device Type:** GE-GLM104-PN
- Device Role:** Device
- Buttons:** Identify Device
- Device Name:** ge-glm104-pn-sw-1
- Buttons:** Set Device Name
- IP Address:** 192.168.0.21
- Subnet Mask:** 255.255.255.0
- Gateway:** 0.0.0.0
- Buttons:** Set IP Information
- Reset device to factory settings:**
- Buttons:** Reset Device
- Exit**

Figure 63

To set SW-2 device name and IP address, click [Edit Device], set Device Name to “ge-glm104-pn-sw-2” and click [Set Device Name] button, then set IP Address to “192.168.0.22”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name:** GE Intelligent Platforms, Inc.
- Vendor ID:** 015A
- MAC Address:** 00-05-65-73-3C-D6
- Device ID:** 0104
- Device Type:** GE-GLM104-PN
- Device Role:** Device
- Buttons:** Identify Device
- Device Name:** ge-glm104-pn-sw-2
- Buttons:** Set Device Name
- IP Address:** 192.168.0.22
- Subnet Mask:** 255.255.255.0
- Gateway:** 0.0.0.0
- Buttons:** Set IP Information
- Reset device to factory settings:**
- Buttons:** Reset Device
- Exit**

Figure 64

To set SW-3 device name and IP address click [Edit Device], set Device Name to “ge-glm104-pn-sw-3” and click [Set Device Name] button, then set IP Address to “192.168.0.23”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name: GE Intelligent Platforms, Inc. (read-only)
- Vendor ID: 015A (read-only)
- MAC Address: 00-05-65-73-3D-7E (read-only)
- Device ID: 0104 (read-only)
- Device Type: GE-GLM104-PN (read-only)
- Device Role: Device (read-only)
- Buttons: Identify Device, Set Device Name, Set IP Information, Reset Device, Exit
- Device Name field: ge-glm104-pn-sw-3
- IP Address field: 192.168.0.23
- Subnet Mask field: 255.255.255.0
- Gateway field: 0.0.0.0
- Reset device to factory settings checkbox (unchecked)

Figure 65

To set SW-4 device name and IP address, click [Edit Device], set Device Name to “ge-glm104-pn-sw-4” and click [Set Device Name] button, then set IP Address to “192.168.0.24”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name: GE Intelligent Platforms, Inc. (read-only)
- Vendor ID: 015A (read-only)
- MAC Address: 00-05-65-73-3C-BE (read-only)
- Device ID: 0104 (read-only)
- Device Type: GE-GLM104-PN (read-only)
- Device Role: Device (read-only)
- Buttons: Identify Device, Set Device Name, Set IP Information, Reset Device, Exit
- Device Name field: ge-glm104-pn-sw-4
- IP Address field: 192.168.0.24
- Subnet Mask field: 255.255.255.0
- Gateway field: 0.0.0.0
- Reset device to factory settings checkbox (unchecked)

Figure 66

To set PNIO-1 device name and IP address, click [Edit Device], set Device Name to “versamax-pns-pnio-1” and click [Set Device Name] button, then set IP Address to “192.168.0.55”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

IC200PNS001 Properties

Vendor Name: GE Intelligent Platforms, Inc. Vendor ID: 015A
 MAC Address: 00-09-91-56-C3-0E Device ID: 0003 Identify Device
 Device Type: IC200PNS001 Device Role: Device

Device Name
 versamax-pns-pnio-1 Set Device Name

IP Address
 IP Address: 192.168.0.55
 Subnet Mask: 255.255.255.0 Set IP Information
 Gateway: 0.0.0.0

Reset device to factory settings
 Reset Device

Exit

Figure 67

After assigning Device Name and IP Address correctly, the Status will be in “Assigned” status.

InfoViewer (P.0.6) IC695PNC001 (P.0.6.9.0) IC200PNS001 PROFINET DCP - Direct Connection

Connection Settings
 Connection: Ethernet 8 Refresh Device List
 LAN: LAN01
 Status: No Errors

Status	Device Name	IP Address	Vendor	Device Type
✓	ge-glm104-pn-sw-1	192.168. 0. 21	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-2	192.168. 0. 22	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-3	192.168. 0. 23	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-4	192.168. 0. 24	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	iolan-controller01	192.168. 0. 1	GE Intelligent Platforms, Inc.	IC695PNC001
✓	versamax-pns-pnio-1	192.168. 0. 55	GE Intelligent Platforms, Inc.	IC200PNS001

Filters (6/6)
☒ Assigned
☒ Assigned with errors
☒ Not assigned

Selection Properties
 MAC Address: 00-09-91-56-C3-0E IP Address: 192.168.0.55 Identify Device
 Device Role: Device Subnet Mask: 255.255.255.0 Edit Device
 Vendor ID: 015A Gateway: 0.0.0.0
 Device ID: 0003

Figure 68

3.2.6 MRP Setting

Setting MRP for I/O controller and I/O devices according to the following figure.

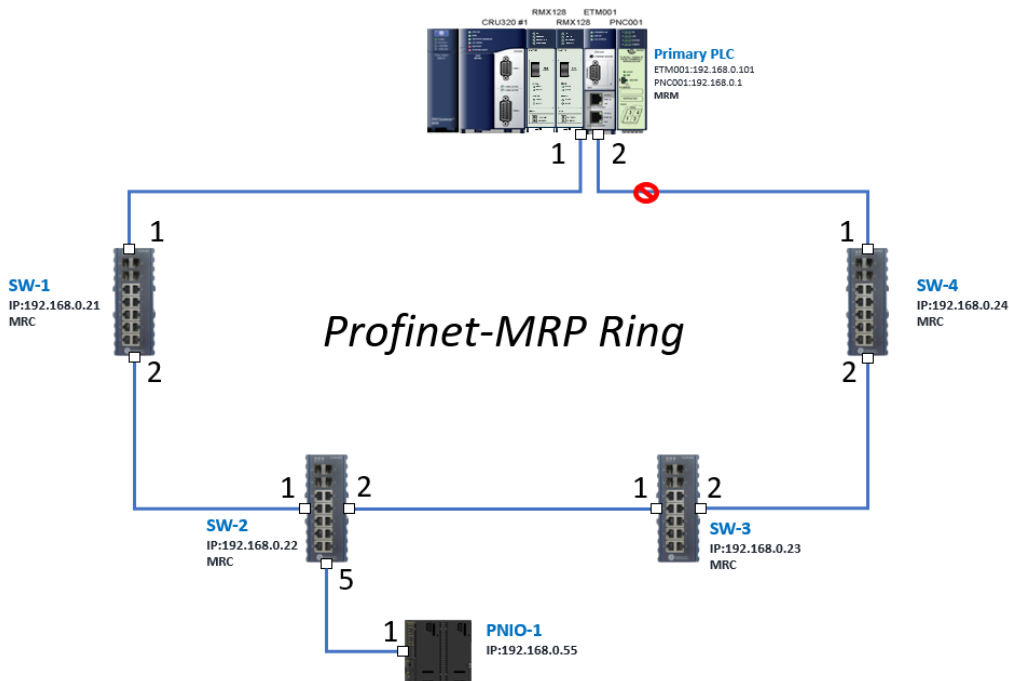


Figure 69

In order to enable MRP function in I/O controller, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

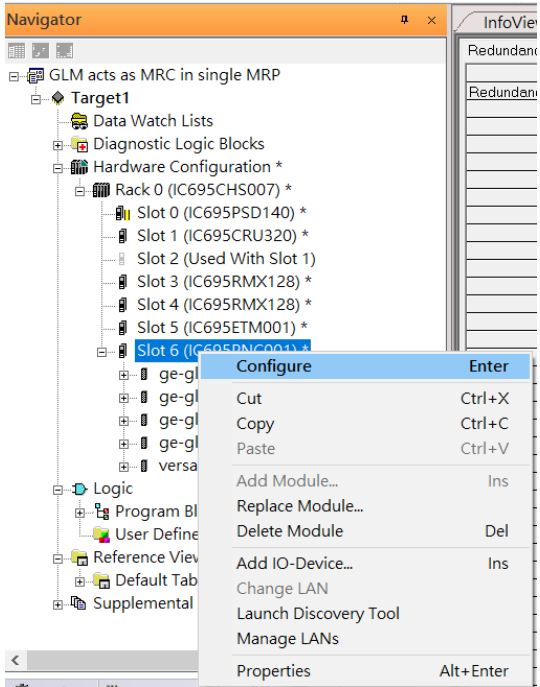


Figure 70

Enable MRP function by changing the value of “Media Redundancy” to Manager and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

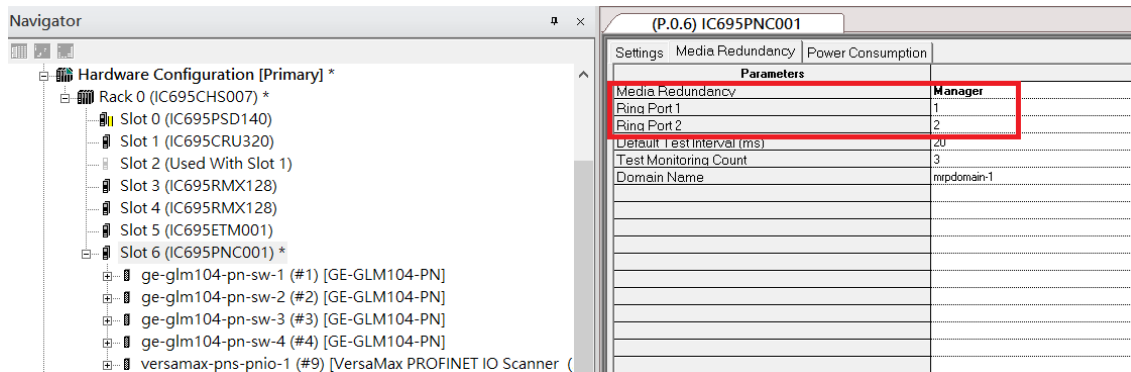


Figure 71

In order to enable MRP function in SW1, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

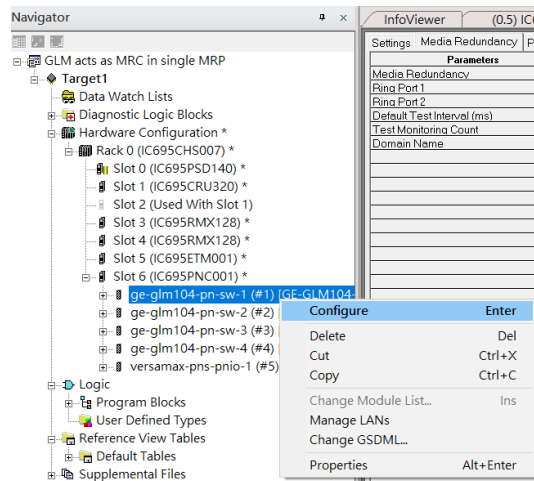


Figure 72

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

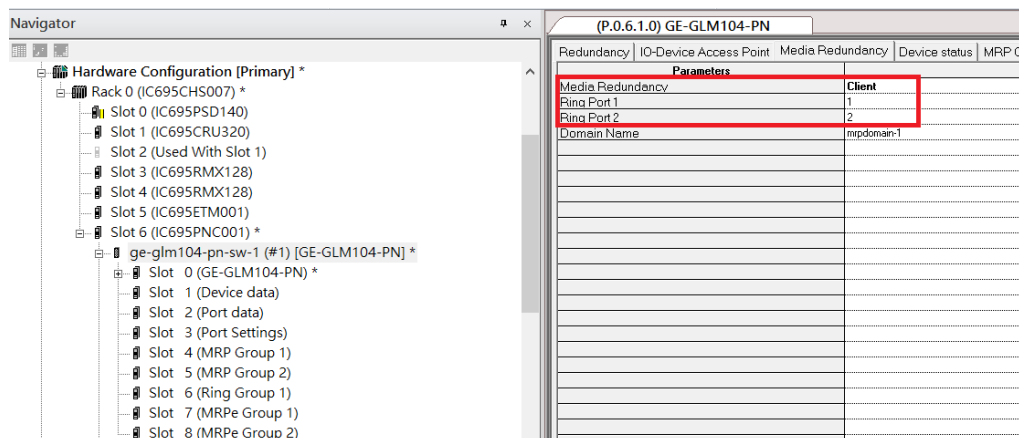


Figure 73

In order to enable MRP function in SW2, click the right button and choose [Configure].
It will show “Media Redundancy” on the right window.

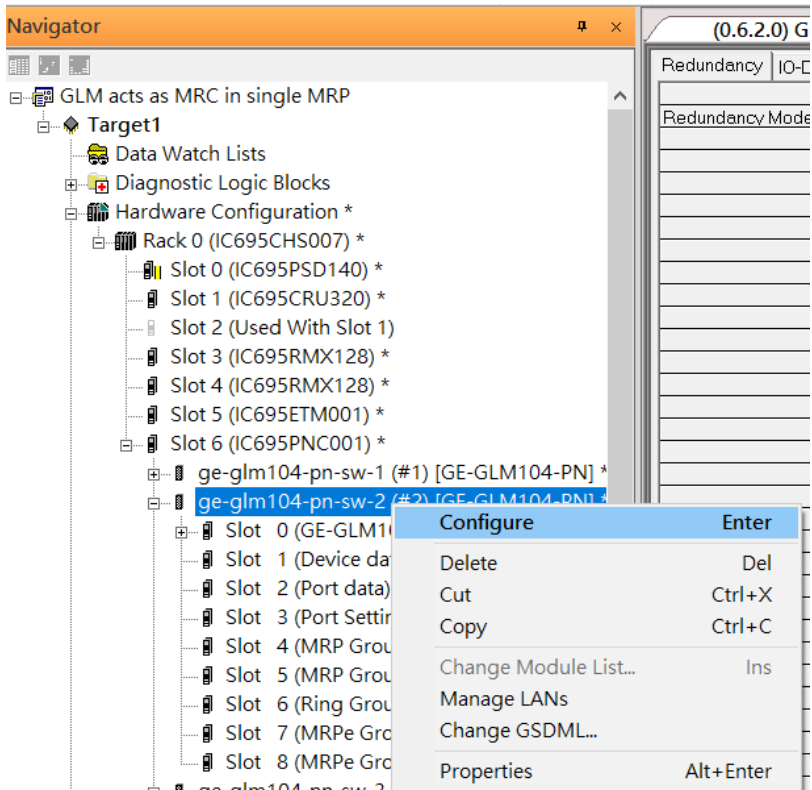


Figure 74

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

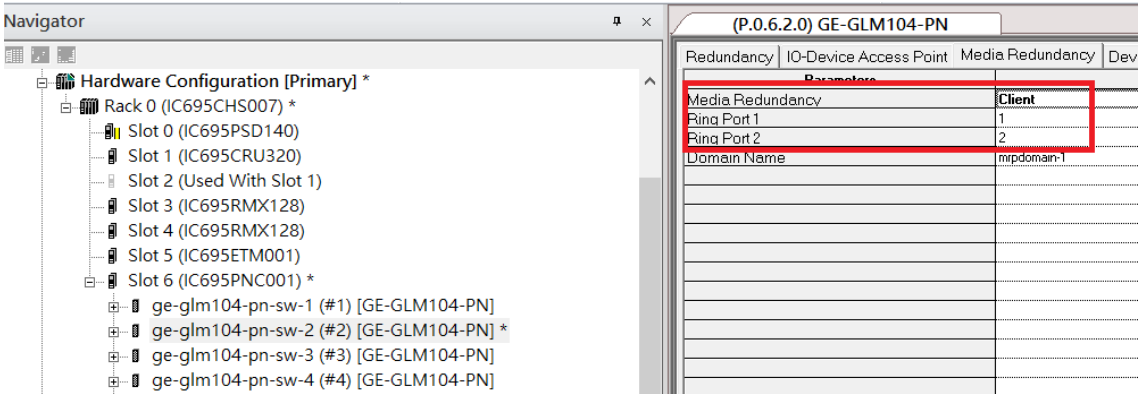


Figure 75

In order to enable MRP function in SW3, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

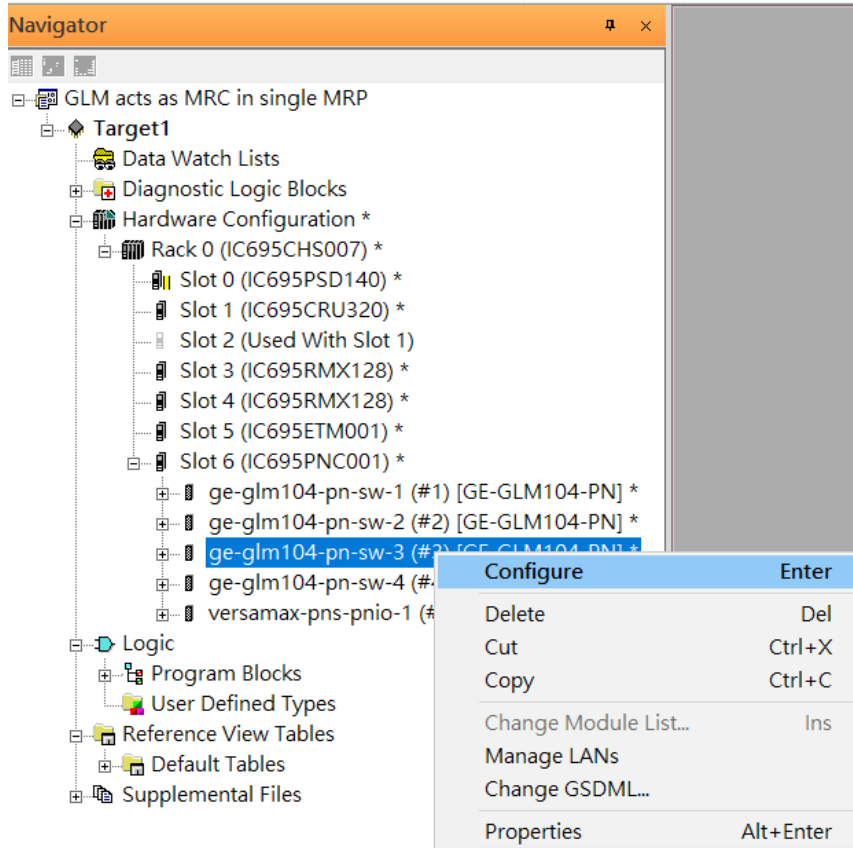


Figure 76

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

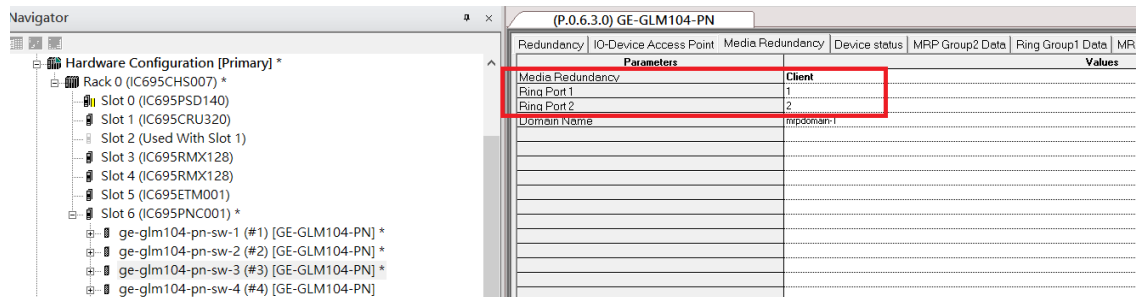


Figure 77

In order to enable MRP function in SW4, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

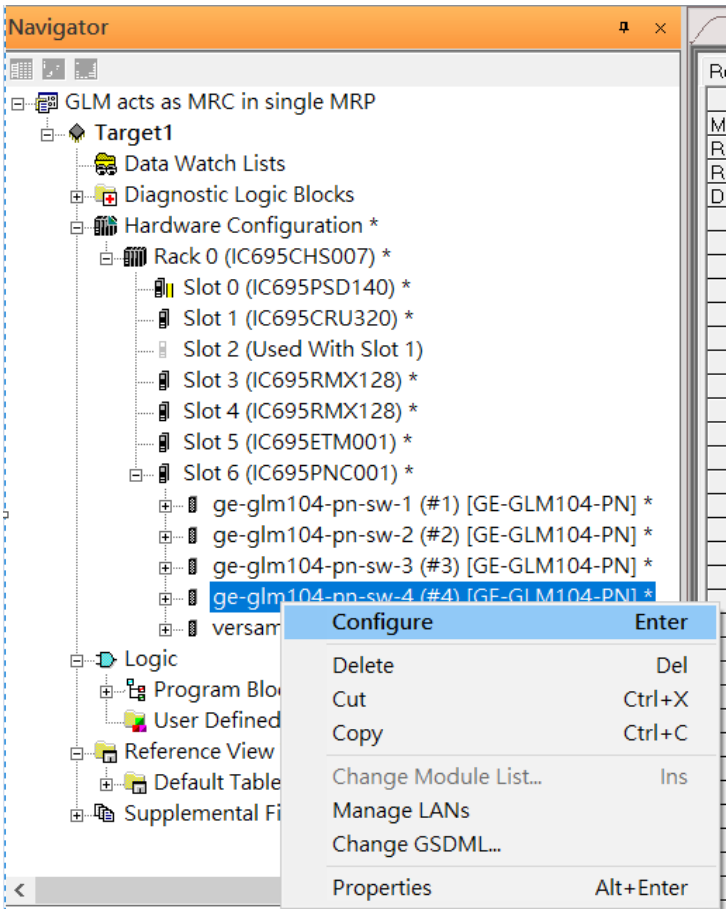


Figure 78

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1]to “1”, [Ring Port 2]to “2”.

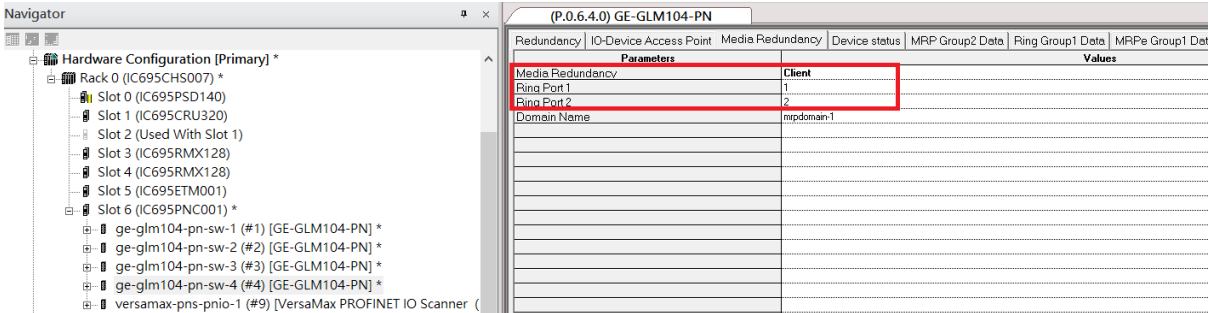


Figure 79

3.2.7 Network Setting

To establish the communication to the I/O Controller from Proficy Machine Edition, the interface of I/O Controller shall be specified.

It should be noted that there is only 1 I/O Controller (Primary or Secondary) is able to communicate with Proficy Machine Edition. Therefore, there are 3 rules of communication are defined.

I/O Controller Communication Rule

Rule	Description
1	The communicated I/O Controller shall be specified. Click primary or secondary hardware configuration, click the right button, and select [Set as Selected HWC]
2	During the communication, the cable shall be connected to the ETM001 in specified hardware (Primary or Secondary)
3	Specify the interface and IP address for communicated I/O Controller

For rule 3, click [Target 1] and Select [Property]

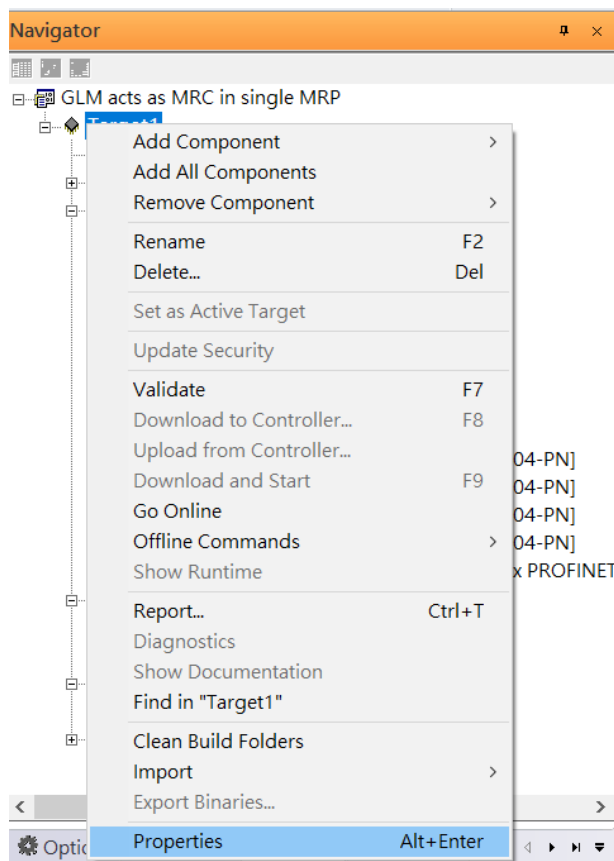
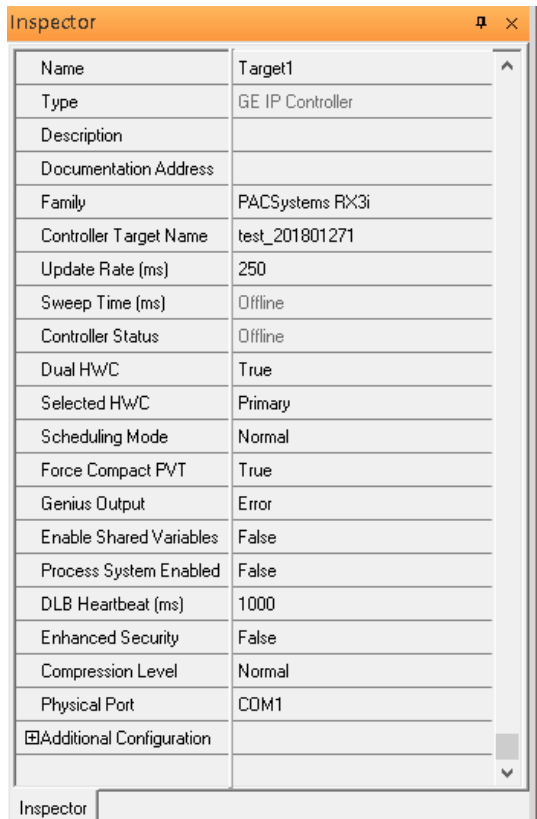


Figure 80

Then the configuration table is shown.

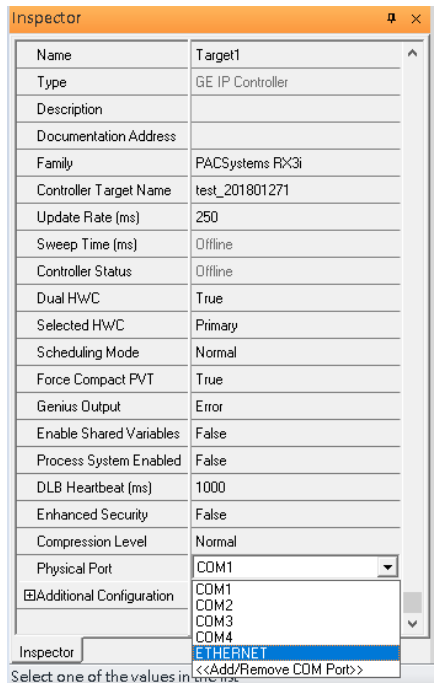


The image shows a software window titled "Inspector" with a close button. It contains a table with various configuration parameters for a device named "Target1". The parameters include Name, Type, Description, Documentation Address, Family, Controller Target Name, Update Rate (ms), Sweep Time (ms), Controller Status, Dual HWC, Selected HWC, Scheduling Mode, Force Compact PVT, Genius Output, Enable Shared Variables, Process System Enabled, DLB Heartbeat (ms), Enhanced Security, Compression Level, Physical Port, and an expandable "Additional Configuration" section.

Name	Target1
Type	GE IP Controller
Description	
Documentation Address	
Family	PACSystems RX3i
Controller Target Name	test_201801271
Update Rate (ms)	250
Sweep Time (ms)	Offline
Controller Status	Offline
Dual HWC	True
Selected HWC	Primary
Scheduling Mode	Normal
Force Compact PVT	True
Genius Output	Error
Enable Shared Variables	False
Process System Enabled	False
DLB Heartbeat (ms)	1000
Enhanced Security	False
Compression Level	Normal
Physical Port	COM1
Additional Configuration	

Figure 81

Select [Physical Port] to [Ethernet]



The image shows the same "Inspector" window as Figure 81, but with the "Physical Port" dropdown menu open. The menu lists "COM1", "COM2", "COM3", and "COM4". The "ETHERNET" option is highlighted in blue. Below the menu, there is a text prompt "Select one of the values in the list" and a button "<<Add/Remove COM Port>>".

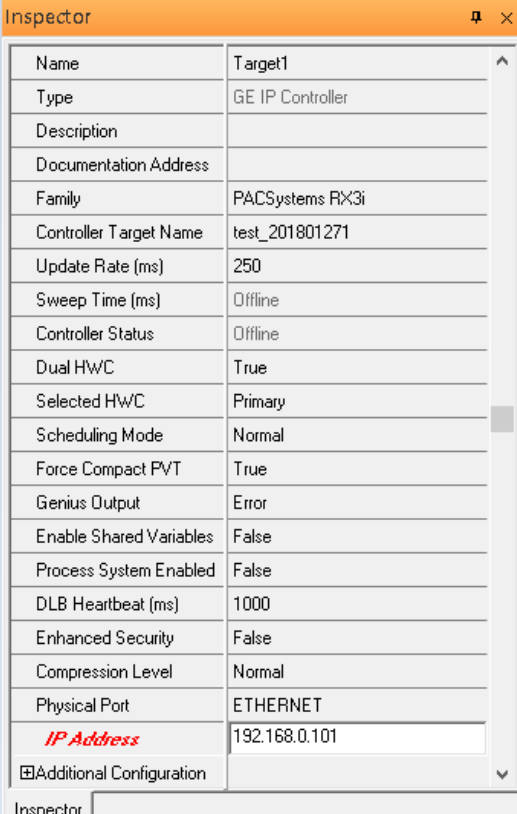
Name	Target1
Type	GE IP Controller
Description	
Documentation Address	
Family	PACSystems RX3i
Controller Target Name	test_201801271
Update Rate (ms)	250
Sweep Time (ms)	Offline
Controller Status	Offline
Dual HWC	True
Selected HWC	Primary
Scheduling Mode	Normal
Force Compact PVT	True
Genius Output	Error
Enable Shared Variables	False
Process System Enabled	False
DLB Heartbeat (ms)	1000
Enhanced Security	False
Compression Level	Normal
Physical Port	COM1
Additional Configuration	

COM1
COM2
COM3
COM4
ETHERNET
<<Add/Remove COM Port>>

Select one of the values in the list

Figure 82

Also, the IP address of communicated I/O Controller shall be set. Here the [Primary] setting is shown. Note, the specified IP address is set as the IP address on ETM001.



Inspector	
Name	Target1
Type	GE IP Controller
Description	
Documentation Address	
Family	PACSystems RX3i
Controller Target Name	test_201801271
Update Rate (ms)	250
Sweep Time (ms)	Offline
Controller Status	Offline
Dual H/WC	True
Selected H/WC	Primary
Scheduling Mode	Normal
Force Compact PVT	True
Genius Output	Error
Enable Shared Variables	False
Process System Enabled	False
DLB Heartbeat (ms)	1000
Enhanced Security	False
Compression Level	Normal
Physical Port	ETHERNET
IP Address	192.168.0.101
Additional Configuration	

Figure 83

3.2.8 PC Network

The IP address of PC with Proficy Machine Edition shall be set in the same network area.

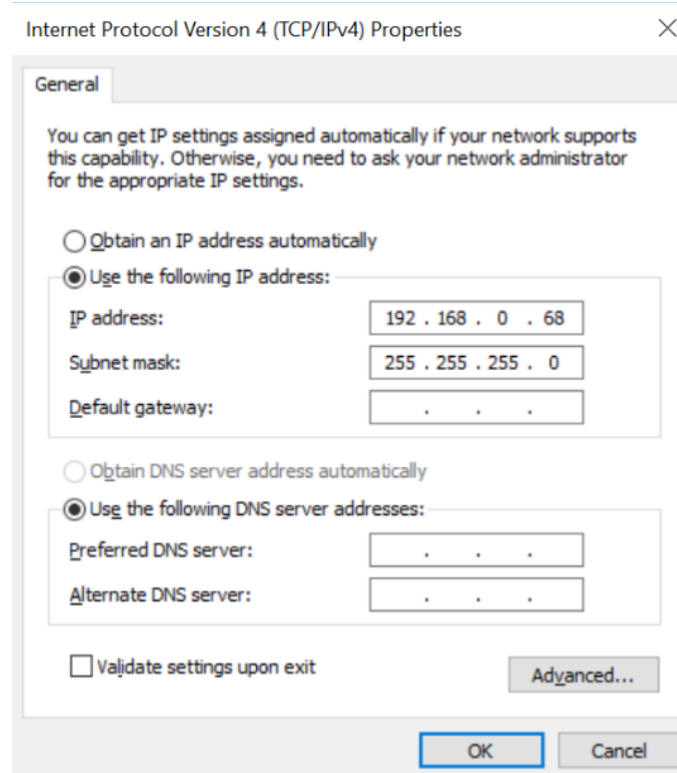


Figure 84

3.2.9 Temporary IP

If the IP address of ETM001 is lost or forgotten, the IP address can be changed by the function [Set Temporary IP Address] according to the MAC address of ETM001. In the following figure, the MAC address is referenced to the ETM001, and the IP address can be defined by user.

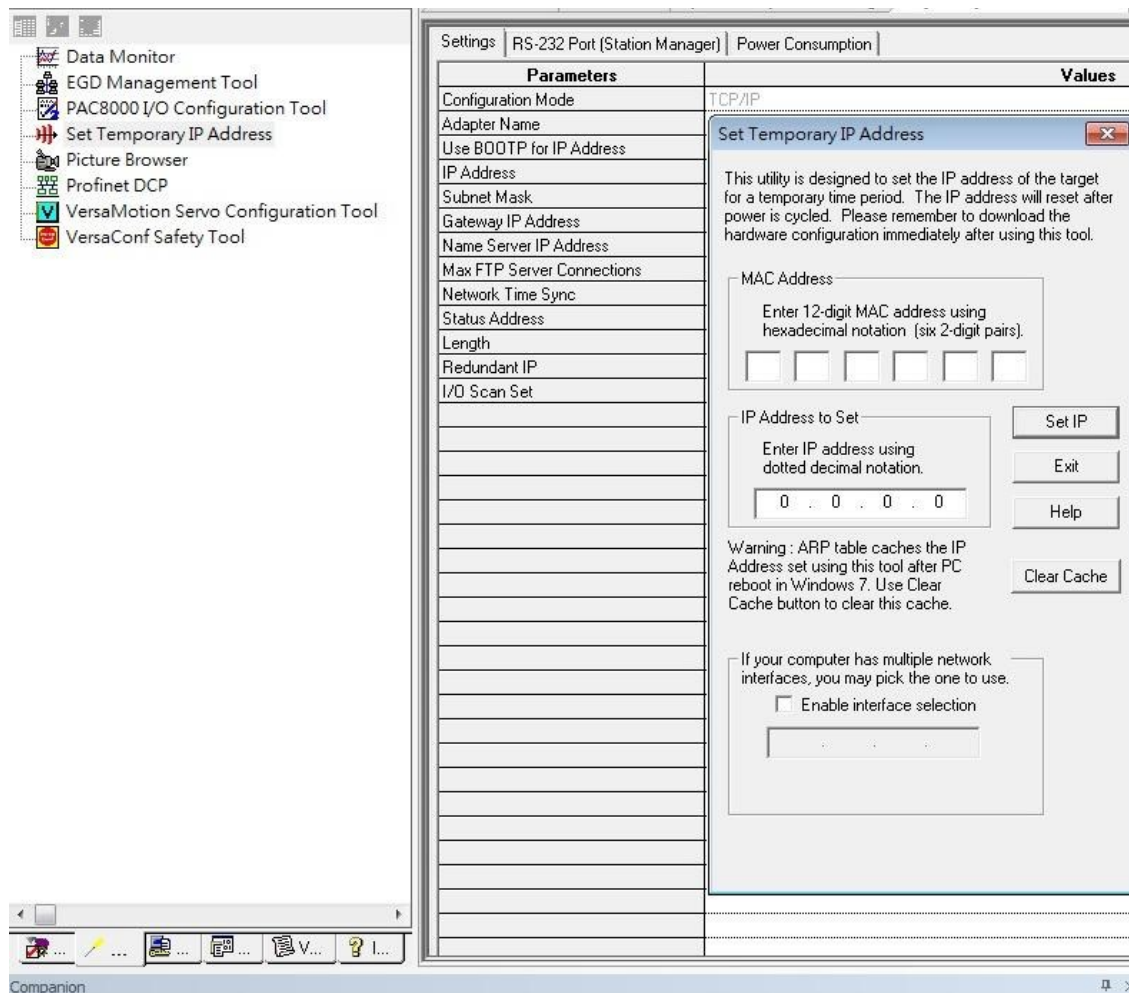


Figure 85

3.3 Implementation

To download the configuration to hardware, the following steps shall be applied.

First, press the [Connect] icon.

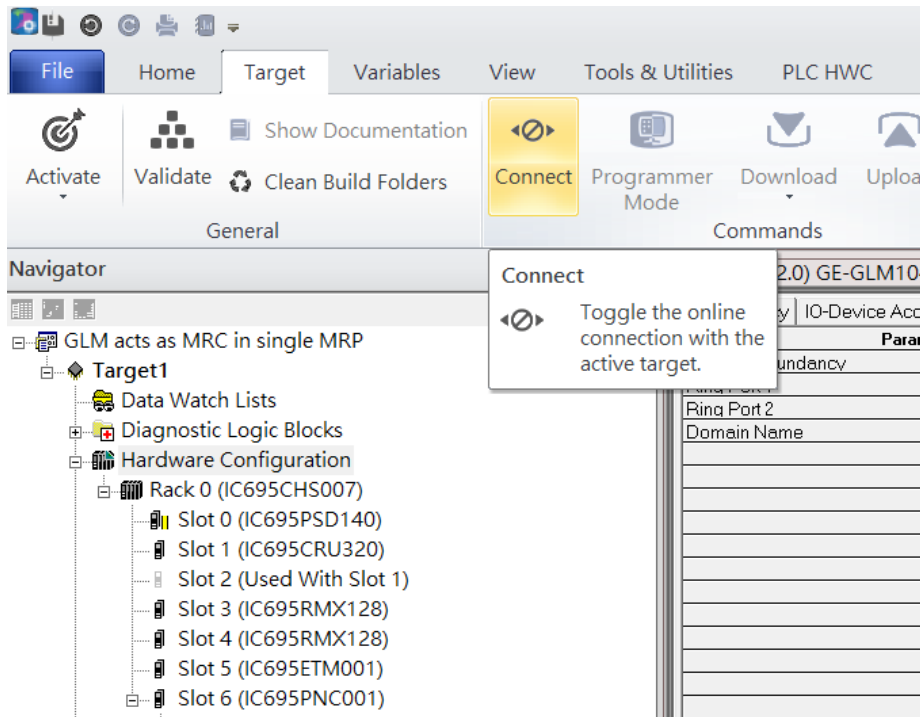


Figure 86

Then press the icon [Programmer Mode]

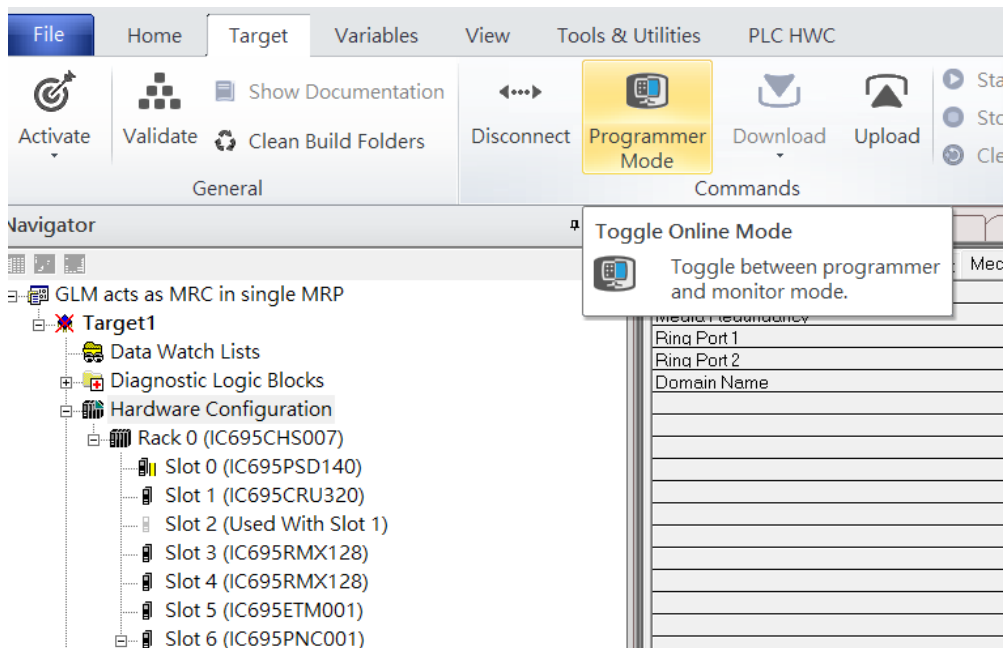


Figure 87

Then press icon [Download] and select “Download”

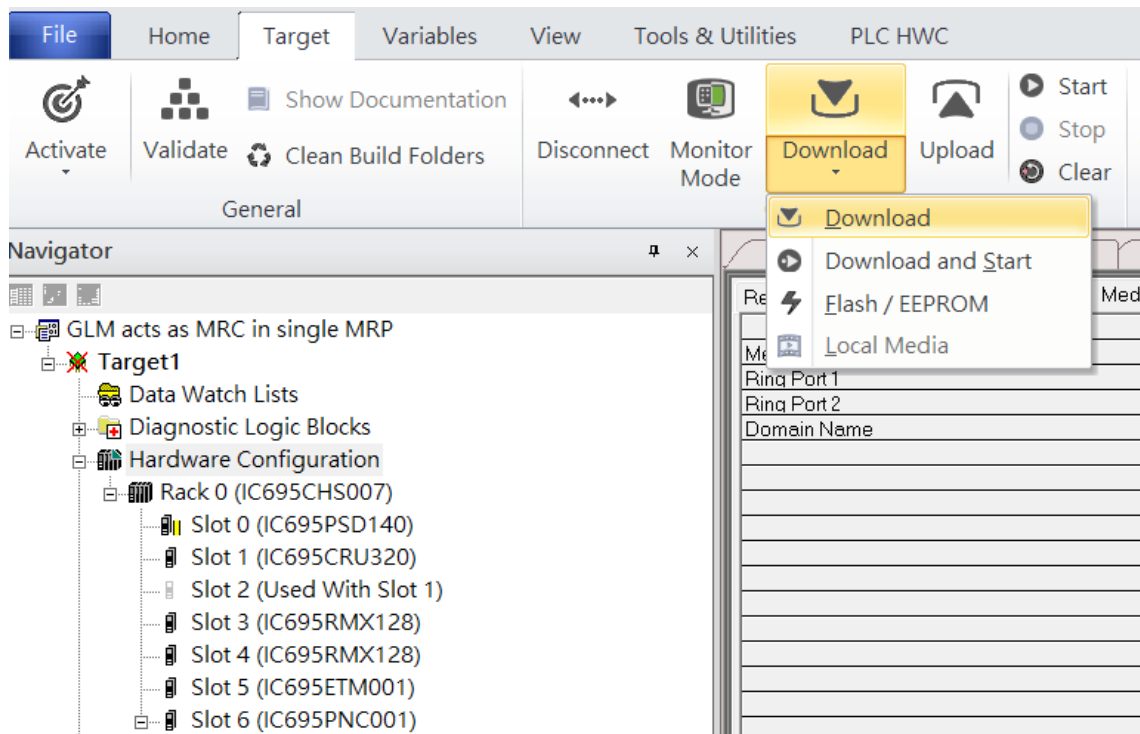


Figure 88

Then the dialogue is appeared to make sure the initialization procedure, select [OK]

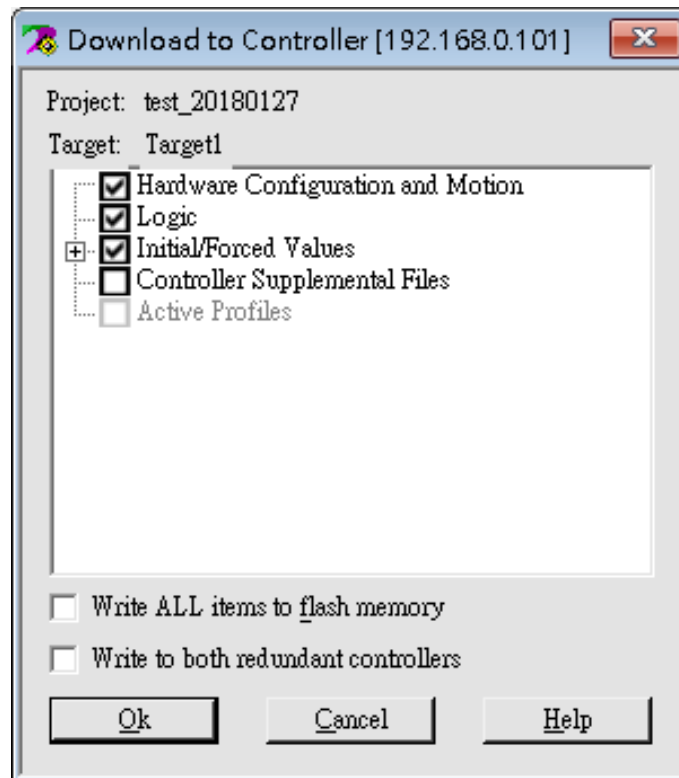


Figure 89

After download completely, press icon [Start] to active PLC. Note: After downloading completely, switch CRU320 to “Run I/O Enable”

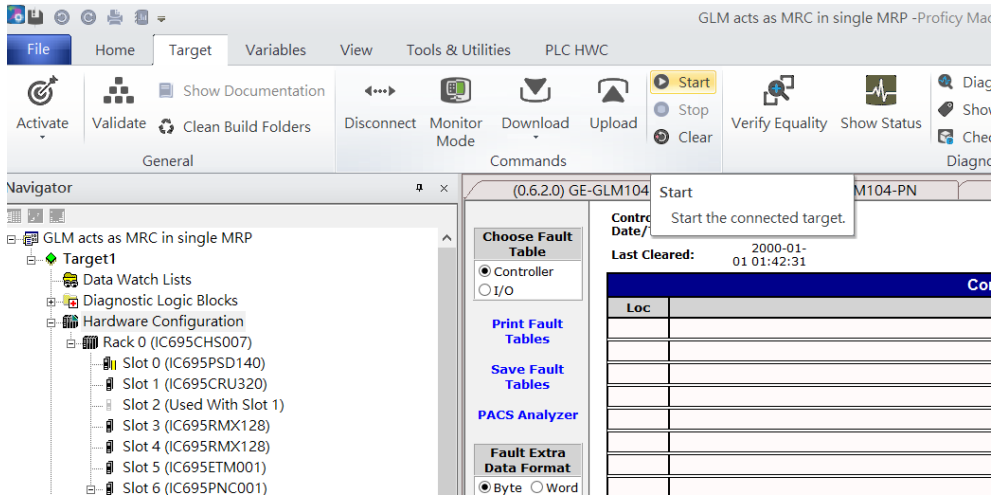


Figure 90

Then the dialogue is appeared, please select [OK]

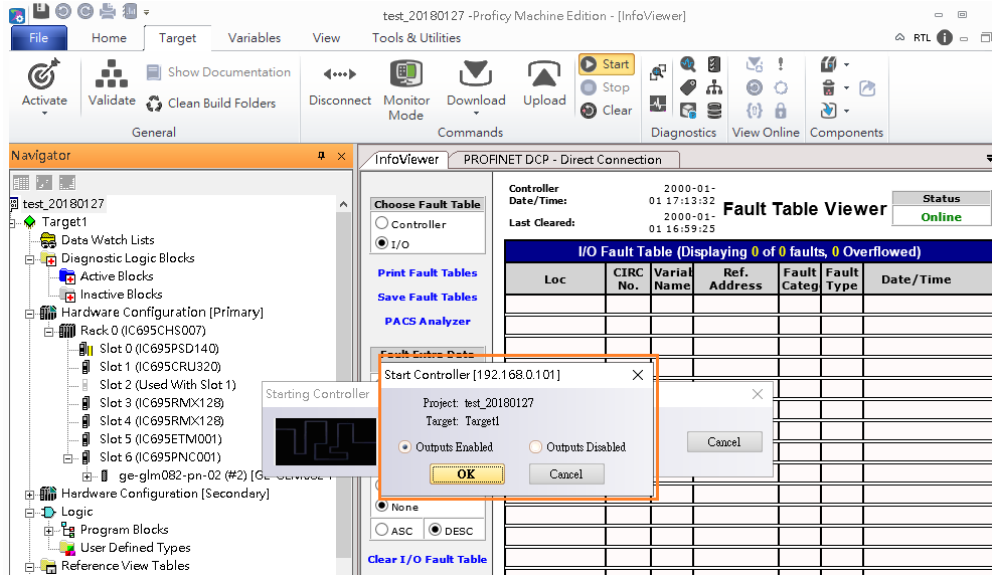


Figure 91

If PLC has started successfully, a message “The Controller was successfully started”.

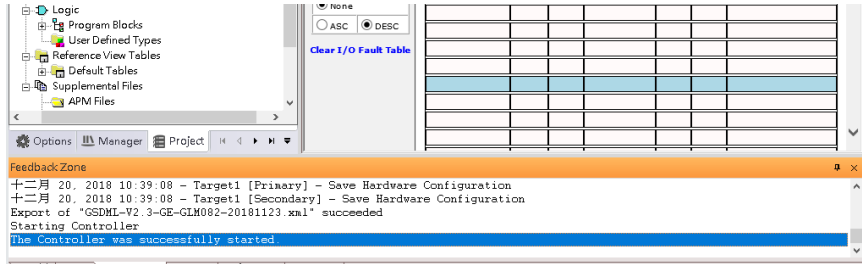


Figure 92

Chapter 4 Multiple PROFINET-MRP Ring

4.1 Network Topology

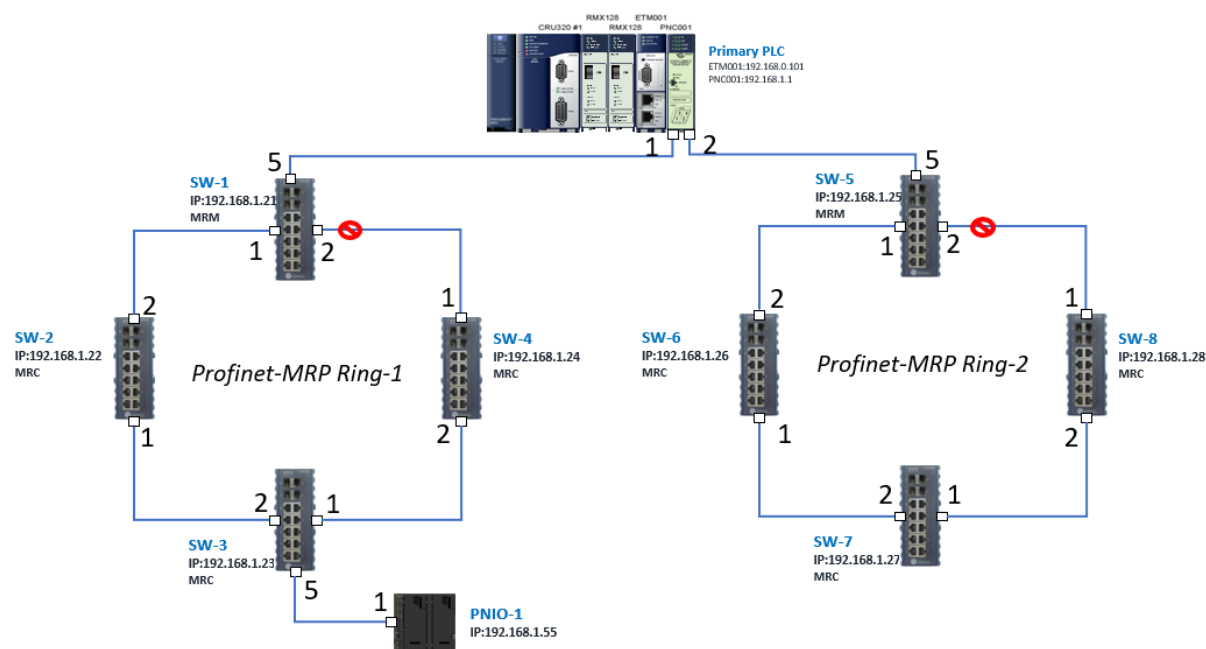


Figure 93

4.2 Hardware Configuration

On the CRU320, the I/O data can be set to “STOP”, “RUN OUTPUT DISABLE” or “RUN I/O Enable” states by a switch imbedded on CRU320. During the configuration, the switches on both 2 CRU320s must be set to “STOP”

4.2.1 Project Open

To start the software Proficy Machine Edition, please follow the steps below:

(1) Click [Start] -> [Proficy] -> [Proficy Machine Edition] -> [Proficy Machine Edition]. See the following picture.



Figure 94

(2) Select the empty project and click [OK].

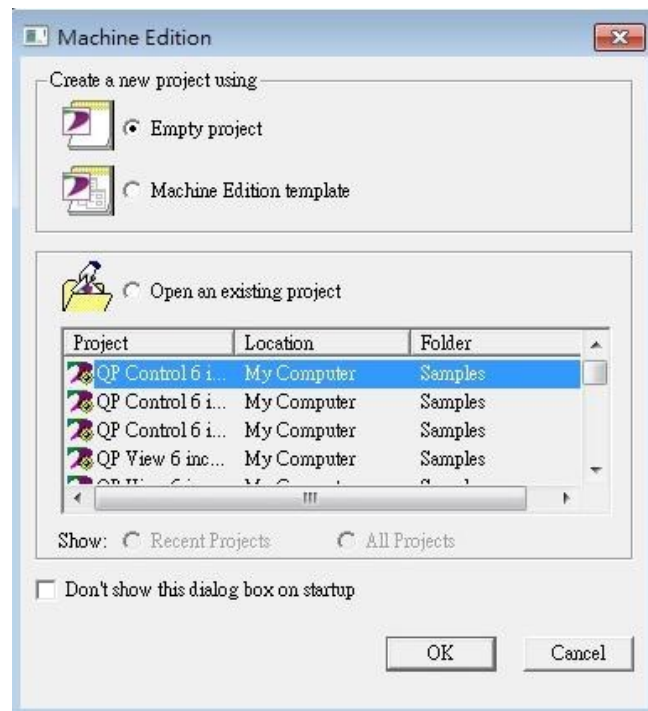


Figure 95

(3) Set the project name and click [OK]

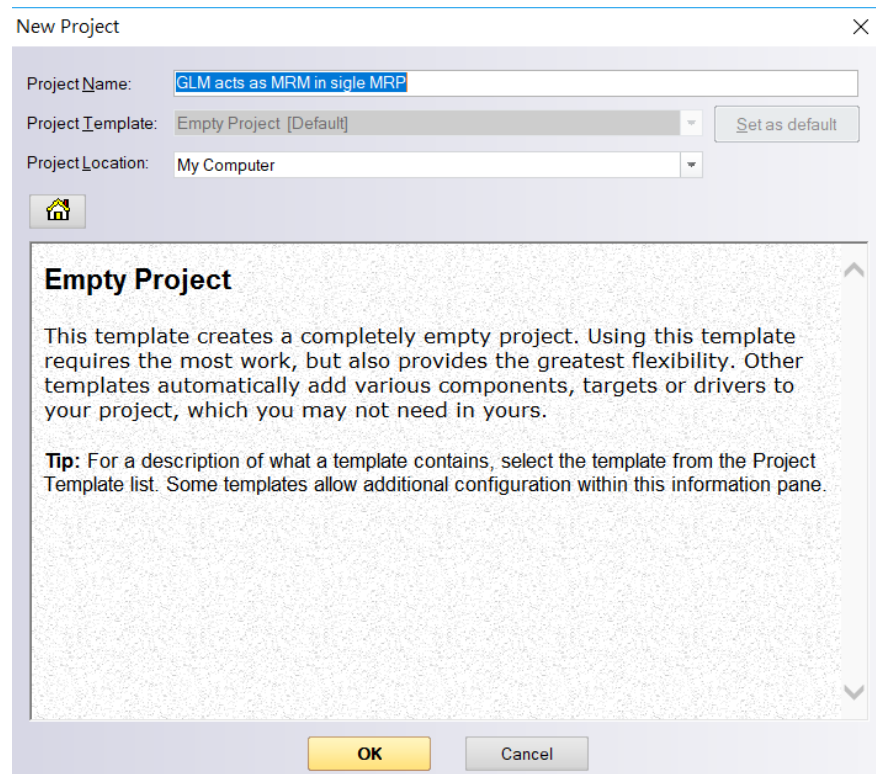


Figure 96

4.2.2 I/O Controller Setting

Next step is to add a target for this project. Click right button on project name “GLM act as MRC in single MRC group” and select [Add Target] -> [GE Intelligent Platforms Controller] -> [PACSystems RX3i]. The PACSystems RX3i is the I/O Controller to be tested. See the following picture.

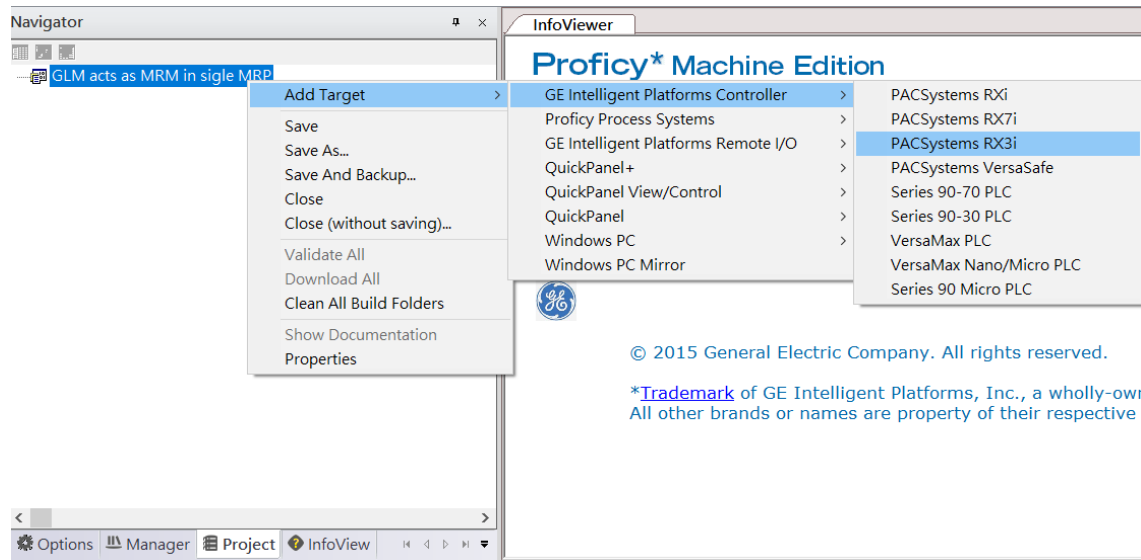


Figure 97

Originally the I/O Controller is described as the rack with 12 slots, each slot can be regarded as the chassis for device installation such as power card, communication module, or bus controller. However, there are only 7 chassis can be used in the I/O Controller CRU320. Thus, replace the rack for 7 slots.

Click right button on “Rack0 (IC695CHS012)” and select [Replace Rack...]

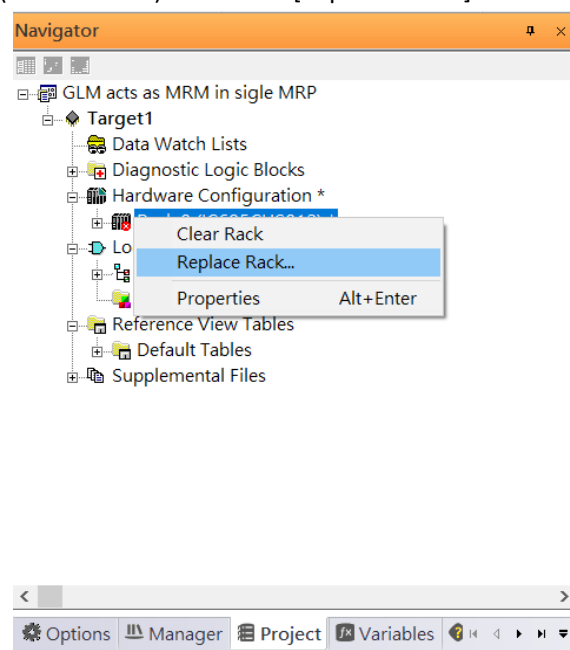


Figure 98

Select "IC695CHS007" and click [OK]

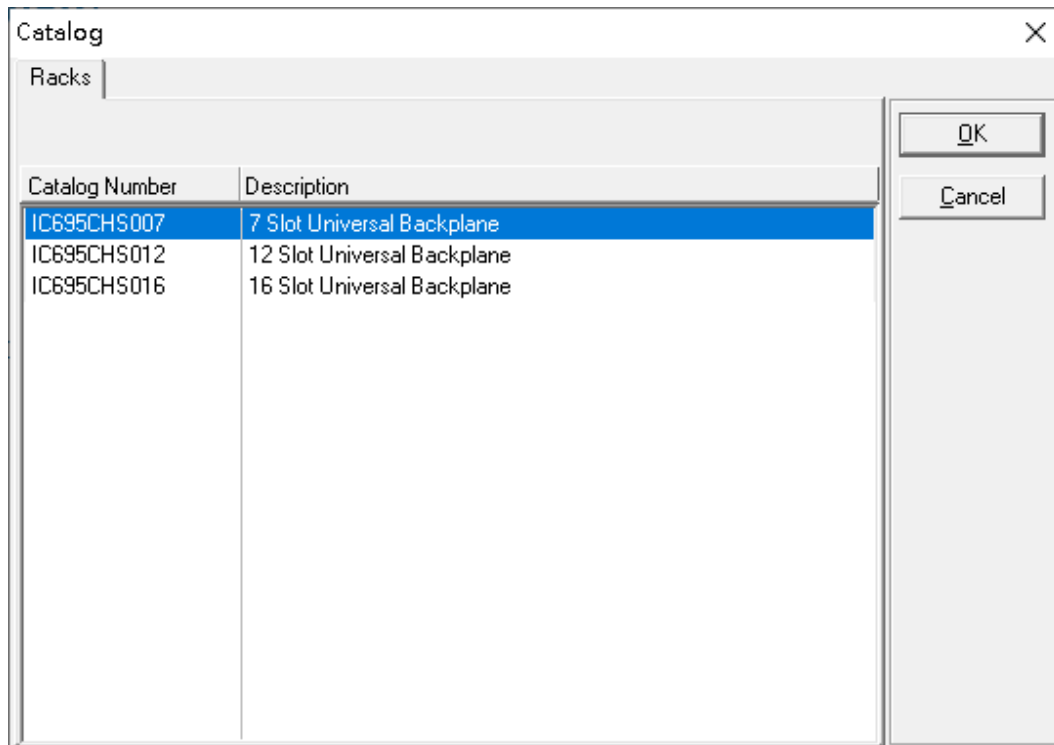


Figure 99

After the rack and the number of slots is defined, select the corresponding devices into the slots according to the I/O Controller. The following picture is the current installation for each device on the I/O Controller



Figure 100

From left to right, the installed devices on the I/O Controller are

Devices on I/O Controller

Device Type	Device Name	Chassis index
Power Card	PSD140	0
Central Processing Unit	CRU320	1 ~ 2
Communication Module	RMX128	3
Communication Module	RMX128	4
Communication Module	ETM001	5
Bus Controller	PNC001	6

Now, add the module into the slots by the current devices on the I/O Controller, the chassis index is corresponding to the slot index.

First, replace the power card. Click slot 0 and click the right button, select [Replace Module ...], and specify the installed power card, PSD140, then click [OK]

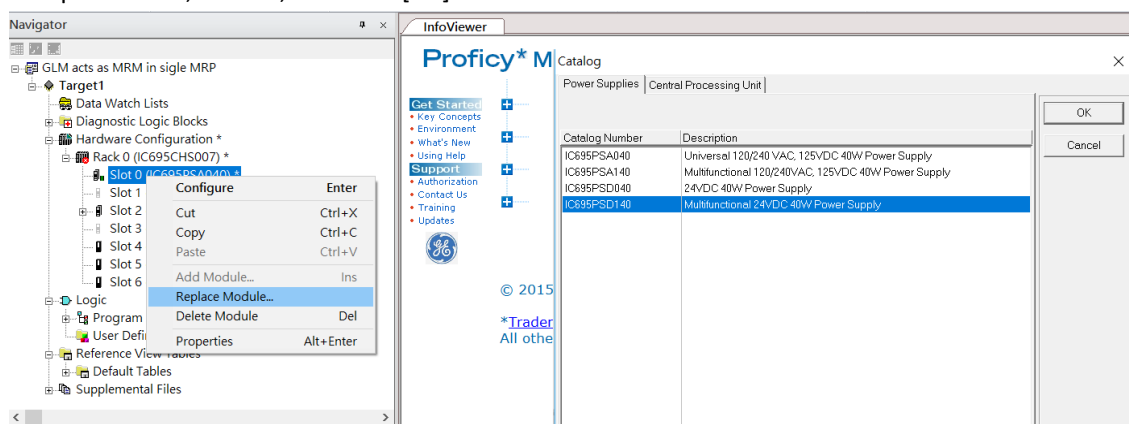


Figure 101

Slot 0 is replaced by current power card, PSD140

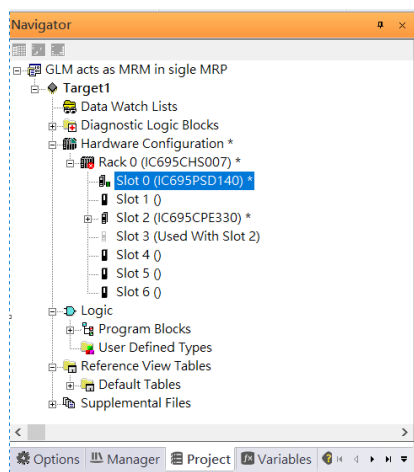


Figure 102

For slot 1 and 2, 2 chassis (1 and 2) is occupied by the Central Processing Unit, CRU320. To integrate slot 1 and 2, pull the slot 2 to slot 1

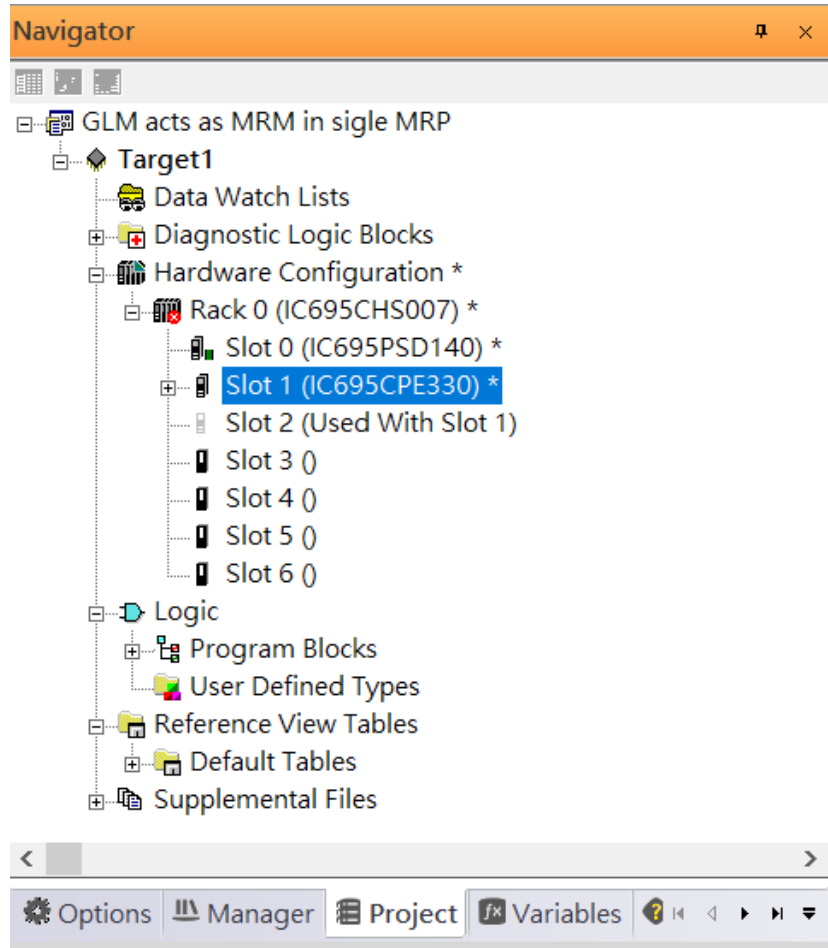


Figure 103

Now the slot 2 is cleaned.

To select the Central Processing Unit, click slot 1 and click the right button, select [Replace Module...] to choose CRU320

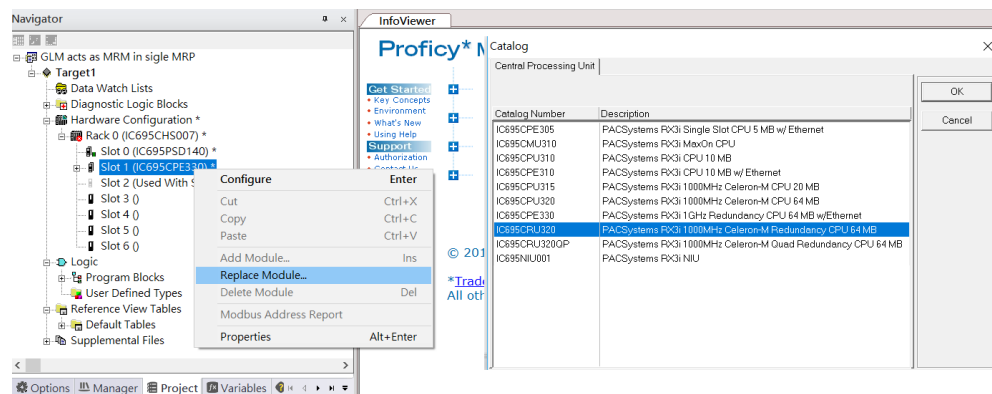


Figure 104

Then choose [No].

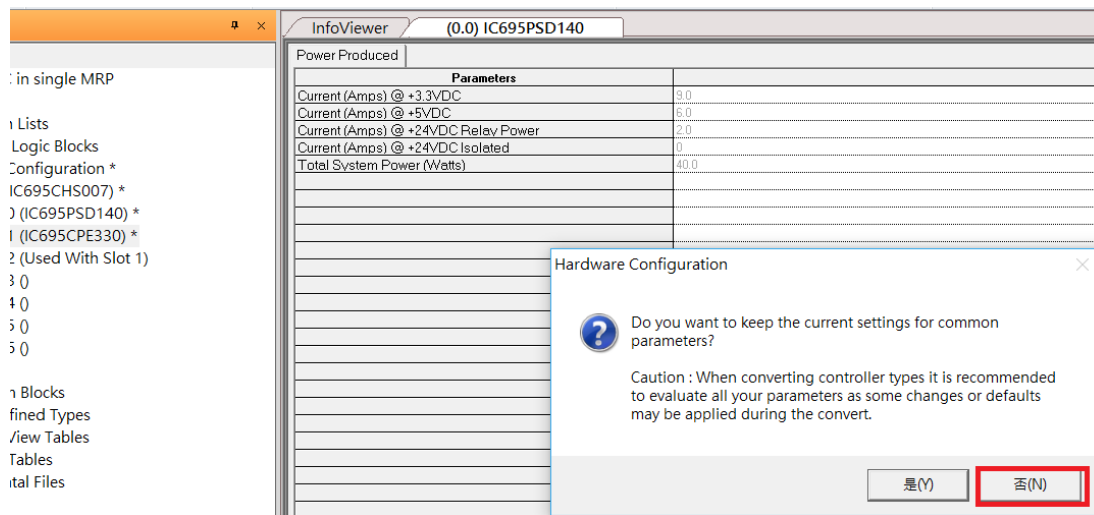


Figure 105

Now the CRU320 is specified.

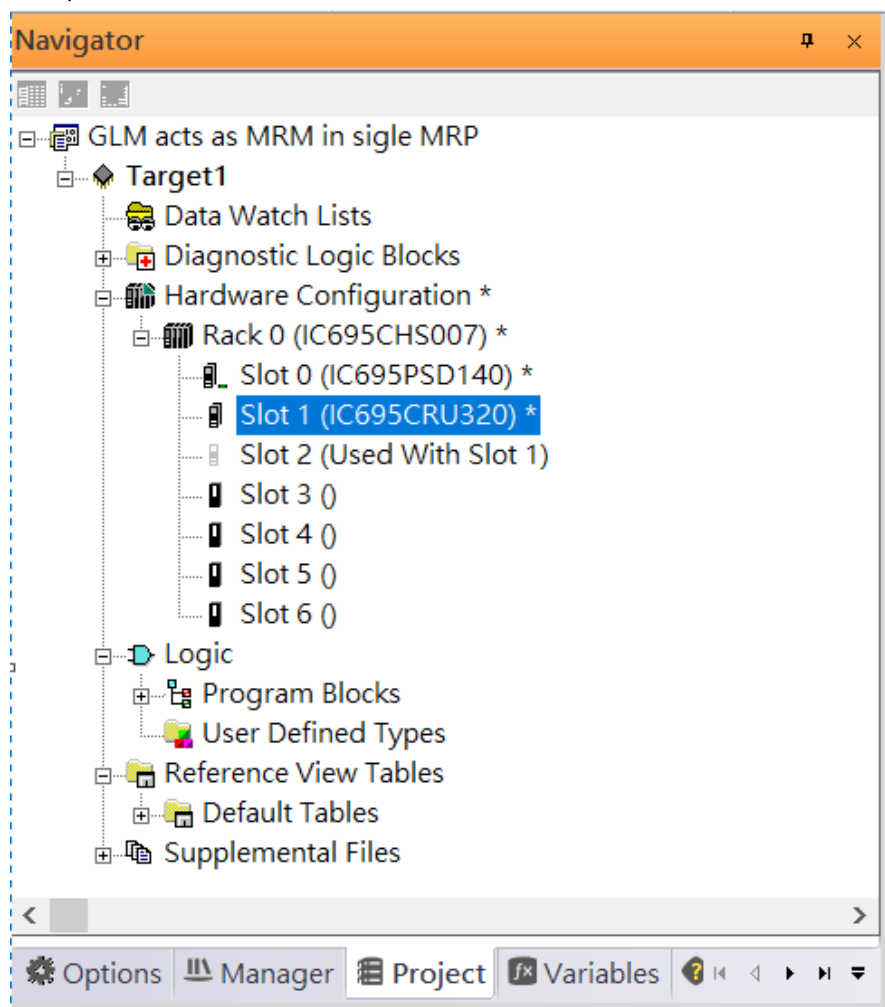


Figure 106

Next is to add RMX128 module for slot 3. Click the right button on slot 3, select [Add Module ...]

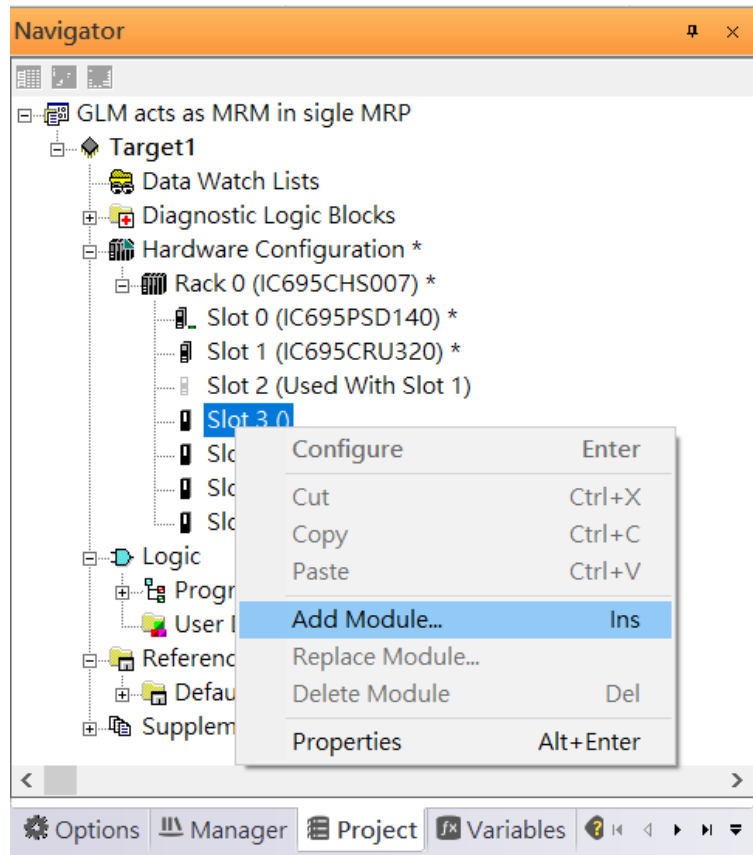


Figure 107

According to the current installation on the I/O Controller, the RMX128 shall be select. Select [Communications] -> [IC695RMX128] and click [OK]

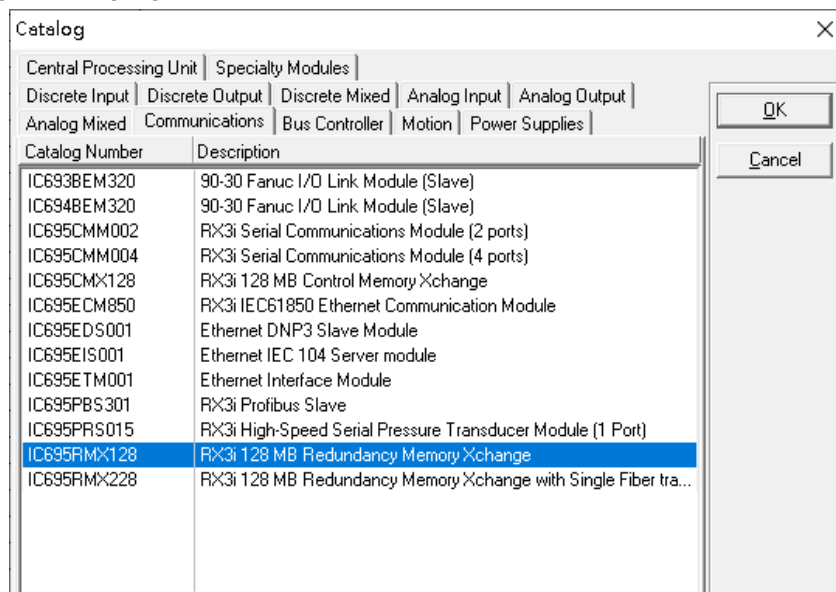


Figure 108

Now the RMX128 is ready on slot 3.

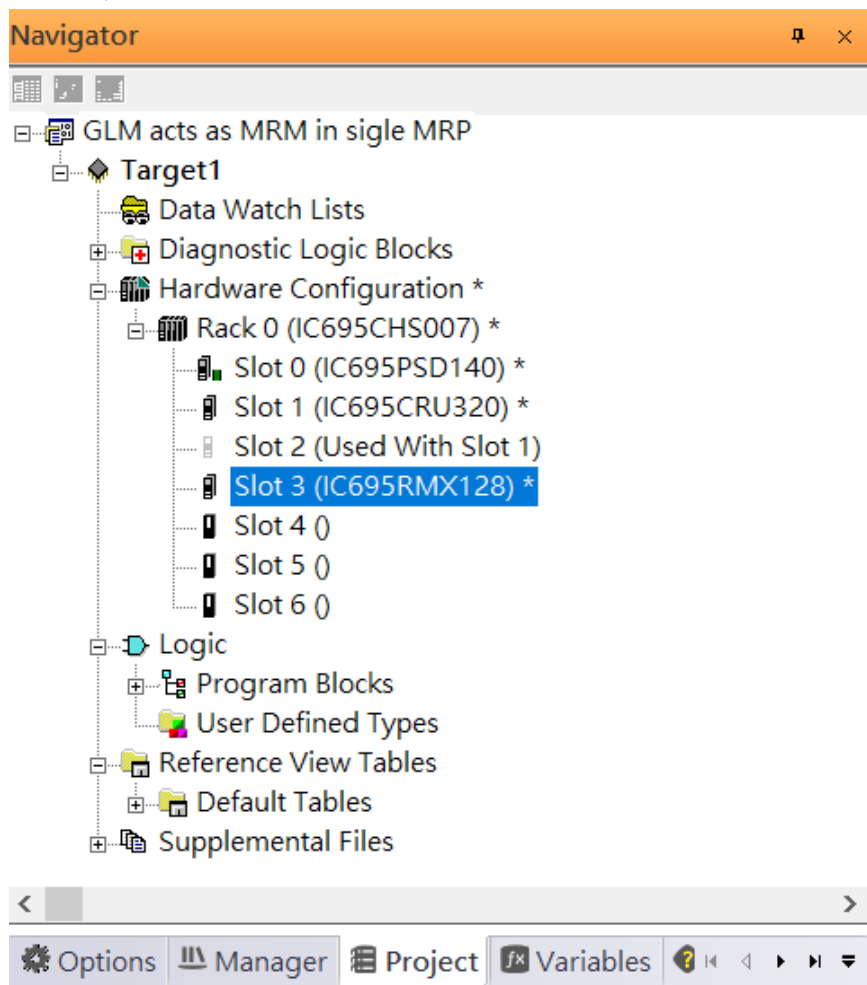


Figure 109

Continuously, select RMX128 for slot 4.

Click the right button on slot 4, select [Add Module ...], select [Communications] -> [IC695RMX128] and click [OK]

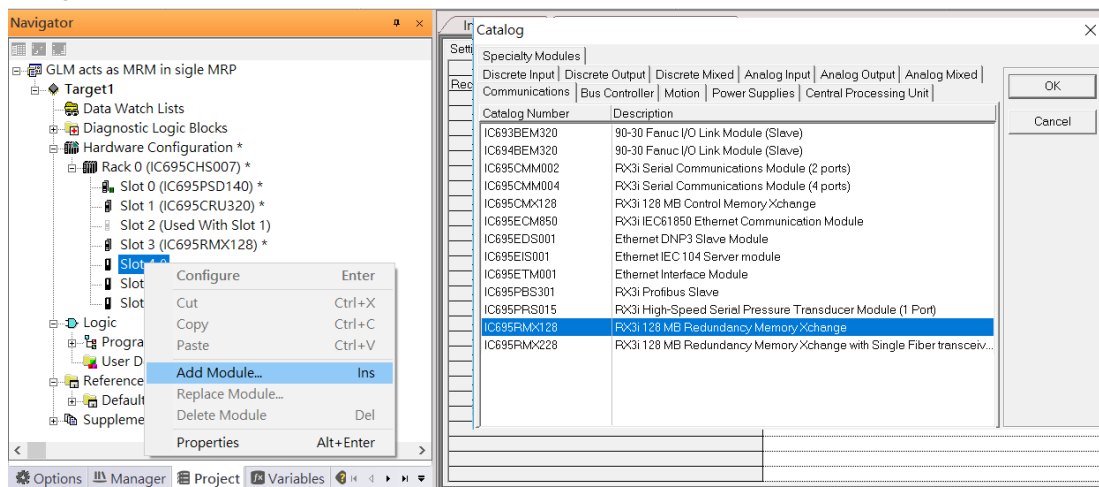


Figure 110

Continuously, select ETM001 for slot 5.

Click the right button on slot 5, select [Add Module ...], select [Communications] -> [IC695ETM001] and click [OK]

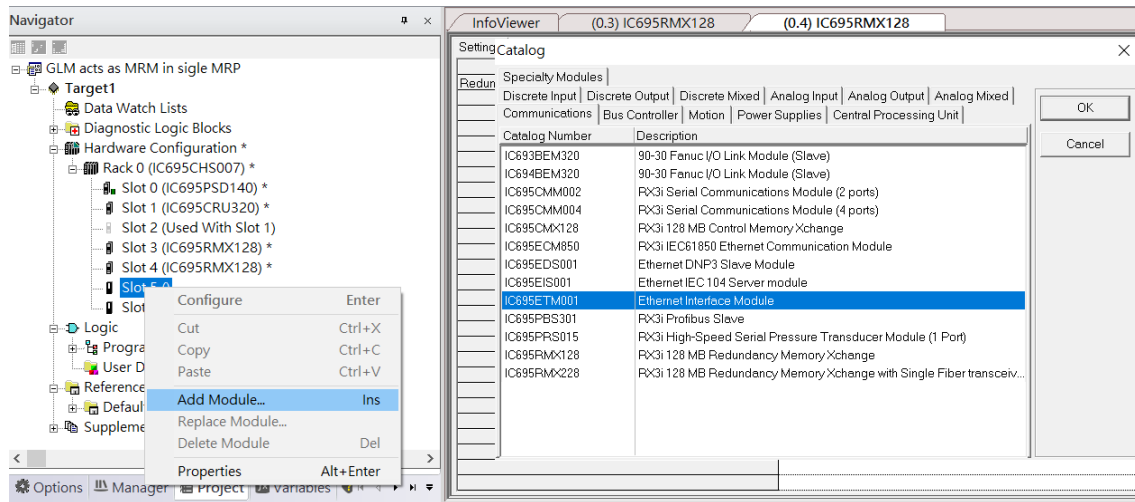


Figure 111

It should be noted that the ETM001 is the management device for Proficy Machine Edition. The communication interface is Ethernet network. The IP address and Subnet Mask shall be specified.

In the following picture, the IP address 192.168.0.101 and mask 255.255.255.0 is specified on ETM001.

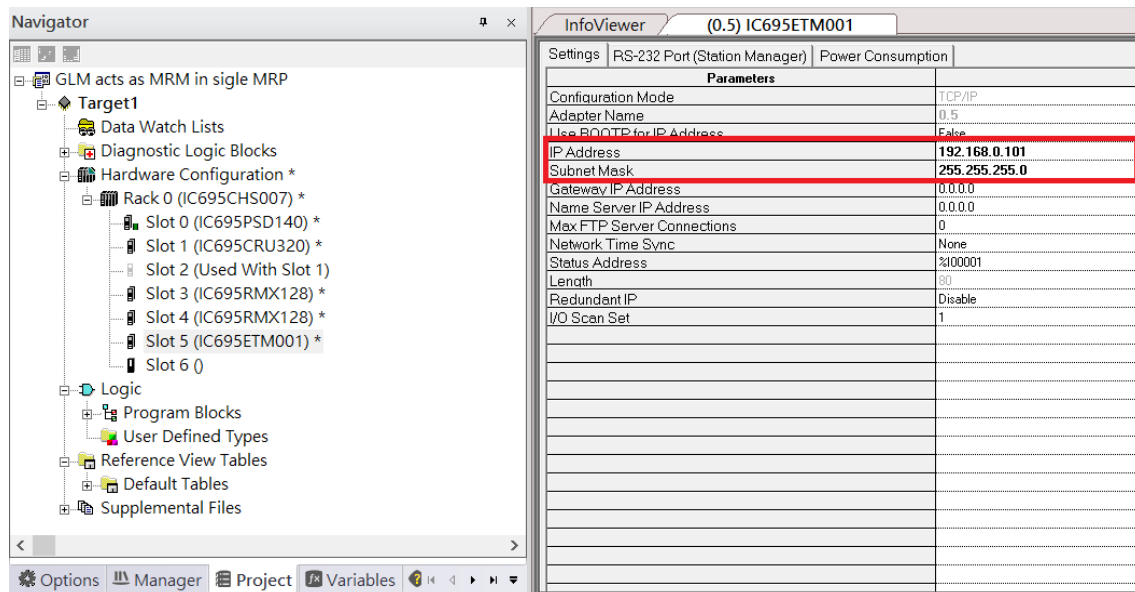


Figure 112

Continuously, select PNC001 for slot 6.

Click slot 6 and click the right button, select [Add Module ...], specify the installed Bus Controller, PNC001 and click [OK]

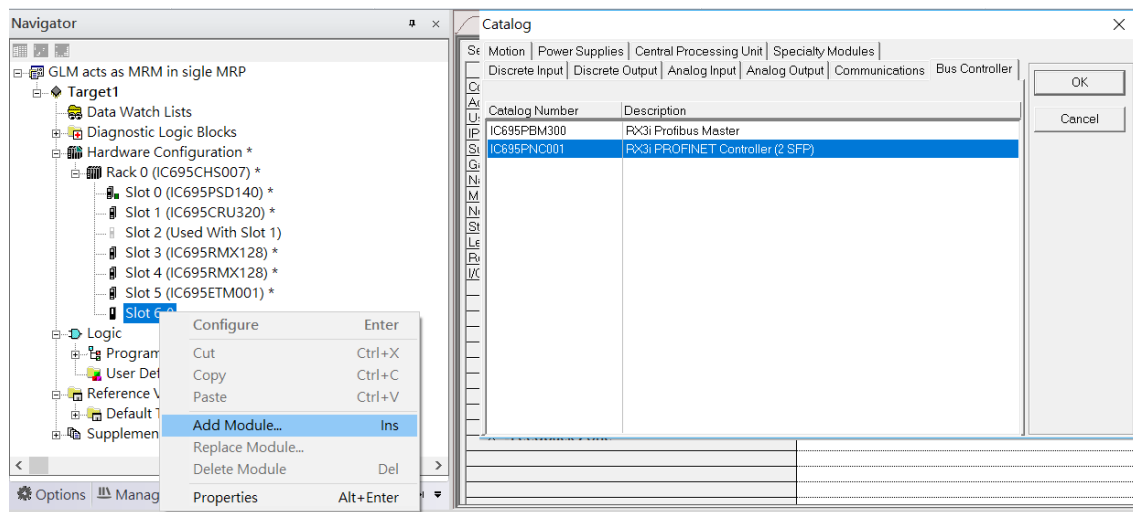


Figure 113

Now all the devices on the I/O Controller are ready on the slots on the rack, the following picture is the current status, and we shall save it.

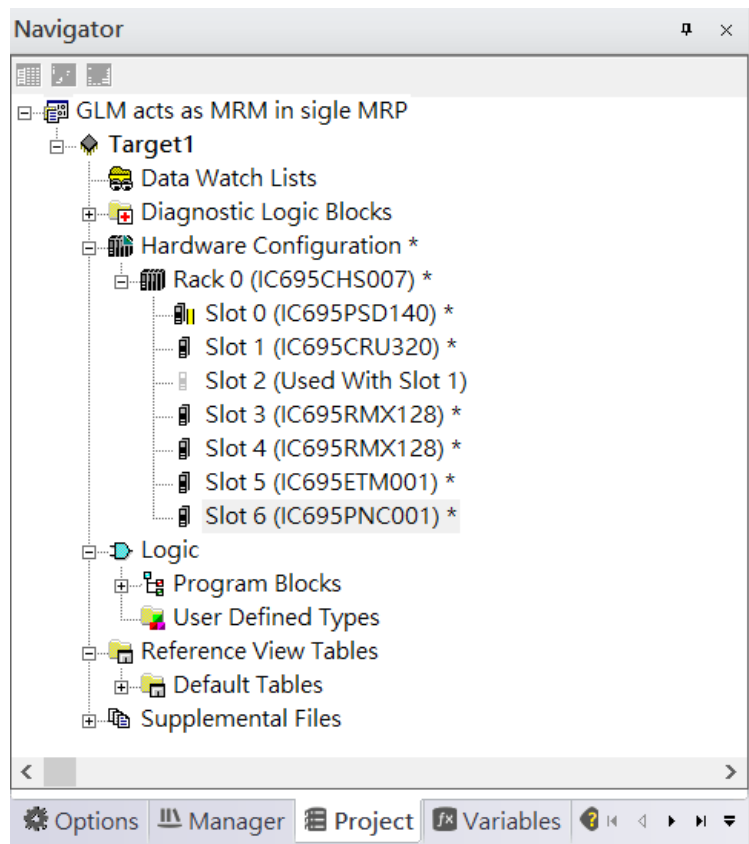


Figure 114

4.2.3 I/O Device Setting

This section introduces the I/O Device integration. To configure the I/O Device, the GSDML file is necessary. Now we create another interface to load the GSDML file by using [Toolchest].

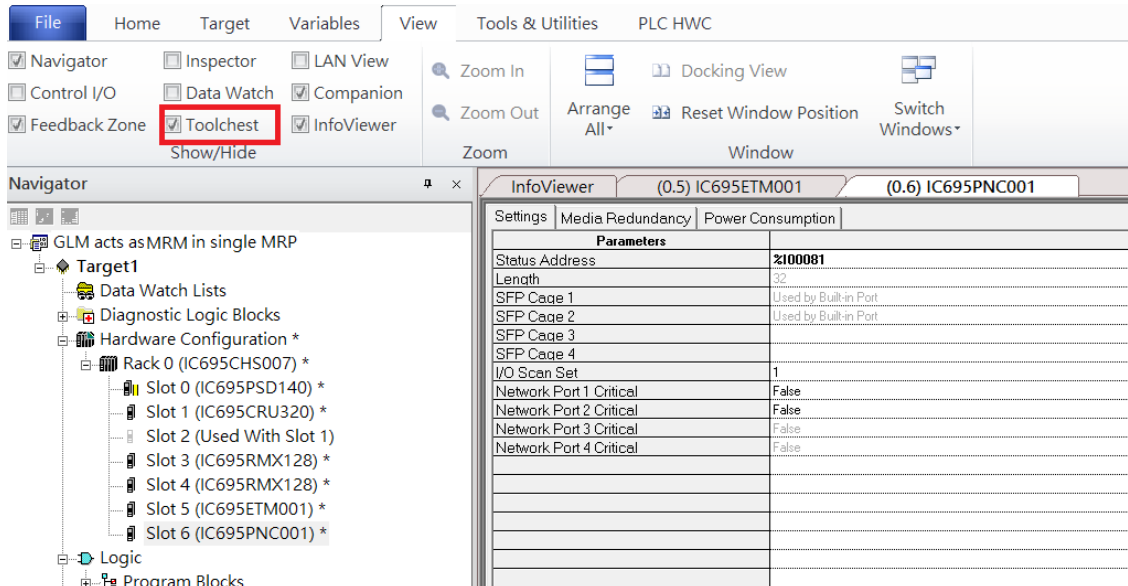


Figure 115

As shown in the following picture, a new interface is created on the right-hand side.

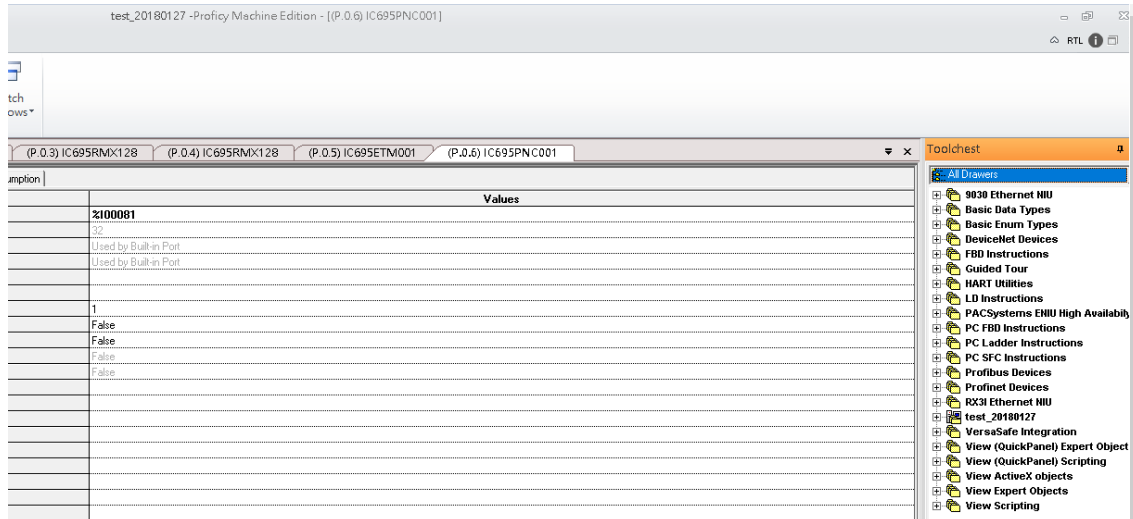


Figure 116

Select Profinet Devices.

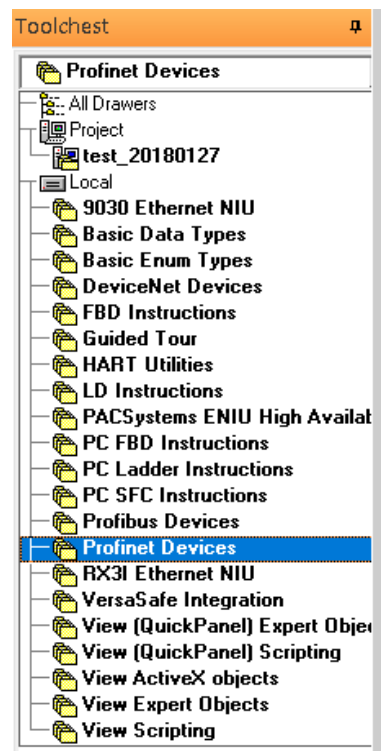


Figure 117

Click right button, select [Assistants] -> [Import GSDML File ...]

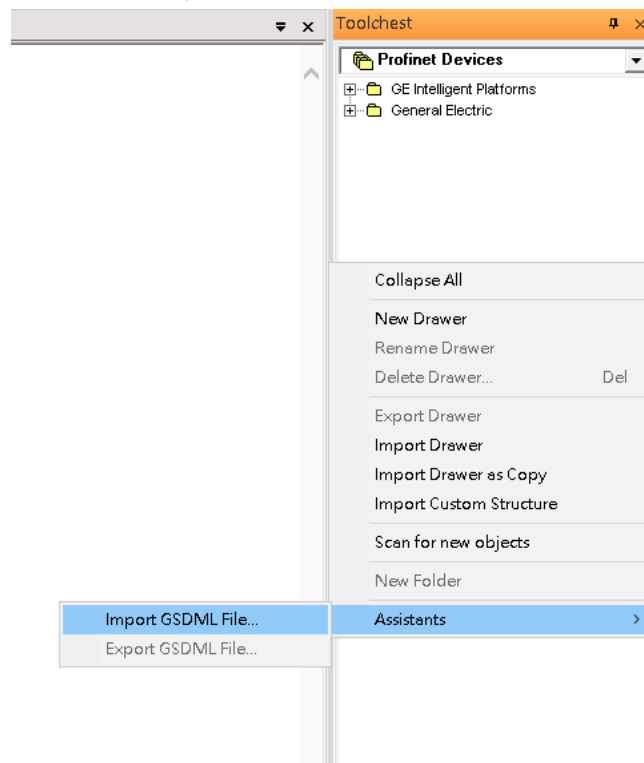


Figure 118

Select the GSDML File.

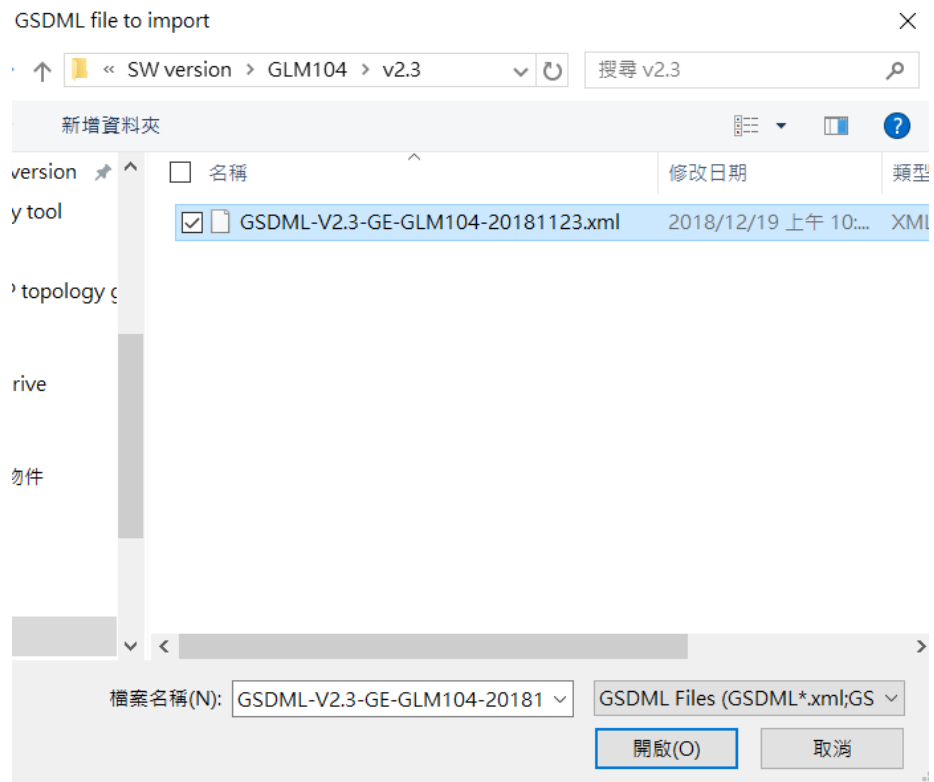


Figure 119

Then the corresponding I/O Device of GSDML File is added in the [Toolchest].



Figure 120

In this document, there are nine I/O devices and one I/O controller. I/O devices are eight switches and one GE VersaMax PROFINET I/O Scanner.

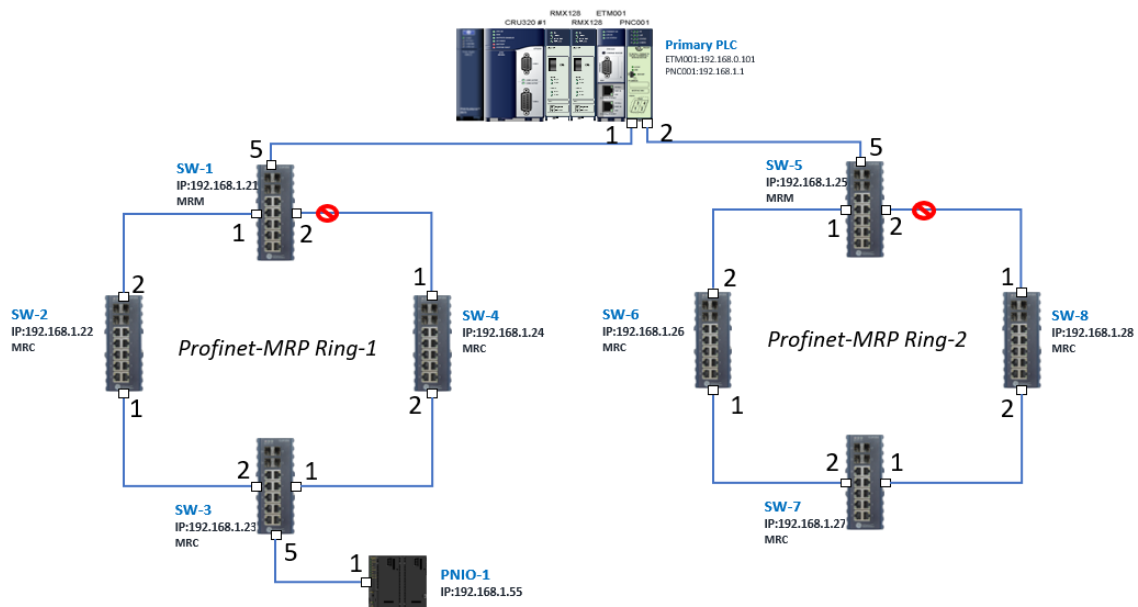


Figure 121

The I/O Device is connected to the Bus Controller on the I/O Controller. Click the slot 6 and click the right button to add the I/O Device on the PNC001.

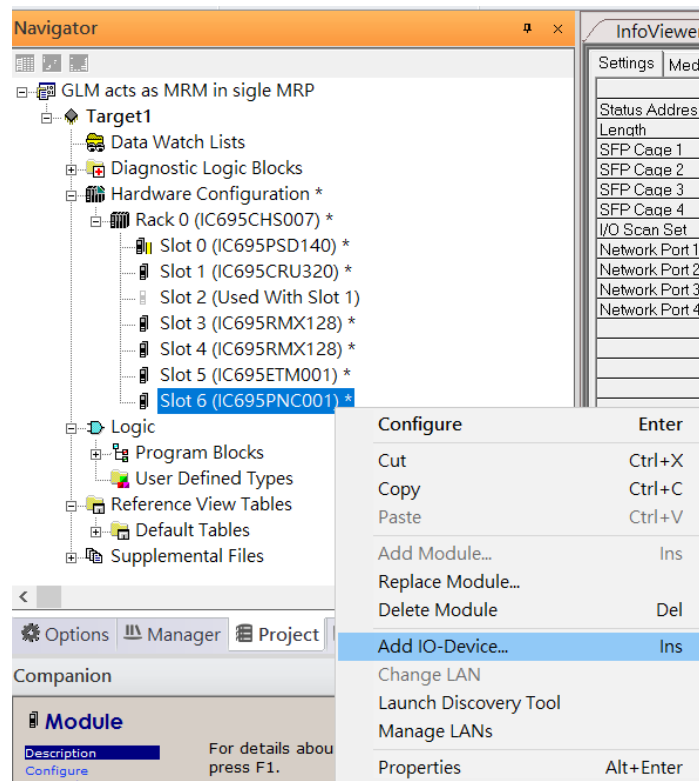


Figure 122

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

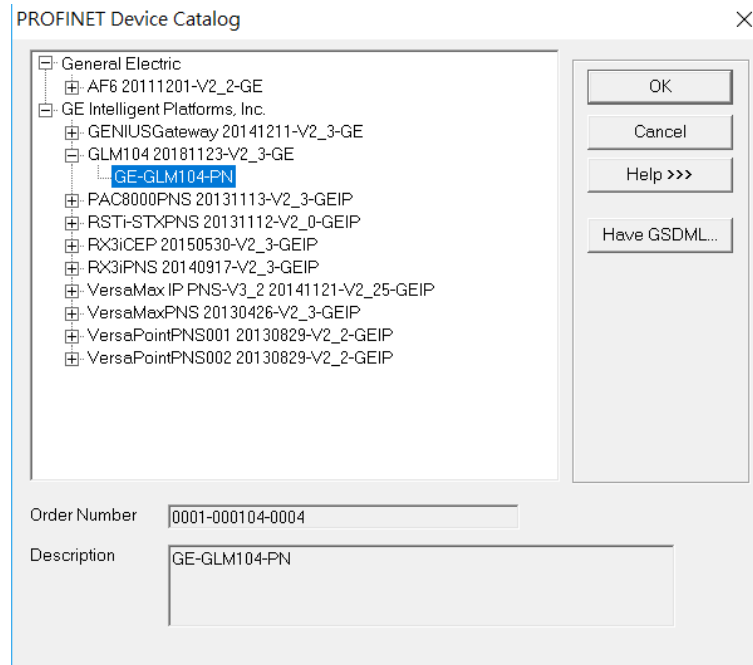


Figure 123

Now the I/O device GLM104(SW1) is ready and is a sub slot on PNC001.

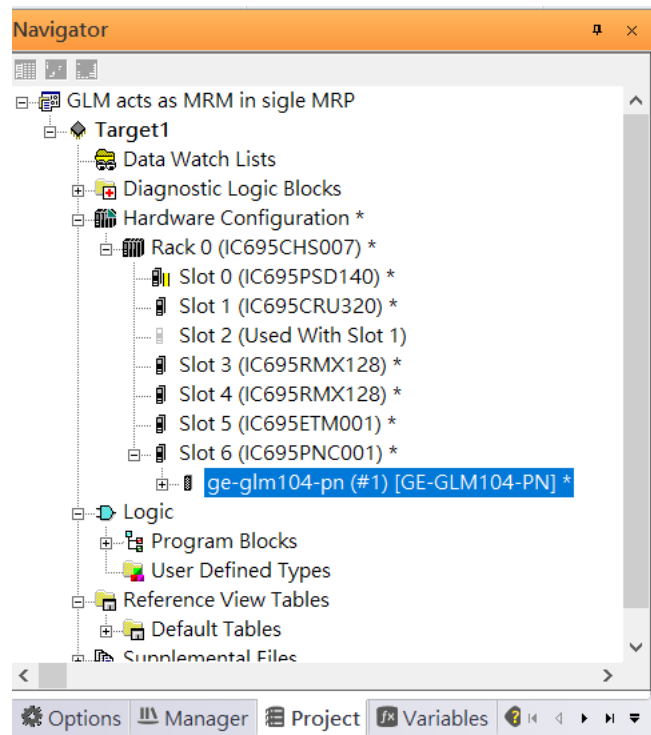


Figure 124

Then add the second I/O device in the PNC001.

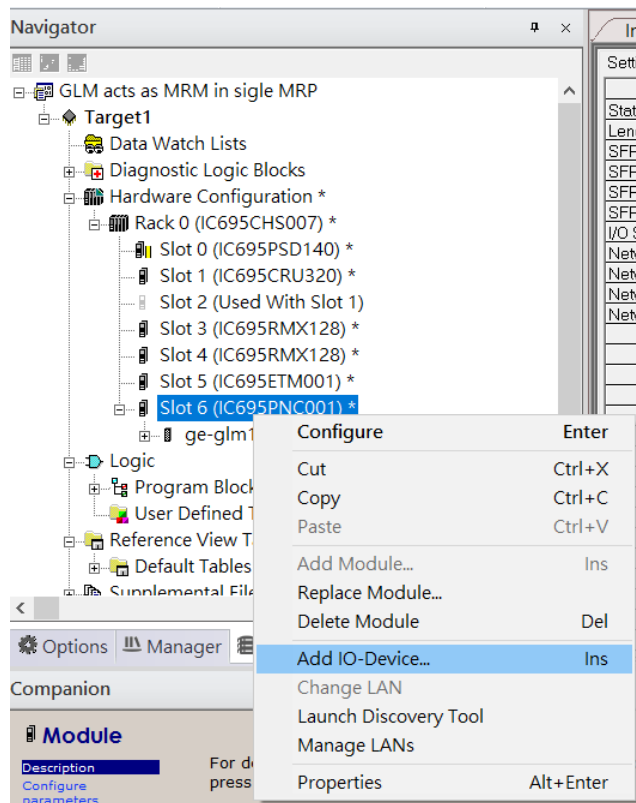


Figure 125

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE] -> [GE-GLM104-PN] and click [OK]

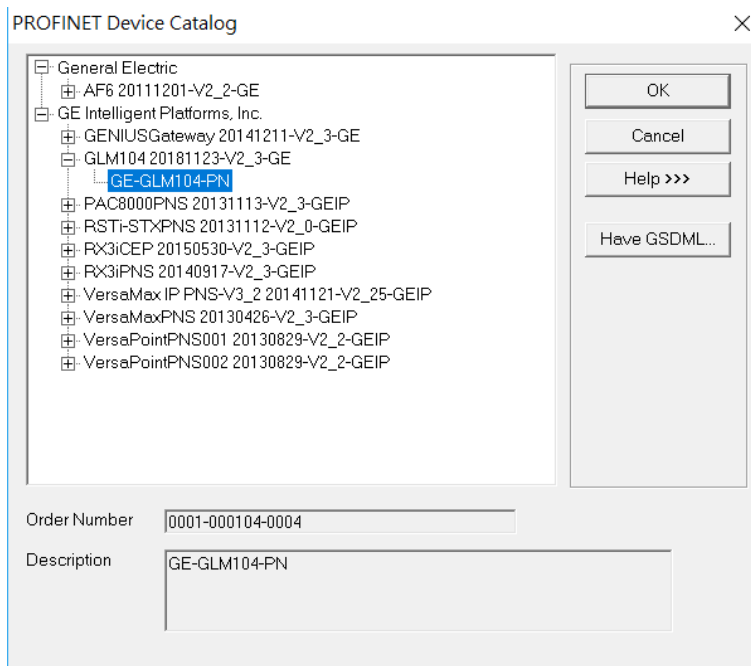


Figure 126

Now the I/O device GLM104(SW2) is ready and is a sub slot on PNC001.

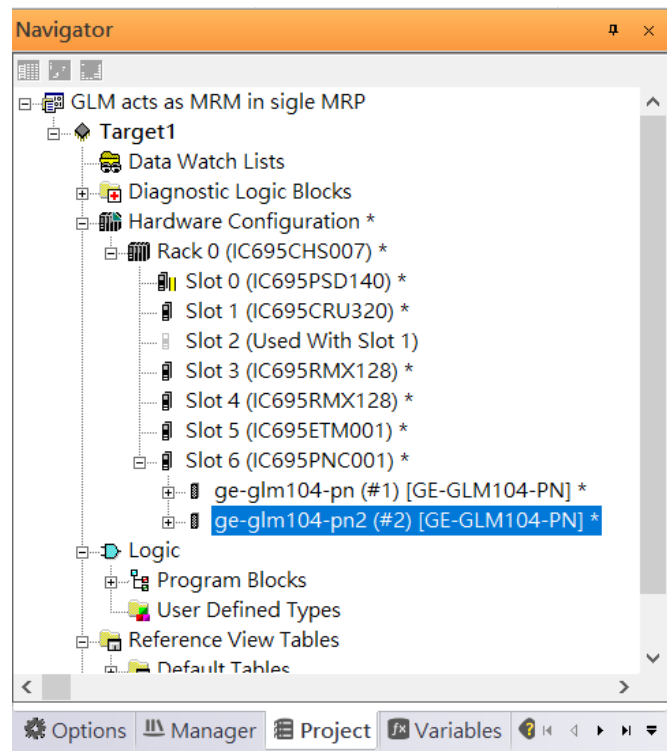


Figure 127

Then add the third I/O device in the PNC001

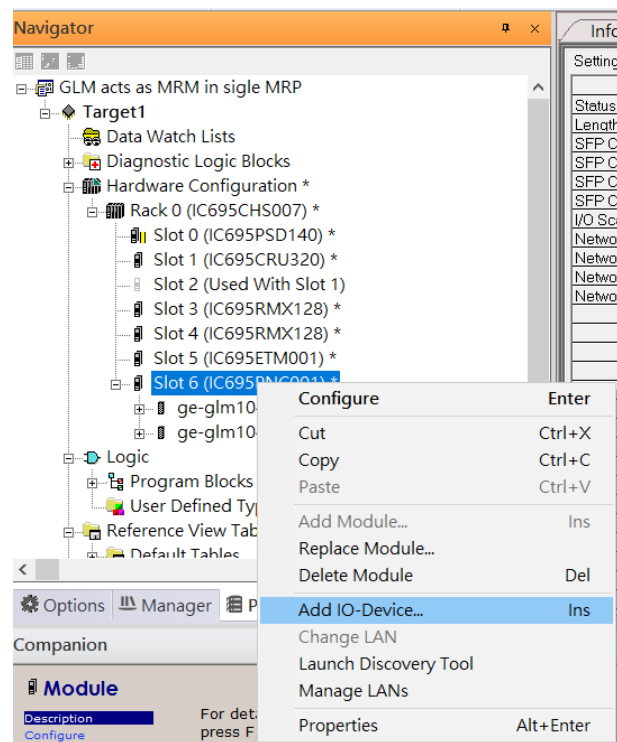


Figure 128

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

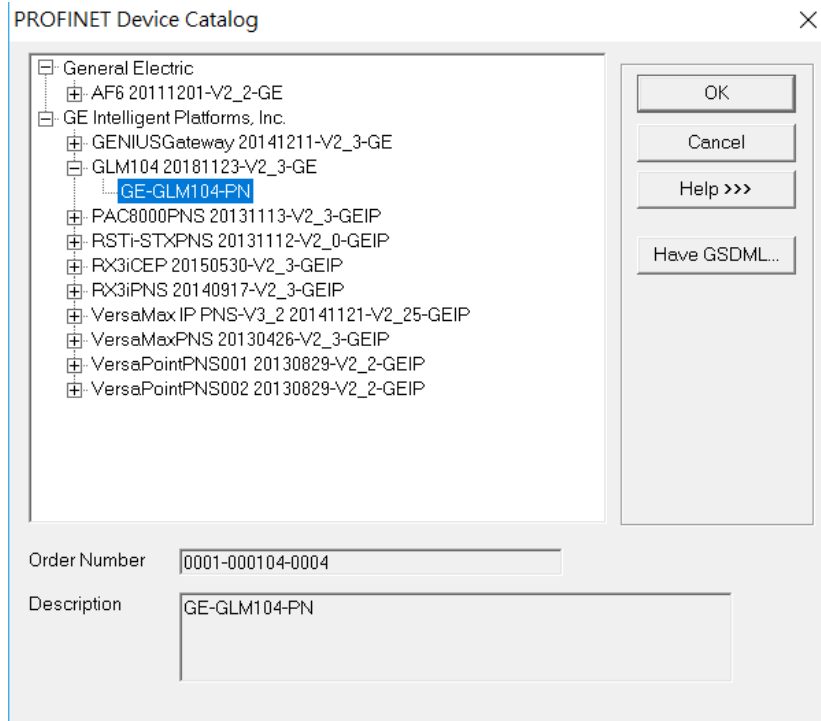


Figure 129

Now the I/O device GLM104(SW3) is ready and is a sub slot on PNC001

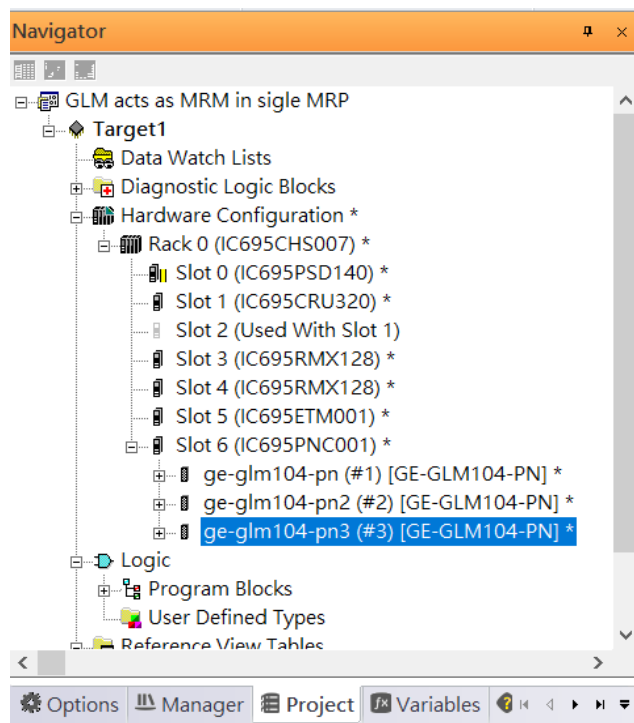


Figure 130

Then add the fourth I/O device in the PNC001.

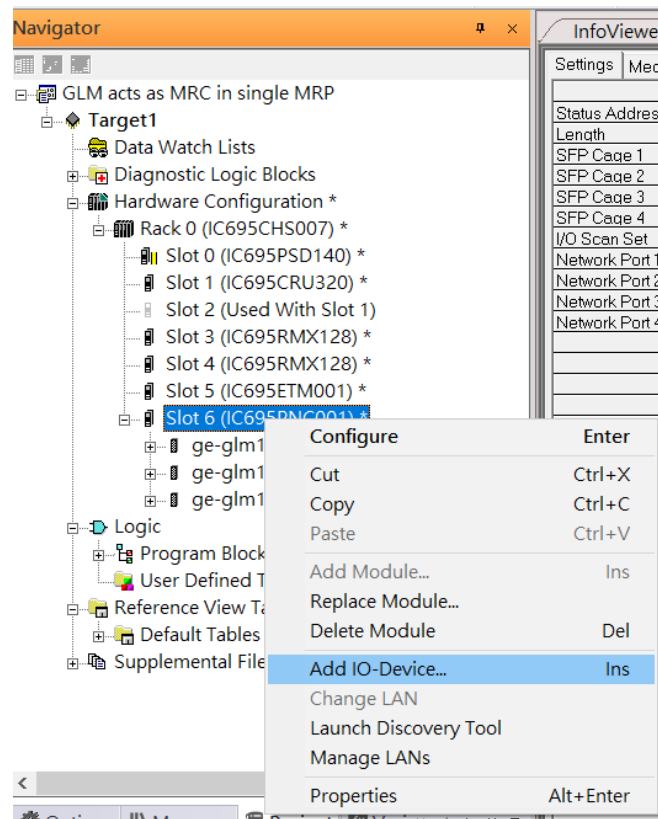


Figure 131

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

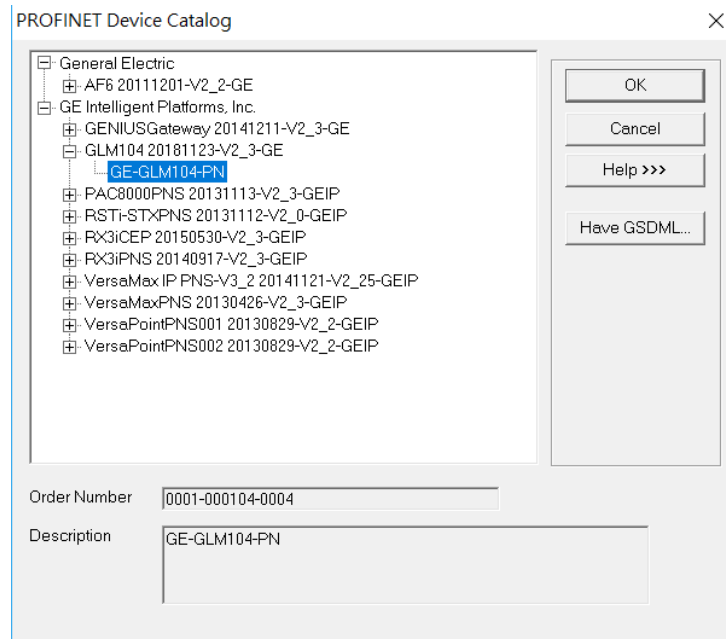


Figure 132

M104(SW4) is ready and is a sub slot on PNC001.

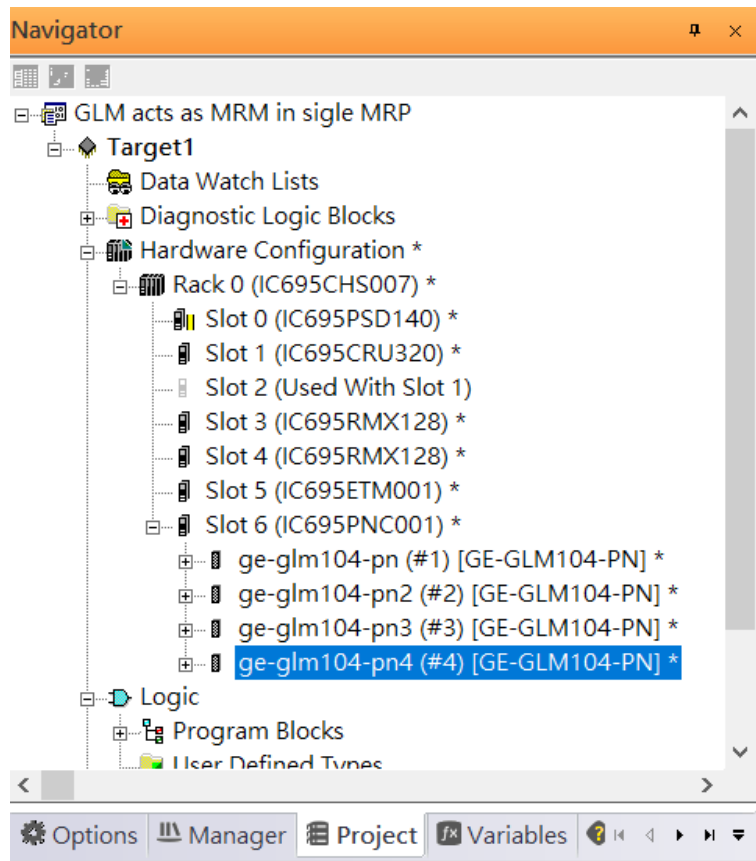


Figure 133

Then add the fifth I/O device in the PNC001.

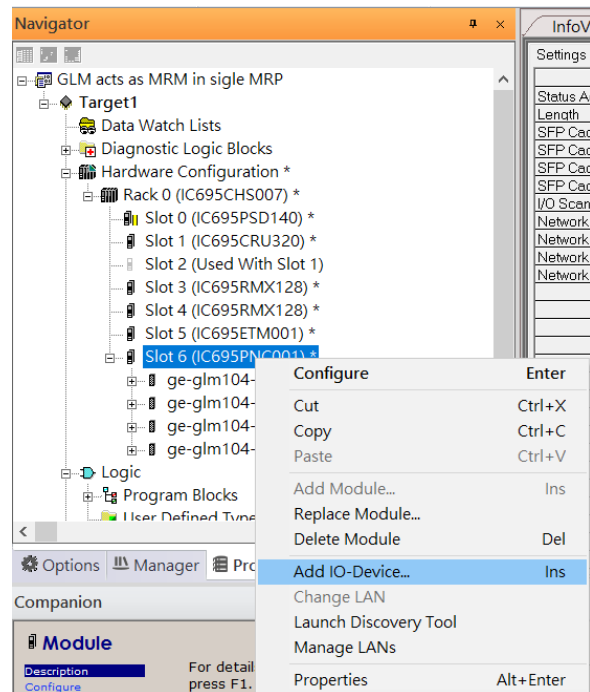


Figure 134

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE] -> [GE-GLM104-PN] and click [OK]

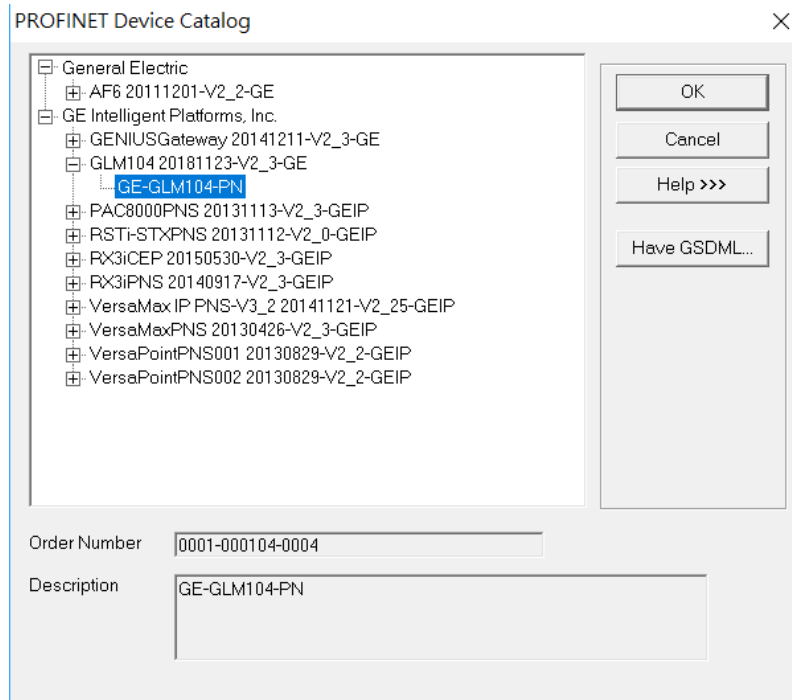


Figure 135

Now the I/O device GLM104(SW5) is ready and is a sub slot on PNC001.

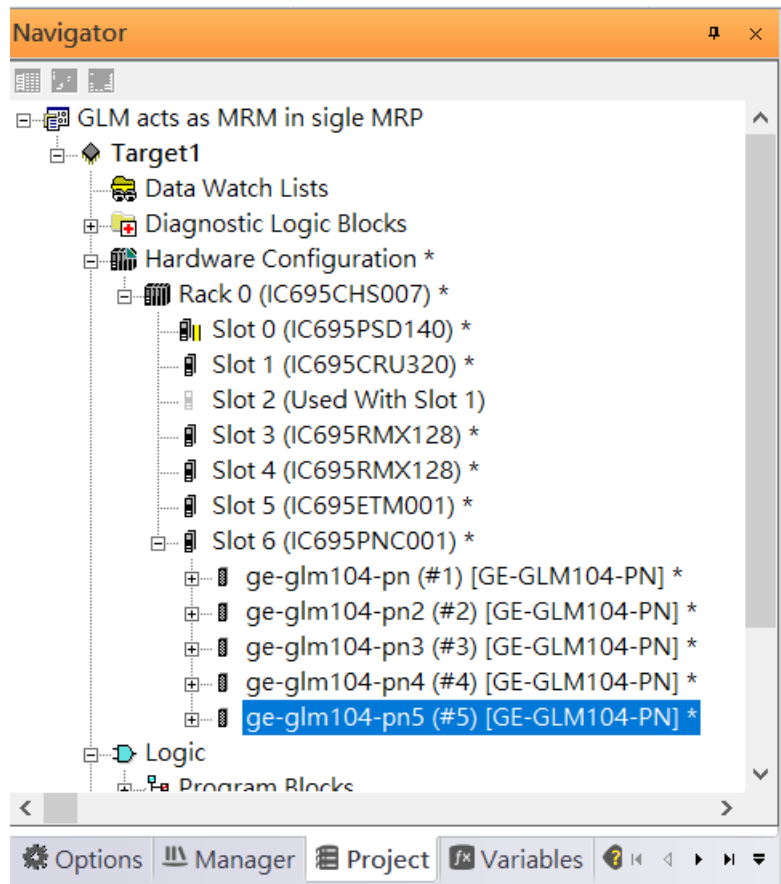


Figure 136

Then add the sixth I/O device in the PNC001.

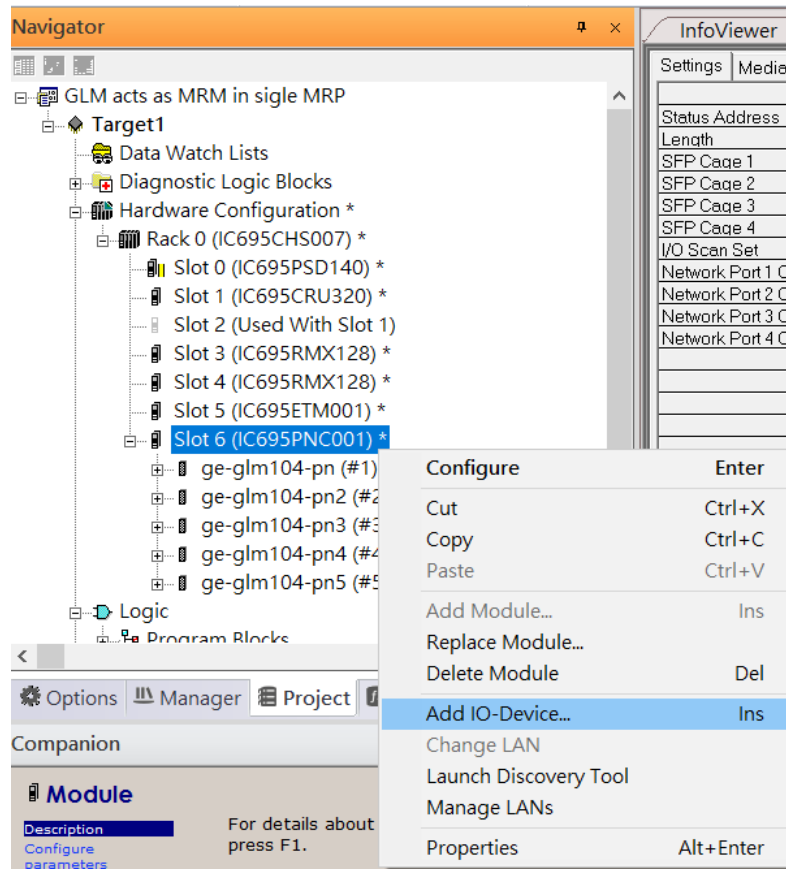


Figure 137

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE] -> [GE-GLM104-PN] and click [OK]

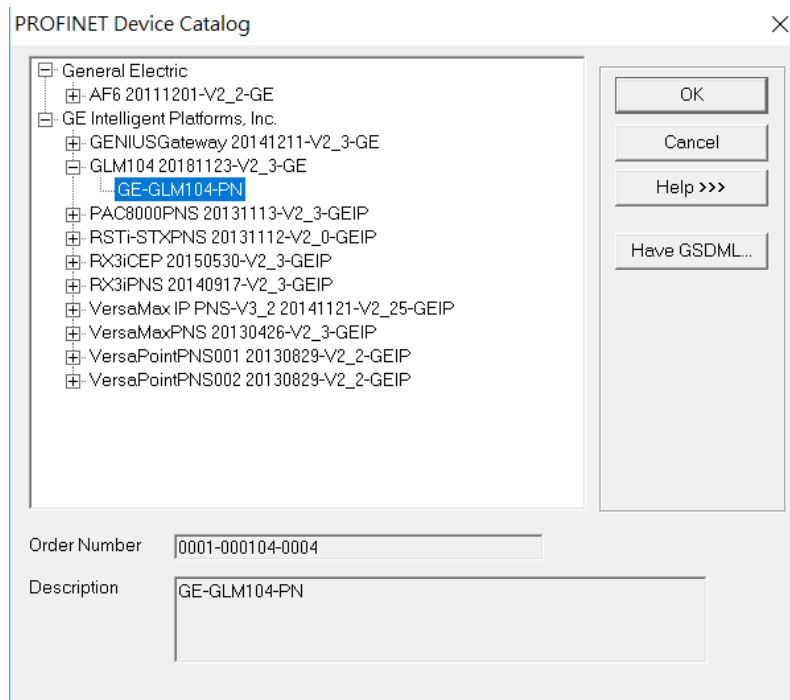


Figure 138

Now the I/O device GLM104(SW6) is ready and is a sub slot on PNC001.

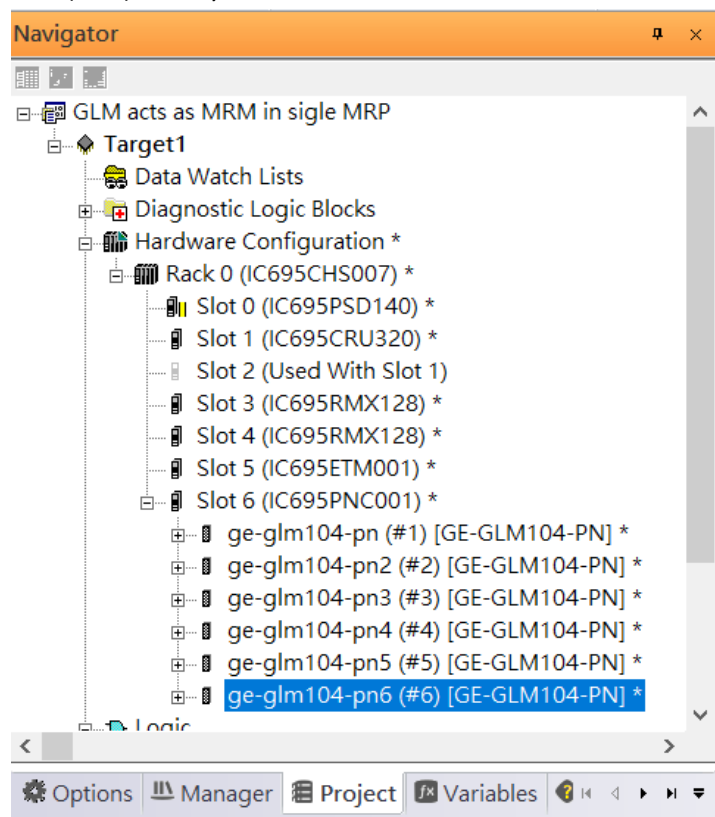


Figure 139

Then add the seventh I/O device in the PNC001.

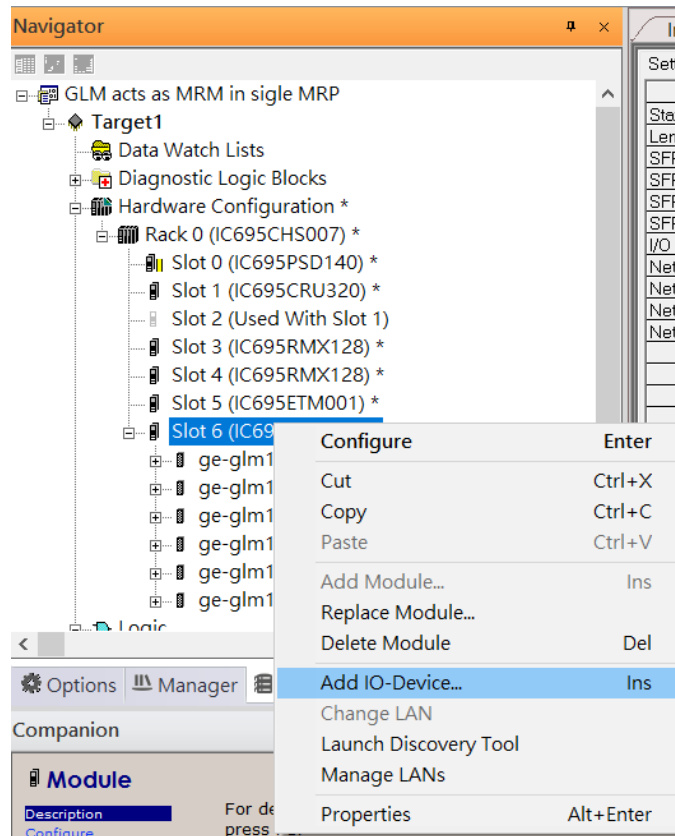


Figure 140

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE] -> [GE-GLM104-PN] and click [OK]

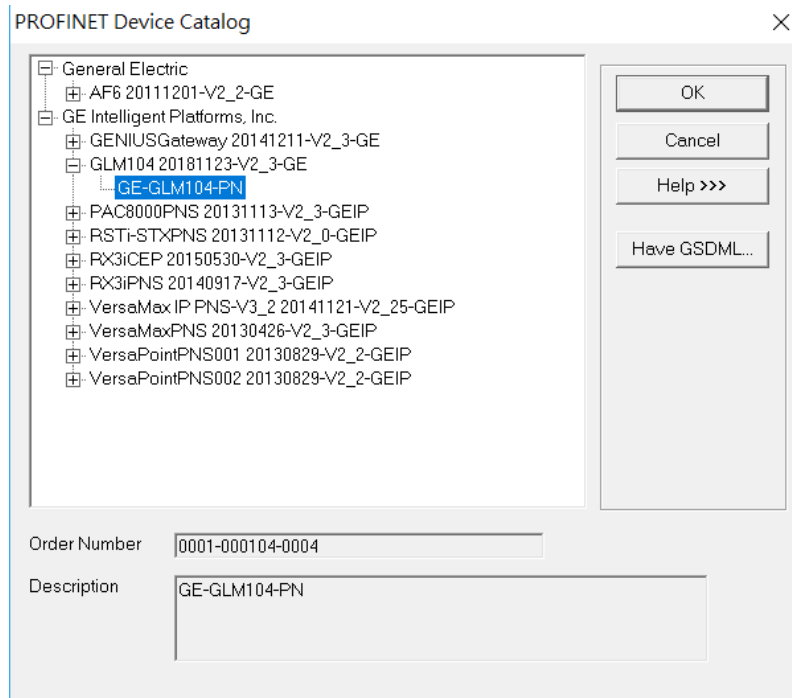


Figure 141

Now the I/O device GLM104(SW7) is ready and is a sub slot on PNC001.

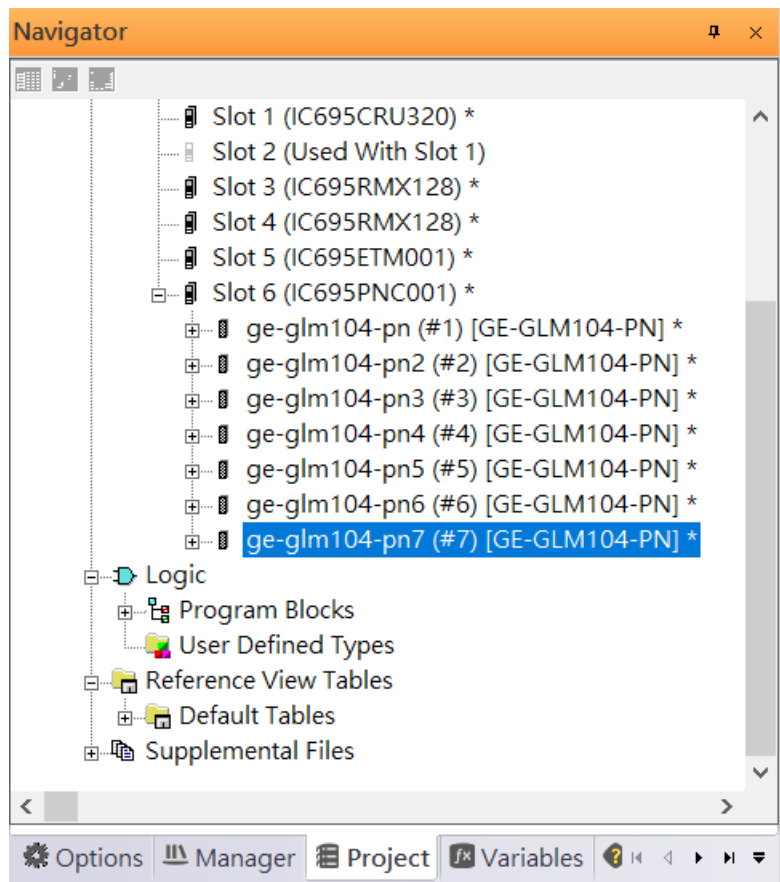


Figure 142

Then add the eighth I/O device in the PNC001.

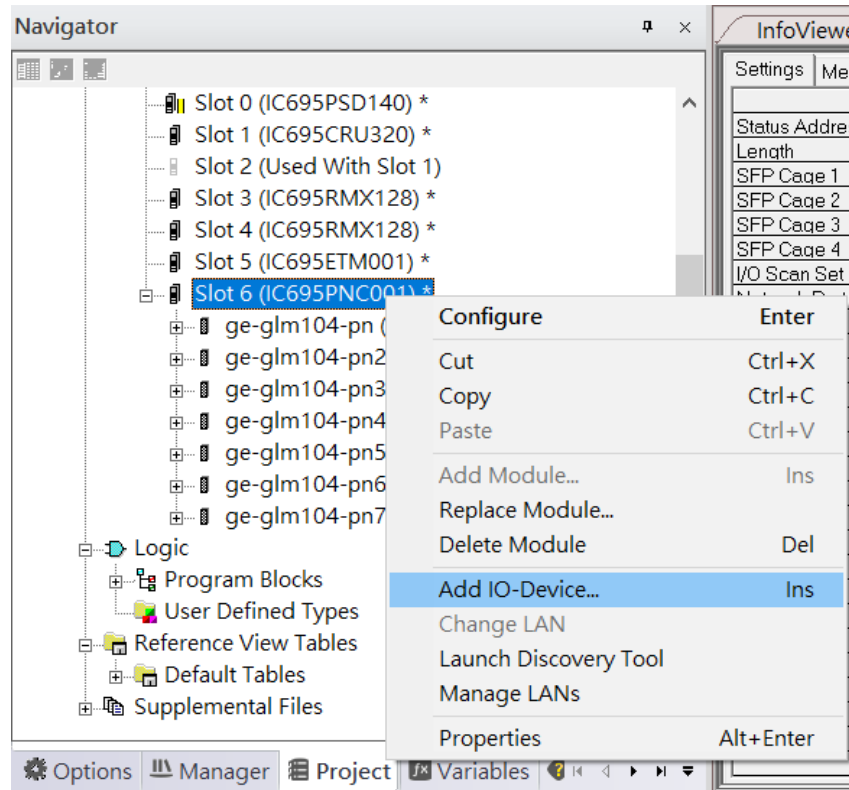


Figure 143

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

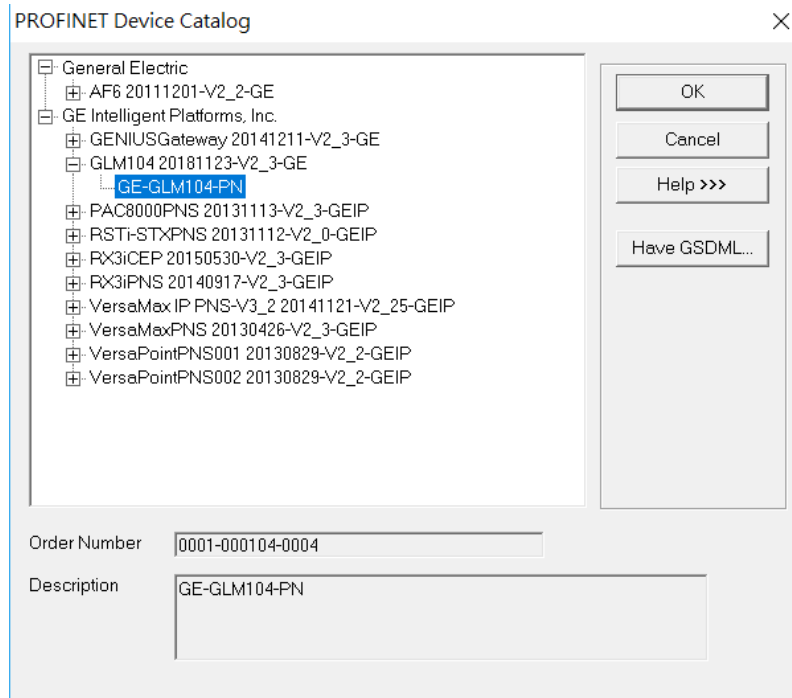


Figure 144

Now the I/O device GLM104(SW8) is ready and is a sub slot on PNC001.

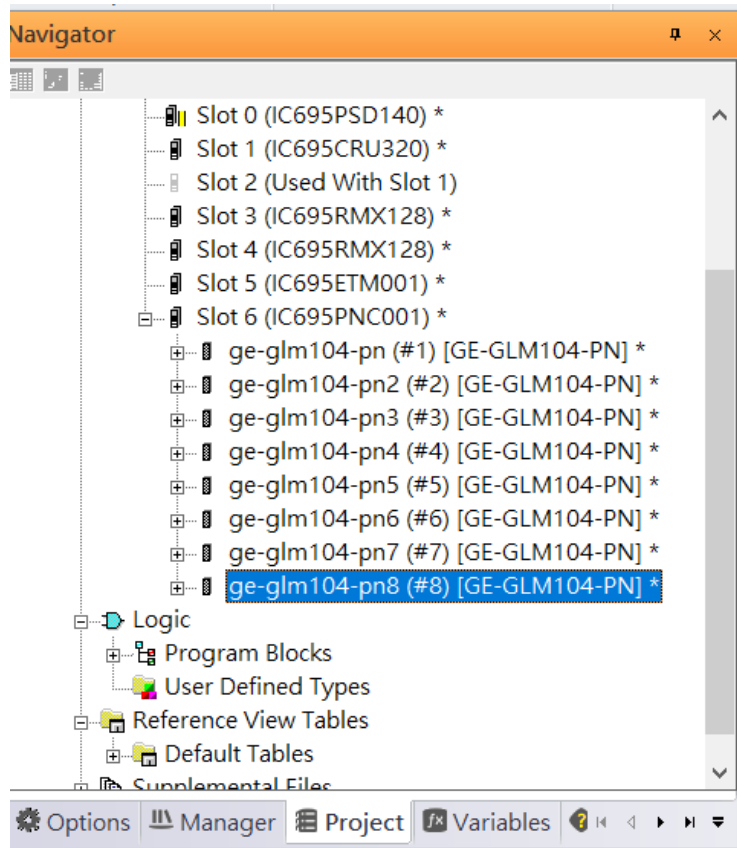


Figure 145

Then add the ninth I/O device in the PNC001.

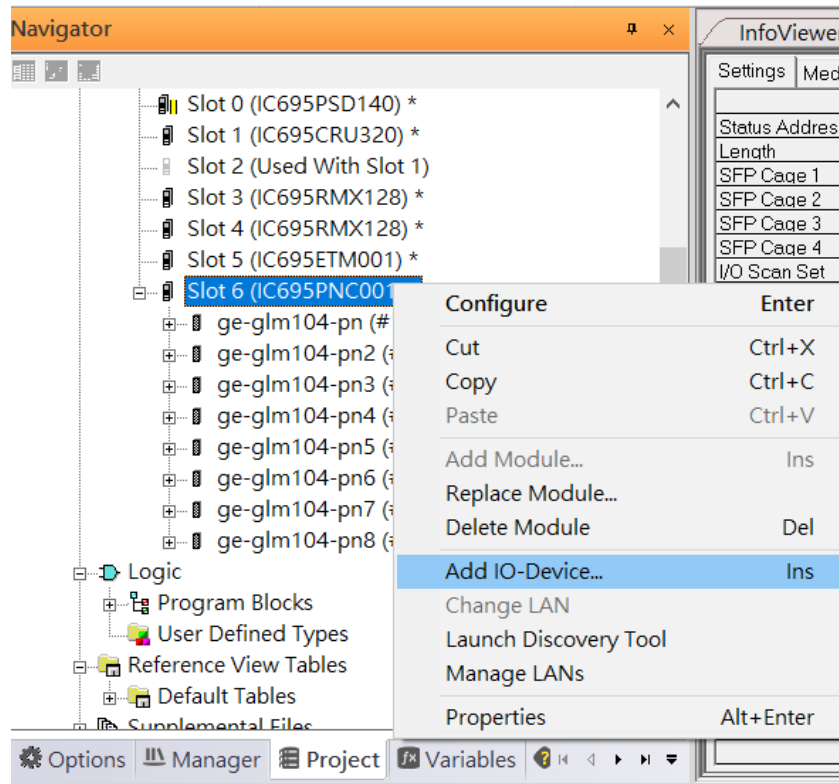


Figure 146

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [VersaMaxPNS 20130426-V2_3-GEIP] -> [VersaMax PROFINET IO Scanner (2 RJ-45 Copper connectors)] and click [OK]

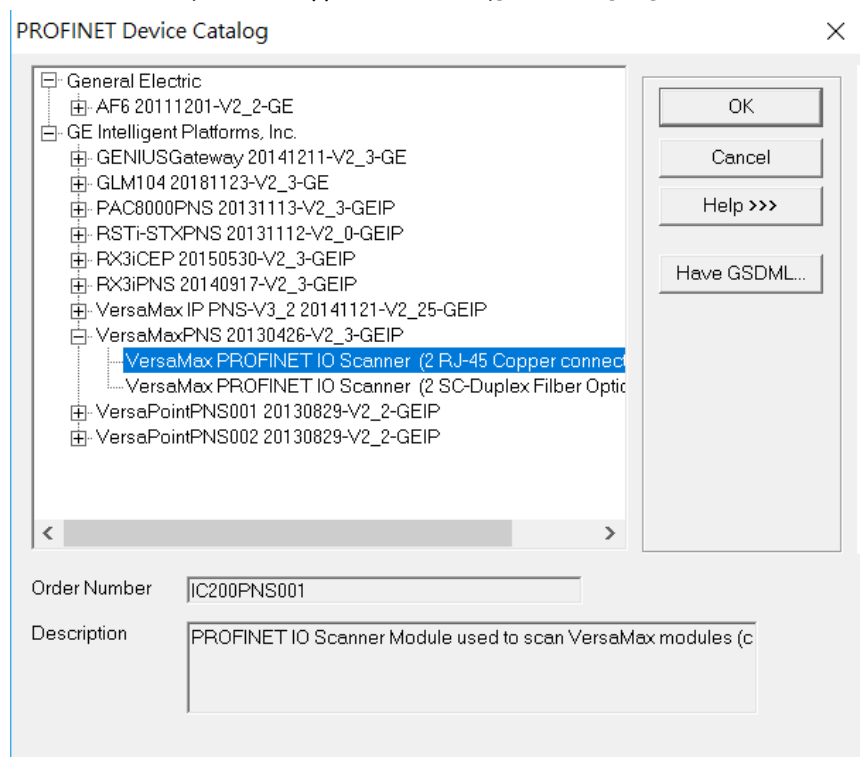


Figure 147

Now the I/O device VersaMax PROFINET IO Scanner is ready and is a subslot on PNC001.

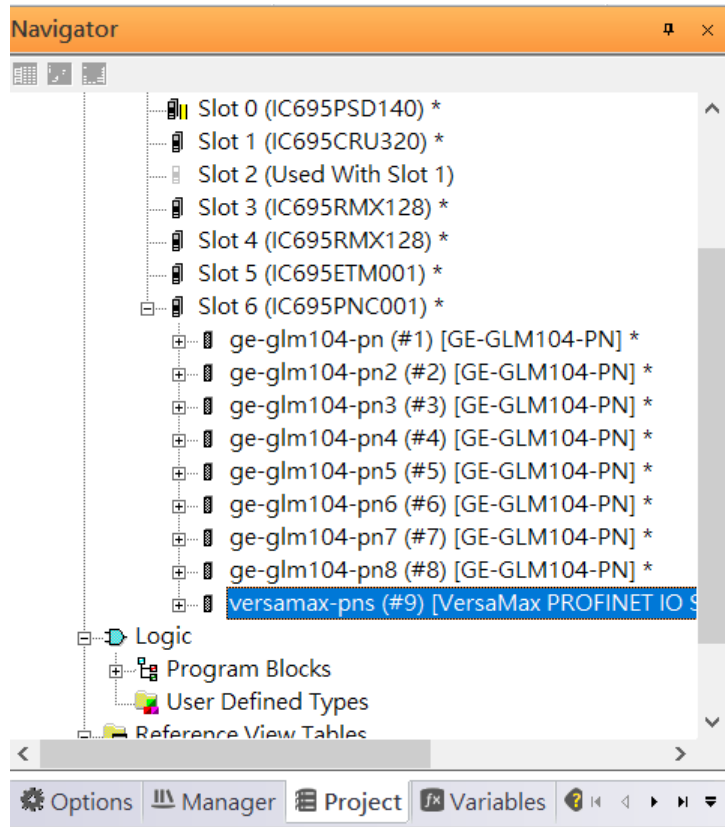


Figure 148

4.2.4 DCP Set Command

To configure the setting or monitor the status on the I/O Device, the communication interface is also based on Ethernet network. We can specify the IP address and the device name from I/O Controller via the DCP (Discovery and Configuration Protocol).

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn, and click the right button. Select [Properties], see the following picture.

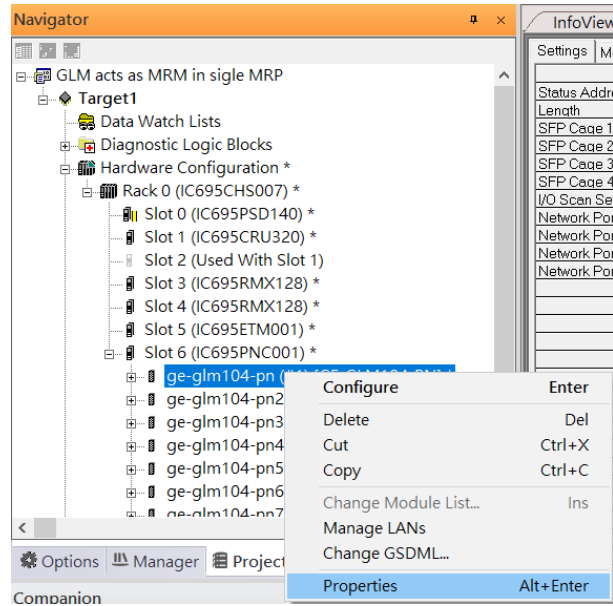


Figure 149

In this table, the I/O Device name can be specified in field [Device Name], and the IP address can be set in field [IP address]. We modify device name to “ge-glm104-pn-sw-1” and IP address to “192.168.0.21” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-1” later.

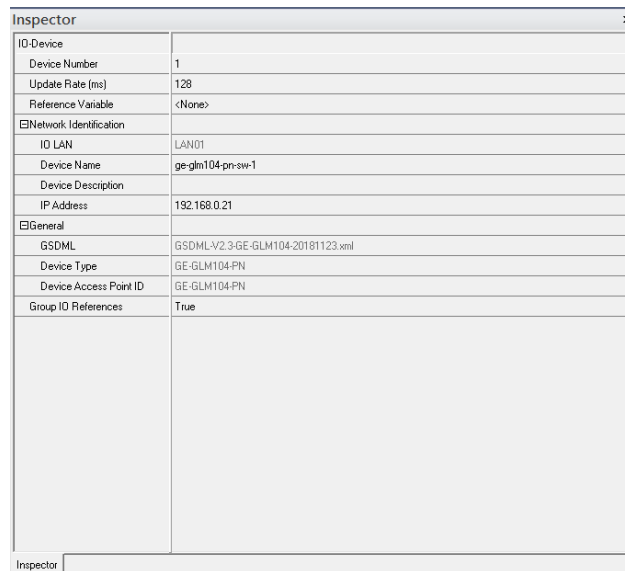


Figure 150

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn2, and click the right button. Select [Properties], see the following picture.

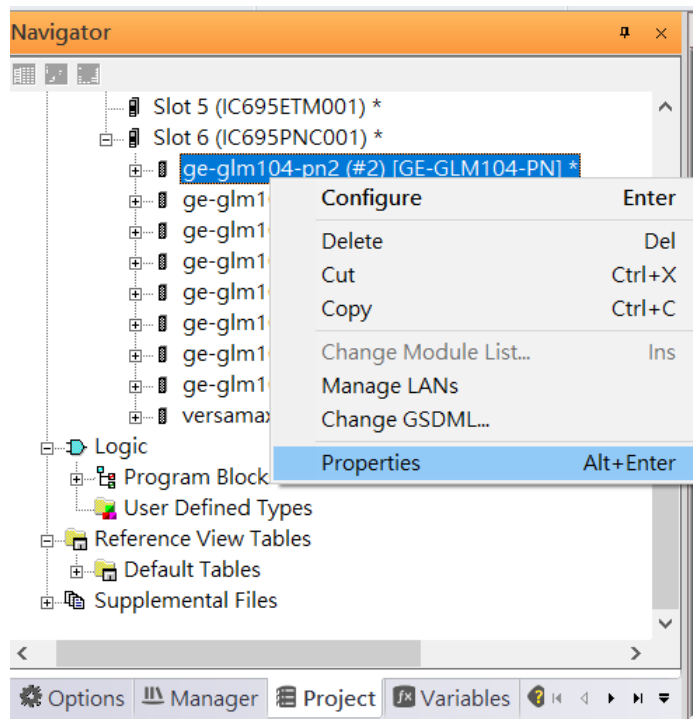


Figure 151

We modify device name to “ge-glm104-pn-sw-2” and IP address to “192.168.0.22” then we use I/O Device DiscoveryTool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-2” later

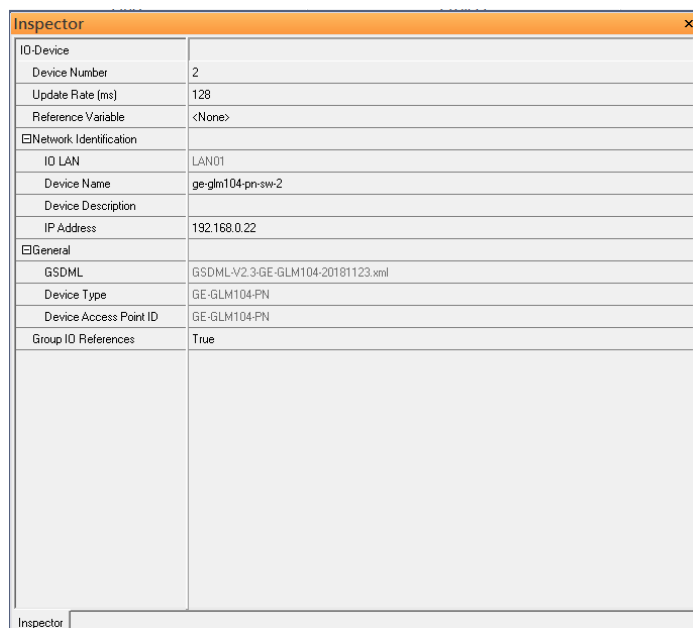


Figure 152

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn3, and click the right button. Select [Properties], see the following picture.

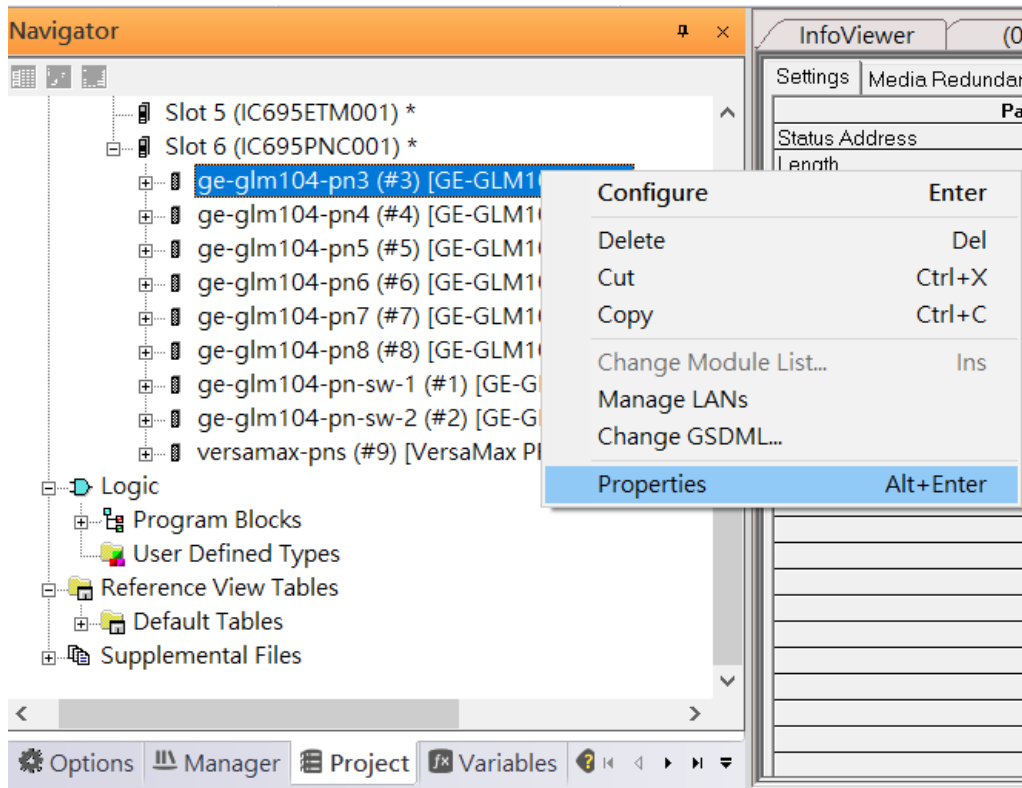


Figure 153

We modify device name to “ge-glm104-pn-sw-3” and IP address to “192.168.0.23” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-3” later.

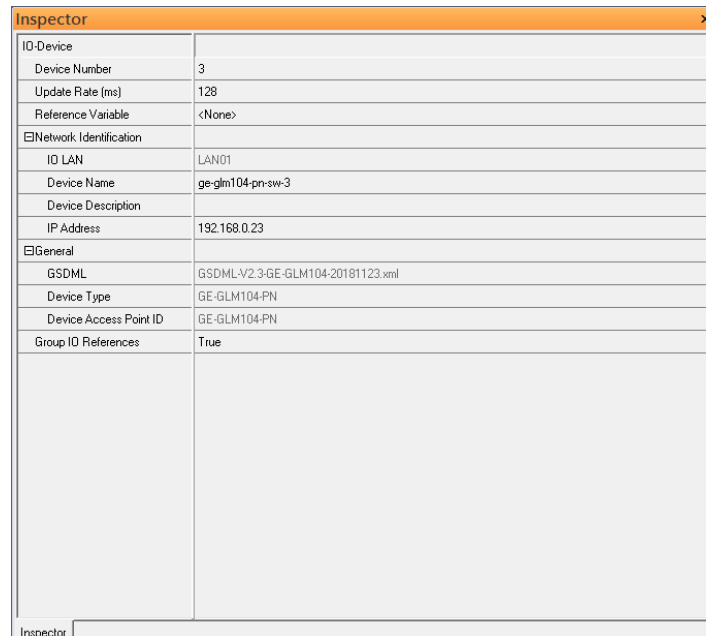


Figure 154

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn4, and click the right button. Select [Properties], see the following picture.

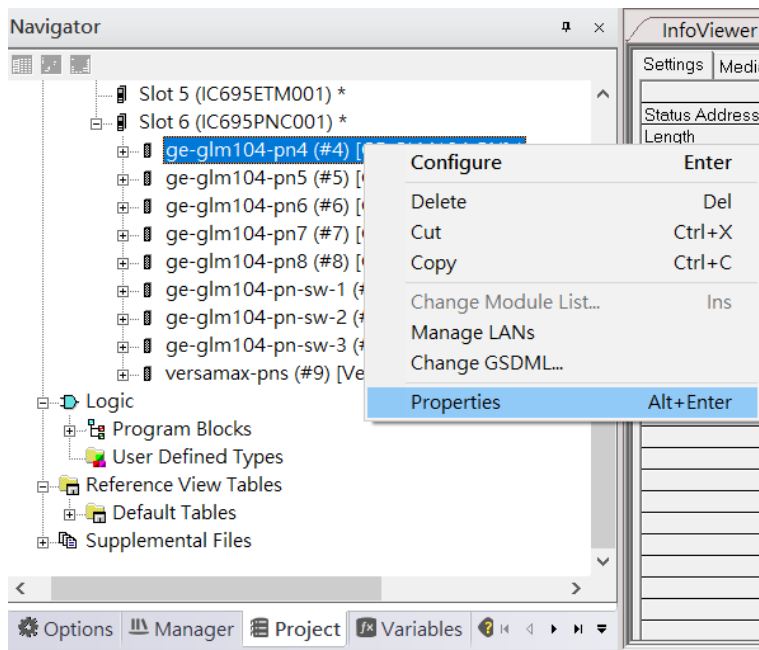


Figure 155

We modify device name to “ge-glm104-pn-sw-4” and IP address to “192.168.0.24” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-4” later.

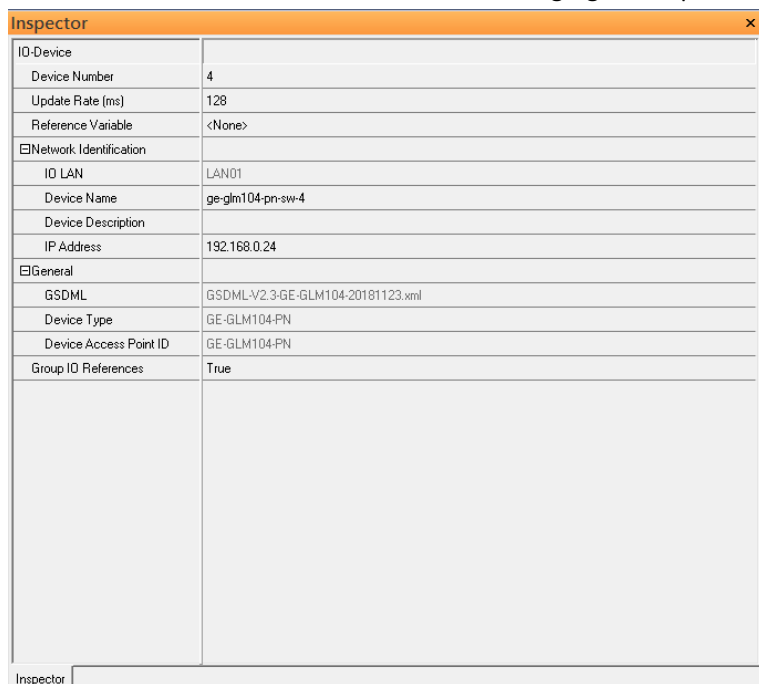


Figure 156

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn5, and click the right button. Select [Properties], see the following picture.

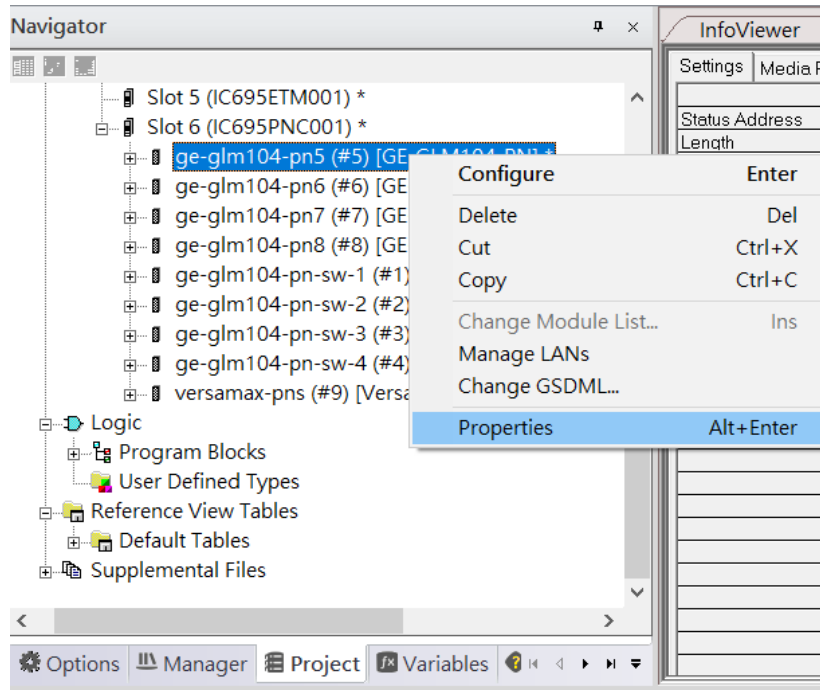


Figure 157

We modify device name to “ge-glm104-pn-sw-5” and IP address to “192.168.0.25” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-5” later.

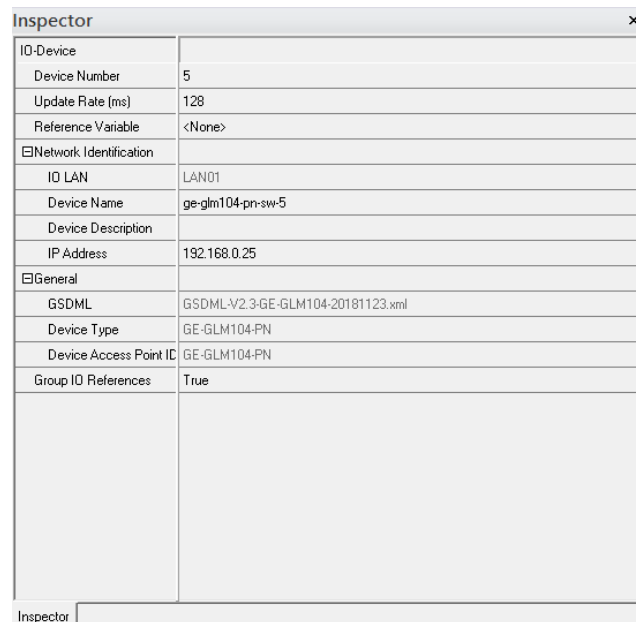


Figure 158

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn6, and click the right button. Select [Properties], see the following picture.

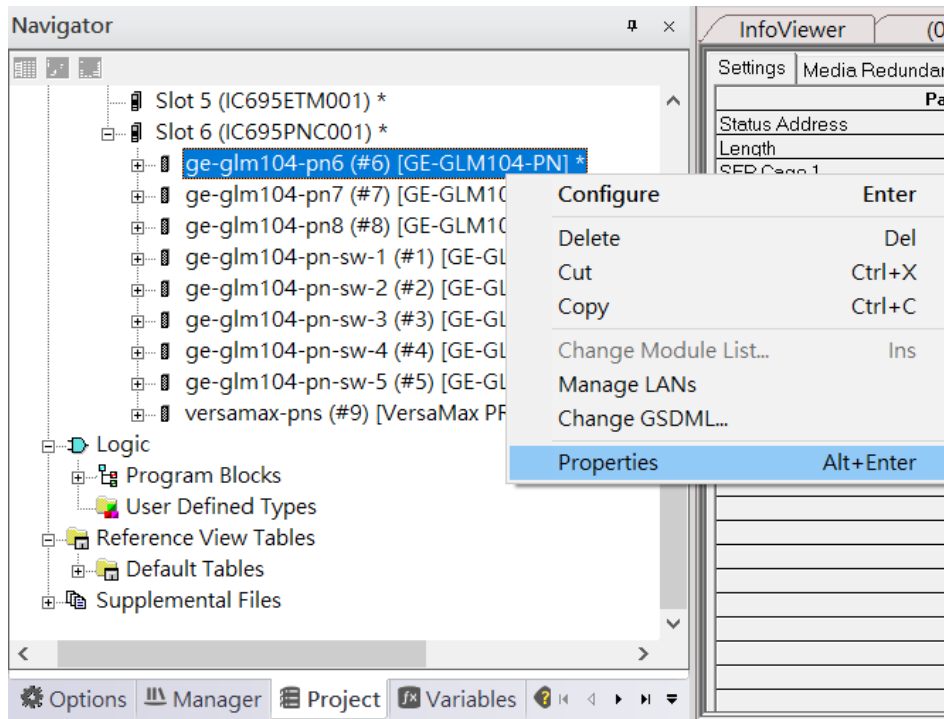


Figure 159

We modify device name to “ge-glm104-pn-sw-6” and IP address to “192.168.0.26” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-6” later.

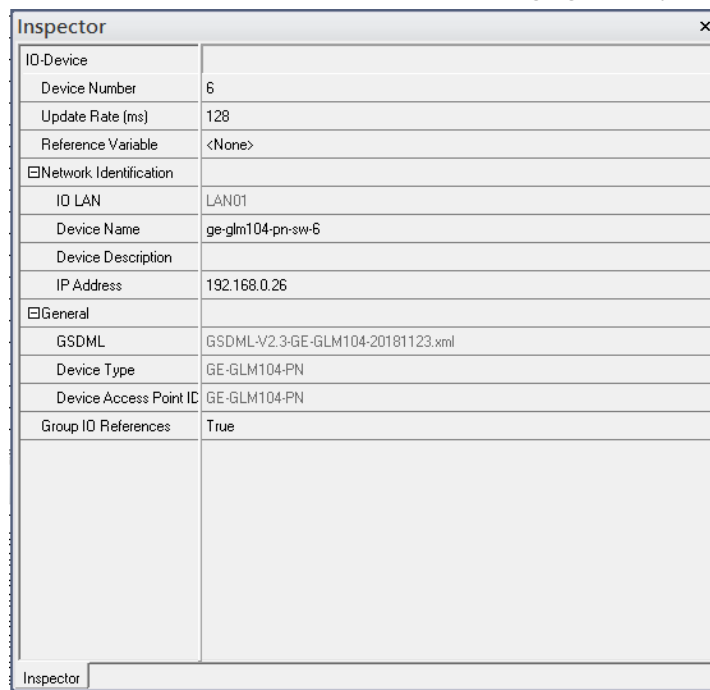


Figure 160

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn7, and click the right button. Select [Properties], see the following picture.

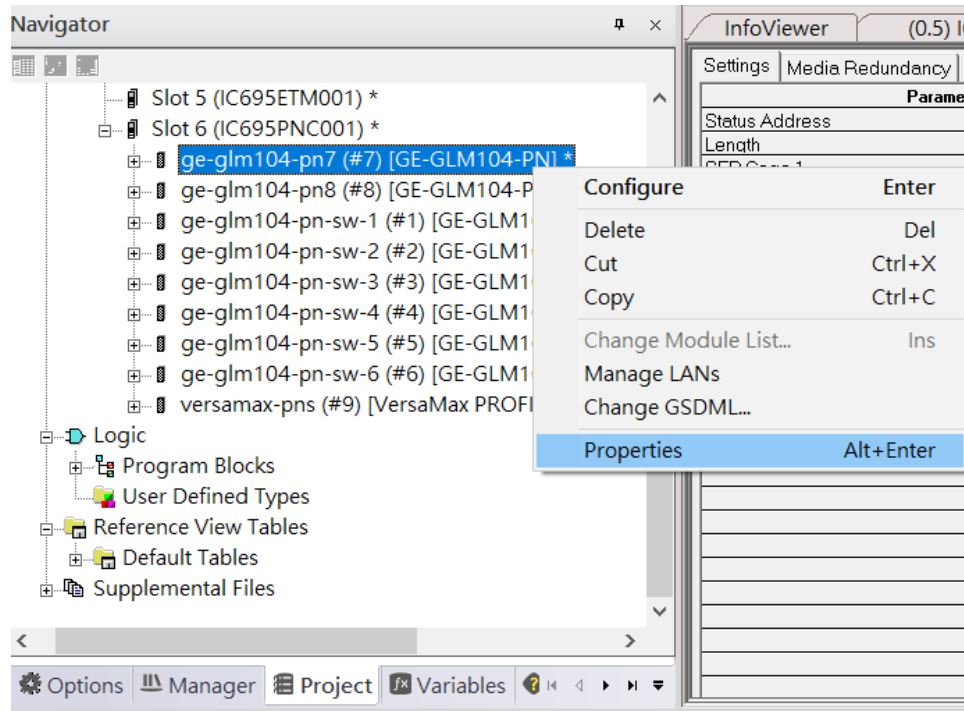


Figure 161

We modify device name to “ge-glm104-pn-sw-7” and IP address to “192.168.0.27” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-7” later.

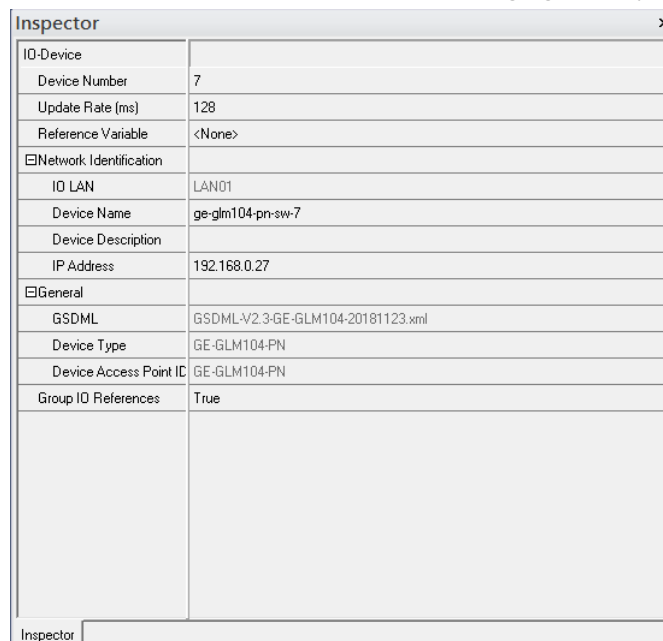


Figure 162

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn8, and click the right button. Select [Properties], see the following picture.

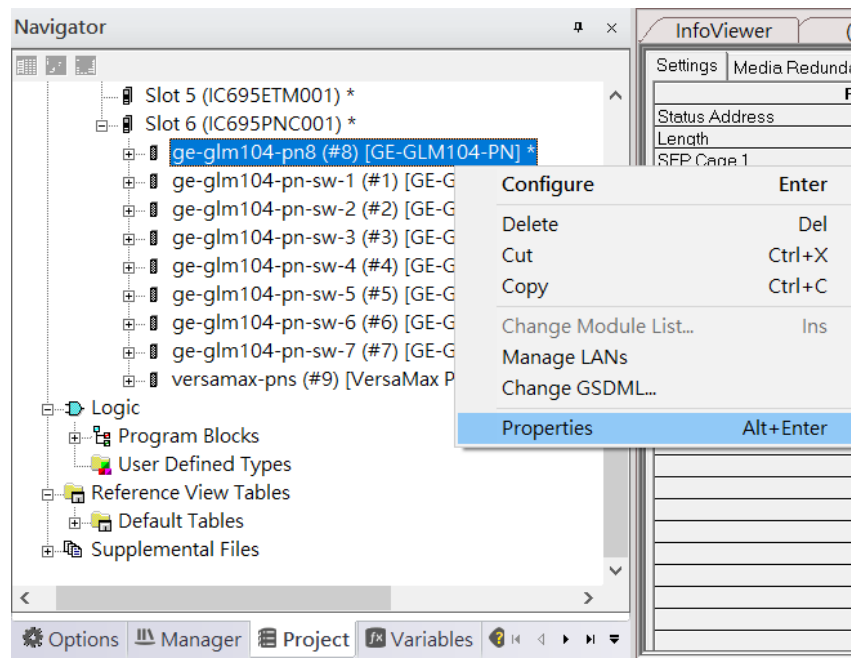


Figure 163

We modify device name to “ge-glm104-pn-sw-8” and IP address to “192.168.0.28” then we use I/O Device DiscoveryTool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-8” later.

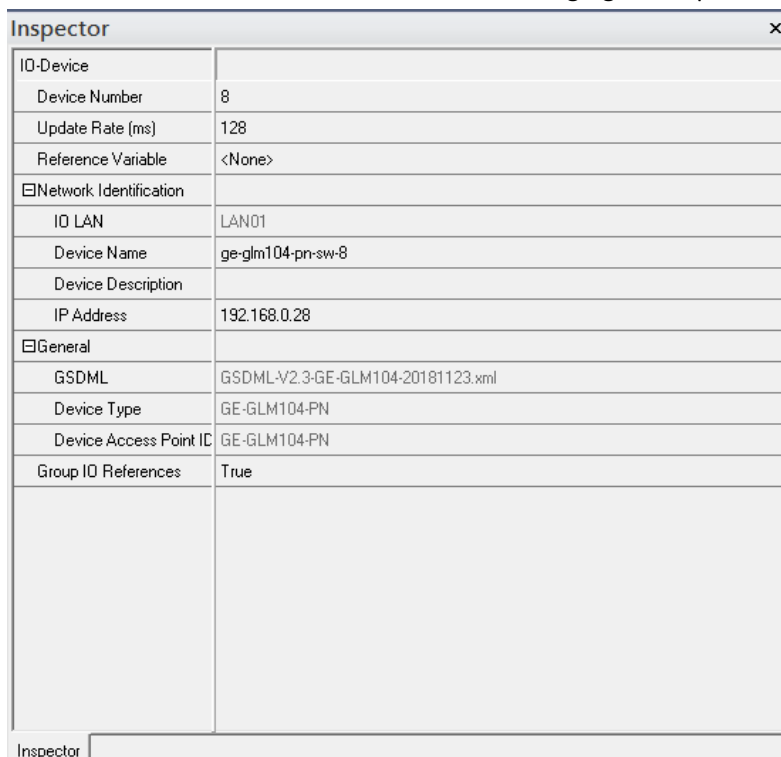


Figure 164

Under the slot 6, PNC001, select the I/O Device, versamax-pns, and click the right button. Select [Properties], see the following picture

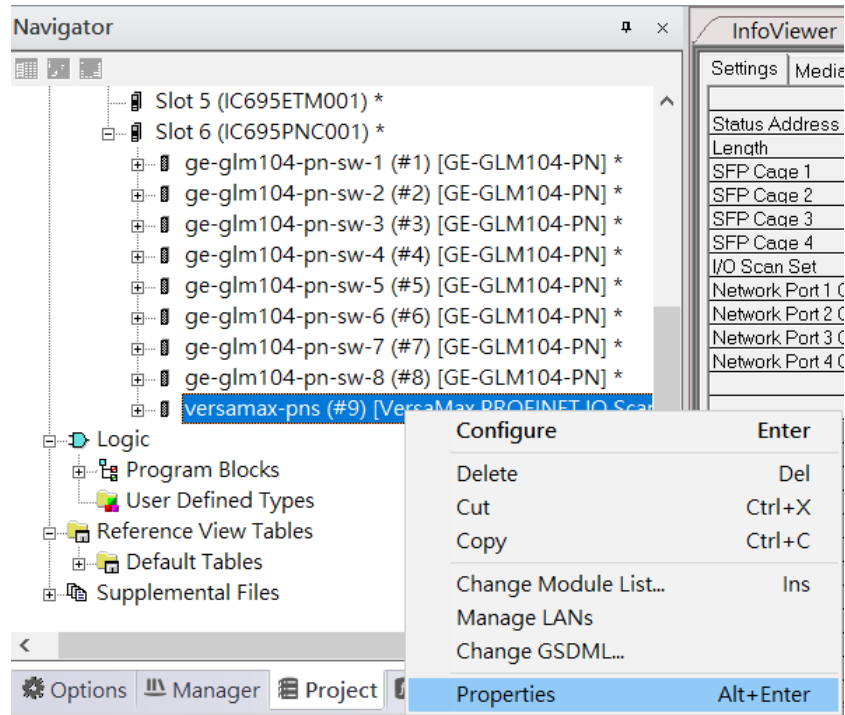


Figure 165

We modify device name to “versamax-pns-pnio-1” and IP address to “192.168.0.55” then we use I/O Device DiscoveryTool to observed an I/O Device and set I/O Device’s name to “versamax-pns-pnio-1” later.

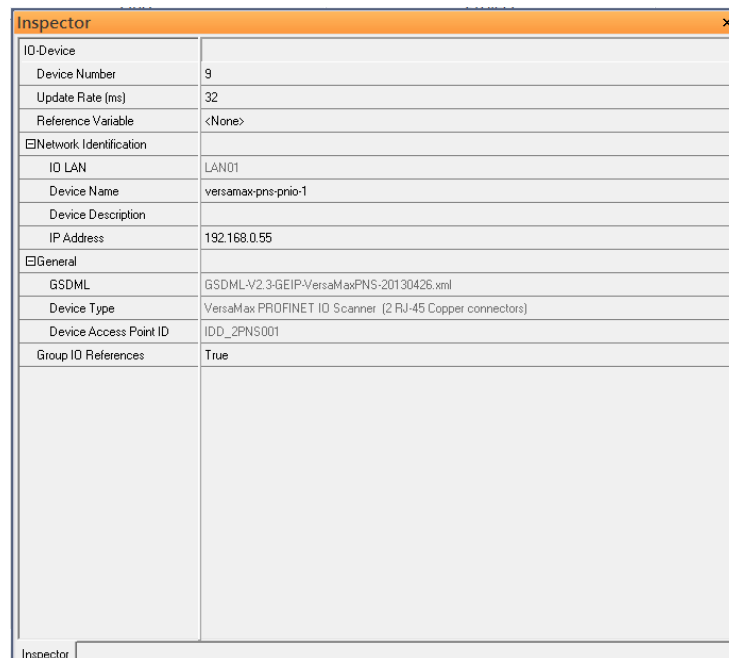


Figure 166

Now all the devices have been changed their device name and IP address like the following picture.

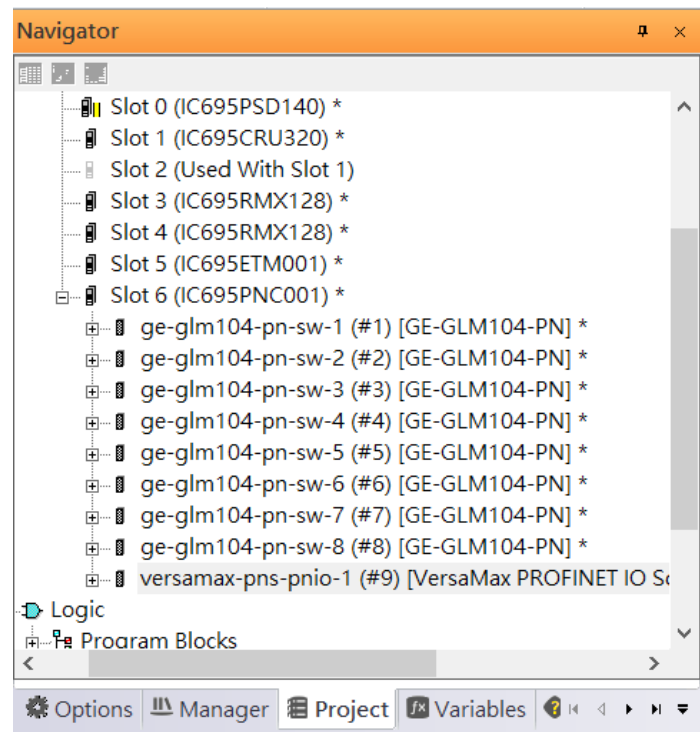


Figure 167

The tool is shown in the following picture, then press [Refresh Device List].

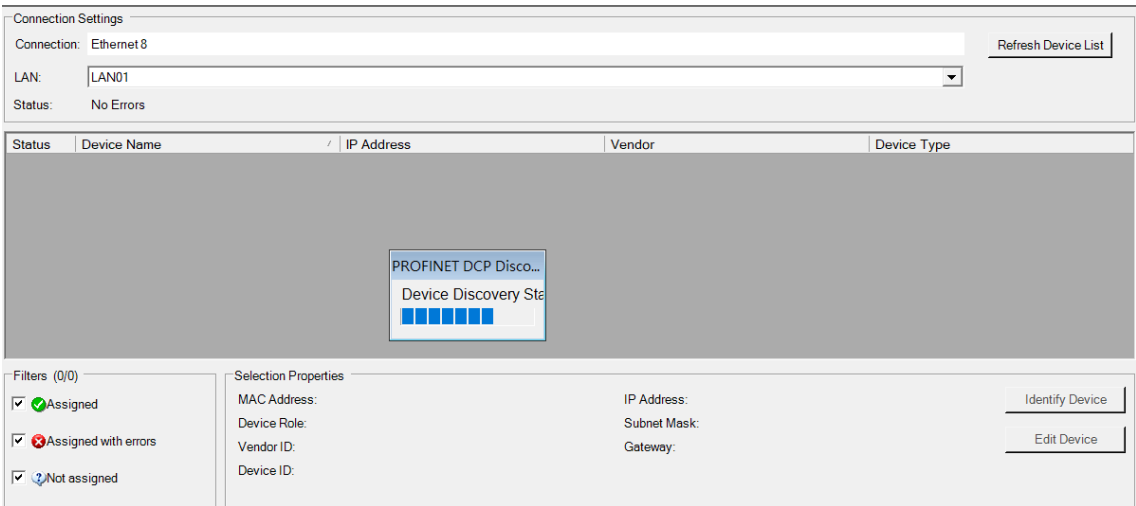


Figure 169

Then the connected I/O Device is listed in the following table.

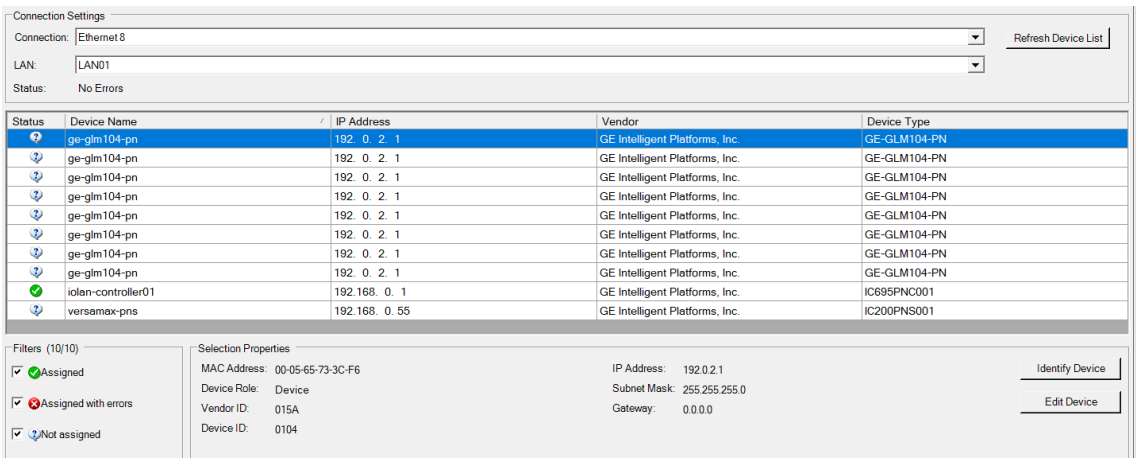


Figure 170

There are I/O Devices and their status are in “Not assigned”. We need to change their device name to and IP address. Use [Identify Device] to make sure which device we set according to the hardware topology. Then start to set SW-1 device name and IP address.

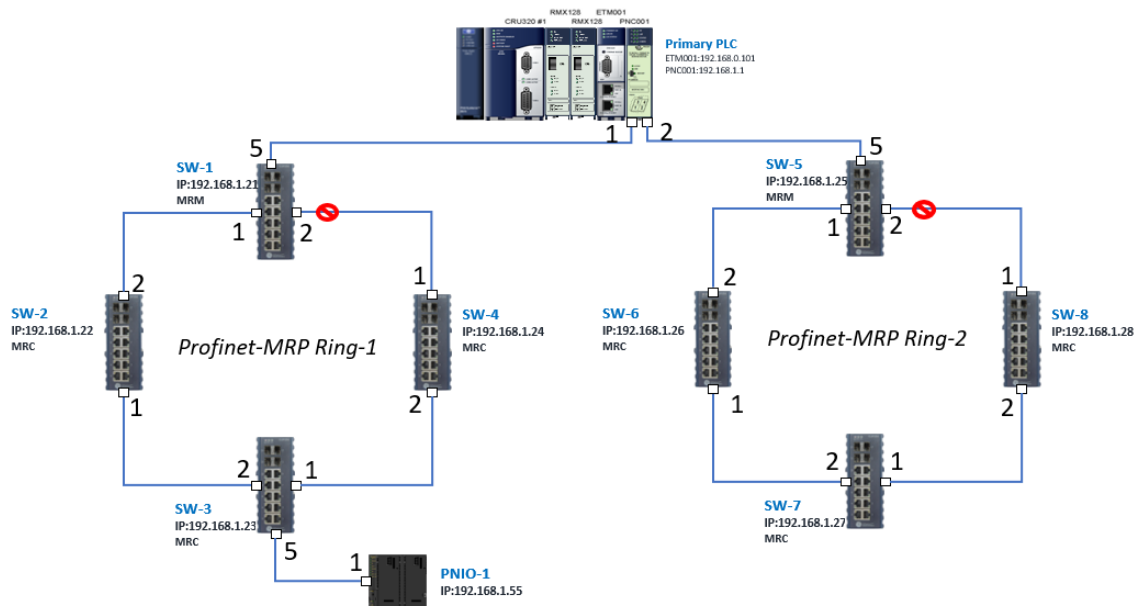


Figure 171

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-1” and click [Set Device Name] button, then set IP Address to “192.168.0.21”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

GE-GLM104-PN Properties

Vendor Name: GE Intelligent Platforms, Inc. Vendor ID: 015A
 MAC Address: 00-05-65-72-FB-D0 Device ID: 0104
 Device Type: GE-GLM104-PN Device Role: Device

Device Name: ge-glm104-pn-sw-1

IP Address:
 IP Address: 192.168.0.21
 Subnet Mask: 255.255.255.0
 Gateway: 0.0.0.0

Reset device to factory settings

Exit

Figure 172

Then set SW-2 device name and IP address

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-2” and click [Set Device Name] button, then set IP Address to “192.168.0.22”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name: GE Intelligent Platforms, Inc. | Vendor ID: 015A
- MAC Address: 00-05-65-73-3C-D6 | Device ID: 0104 | [Identify Device]
- Device Type: GE-GLM104-PN | Device Role: Device
- Device Name: [ge-glm104-pn-sw-2] | [Set Device Name]
- IP Address: [192.168.0.22]
- Subnet Mask: [255.255.255.0] | [Set IP Information]
- Gateway: [0.0.0.0]
- Reset device to factory settings | [Reset Device]
- [Exit]

Figure 173

Then set SW-3 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-3” and click [Set Device Name] button, then set IP Address to “192.168.0.23”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name: GE Intelligent Platforms, Inc. | Vendor ID: 015A
- MAC Address: 00-05-65-73-3D-7E | Device ID: 0104 | [Identify Device]
- Device Type: GE-GLM104-PN | Device Role: Device
- Device Name: [ge-glm104-pn-sw-3] | [Set Device Name]
- IP Address: [192.168.0.23]
- Subnet Mask: [255.255.255.0] | [Set IP Information]
- Gateway: [0.0.0.0]
- Reset device to factory settings | [Reset Device]
- [Exit]

Figure 174

Then set SW-4 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-4” and click [Set Device Name] button, then set IP Address to “192.168.0.24”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name:** GE Intelligent Platforms, Inc.
- Vendor ID:** 015A
- MAC Address:** 00-05-65-73-3C-BE
- Device ID:** 0104
- Device Type:** GE-GLM104-PN
- Device Role:** Device
- Buttons:** Identify Device, Set Device Name, Set IP Information, Reset Device, Exit.
- Device Name:** ge-glm104-pn-sw-4
- IP Address:** 192.168.0.24
- Subnet Mask:** 255.255.255.0
- Gateway:** 0.0.0.0

Figure 175

Then set SW-5 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-5” and click [Set Device Name] button, then set IP Address to “192.168.0.25”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box after configuration for device SW-5. It contains the following fields and buttons:

- Vendor Name:** GE Intelligent Platforms, Inc.
- Vendor ID:** 015A
- MAC Address:** 00-05-65-73-3C-D6
- Device ID:** 0104
- Device Type:** GE-GLM104-PN
- Device Role:** Device
- Buttons:** Identify Device, Set Device Name, Set IP Information, Reset Device, Exit.
- Device Name:** ge-glm104-pn-sw-5
- IP Address:** 192.168.0.25
- Subnet Mask:** 255.255.255.0
- Gateway:** 0.0.0.0

A message box at the bottom of the dialog states: "The IP address information was written to the device successfully. The Device Name was written to the device successfully (ge-glm104-pn changed to ge-glm104-pn-sw-5)".

Figure 176

Then set SW-6 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-6” and click [Set Device Name] button, then set IP Address to “192.168.0.26”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name:** GE Intelligent Platforms, Inc.
- Vendor ID:** 015A
- MAC Address:** 00-05-65-73-3C-F6
- Device ID:** 0104
- Device Type:** GE-GLM104-PN
- Device Role:** Device
- Buttons:** Identify Device, Set Device Name, Set IP Information, Reset Device, Exit.
- Device Name:** ge-glm104-pn-sw-6
- IP Address:** 192.168.0.26
- Subnet Mask:** 255.255.255.0
- Gateway:** 0.0.0.0
- Message Log:** The IP address information was written to the device successfully. The Device Name was written to the device successfully (ge-glm104-pn changed to ge-glm104-pn-sw-6)

Figure 177

Then set SW-7 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-7” and click [Set Device Name] button, then set IP Address to “192.168.0.27”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name:** GE Intelligent Platforms, Inc.
- Vendor ID:** 015A
- MAC Address:** 00-05-65-73-3C-5E
- Device ID:** 0104
- Device Type:** GE-GLM104-PN
- Device Role:** Device
- Buttons:** Identify Device, Set Device Name, Set IP Information, Reset Device, Exit.
- Device Name:** ge-glm104-pn-sw-7
- IP Address:** 192.168.0.27
- Subnet Mask:** 255.255.255.0
- Gateway:** 0.0.0.0
- Message Log:** The IP address information was written to the device successfully. The Device Name was written to the device successfully (ge-glm104-pn changed to ge-glm104-pn-sw-7)

Figure 178

Then set SW-8 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-8” and click [Set Device Name] button, then set IP Address to “192.168.0.28”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

GE-GLM104-PN Properties

Vendor Name: GE Intelligent Platforms, Inc. Vendor ID: 015A
 MAC Address: 00-05-65-73-3C-8E Device ID: 0104
 Device Type: GE-GLM104-PN Device Role: Device

Identify Device

Device Name
 ge-glm104-pn-sw-8 Set Device Name

IP Address
 IP Address: 192.168.0.28
 Subnet Mask: 255.255.255.0
 Gateway: 0.0.0.0 Set IP Information

Reset device to factory settings
 Reset Device

The IP address information was written to the device successfully
 The Device Name was written to the device successfully (ge-glm104-pn changed to ge-glm104-pn-sw-8)

Exit

Figure 179

The set PNIO-1 device name and IP address.

Click [Edit Device], set Device Name to “versamax-pns-pnio-1” and click [Set Device Name] button, then set IP Address to “192.168.0.55”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

IC200PNS001 Properties

Vendor Name: GE Intelligent Platforms, Inc. Vendor ID: 015A
 MAC Address: 00-09-91-56-C3-0E Device ID: 0003
 Device Type: IC200PNS001 Device Role: Device

Identify Device

Device Name
 versamax-pns-pnio-1 Set Device Name

IP Address
 IP Address: 192.168.0.55
 Subnet Mask: 255.255.255.0
 Gateway: 0.0.0.0 Set IP Information

Reset device to factory settings
 Reset Device

Exit

Figure 180

After assigning Device Name and IP Address correctly, the Status will be in “Assigned” status.

InfoViewer (0.6.7.0) GE-GLM104-PN PROFINET DCP - Direct Connection				
Connection Settings				
Connection: Ethernet 8				Refresh Device List
LAN: LAN01				
Status: No Errors				
Status	Device Name	IP Address	Vendor	Device Type
✓	ge-glm104-pn-sw-1	192.168. 0. 21	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-2	192.168. 0. 22	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-3	192.168. 0. 23	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-4	192.168. 0. 24	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-5	192.168. 0. 25	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-6	192.168. 0. 26	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-7	192.168. 0. 27	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-8	192.168. 0. 28	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	iolan-controller01	192.168. 0. 1	GE Intelligent Platforms, Inc.	IC695PNC001
✓	versamax-pns-pnio-1	192.168. 0. 55	GE Intelligent Platforms, Inc.	IC200PNS001
Filters (10/10)				
<input checked="" type="checkbox"/> Assigned	Selection Properties			
<input checked="" type="checkbox"/> Assigned with errors	MAC Address: 00-09-91-56-C3-0E			
<input checked="" type="checkbox"/> Not assigned	Device Role: Device			
	Vendor ID: 015A			
	Device ID: 0003			
	IP Address: 192.168.0.55			
	Subnet Mask: 255.255.255.0			
	Gateway: 0.0.0.0			
	Identify Device			
	Edit Device			

Figure 181

4.2.6 MRP Setting

Setting MRP for I/O controller and I/O devices according to the following figure.

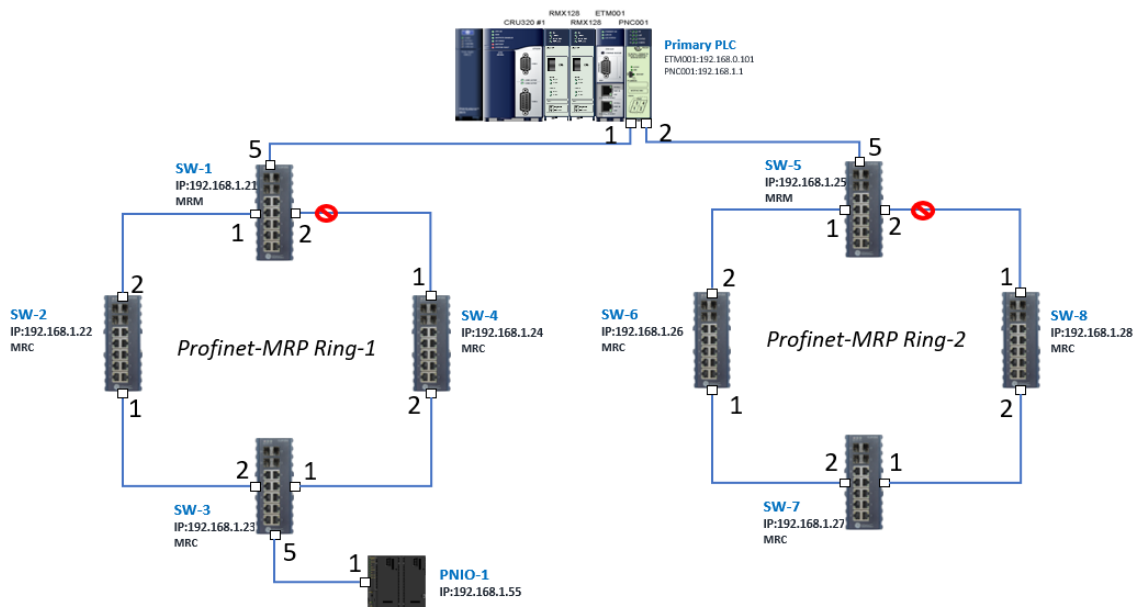


Figure 182

First, configure the MRP in Profinet MRP Ring-1(in the box).

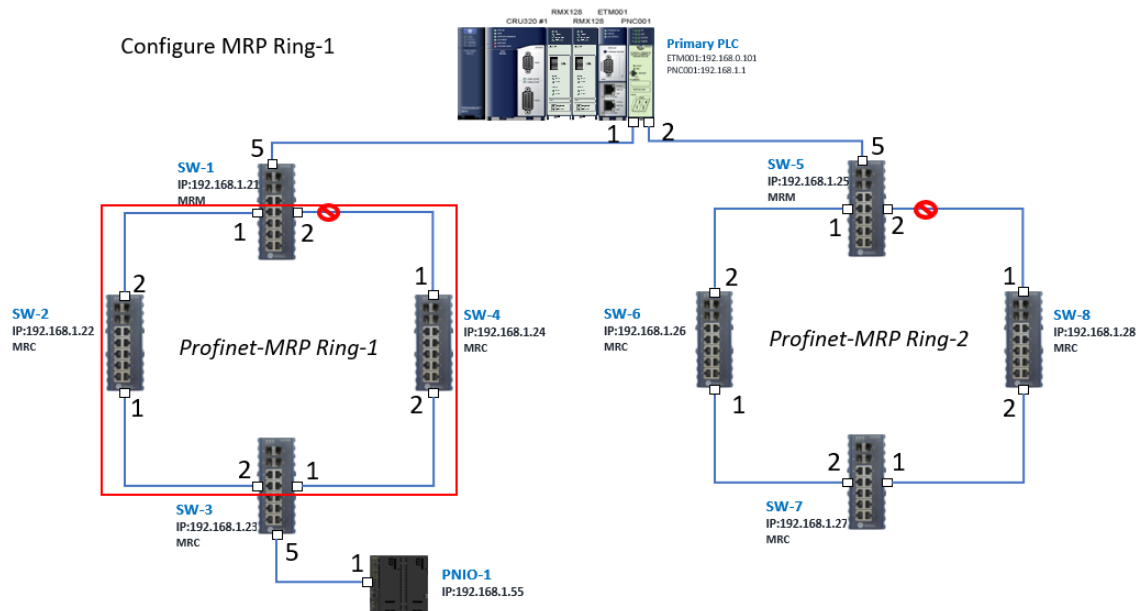


Figure 183

In order to enable MRP function in SW1, click the right button and choose [Configure].
It will show “Media Redundancy” on the right window.

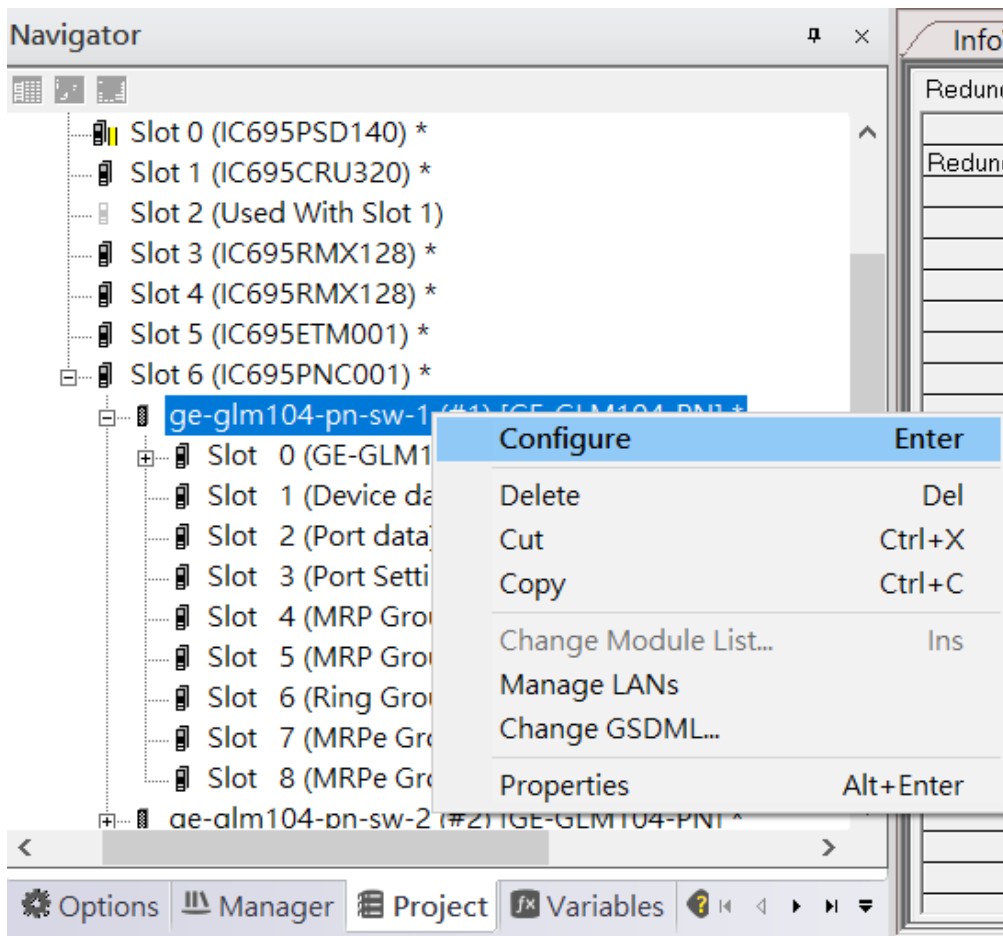


Figure 184

Enable MRP function by changing the value of “Media Redundancy” to manager and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

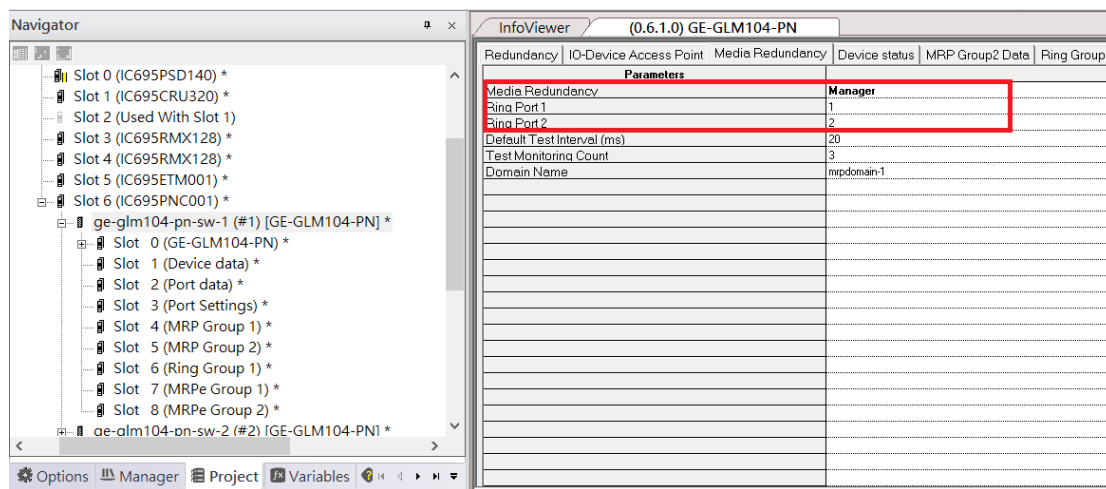


Figure 185

To enable MRP function in SW2, click the right button and choose [Configure].
It will show “Media Redundancy” on the right window.

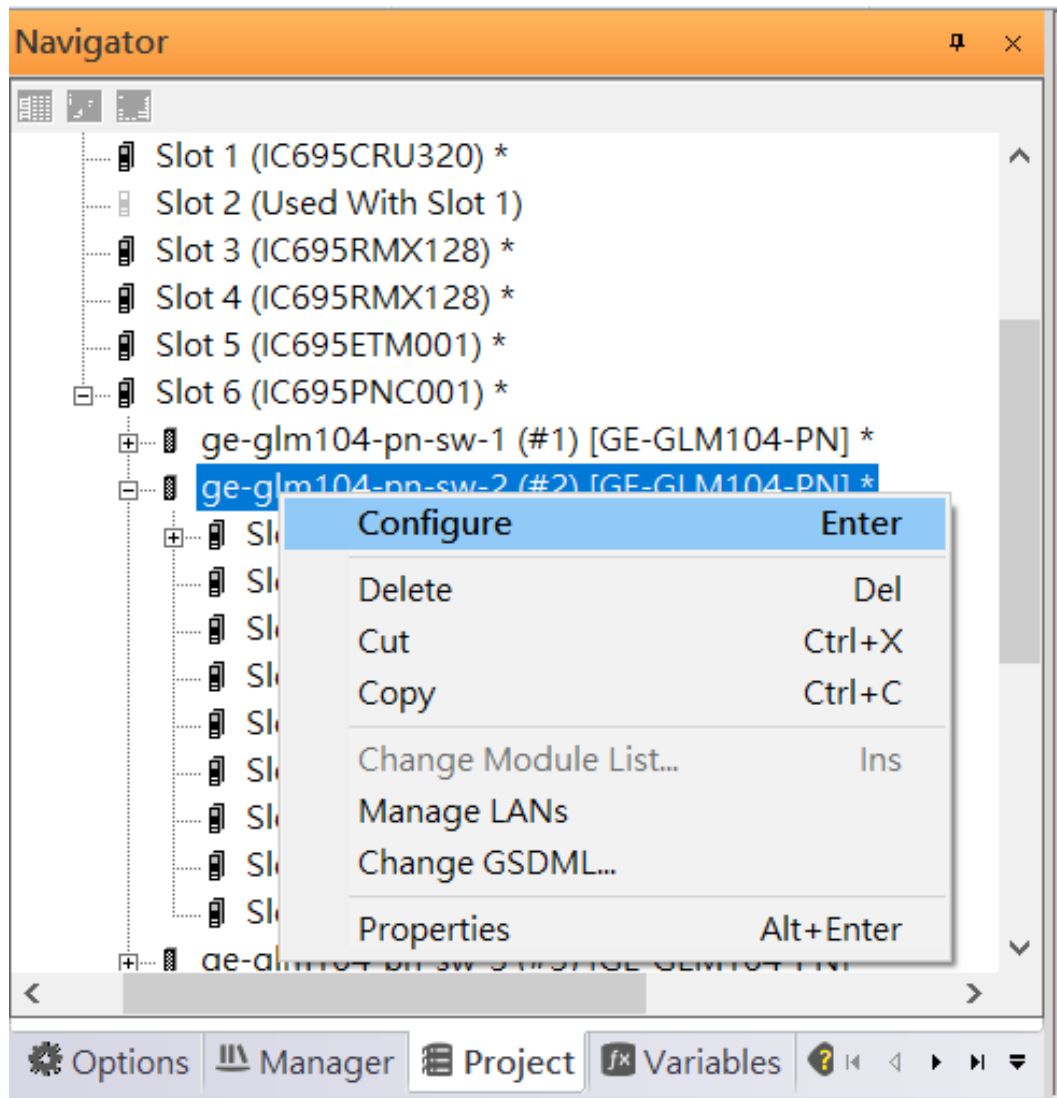


Figure 186

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

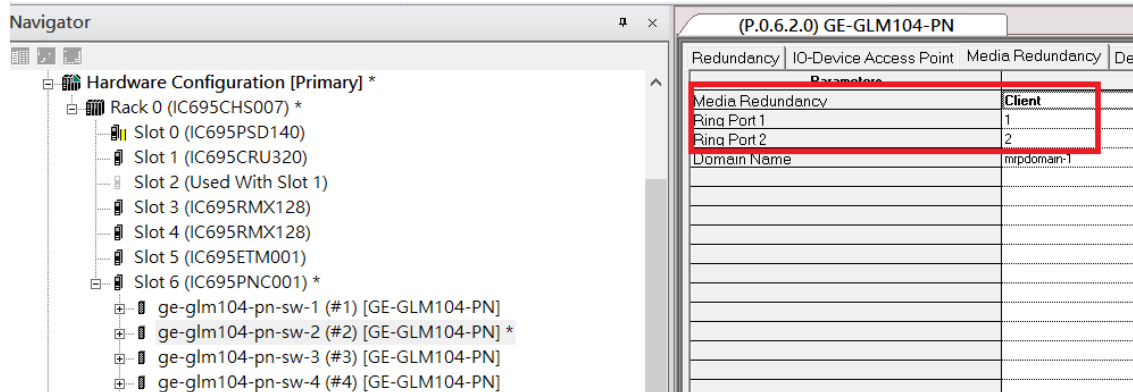


Figure 187

To enable MRP function in SW3, click the right button and choose [Configure].

It will show “Media Redundancy” on the right window.

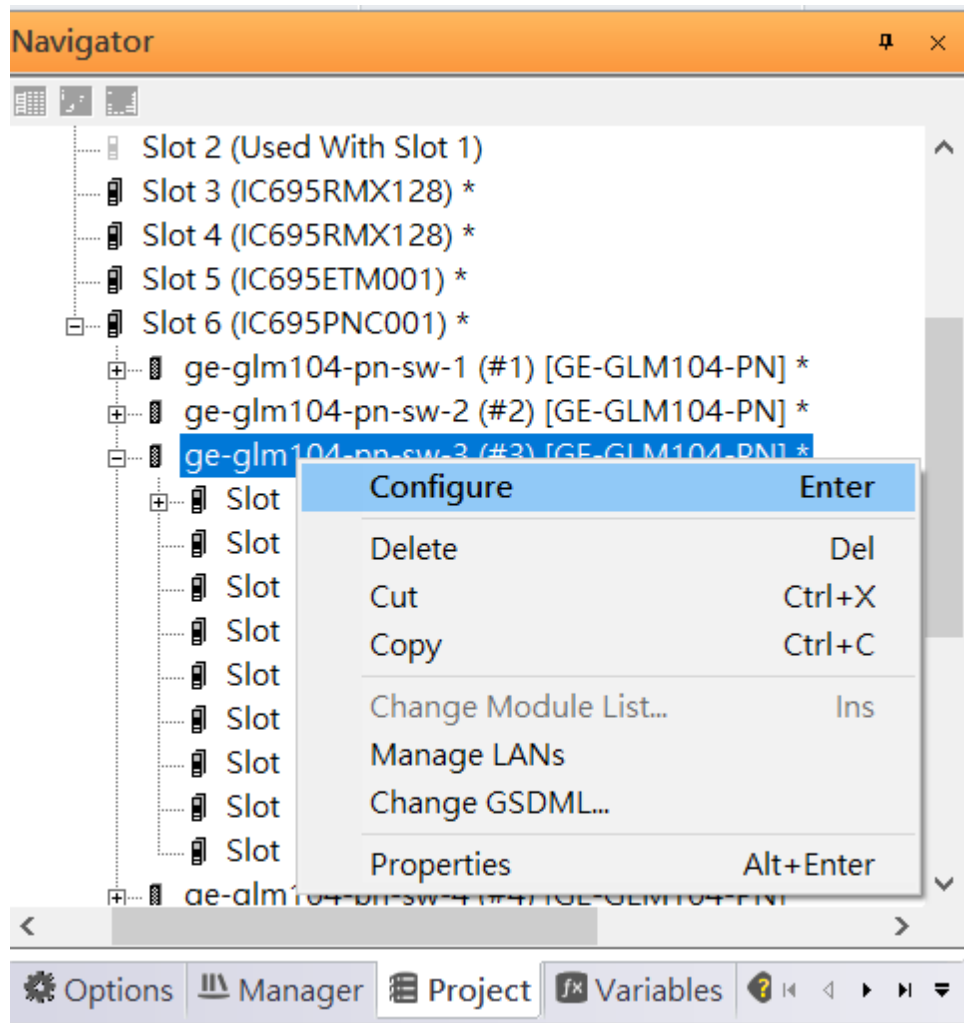


Figure 188

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

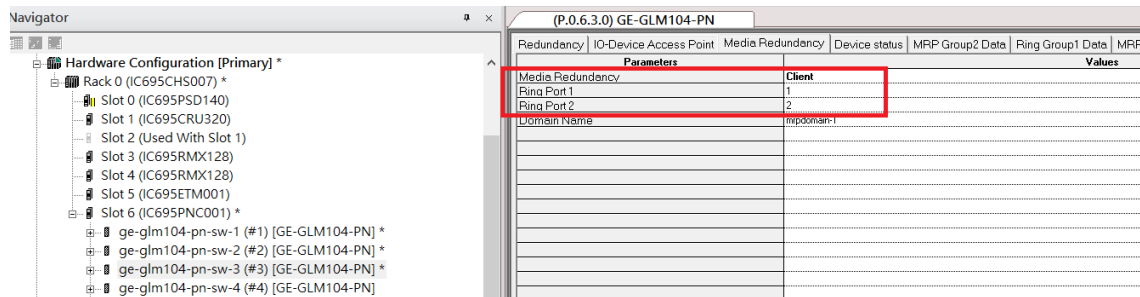


Figure 189

To enable MRP function in SW4, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

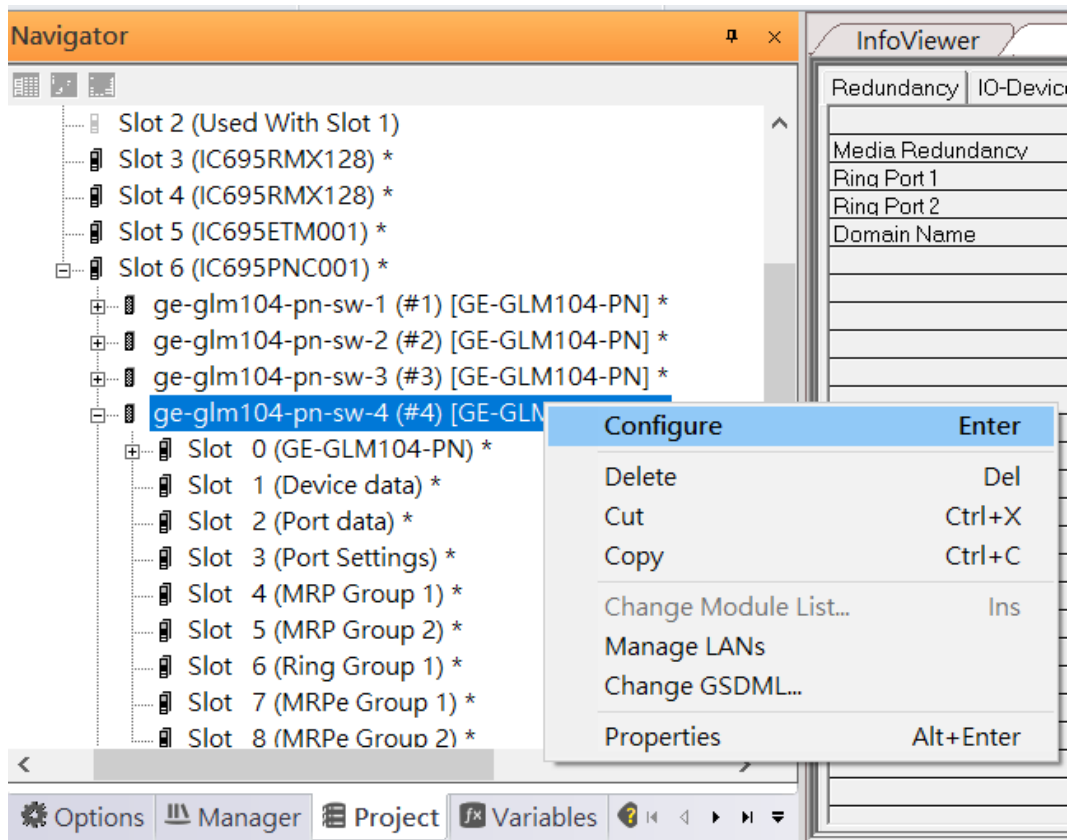


Figure 190

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1]to “1”, [Ring Port 2] to “2”.

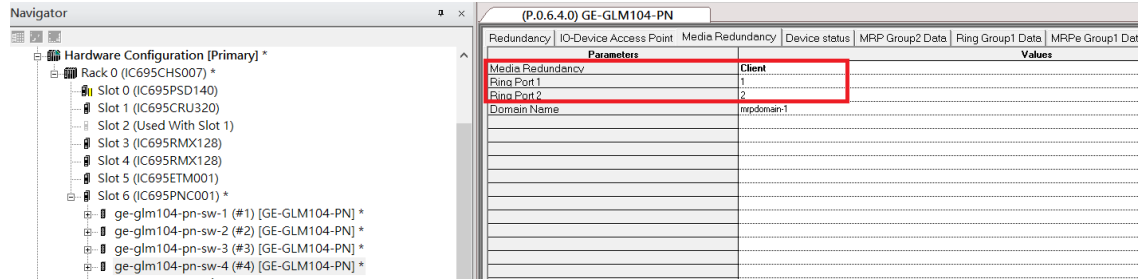


Figure 191

Then configure the MRP in Profinet MRP Ring-2(in the box).

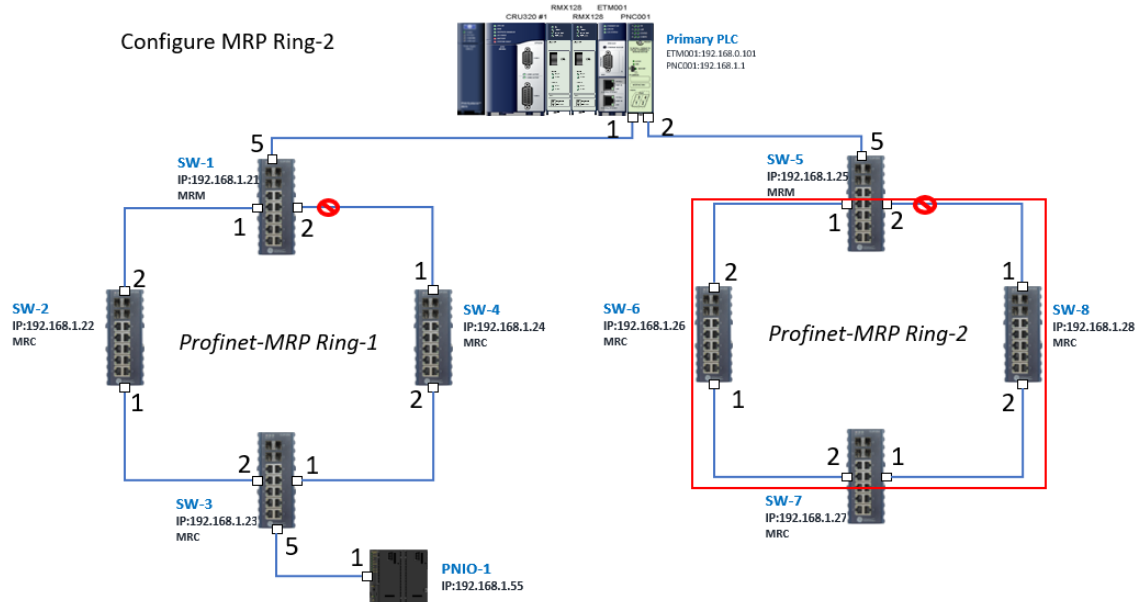


Figure 192

To enable MRP function in SW5, click the right button and choose [Configure].
It will show “Media Redundancy” on the right window.

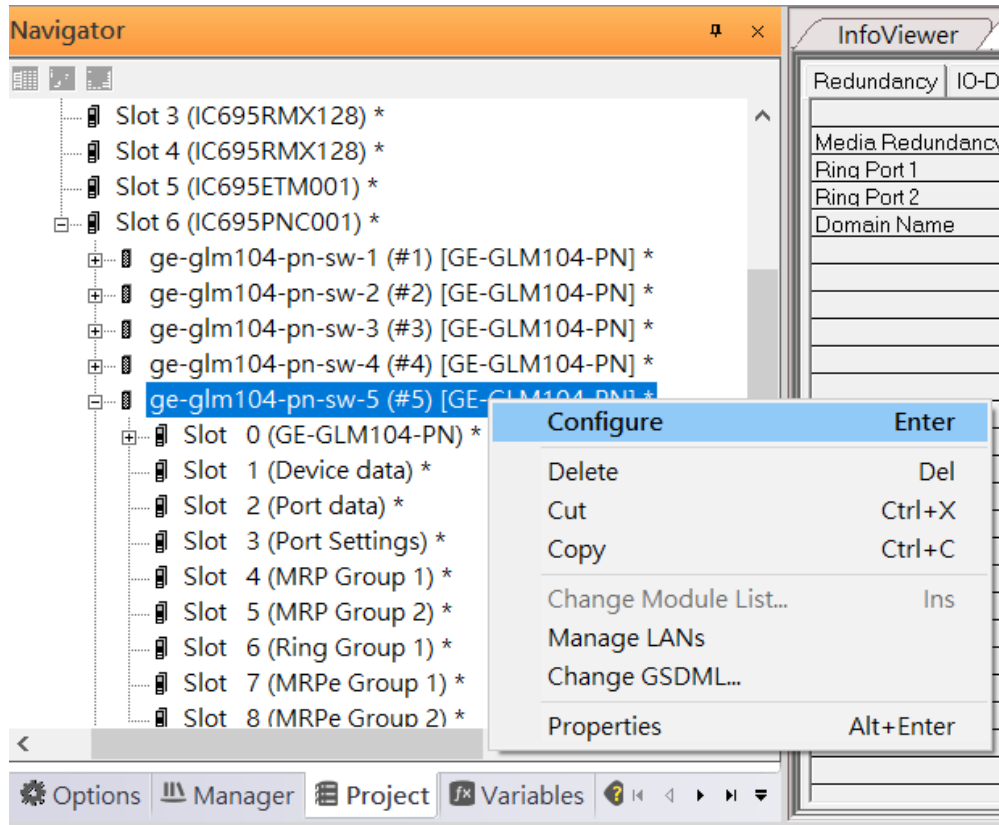


Figure 193

Enable MRP function by changing the value of “Media Redundancy” to manager and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

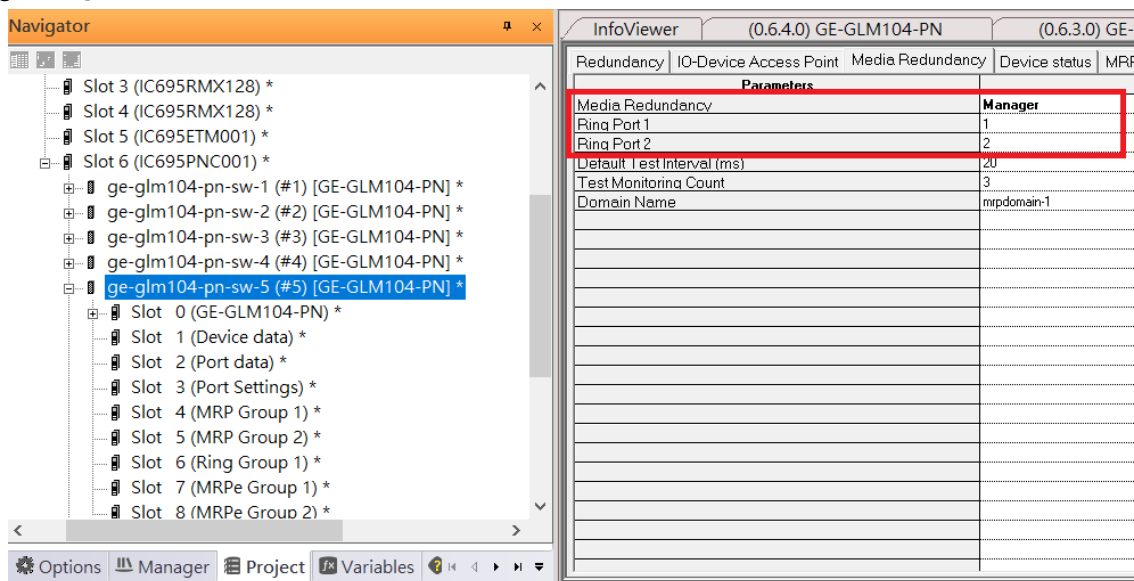


Figure 194

To enable MRP function in SW6, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

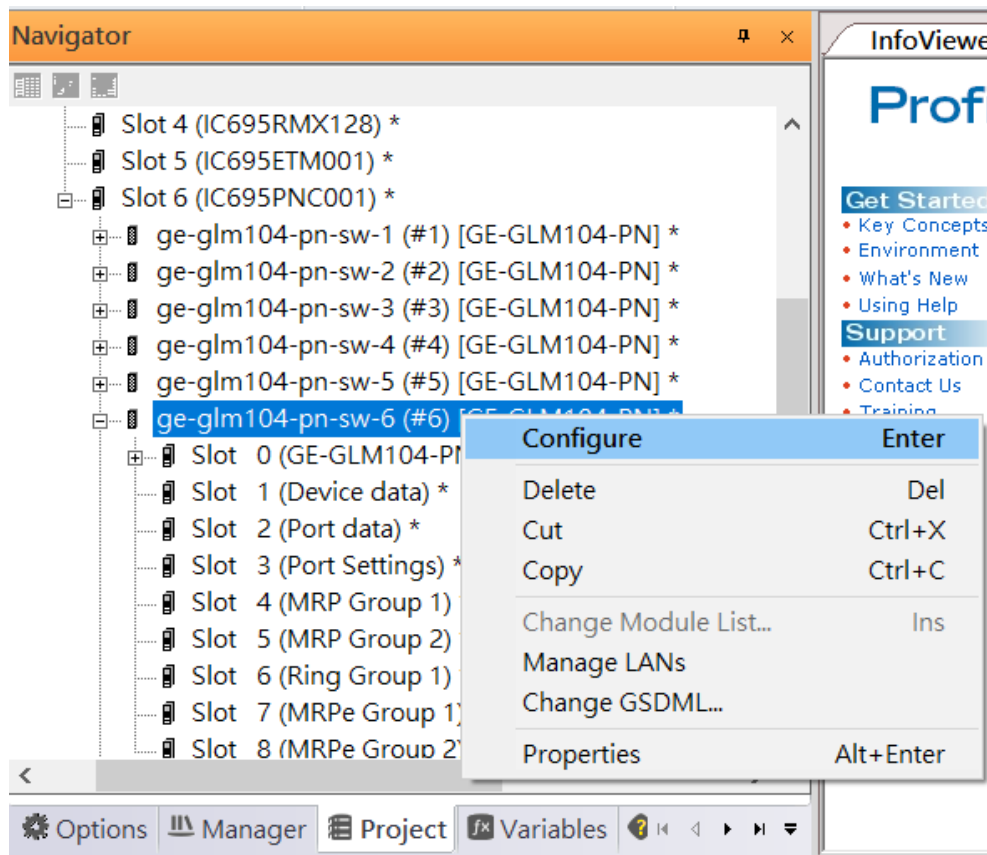


Figure 195

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

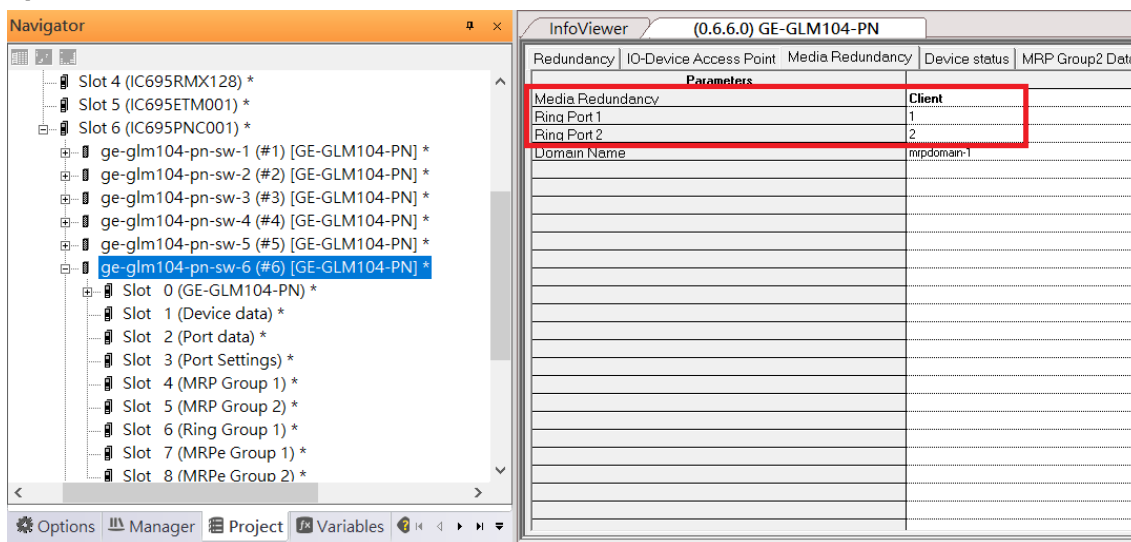


Figure 196

To enable MRP function in SW7, click the right button and choose [Configure].
It will show “Media Redundancy” on the right window.

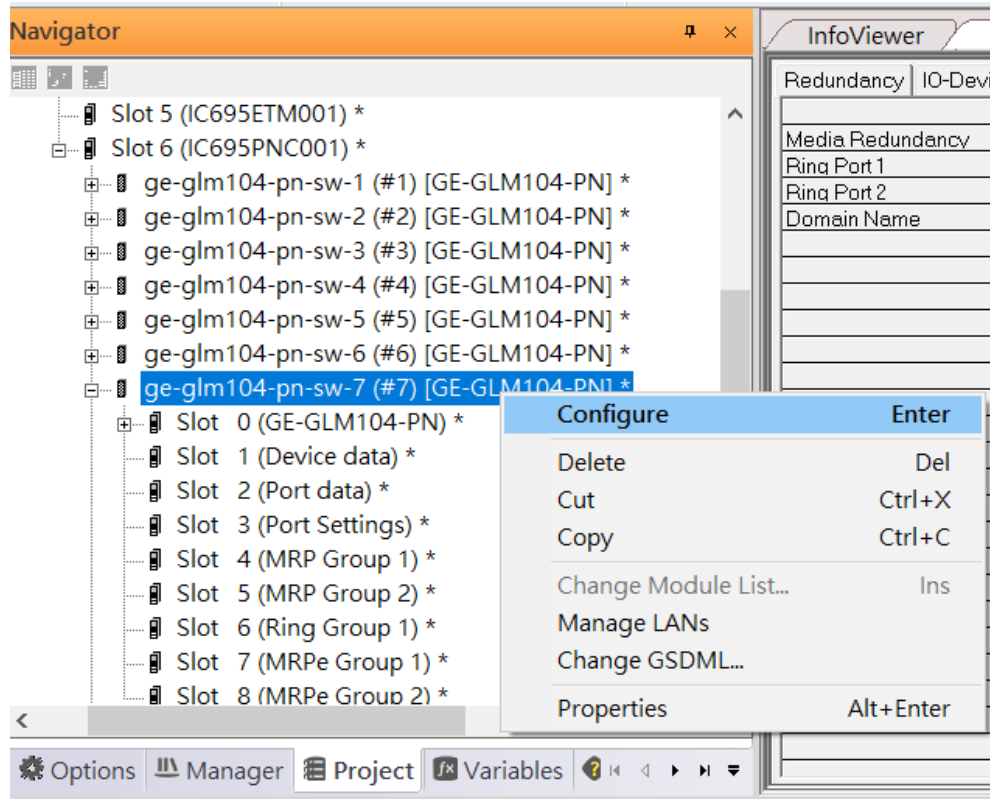


Figure 197

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

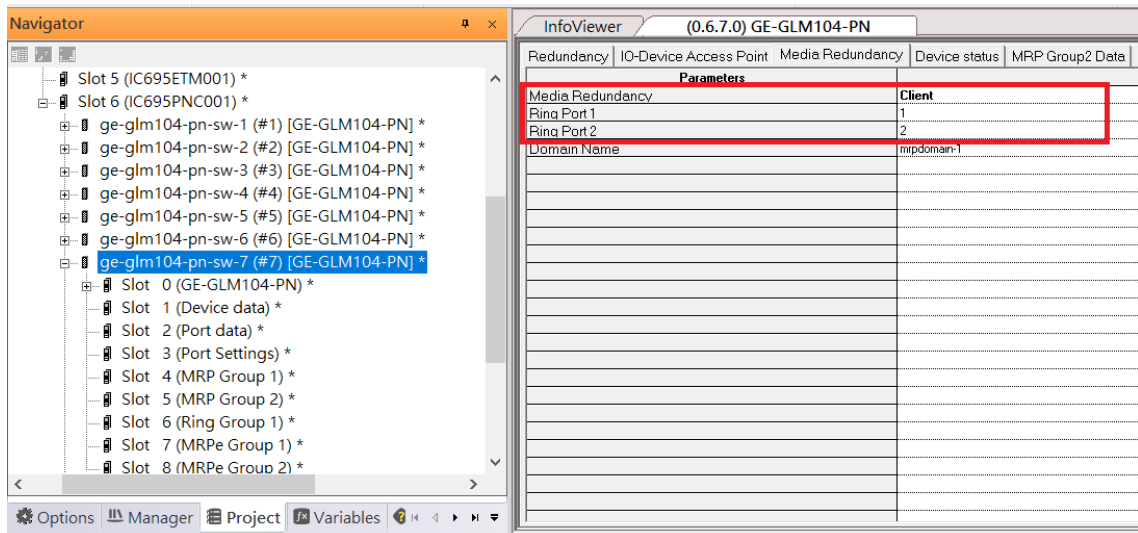


Figure 198

To enable MRP function in SW8, click the right button and choose [Configure].
It will show “Media Redundancy” on the right window.

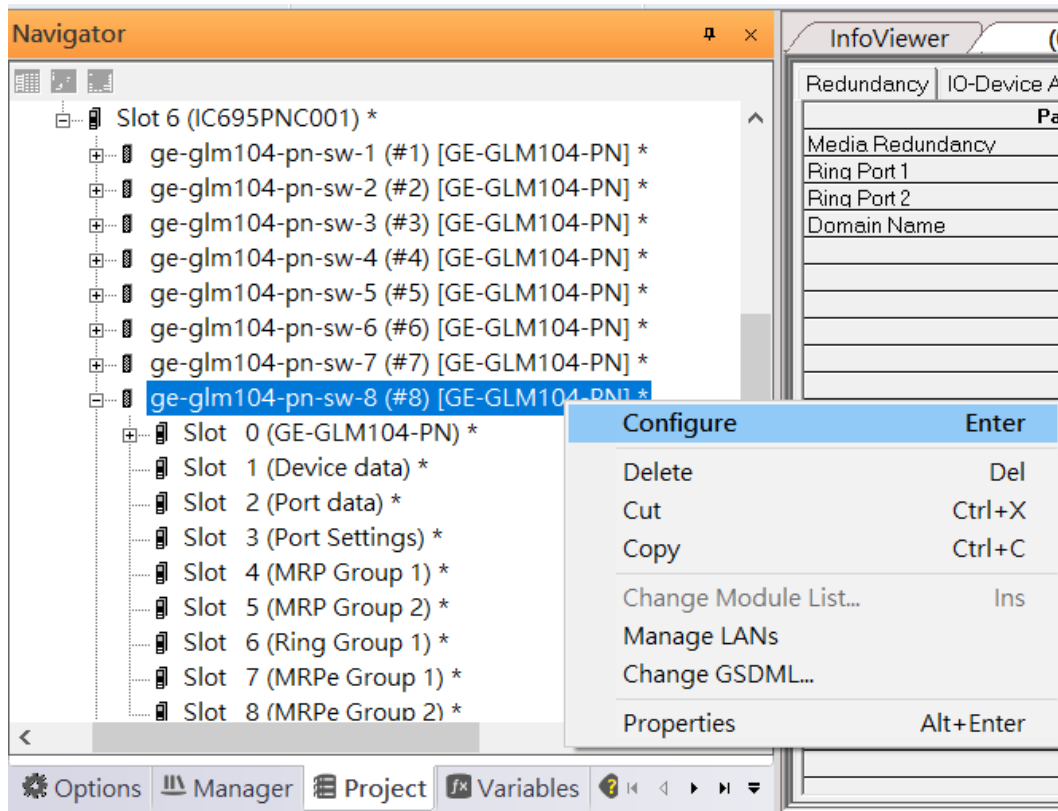


Figure 199

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

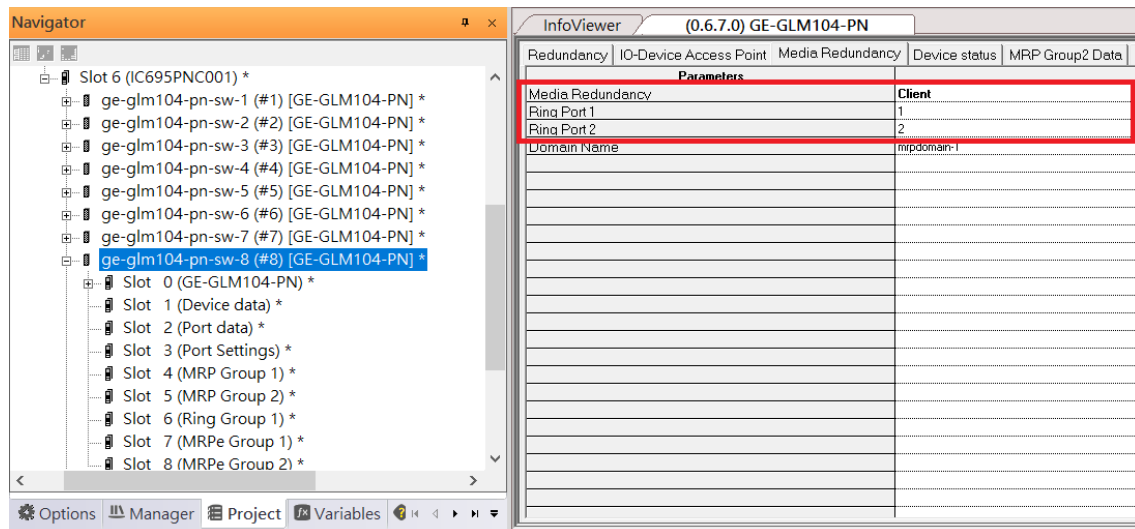


Figure 200

4.2.7 Network Setting

To establish the communication to the I/O Controller from Proficy Machine Edition, the interface of I/O Controller shall be specified.

It should be noted that there is only 1 I/O Controller (Primary or Secondary) is able to communicate with Proficy Machine Edition. Therefore, there are 3 rules of communication are defined.

I/O Controller Communication Rule

Rule	Description
1	The communicated I/O Controller shall be specified. Click primary or secondary hardware configuration, click the right button, and select [Set as Selected HWC]
2	During the communication, the cable shall be connected to the ETM001 in specified hardware (Primary or Secondary)
3	Specify the interface and IP address for communicated I/O Controller

For rule 3, click [Target 1] and Select [Property]

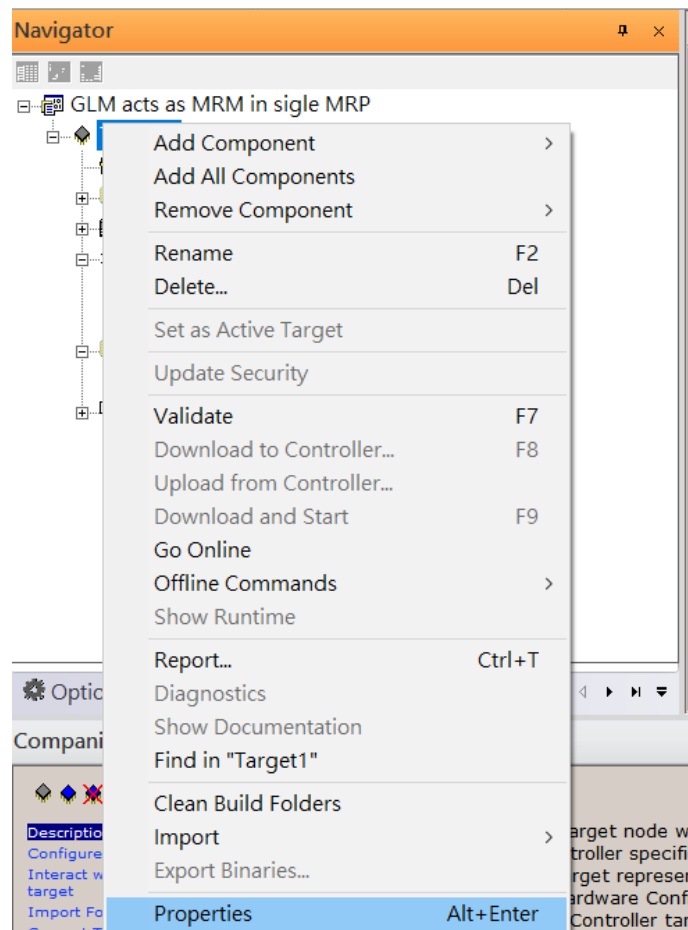
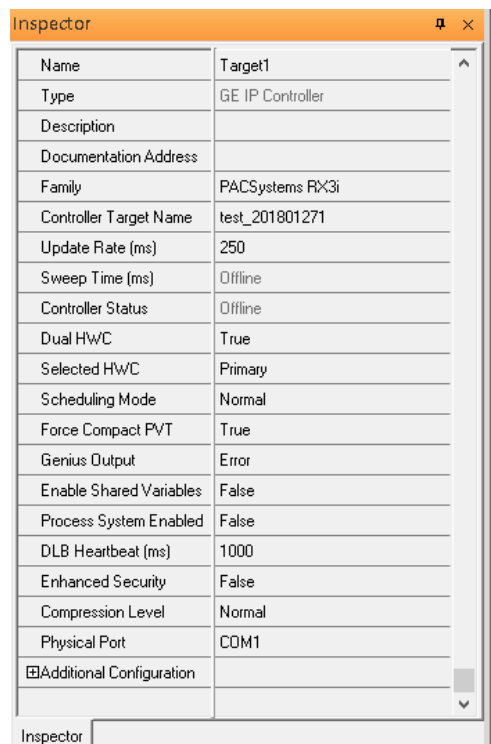


Figure 201

Then the configuration table is shown.

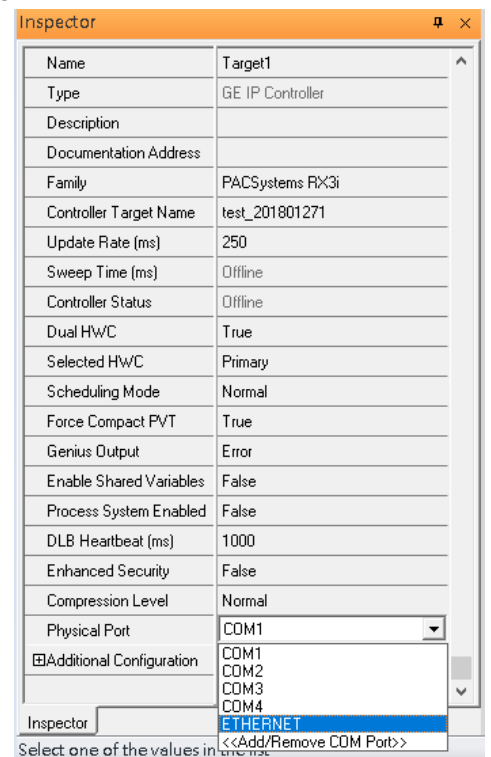


The 'Inspector' window displays a list of configuration parameters for 'Target1'. The parameters and their values are as follows:

Parameter	Value
Name	Target1
Type	GE IP Controller
Description	
Documentation Address	
Family	PACSystems RX3i
Controller Target Name	test_201801271
Update Rate (ms)	250
Sweep Time (ms)	Offline
Controller Status	Offline
Dual HwC	True
Selected HwC	Primary
Scheduling Mode	Normal
Force Compact PVT	True
Genius Output	Error
Enable Shared Variables	False
Process System Enabled	False
DLB Heartbeat (ms)	1000
Enhanced Security	False
Compression Level	Normal
Physical Port	COM1
Additional Configuration	

Figure 202

Select [Physical Port] to [Ethernet]



The 'Inspector' window shows the 'Physical Port' dropdown menu open. The menu lists the following options:

- COM1
- COM2
- COM3
- COM4
- ETHERNET
- <<Add/Remove COM Port>>

The 'ETHERNET' option is highlighted in blue. Below the dropdown, a text prompt reads: 'Select one of the values in the list'.

Figure 203

Also, the IP address of communicated I/O Controller shall be set. Here the [Primary] setting is shown.
Note, the specified IP address is set as the IP address on ETM001.

Inspector	
Name	Target1
Type	GE IP Controller
Description	
Documentation Address	
Family	PACSystems RX3i
Controller Target Name	test_201801271
Update Rate (ms)	250
Sweep Time (ms)	Offline
Controller Status	Offline
Dual HWC	True
Selected HWC	Primary
Scheduling Mode	Normal
Force Compact PVT	True
Genius Output	Error
Enable Shared Variables	False
Process System Enabled	False
DLB Heartbeat (ms)	1000
Enhanced Security	False
Compression Level	Normal
Physical Port	ETHERNET
IP Address	192.168.0.101
Additional Configuration	

Figure 204

4.2.8 PC Network

The IP address of PC with Proficy Machine Edition shall be set in the same network area.

Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address: 192 . 168 . 0 . 68

Subnet mask: 255 . 255 . 255 . 0

Default gateway: . . .

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

Preferred DNS server: . . .

Alternate DNS server: . . .

☐ Validate settings upon exit

Advanced...

OK Cancel

Figure 205

4.2.9 Temporary IP

However, if the IP address of ETM001 is lost or forgotten, the IP address can be changed by the function [Set Temporary IP Address] according to the MAC address of ETM001. In the following figure, the MAC address is referenced to the ETM001, and the IP address can be defined by user.

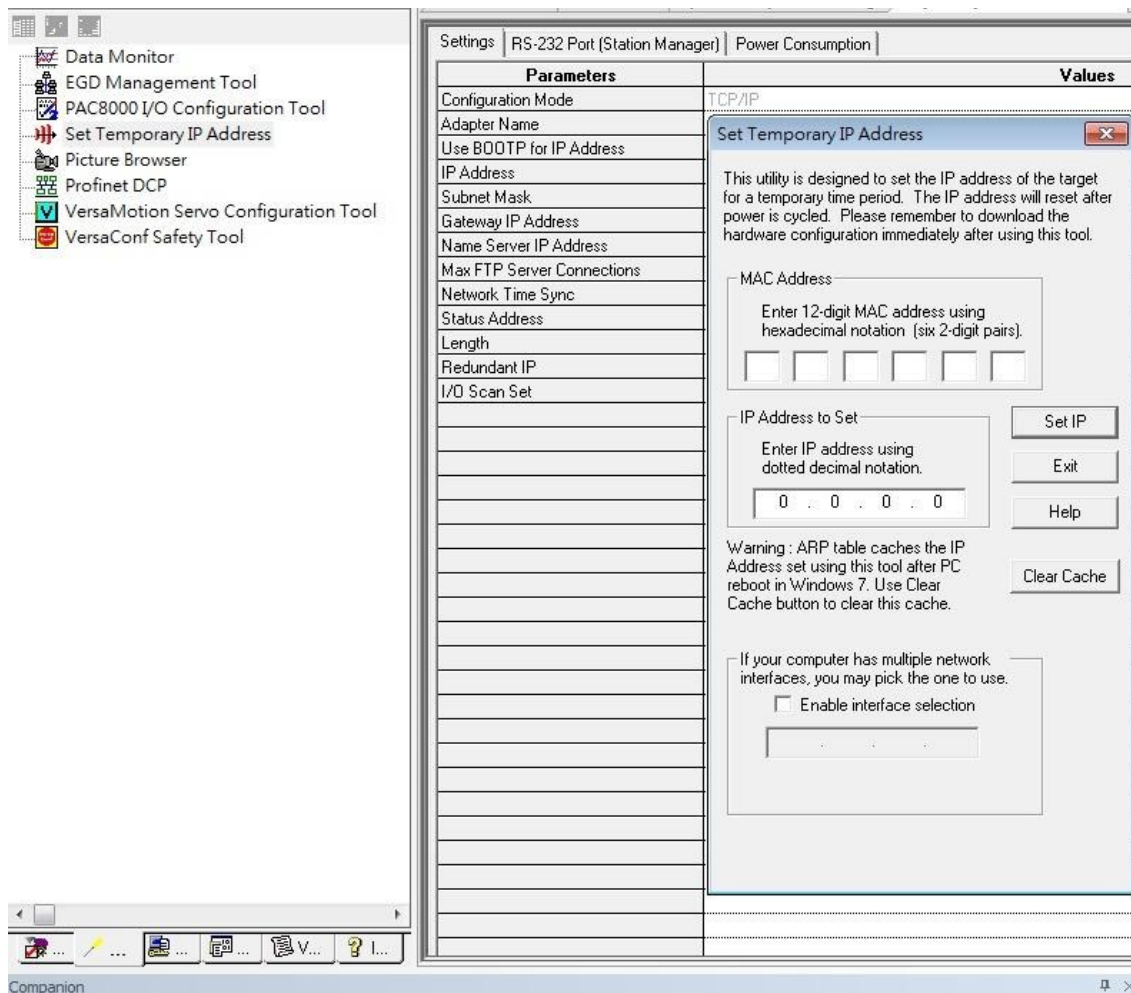


Figure 206

4.3 Implementation

To download the configuration to hardware, the following steps shall be applied.

First, press the [Connect] icon.

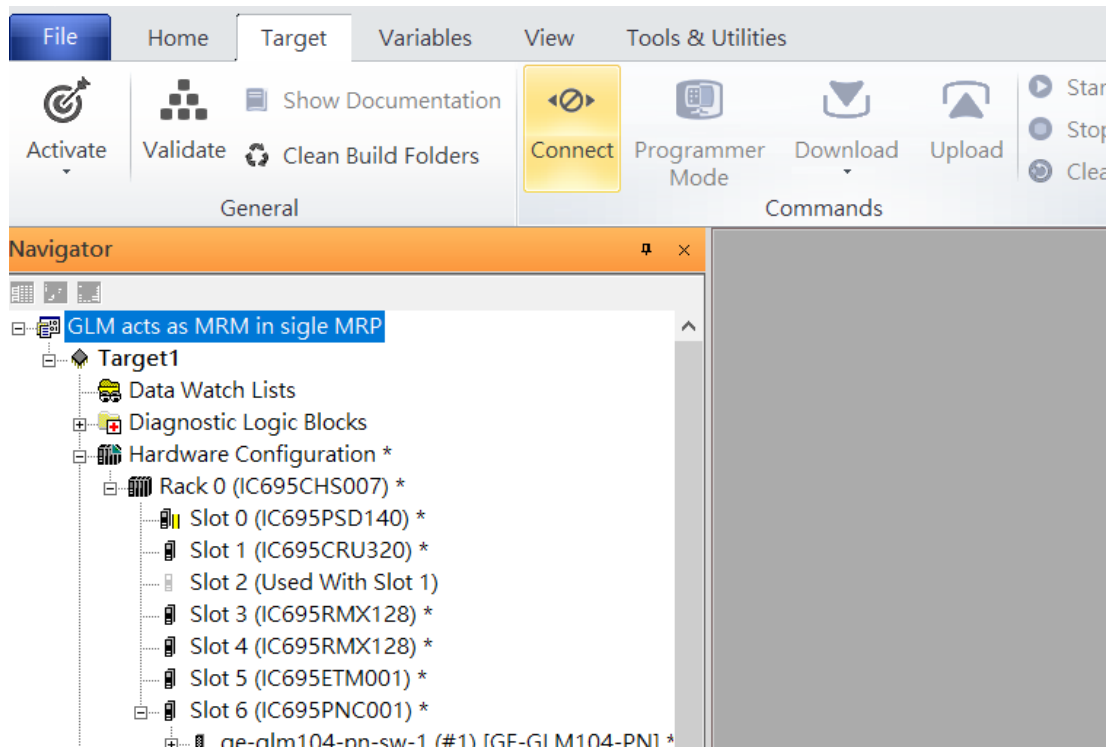


Figure 207

Then press the icon [Programmer Mode]

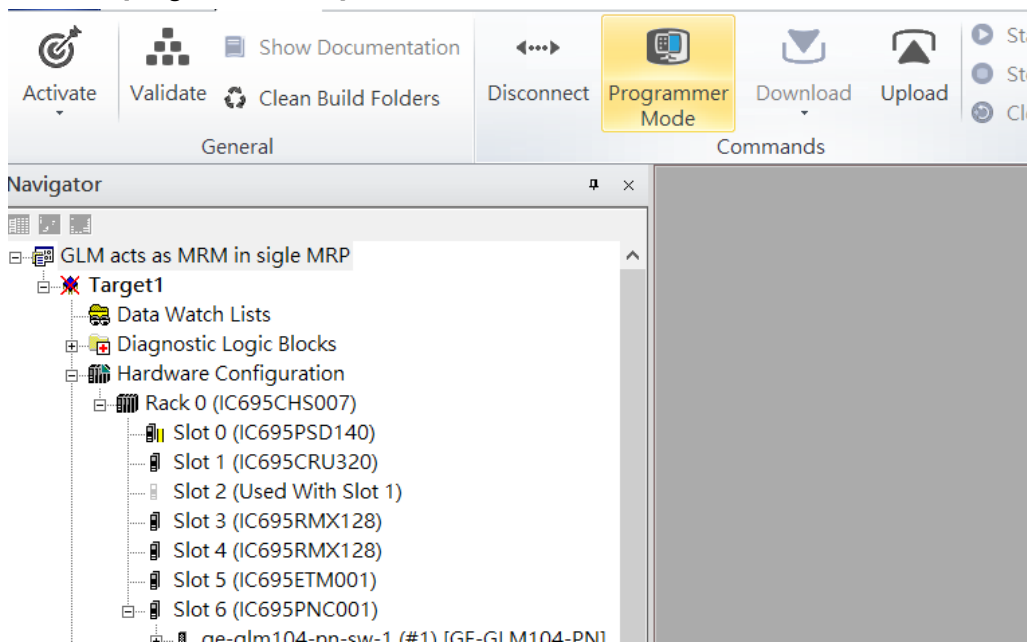


Figure 208

Then press icon [Download] and select “Download”

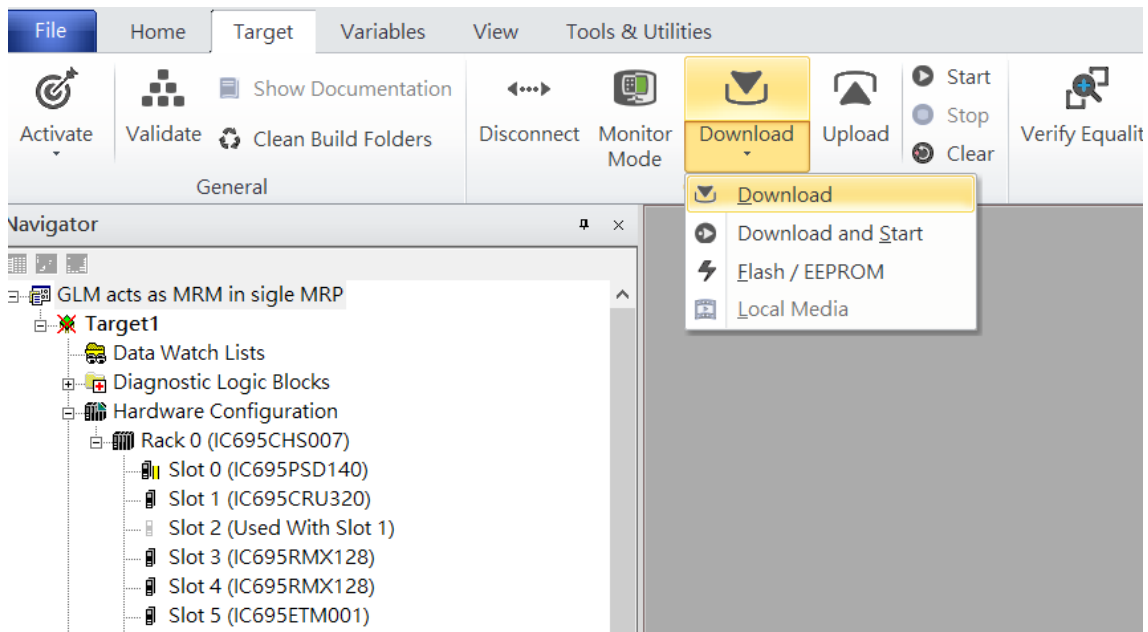


Figure 209

Then the dialogue is appeared to make sure the initialization procedure, select [OK]

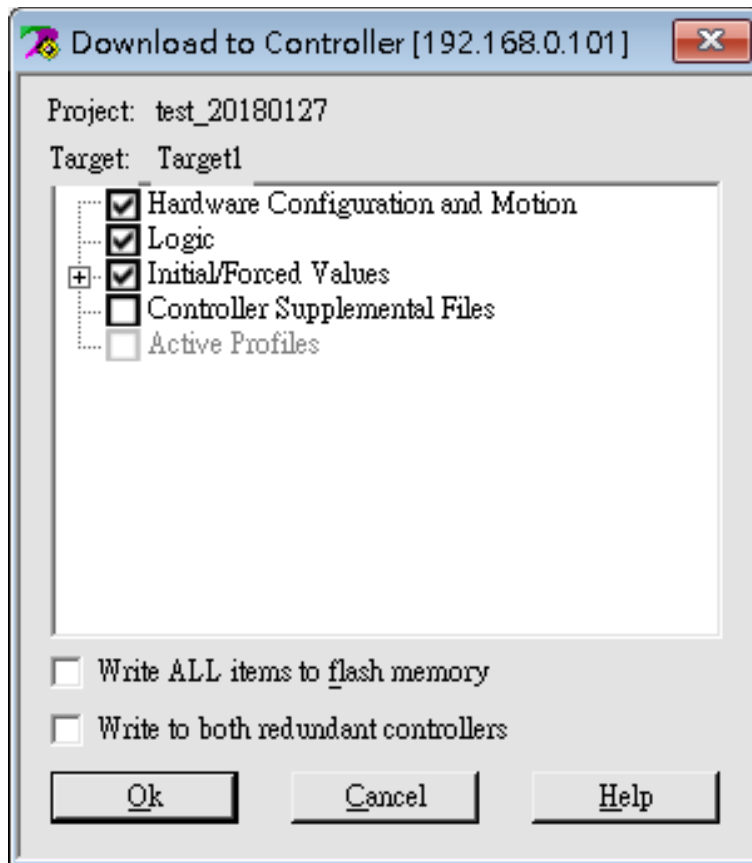


Figure 210

After download completely, press icon [Start] to active PLC.

Note: After downloading completely, switch CRU320 to “Run I/O Enable”

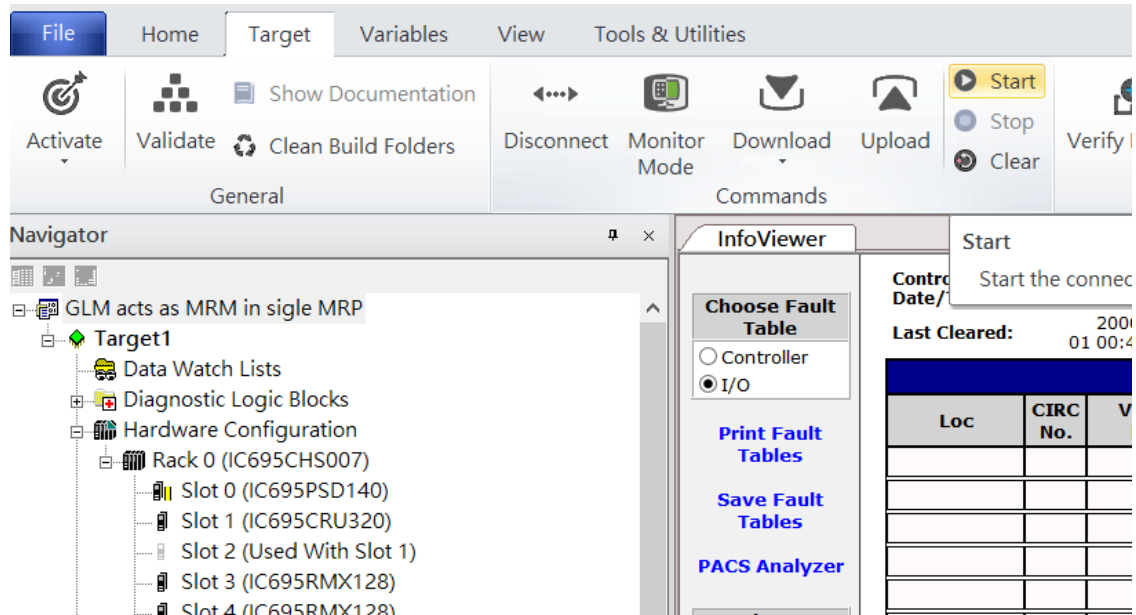


Figure 211

Then the dialogue is appeared, please select [OK]

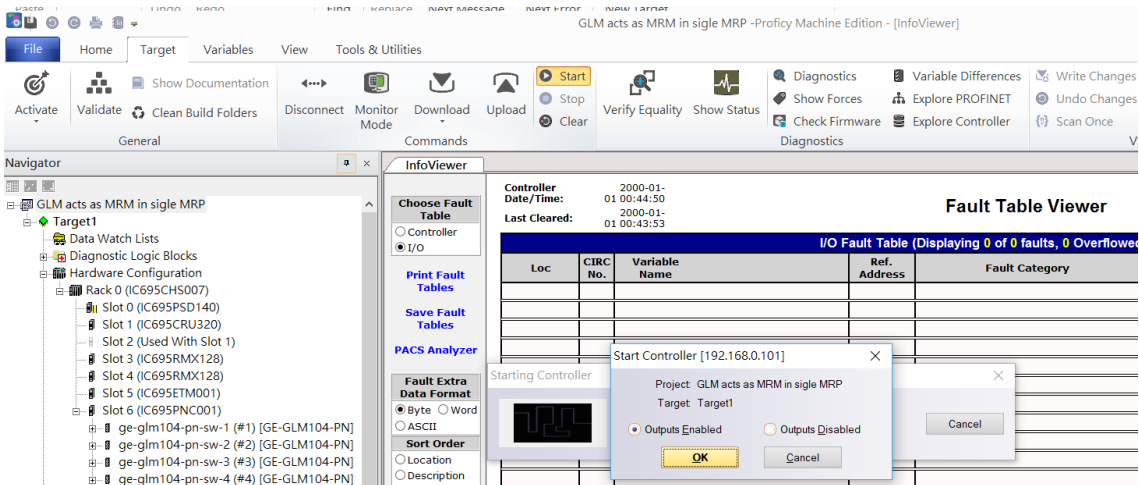


Figure 212

If PLC has started successfully, a message “The Controller was successfully started”.

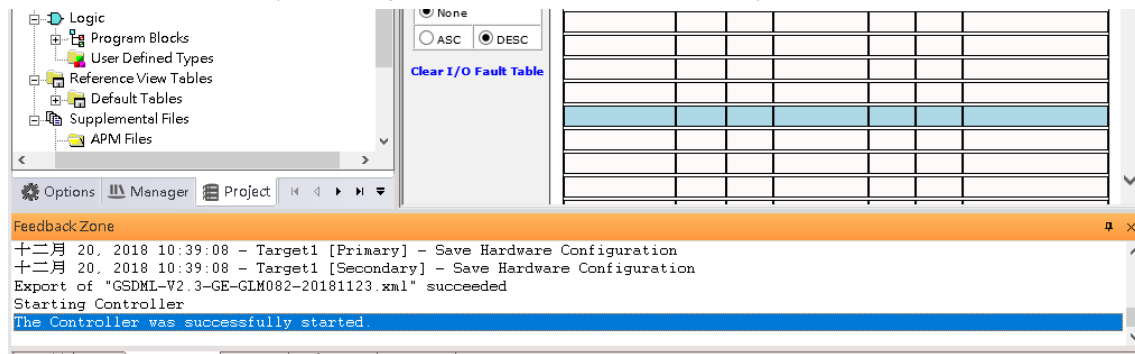


Figure 213

Chapter 5 PROFINET-MRP Main Ring couples multiple PROFINET-MRP Subrings

5.1 Network Topology

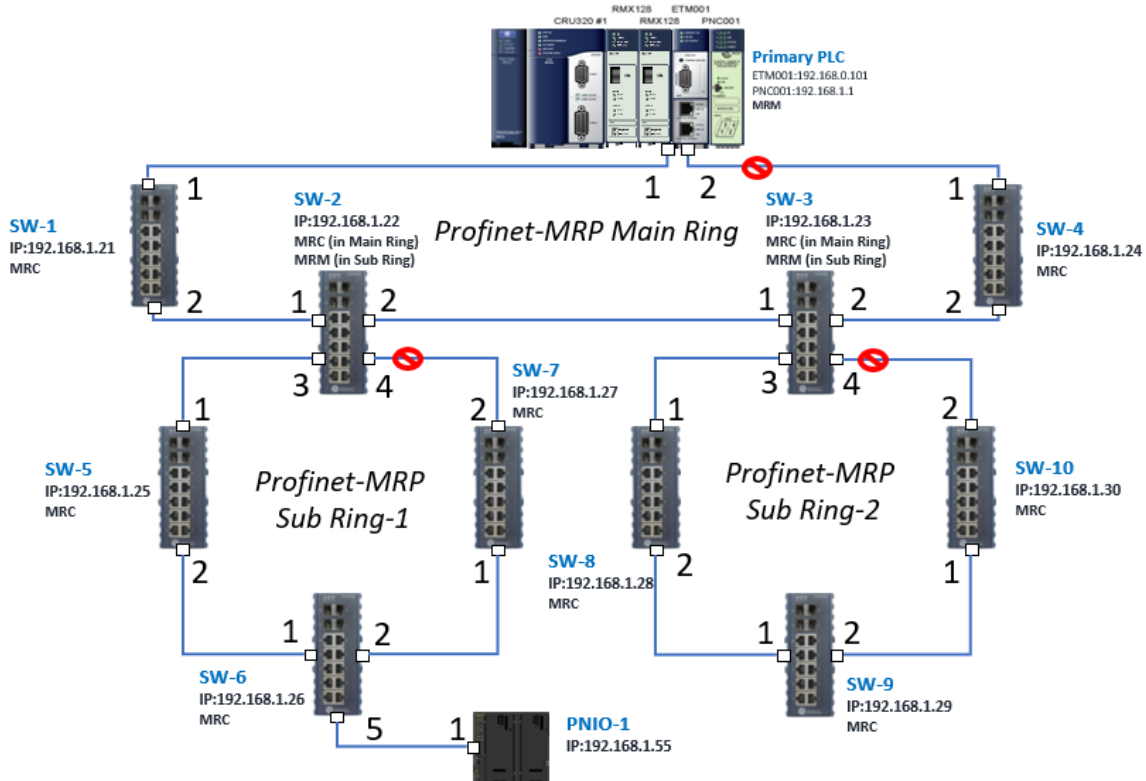


Figure 214

5.2 Hardware Configuration

On the CRU320, the I/O data can be set to "STOP", "RUN OUTPUT DISABLE" or "RUN I/O Enable" states by a switch imbedded on CRU320. During the configuration, the switches on both 2 CRU320s must be set to "STOP"

5.2.1 Project Open

To start the software Proficy Machine Edition, please follow the steps below:

(1) Click [Start] -> [Proficy] -> [Proficy Machine Edition] -> [Proficy Machine Edition]. See the following picture.



Figure 215

(2) Select the empty project and click [OK].

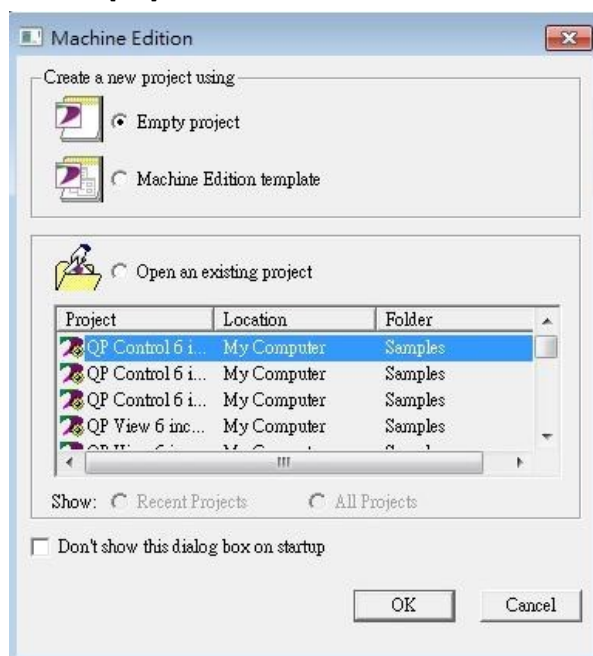


Figure 216

(3) Set the project name and click [OK]

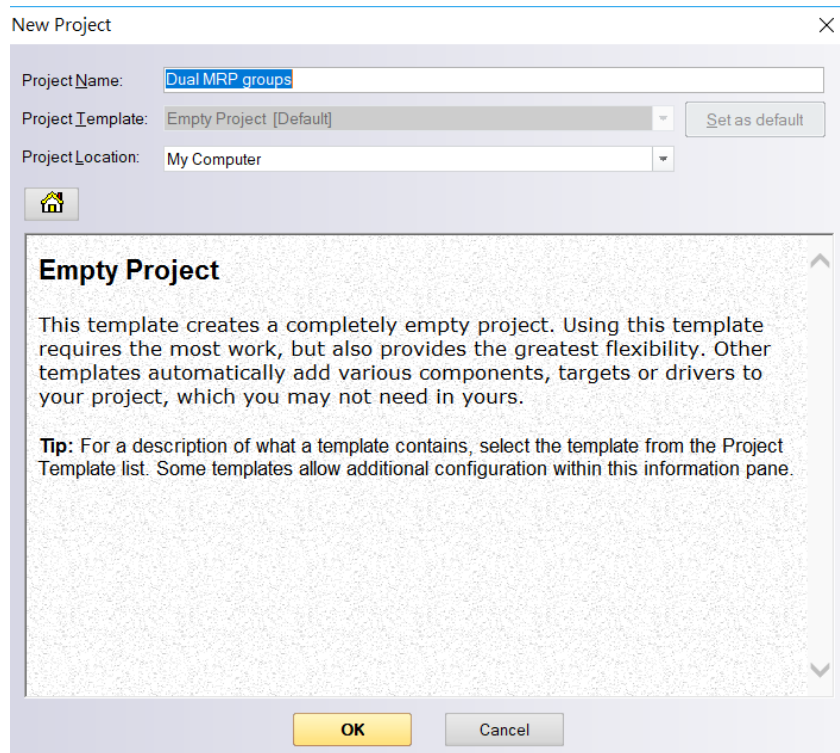


Figure 217

5.2.2 I/O Controller Setting

Next step is to add a target for this project.

Click right button on project name “GLM act as MRC in single MRC group” and select [Add Target] -> [GE Intelligent Platforms Controller] -> [PACSystems RX3i].

The PACSystems RX3i is the I/O Controller to be tested. See the following picture.

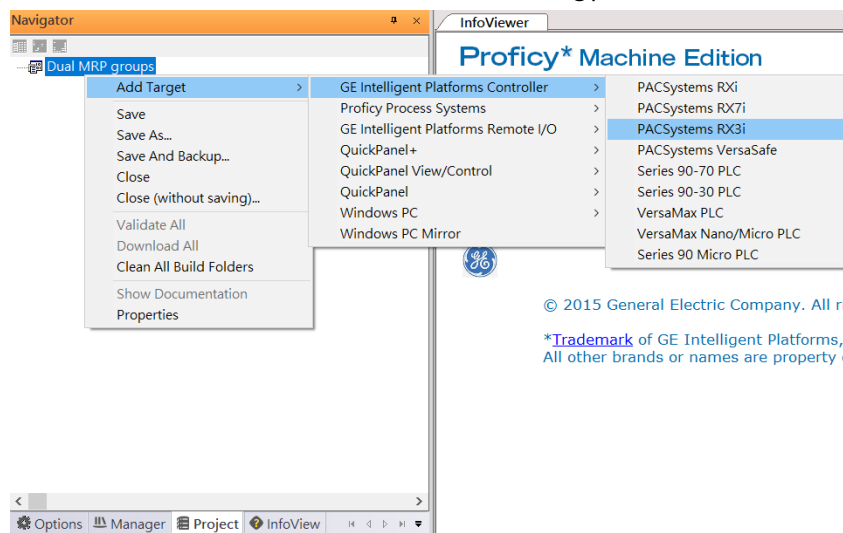


Figure 218

Originally the I/O Controller is described as the rack with 12 slots, each slot can be regarded as the chassis for device installation such as power card, communication module, or bus controller. However, there are only 7 chassis can be used in the I/O Controller CRU320. Thus, replace the rack for 7 slots.

Click right button on “Rack0 (IC695CHS012)” and select [Replace Rack...]

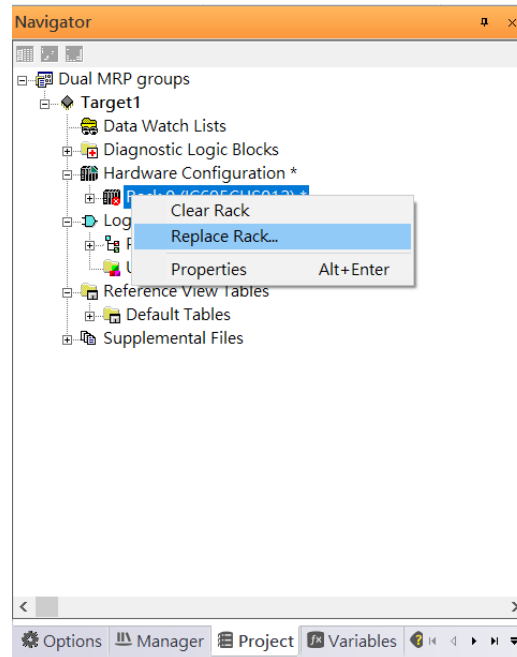


Figure 219

Select “IC695CHS007” and click [OK]

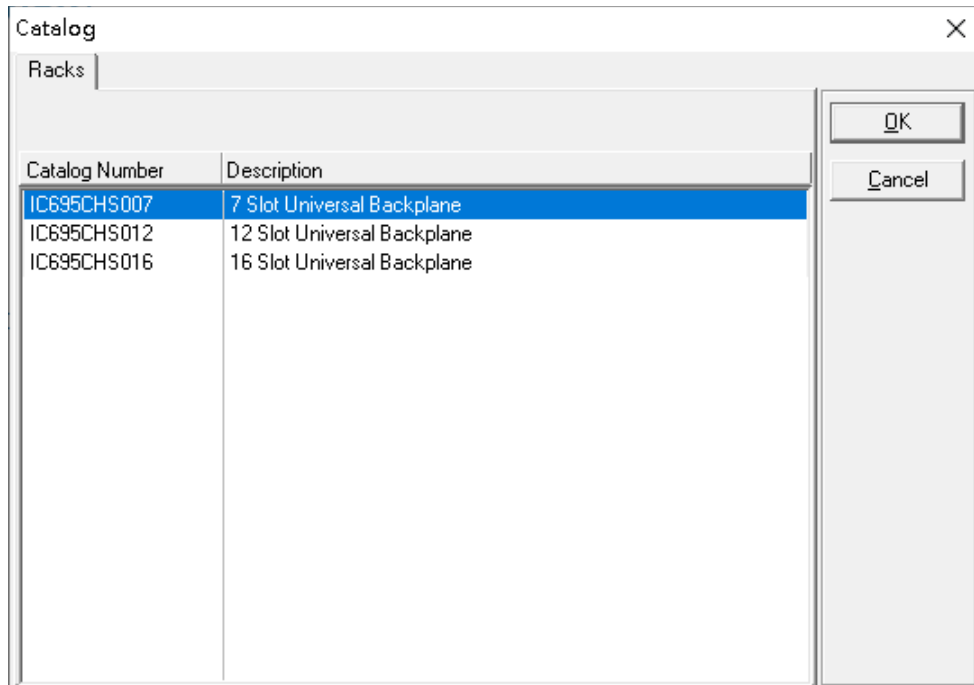


Figure 220

After the rack and the number of slots is defined, select the corresponding devices into the slots according to the I/O Controller. The following picture is the current installation for each device on the I/O Controller



Figure 221

From left to right, the installed devices on the I/O Controller are

Devices on I/O Controller

Device Type	Device Name	Chassis index
Power Card	PSD140	0
Central Processing Unit	CRU320	1 ~ 2
Communication Module	RMX128	3
Communication Module	RMX128	4
Communication Module	ETM001	5
Bus Controller	PNC001	6

Now, add the module into the slots by the current devices on the I/O Controller, the chassis index is corresponding to the slot index. First of all, replace the power card. Click slot 0 and click the right button, select [Replace Module ...], and specify the installed power card, PSD140, then click [OK]

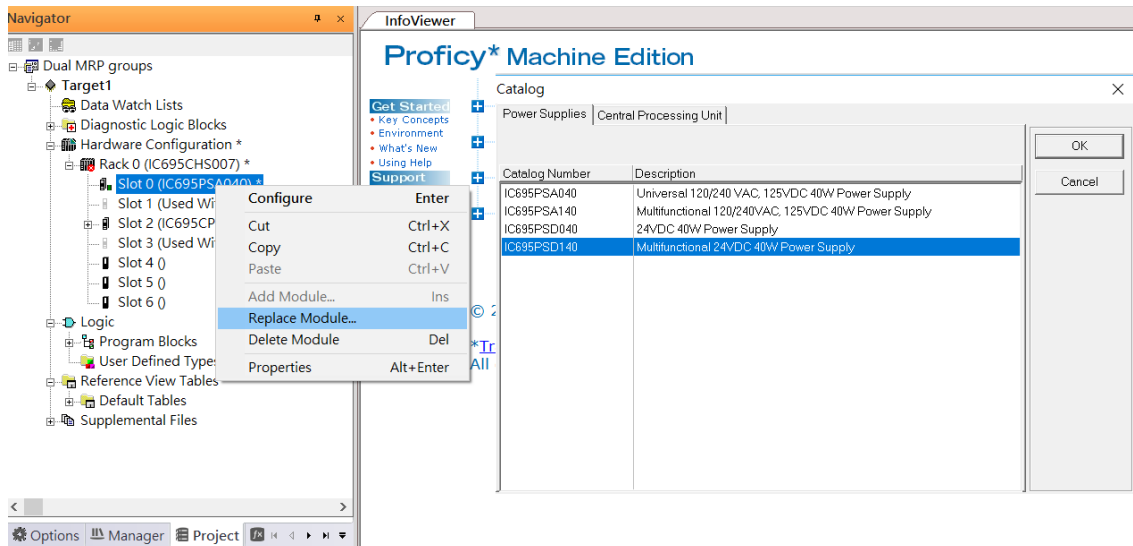


Figure 222

Slot 0 is replaced by current power card, PSD140

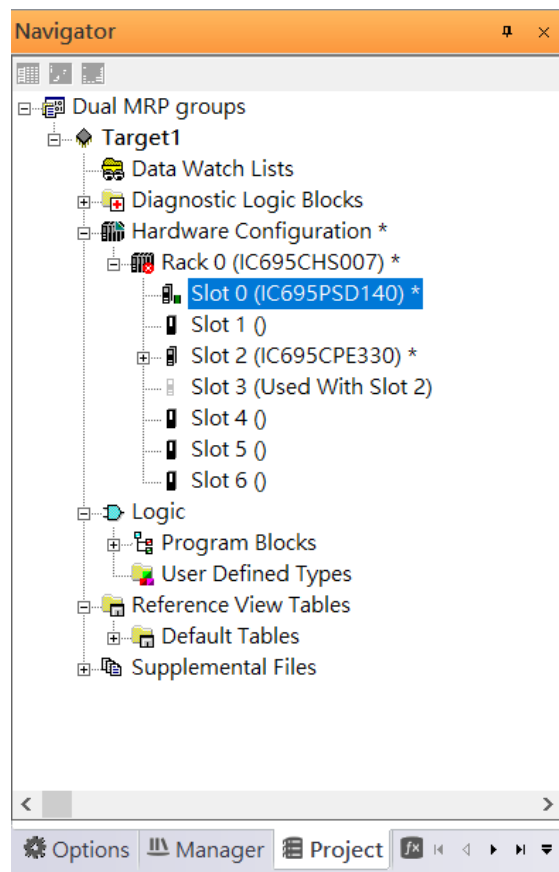


Figure 223

For slot 1 and 2, 2 chassis (1 and 2) is occupied by the Central Processing Unit, CRU320. To integrate slot 1 and 2, pull the slot 2 to slot 1

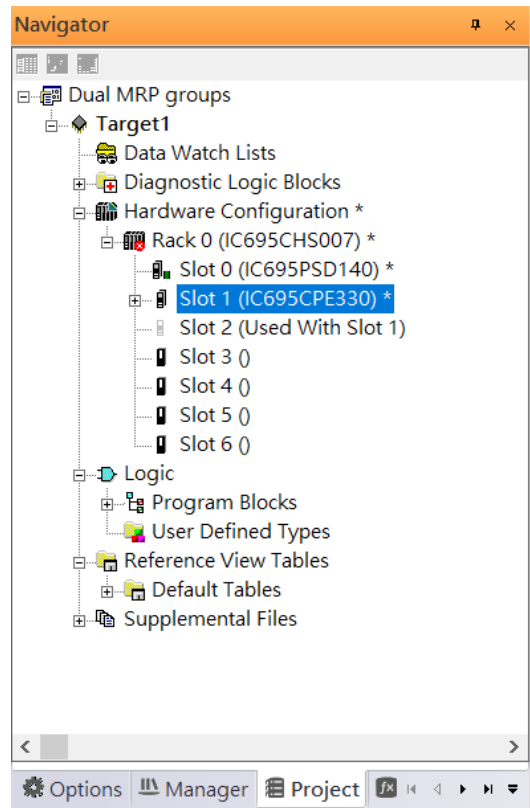


Figure 224

Now the slot 2 is cleaned.

To select the Central Processing Unit, click slot 1 and click the right button, select [Replace Module ...] to choose CRU320

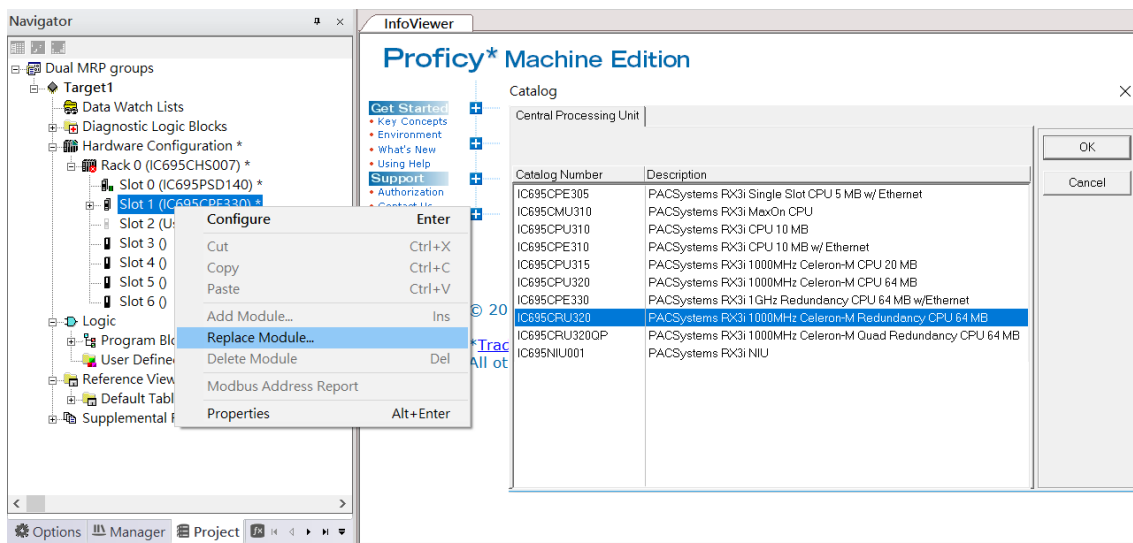


Figure 225

Then choose [No].

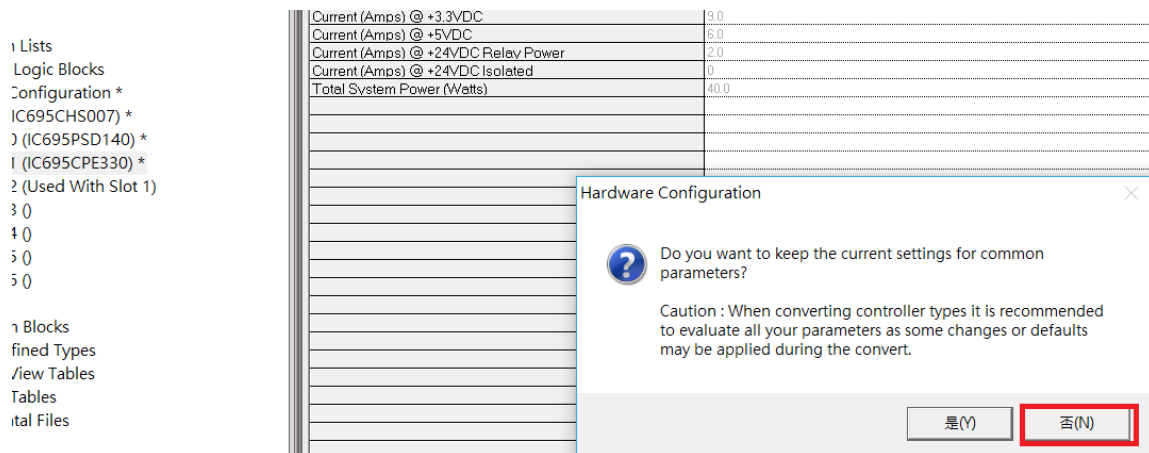


Figure 226

Now the CRU320 is specified.

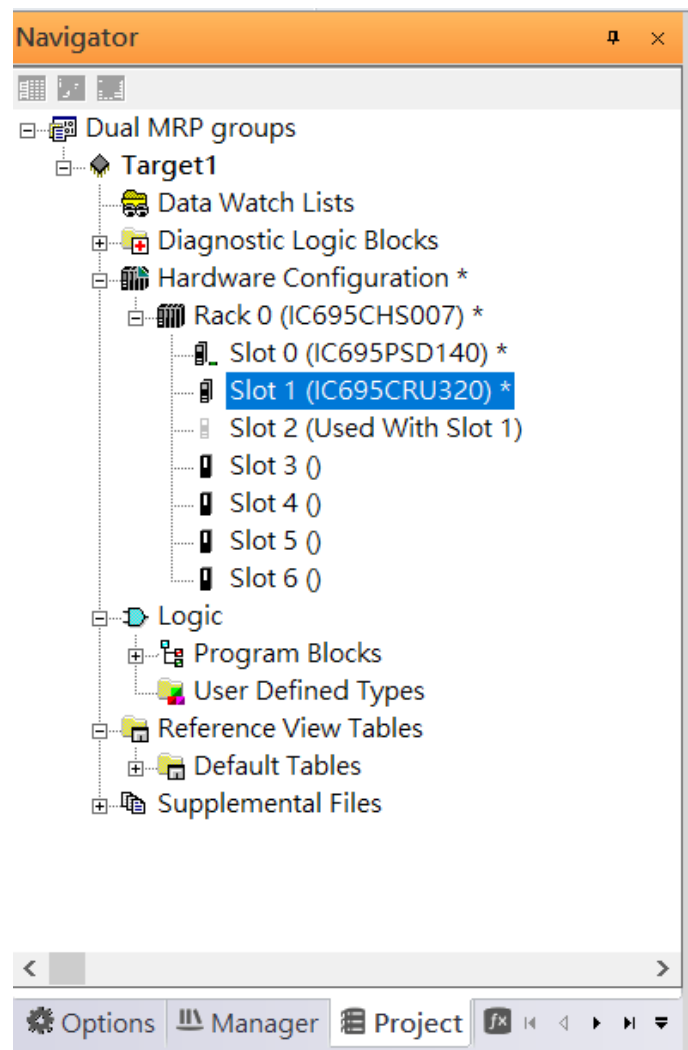


Figure 227

Next is to add RMX128 module for slot 3

Click the right button on slot 3, select [Add Module ...]

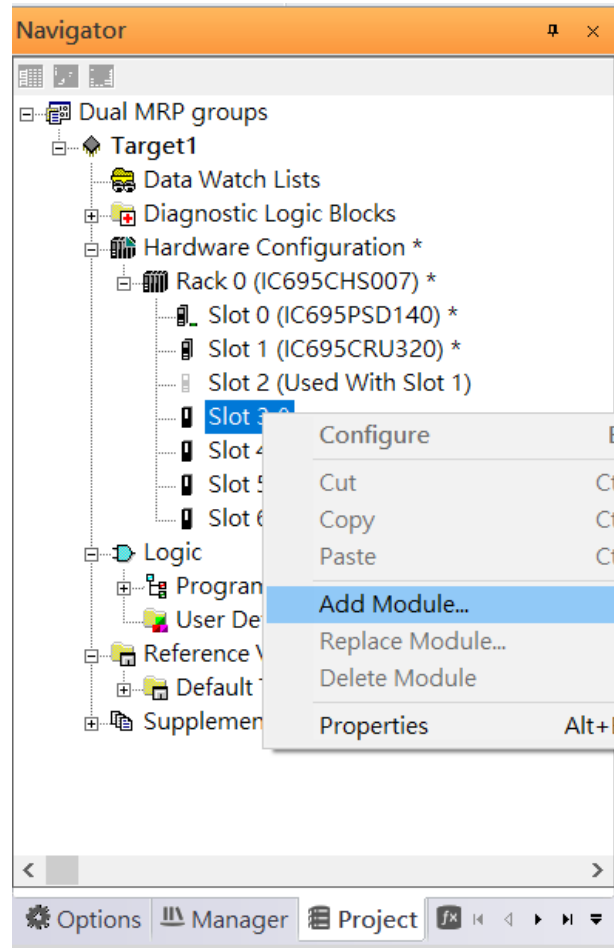


Figure 228

According to the current installation on the I/O Controller, the RMX128 shall be select.
Select [Communications] -> [IC695RMX128] and click [OK]

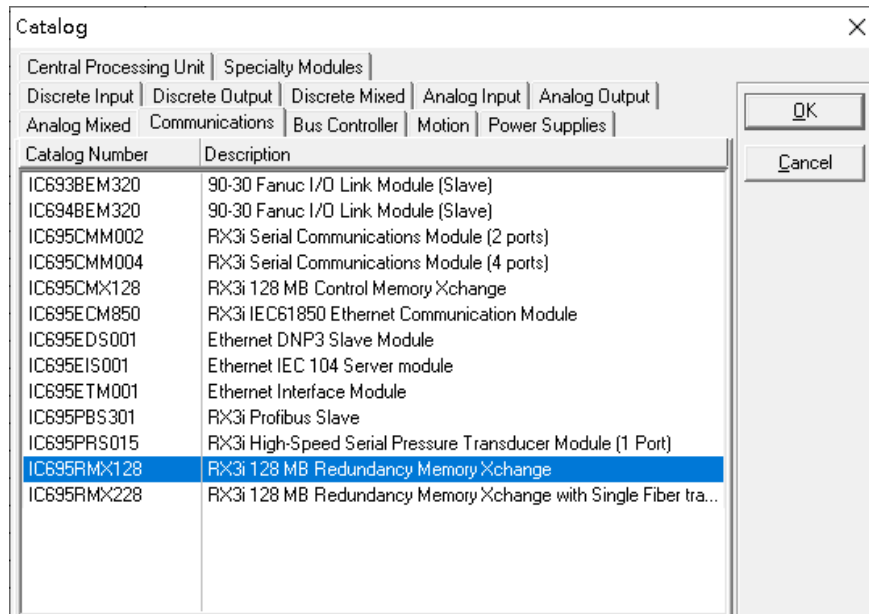


Figure 229

Now the RMX128 is ready on slot 3.

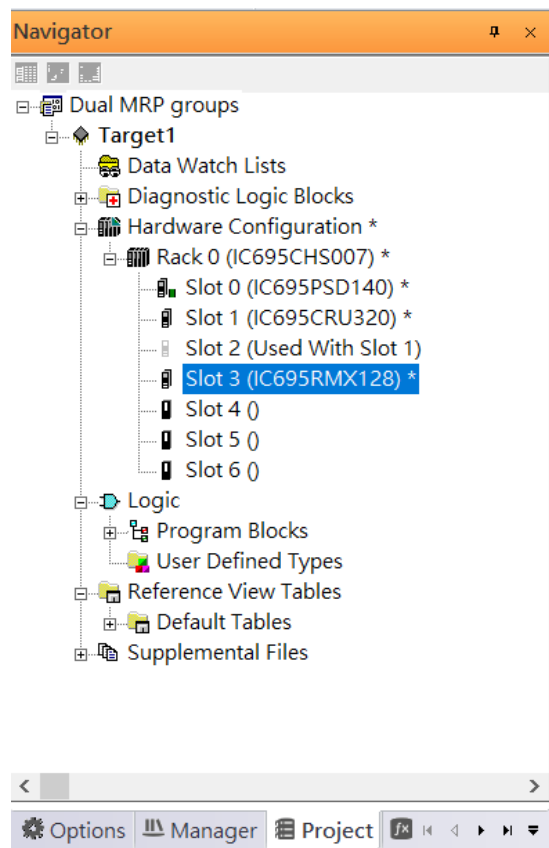


Figure 230

Continuously, select RMX128 for slot 4.

Click the right button on slot 4, select [Add Module ...], select [Communications] -> [IC695RMX128] and click [OK]

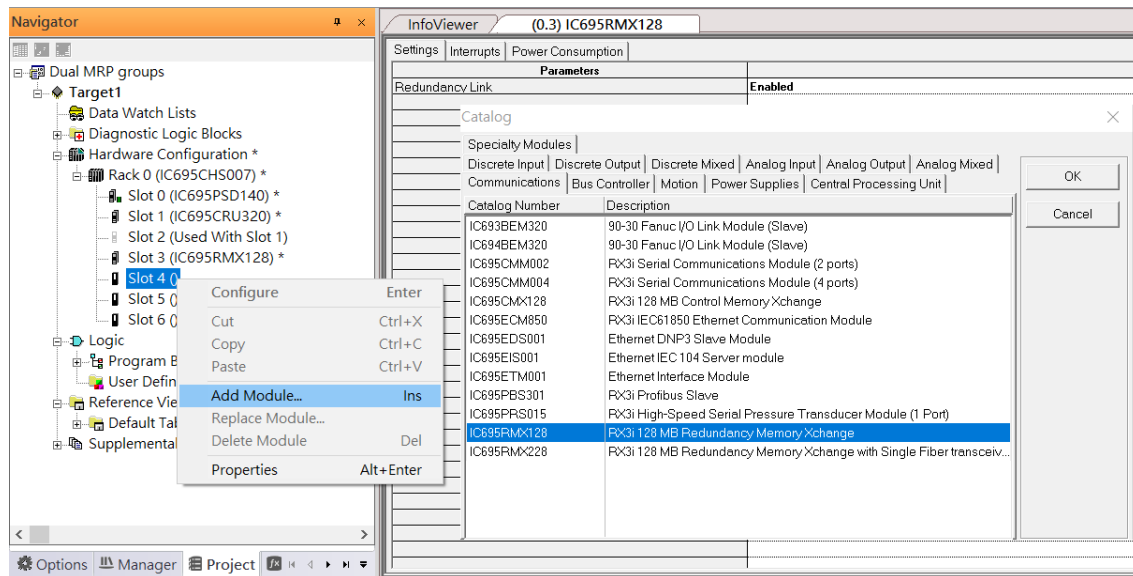


Figure 231

Continuously, select ETM001 for slot 5.

Click the right button on slot 5, select [Add Module ...], select [Communications] -> [IC695ETM001] and click [OK]

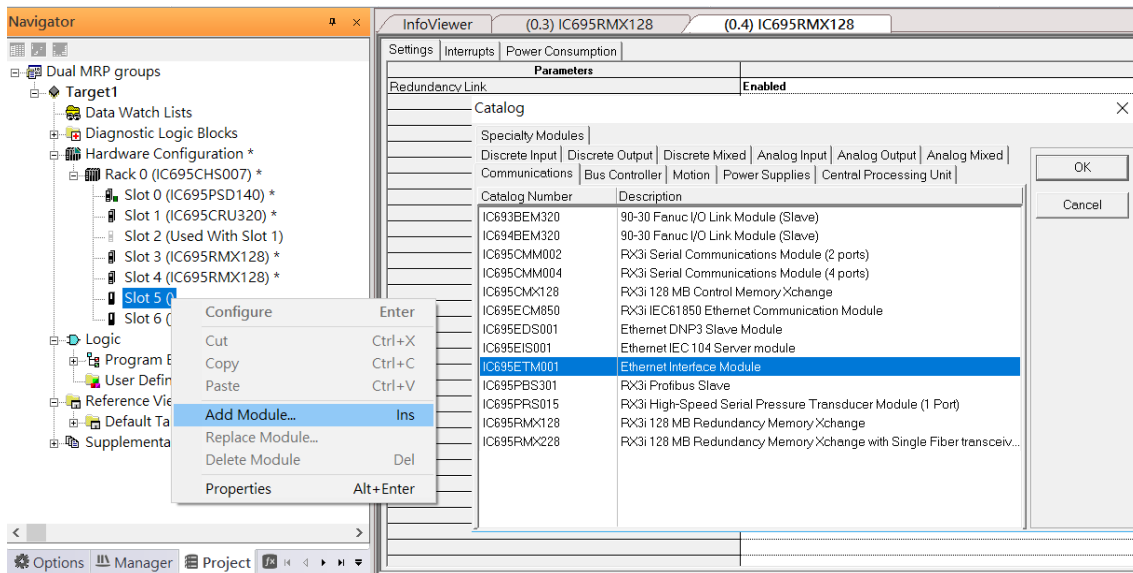


Figure 232

It should be noted that the ETM001 is the management device for Proficy Machine Edition. The communication interface is Ethernet network. The IP address and Subnet Mask shall be specified.

In the following picture, the IP address 192.168.0.101 and mask 255.255.255.0 is specified on ETM001

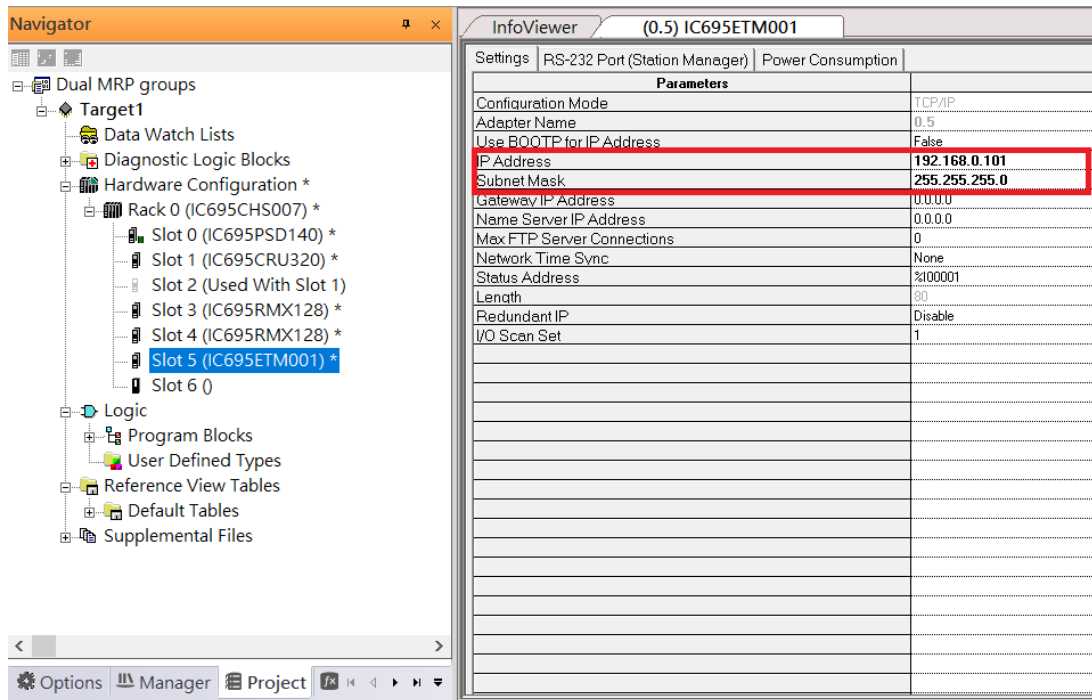


Figure 233

Continuously, select PNC001 for slot 6.

Click slot 6 and click the right button, select [Add Module ...], specify the installed Bus Controller, PNC001 and click [OK]

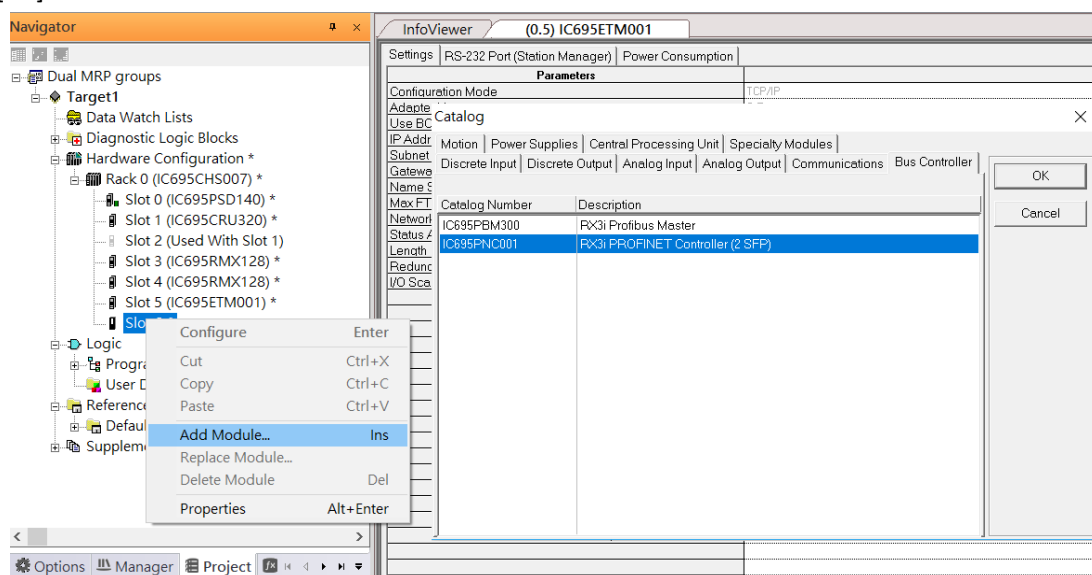


Figure 234

Now all the devices on the I/O Controller are ready on the slots on the rack, the following picture is the current status, and we shall save it.

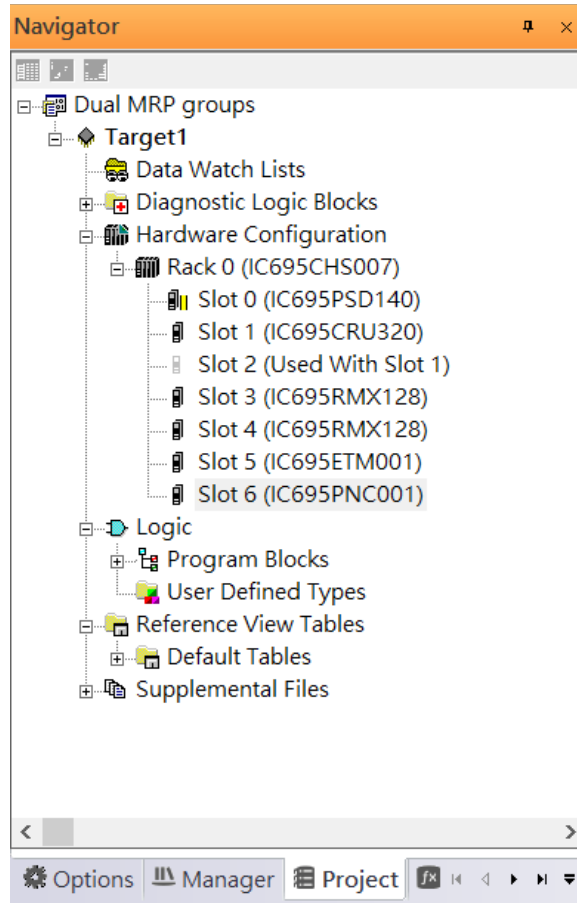


Figure 235

5.2.3 I/O Device Setting

This section introduces the I/O Device integration. To configure the I/O Device, the GSDML file is necessary. Now we create another interface to load the GSDML file by using [Toolchest].

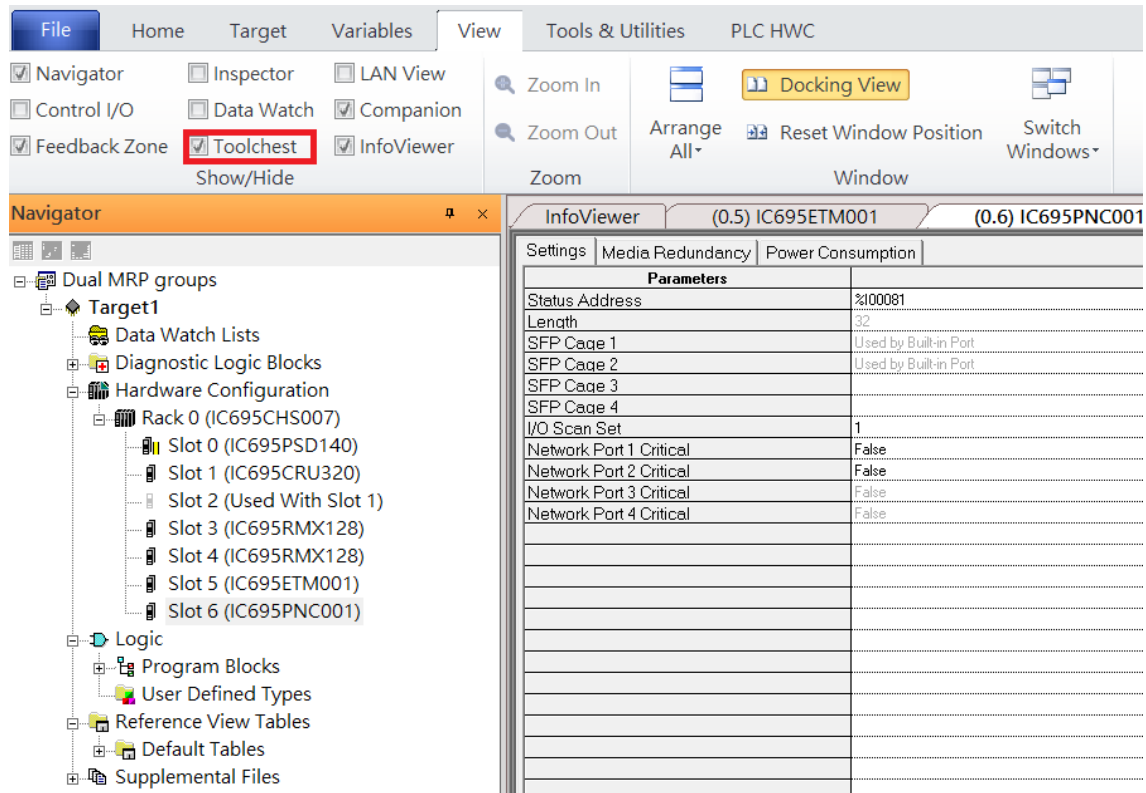


Figure 236

As shown in the following picture, a new interface is created on the right-hand side.

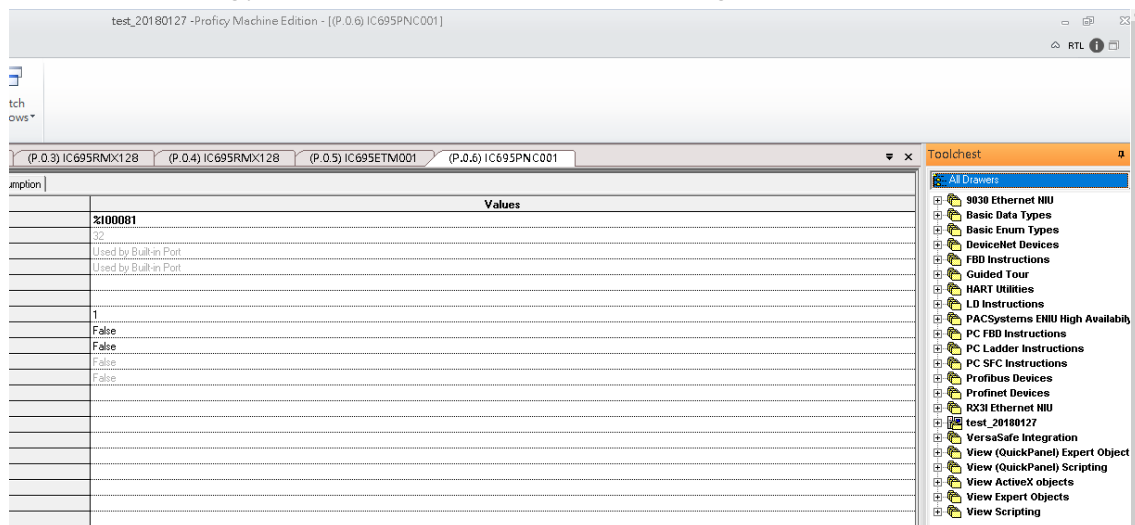


Figure 237

Select Profinet Devices.

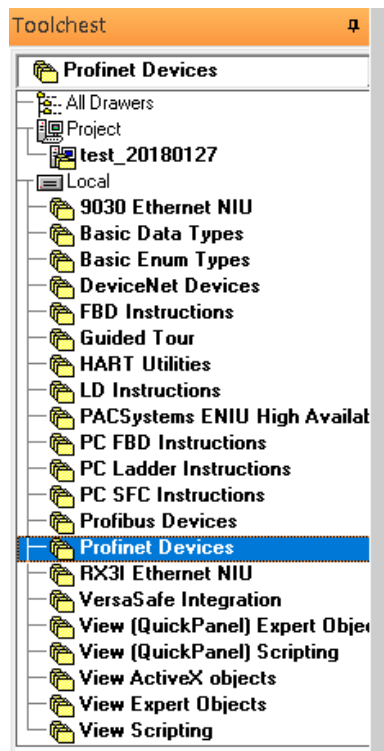


Figure 238

Click right button, select [Assistants] -> [Import GSDML File ...]

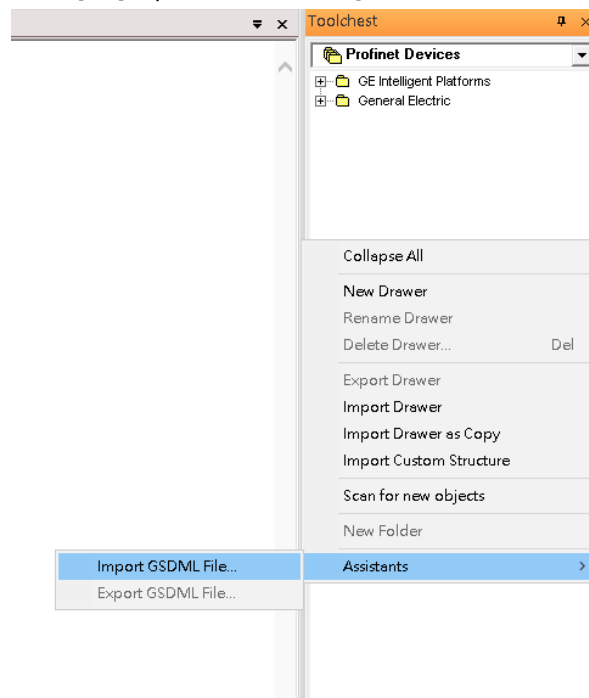


Figure 239

Select the GSDML File.

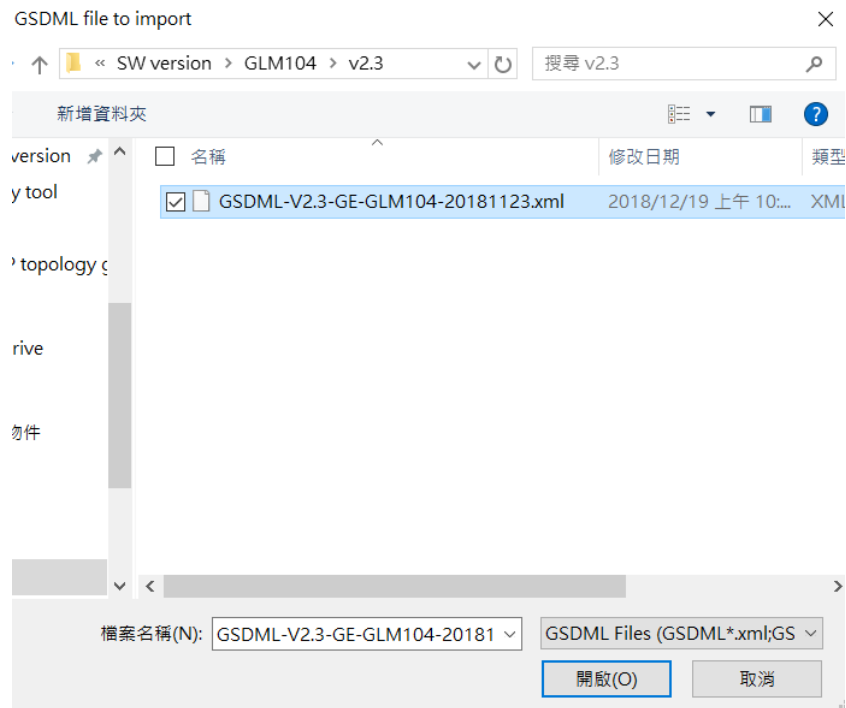


Figure 240

Then the corresponding I/O Device of GSDML File is added in the [Toolchest].

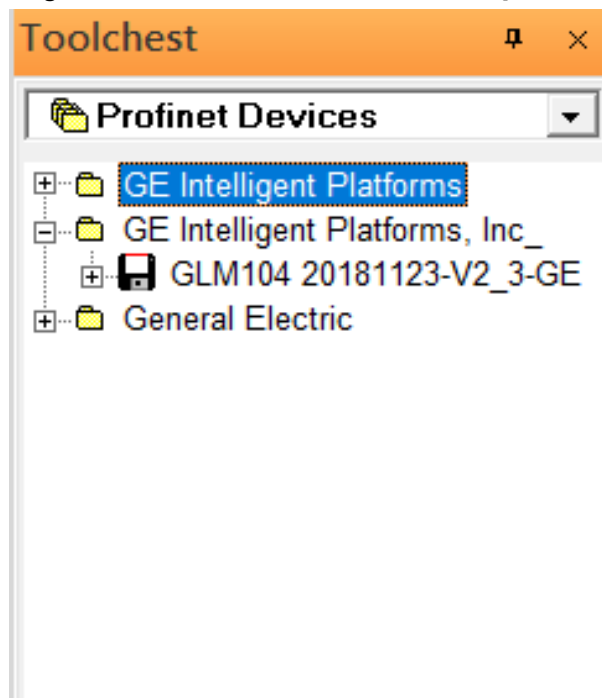


Figure 241

In this document, there are nine I/O devices and one I/O controller. I/O devices are eight switches and one GE VersaMax PROFINET I/O Scanner.

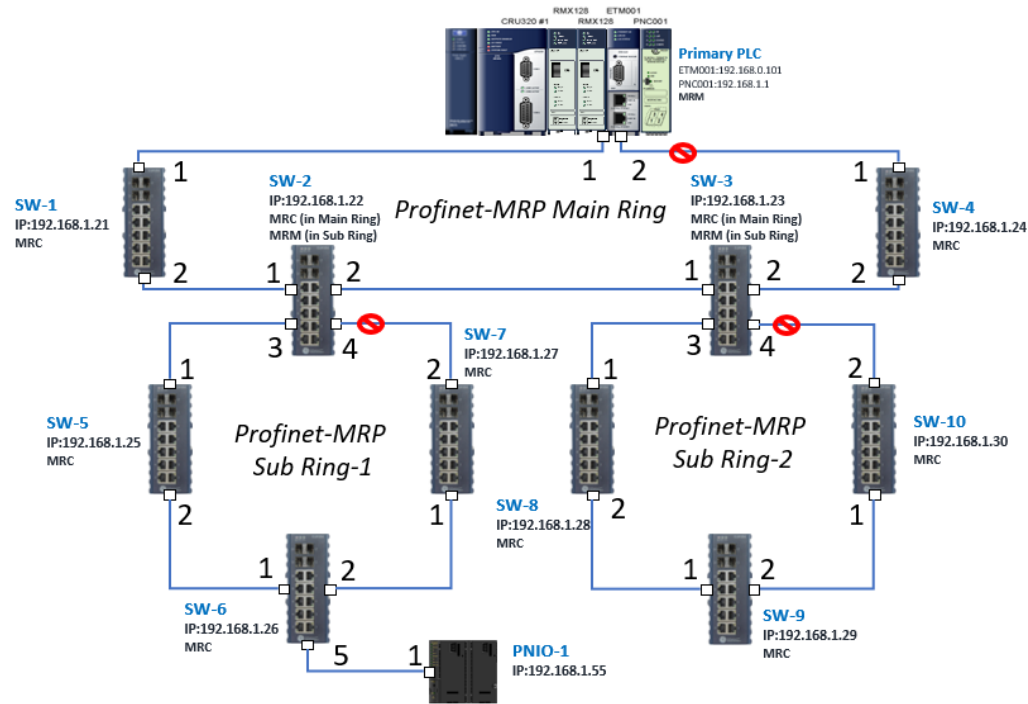


Figure 242

The I/O Device is connected to the Bus Controller on the I/O Controller. Click the slot 6 and click the right button to add the I/O Device on the PNC001

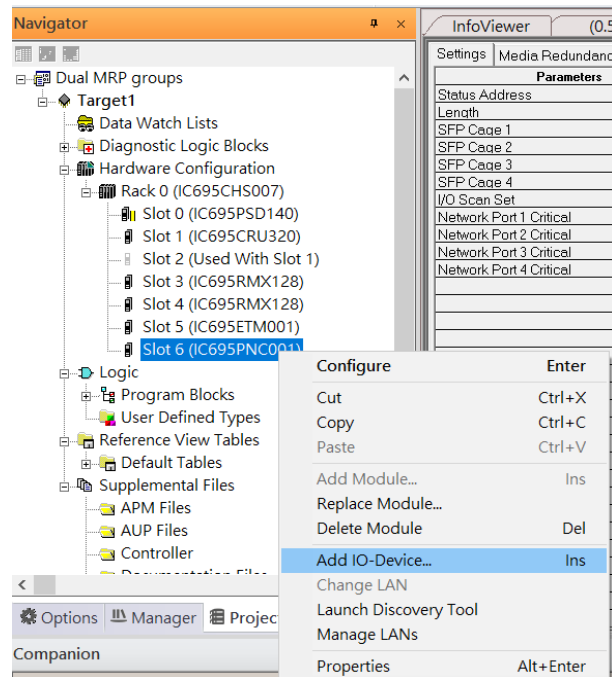


Figure 243

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

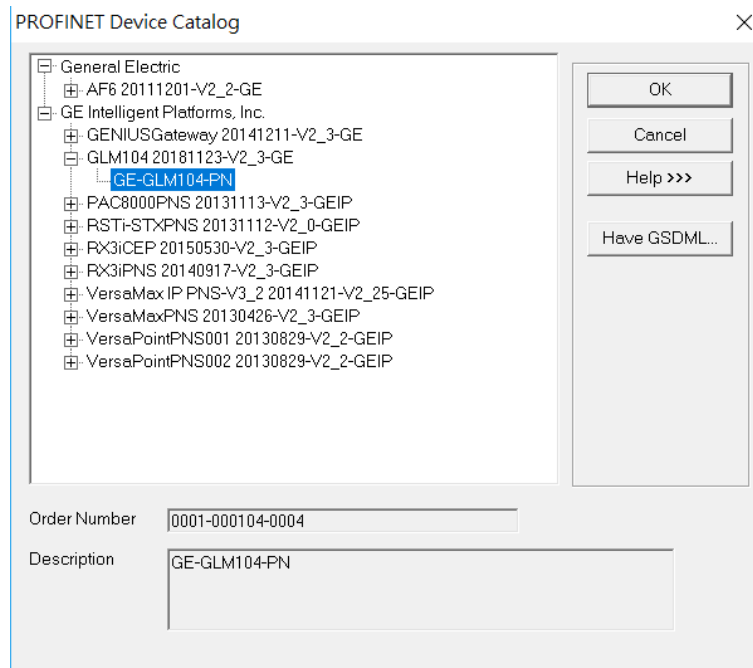


Figure 244

Now the I/O device GLM104(SW1) is ready and is a sub slot on PNC001.

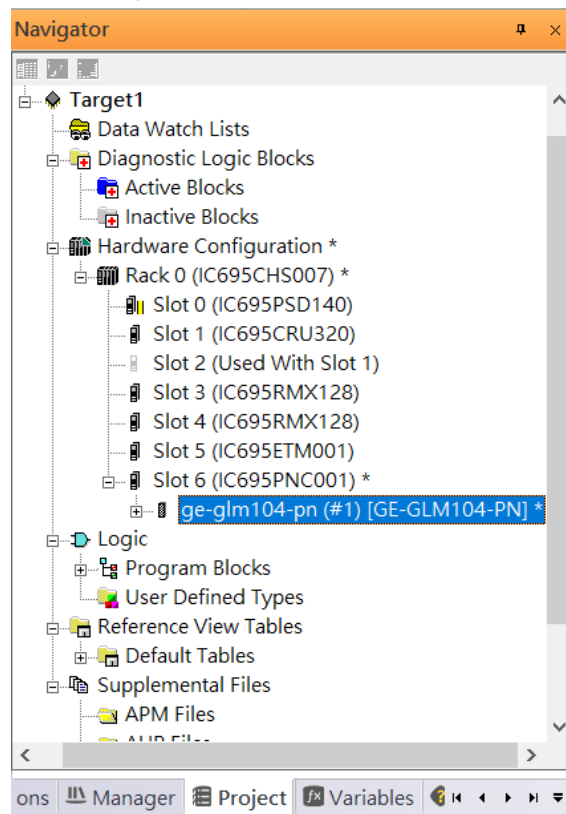


Figure 245

Then add the second I/O device in the PNC001.

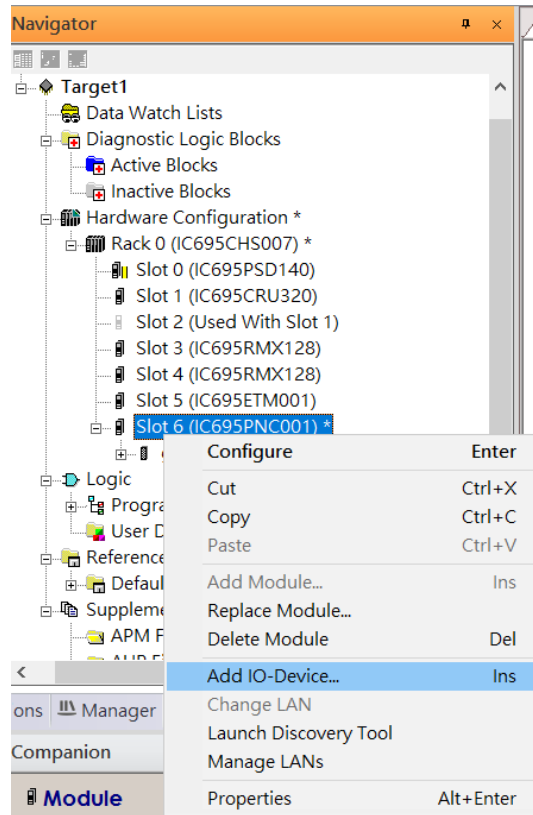


Figure 246

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE] -> [GE-GLM104-PN] and click [OK]

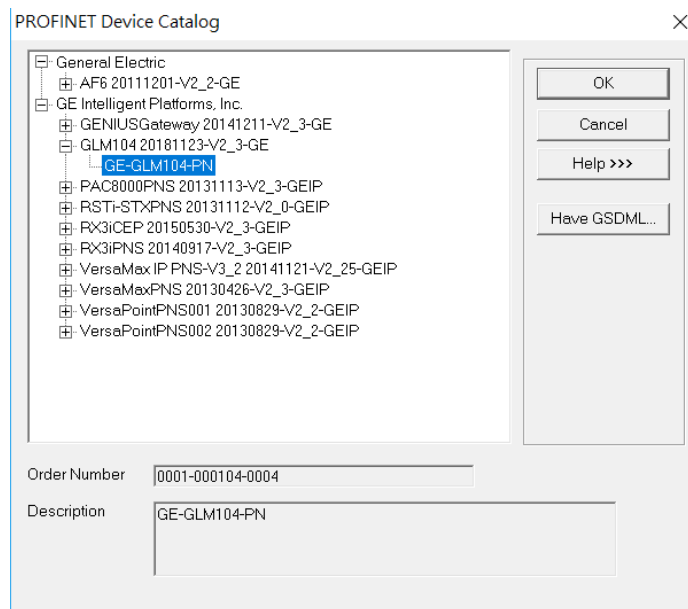


Figure 247

Now the I/O device GLM104(SW2) is ready and is a sub slot on PNC001.

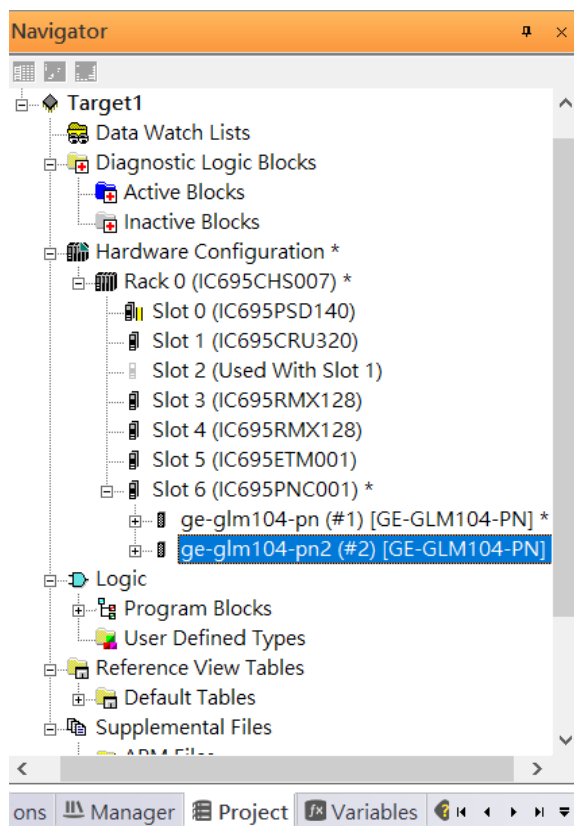


Figure 248

Then add the third I/O device in the PNC001.

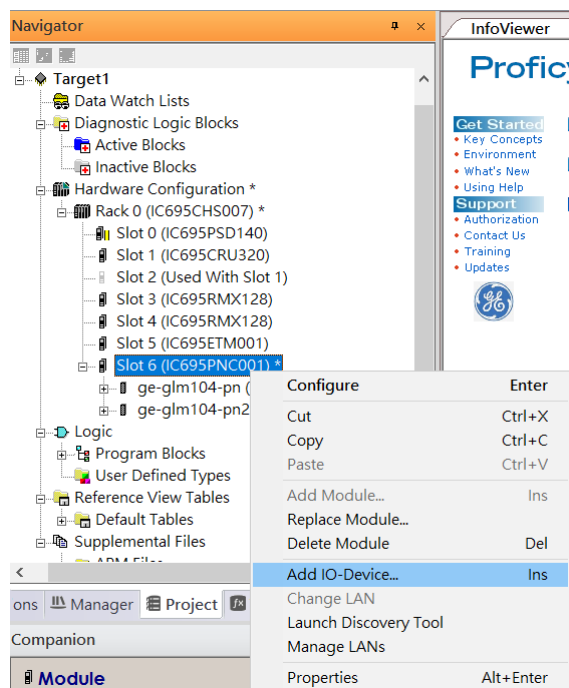


Figure 249

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

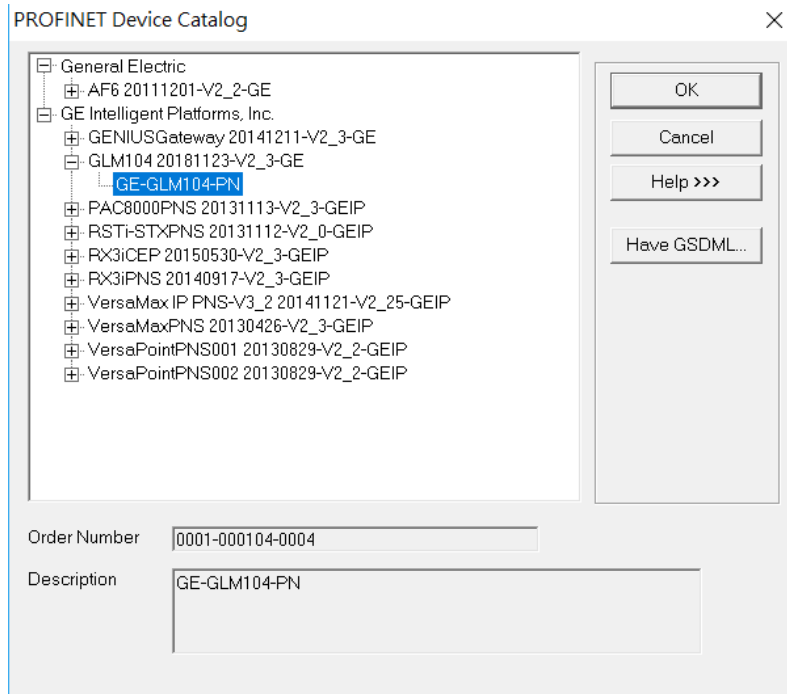


Figure 250

Now the I/O device GLM104(SW3) is ready and is a sub slot on PNC001

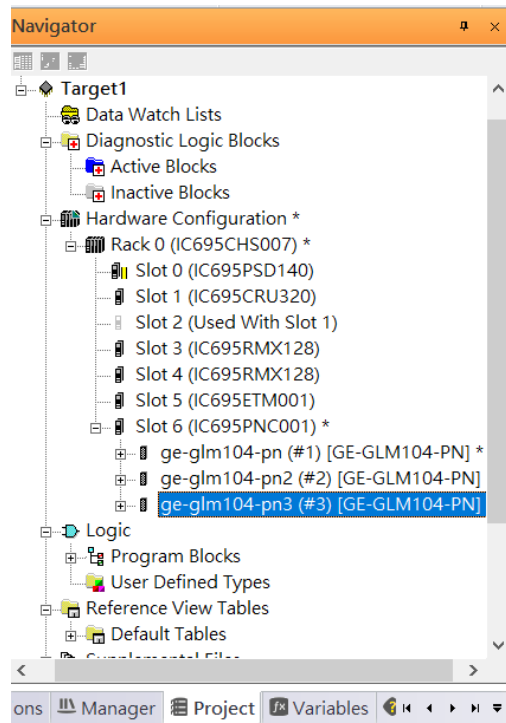


Figure 251

Then add the fourth I/O device in the PNC001.

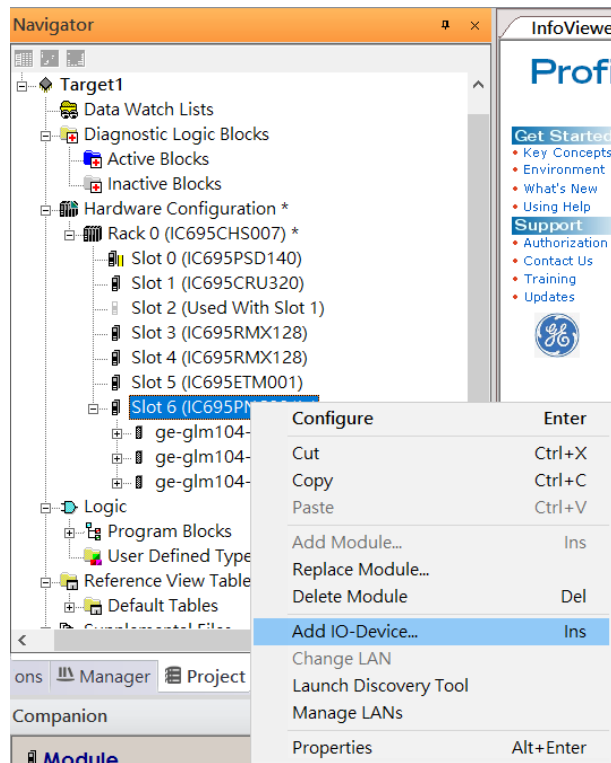


Figure 252

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

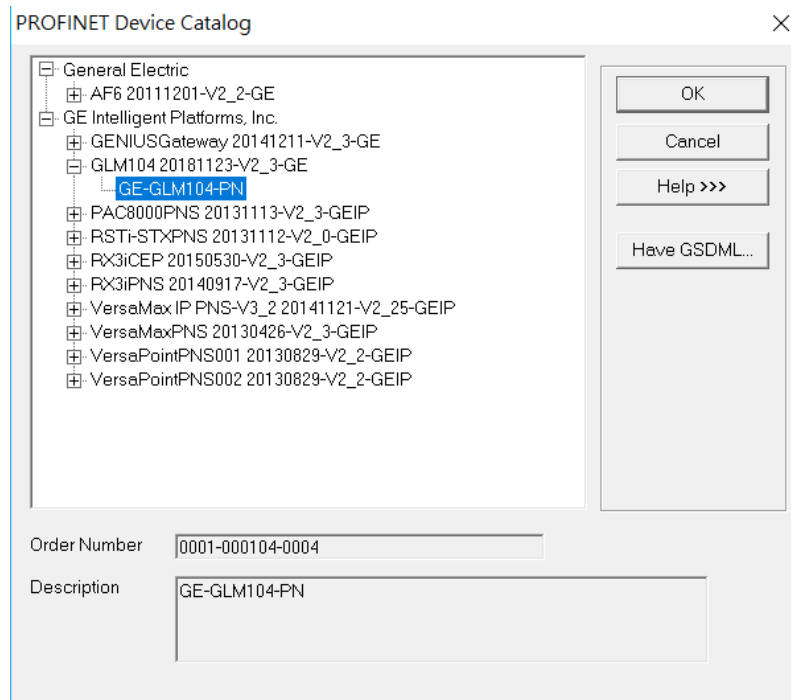


Figure 253

Now the I/O device GLM104(SW4) is ready and is a sub slot on PNC001.

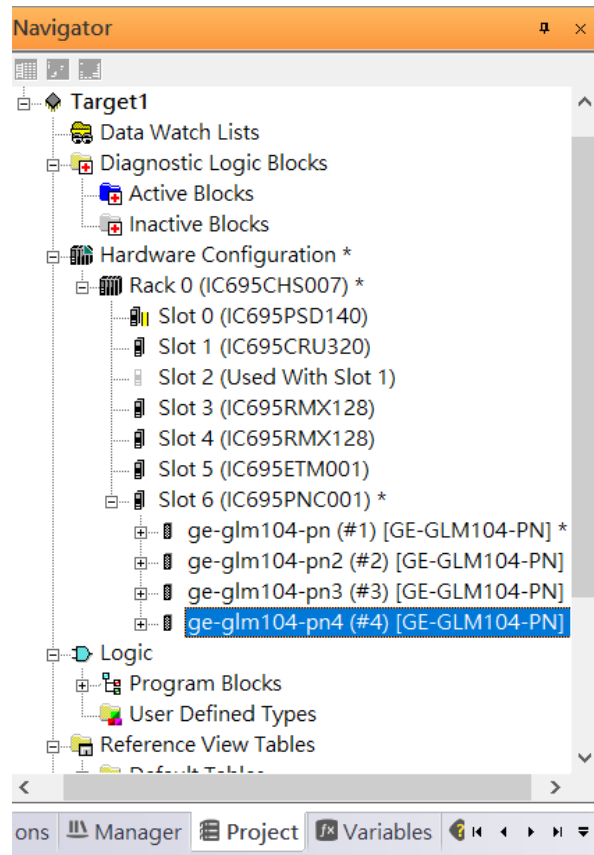


Figure 254

Then add the fifth I/O device in the PNC001.

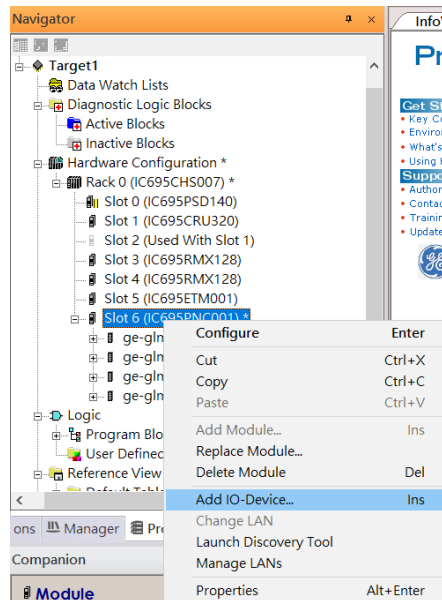


Figure 255

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

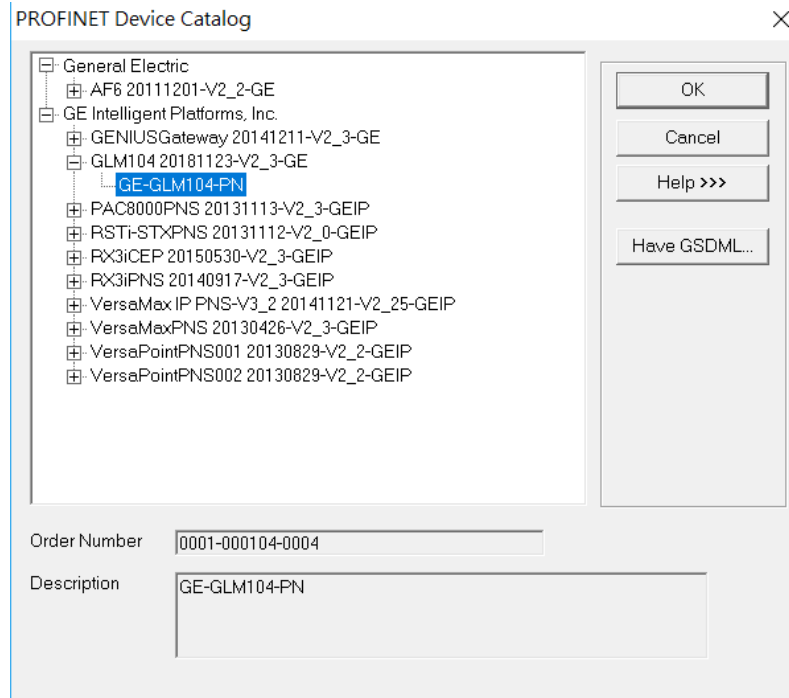


Figure 256

Now the I/O device GLM104(SW5) is ready and is a sub slot on PNC001.

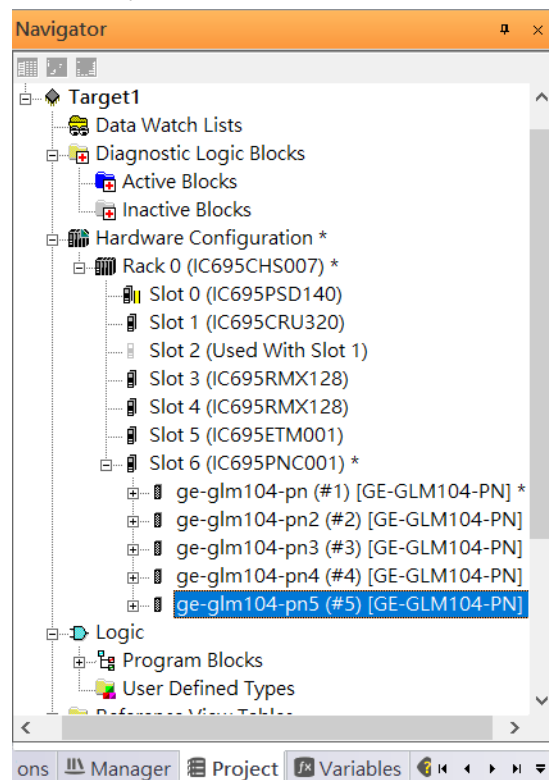


Figure 257

Then add the sixth I/O device in the PNC001.

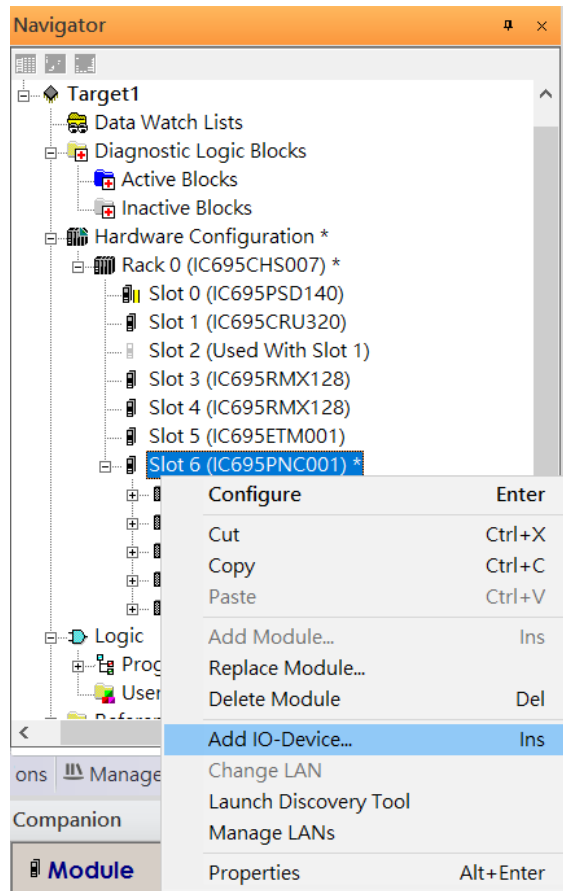


Figure 258

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

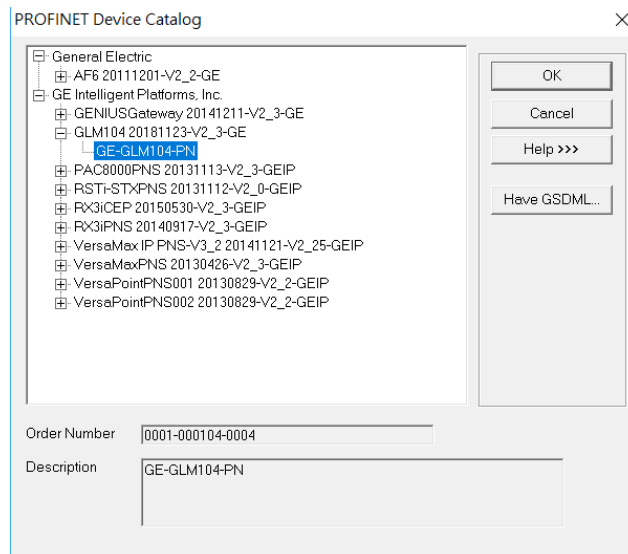


Figure 259

Now the I/O device GLM104(SW6) is ready and is a sub slot on PNC001.

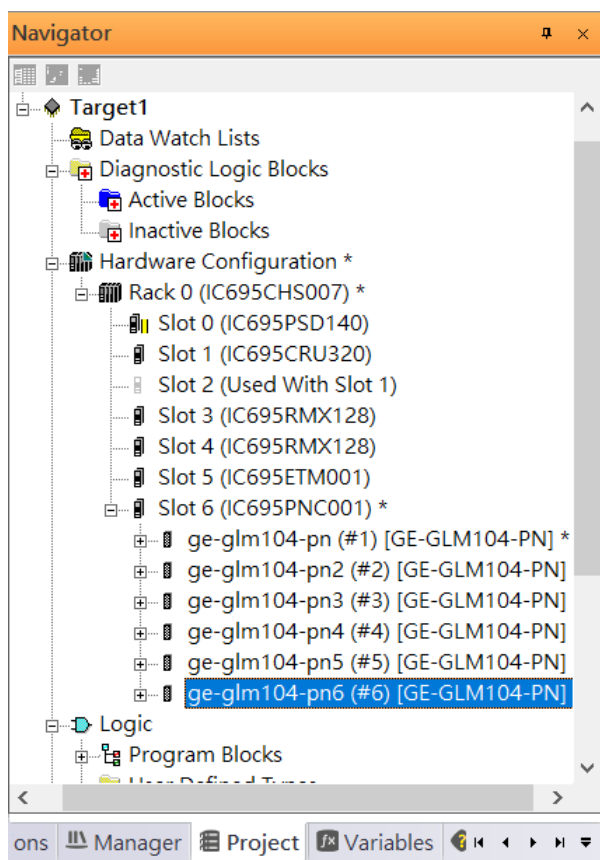


Figure 260

Then add the seventh I/O device in the PNC001.

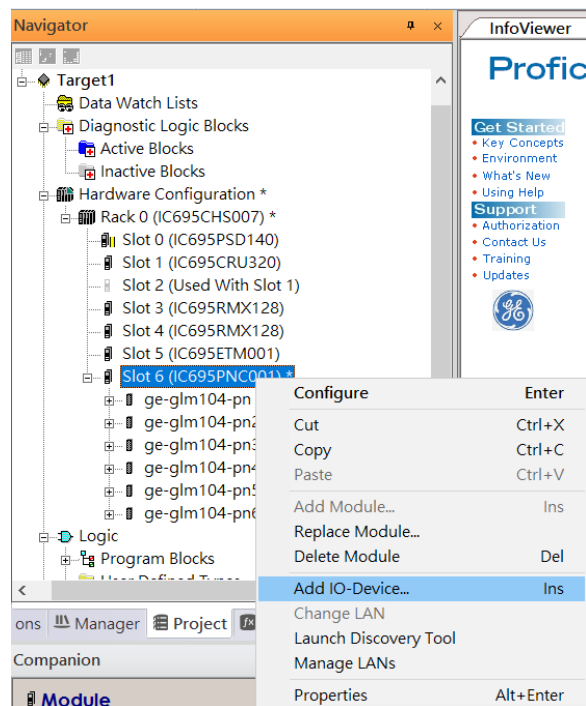


Figure 261

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

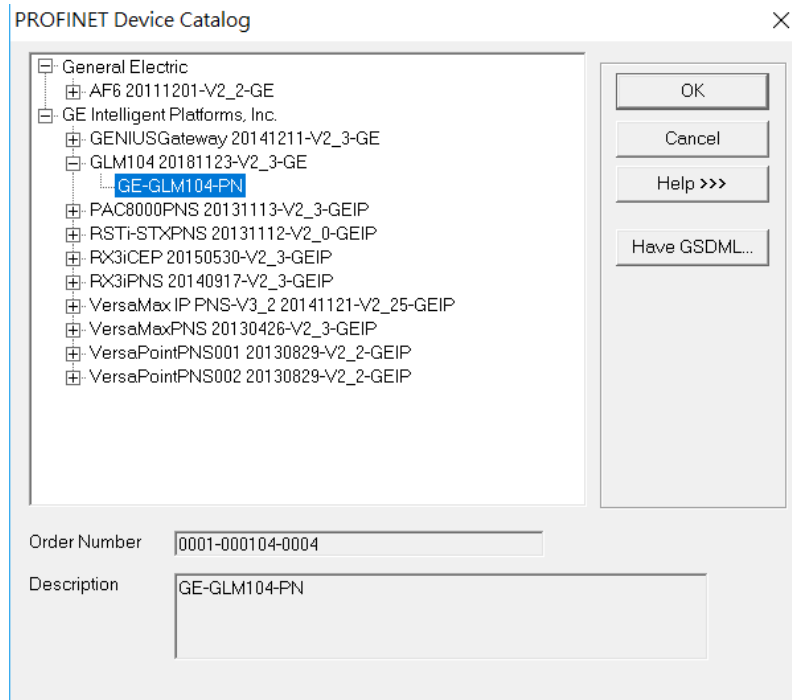


Figure 262

Now the I/O device GLM104(SW7) is ready and is a sub slot on PNC001.

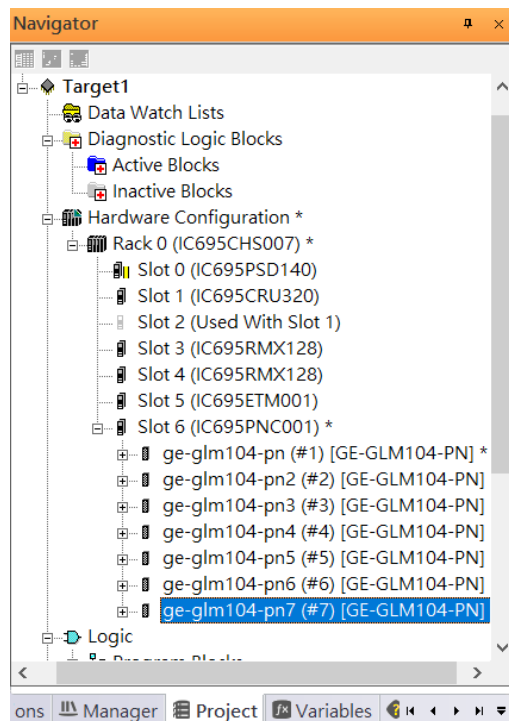


Figure 263

Then add the eighth I/O device in the PNC001.

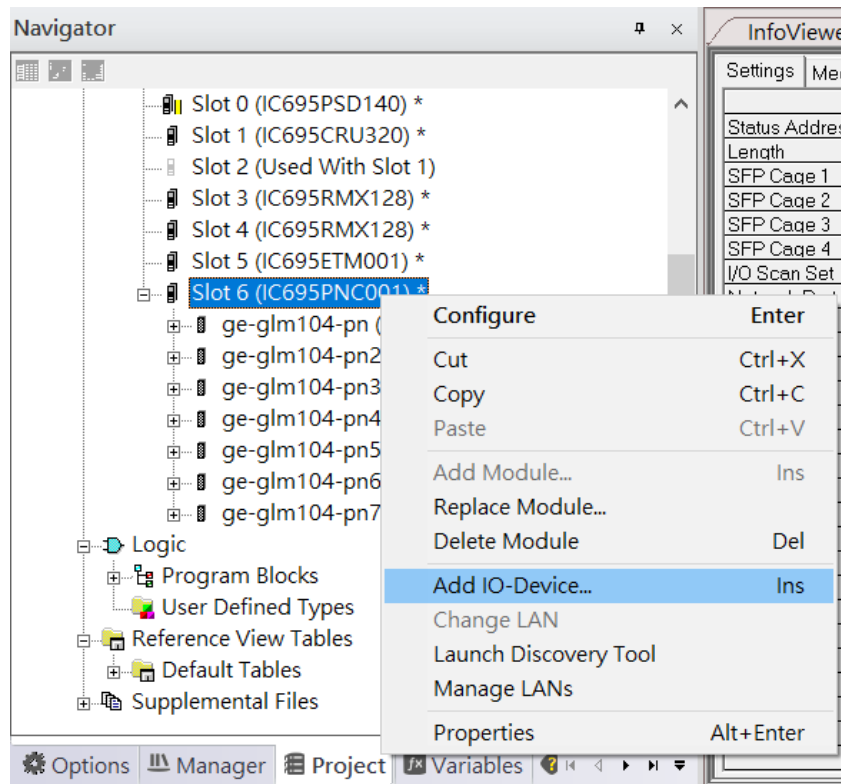


Figure 264

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

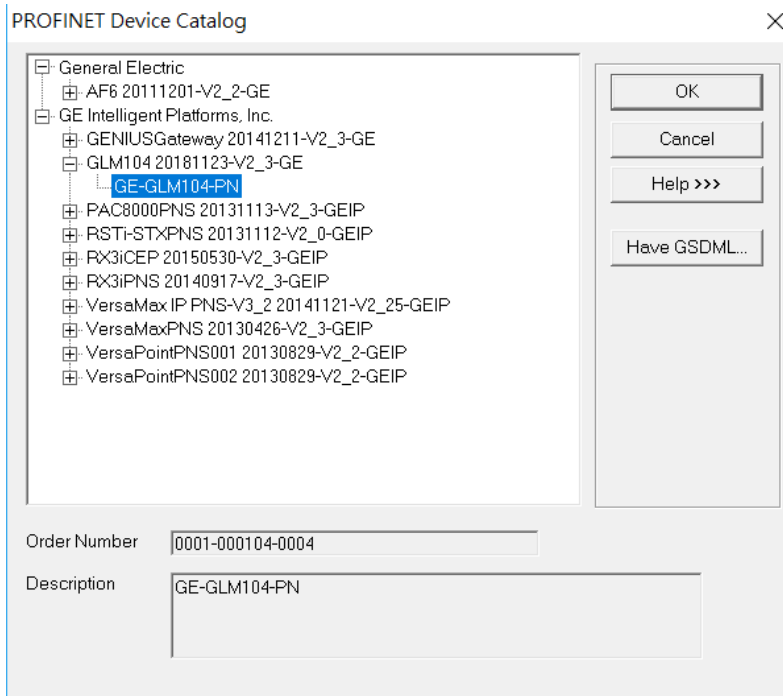


Figure 265

Now the I/O device GLM104(SW8) is ready and is a sub slot on PNC001.

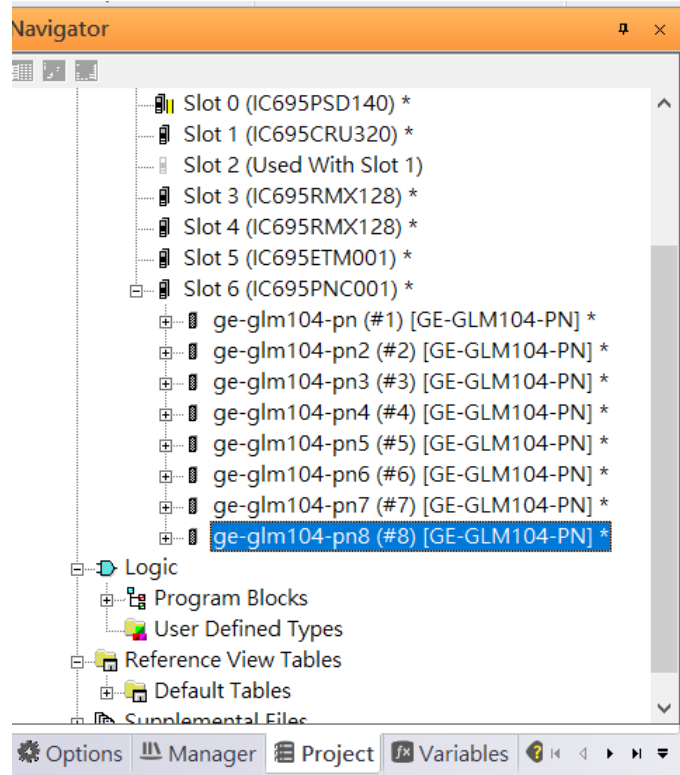


Figure 266

Then add the ninth I/O device in the PNC001.

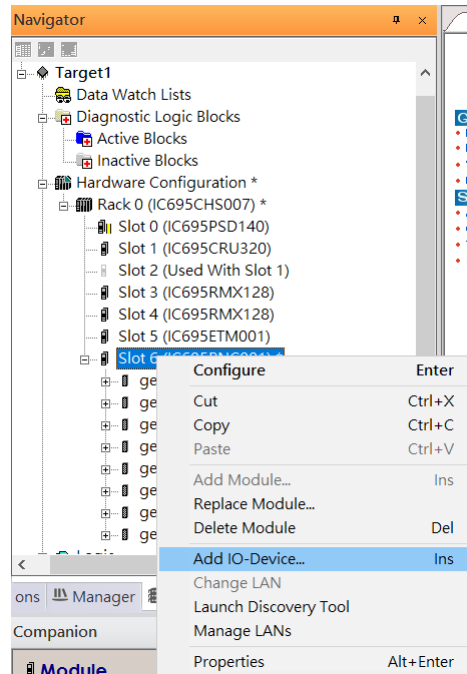


Figure 267

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

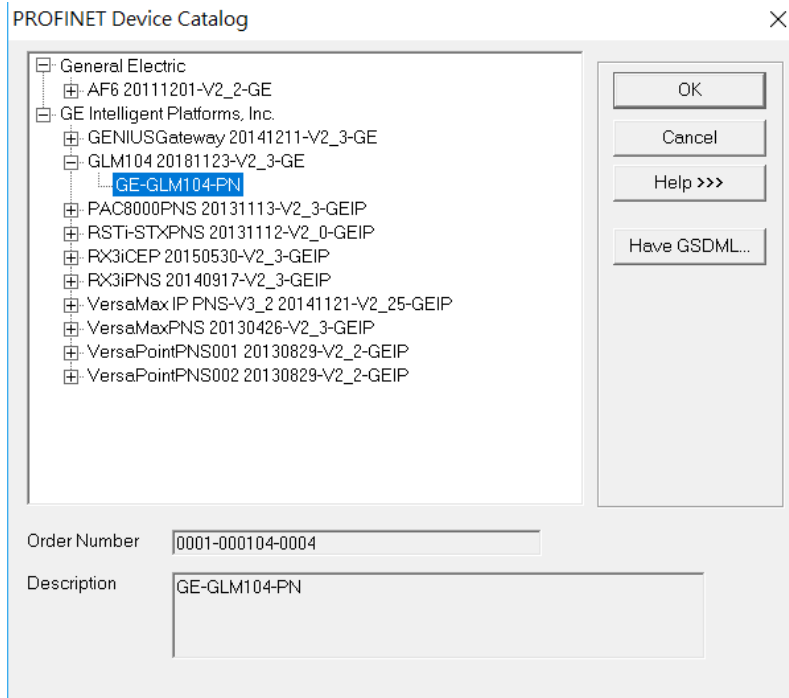


Figure 268

Now the I/O device GLM104(SW9) is ready and is a sub slot on PNC001.

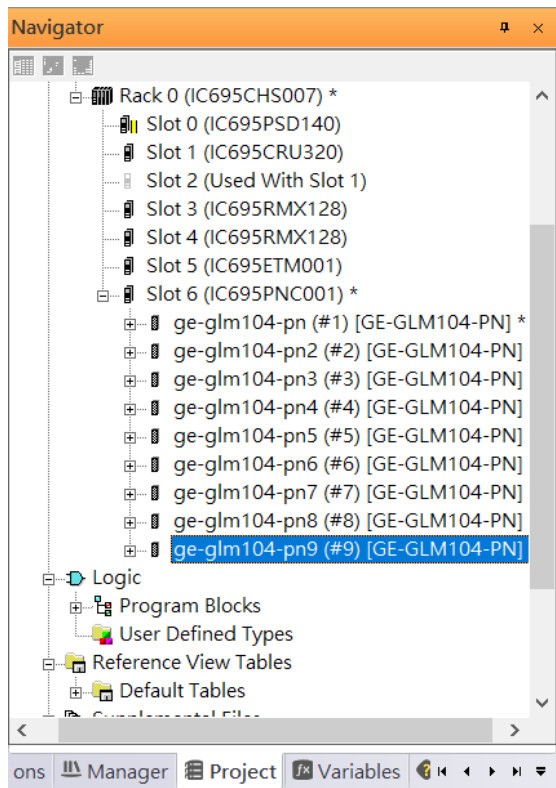


Figure 269

Then add the tenth I/O device in the PNC001.

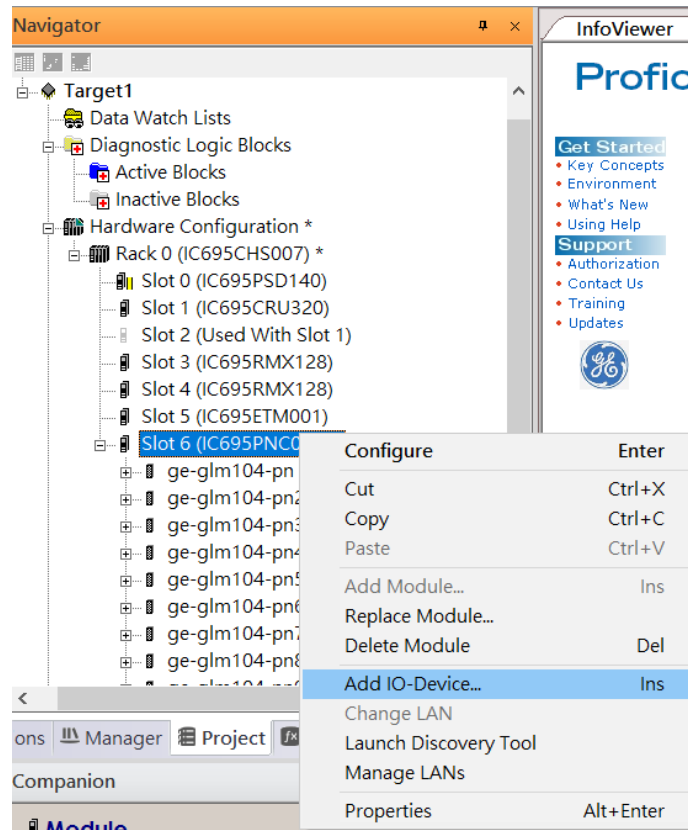


Figure 270

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE] -> [GE-GLM104-PN] and click [OK]

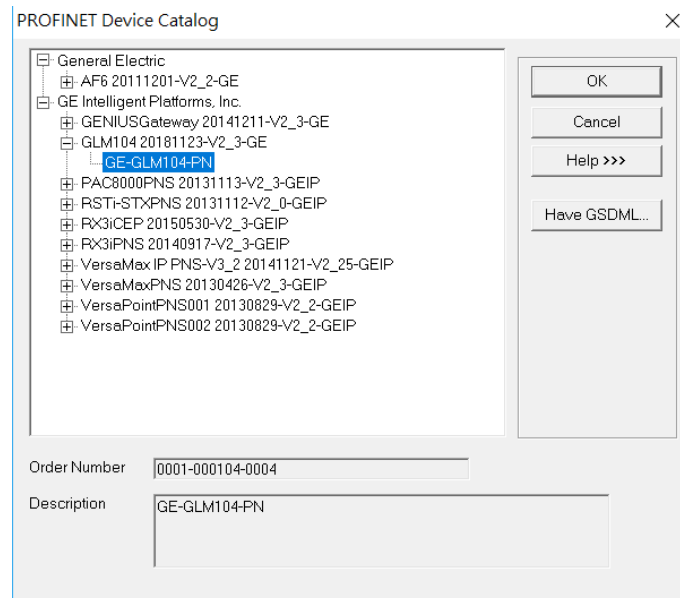


Figure 271

Now the I/O device GLM104(SW10) is ready and is a subslot on PNC001.

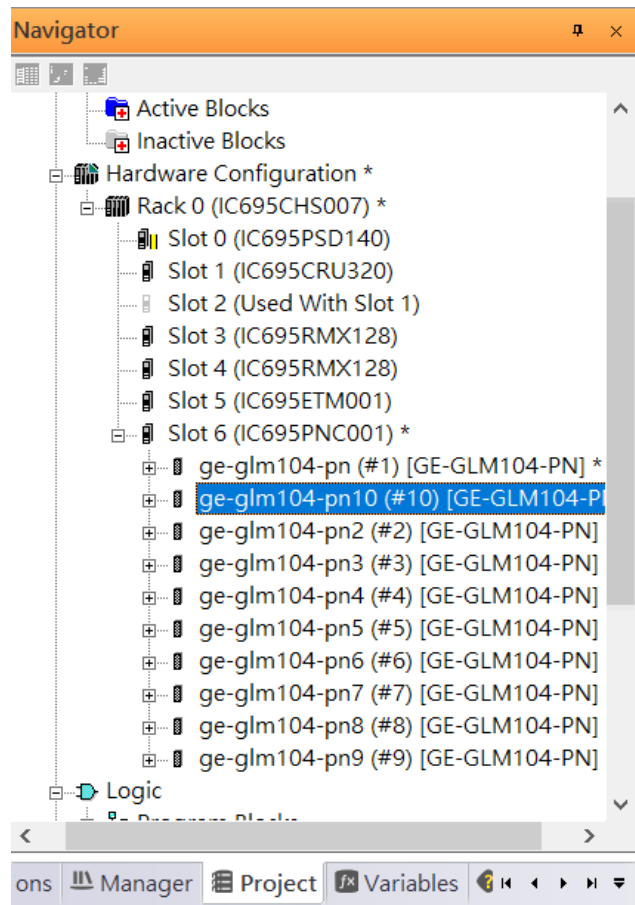


Figure 272

Then add the eleventh I/O device in the PNC001.

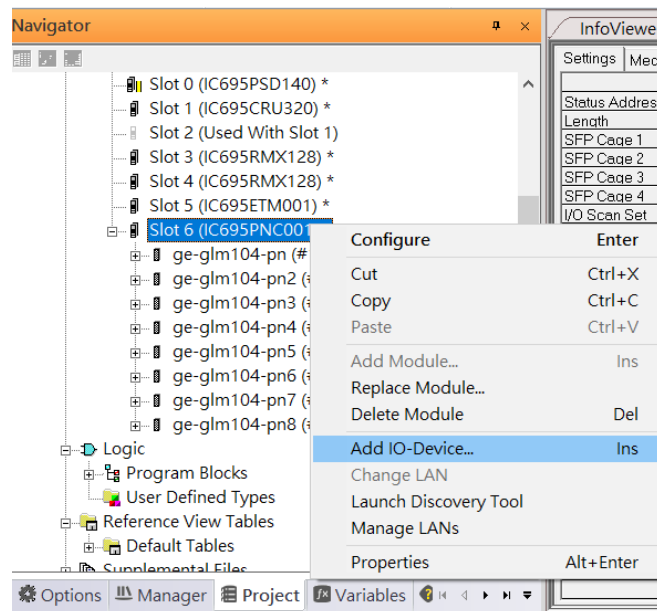


Figure 273

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [VersaMaxPNS 20130426-V2_3-GEIP] -> [VersaMax PROFINET IO Scanner (2 RJ-45 Copper connectors)] and click [OK]

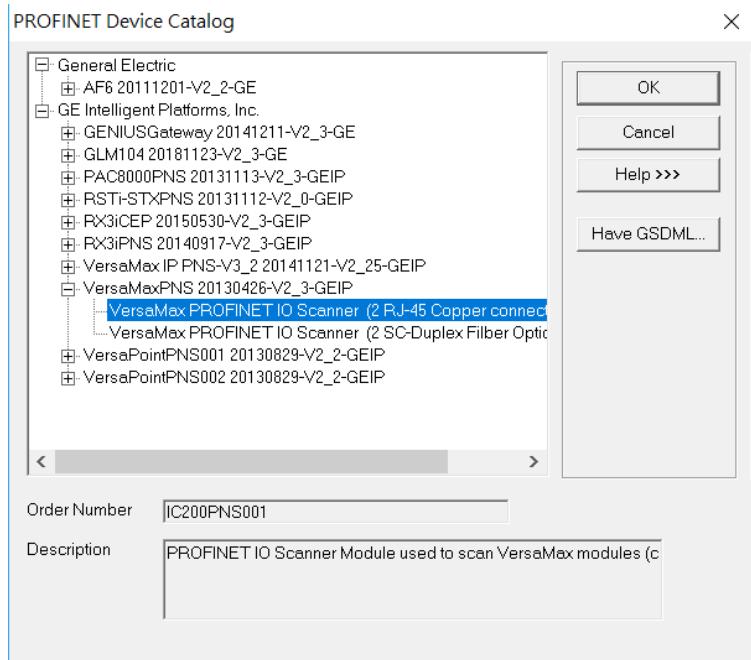


Figure 274

Now the I/O device VersaMax PROFINET IO Scanner is ready and is a sub slot on PNC001.

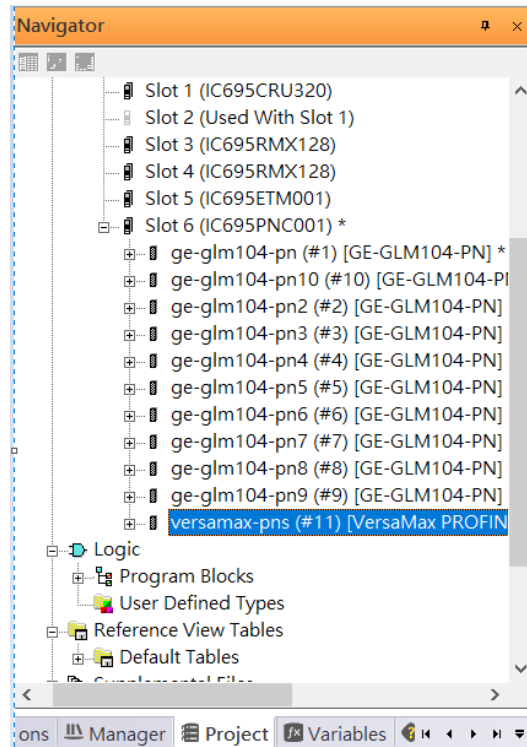


Figure 275

5.2.4 DCP Set Command

To configure the setting or monitor the status on the I/O Device, the communication interface is also based on Ethernet network. We can specify the IP address and the device name from I/O Controller via the DCP (Discovery and Configuration Protocol).

Under the slot 6, PNC001, select the I/O Device, ge-gl m104-pn, and click the right button.

Select [Properties], see the following picture.

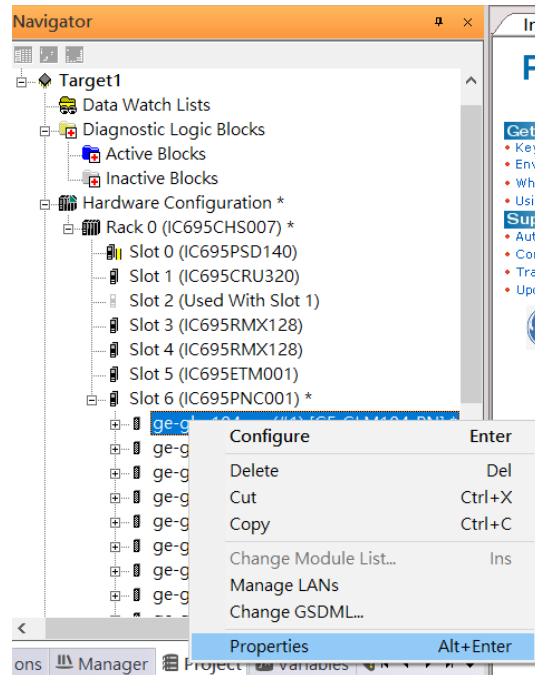


Figure 276

In this table, the I/O Device name can be specified in field [Device Name], and the IP address can be set in field [IP address]. We modify device name to “ge-gl m104-pn-sw-1” and IP address to “192.168.0.21” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-gl m104-pn-sw-1” later.

Inspector	
IO-Device	
Device Number	1
Update Rate (ms)	128
Reference Variable	<None>
Network Identification	
IO LAN	LAN01
Device Name	ge-gl m104-pn-sw-1
Device Description	
IP Address	192.168.0.21
General	
GSDML	GSDML_V2.3-GE-GLM104-20181123.xml
Device Type	GE-GLM104-PN
Device Access Point ID	GE-GLM104-PN
Group ID References	True

Figure 277

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn2, and click the right button. Select [Properties], see the following picture.

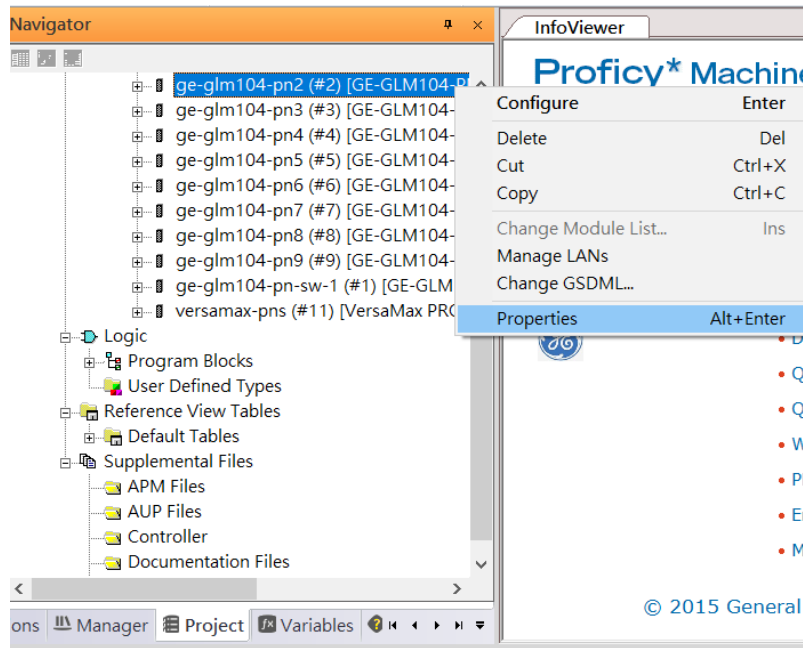


Figure 278

We modify device name to “ge-glm104-pn-sw-2” and IP address to “192.168.0.22” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-2” later.

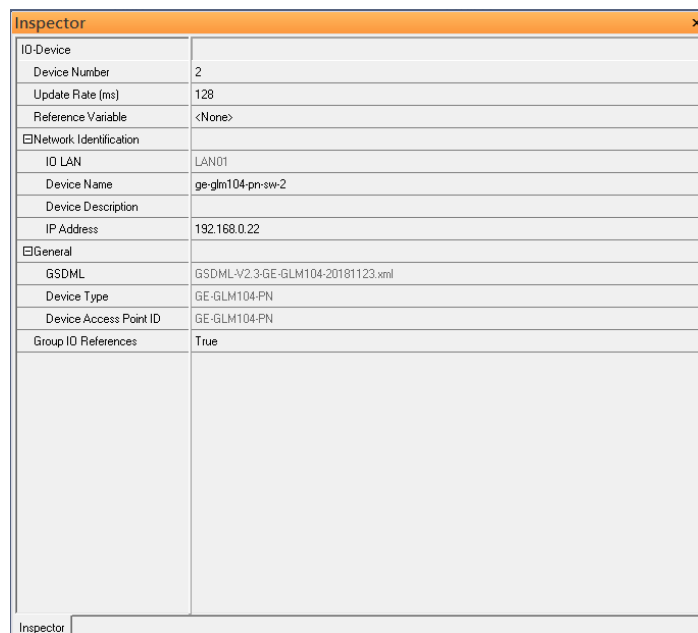


Figure 279

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn3, and click the right button.

Select [Properties], see the following picture.

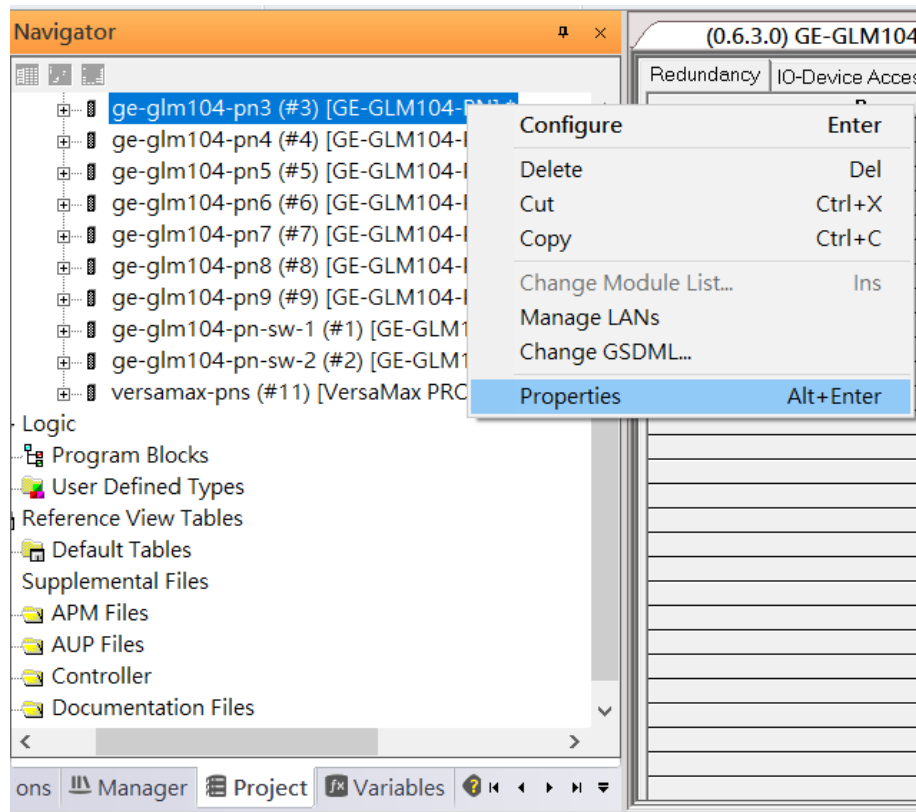


Figure 280

We modify device name to “ge-glm104-pn-sw-3” and IP address to “192.168.0.23” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-3” later.

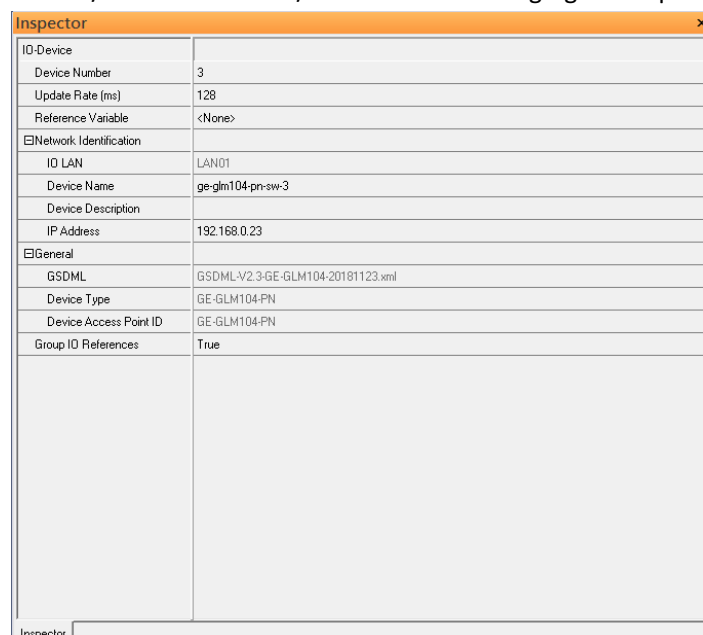


Figure 281

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn4, and click the right button.

Select [Properties], see the following picture.

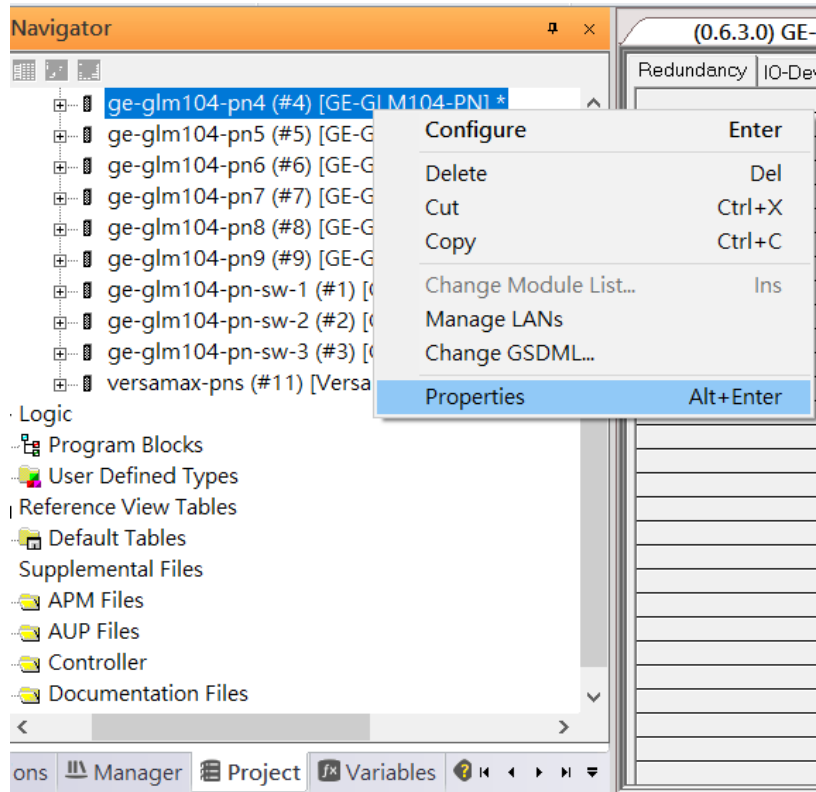


Figure 282

We modify device name to “ge-glm104-pn-sw-4” and IP address to “192.168.0.24” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-4” later.

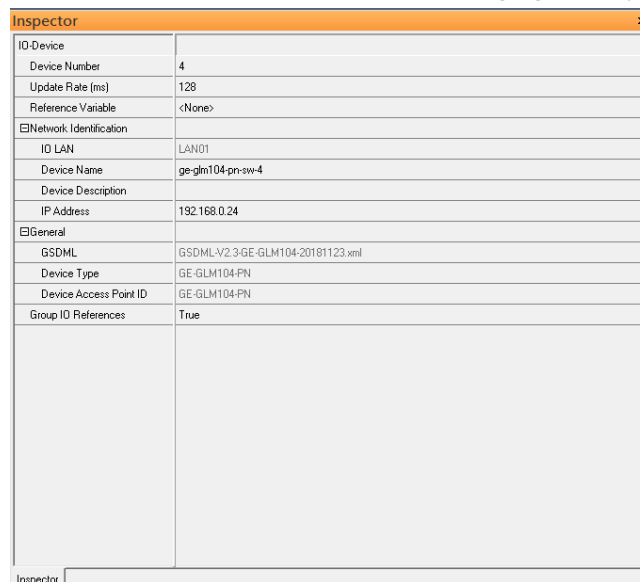


Figure 283

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn5, and click the right button. Select [Properties], see the following picture.

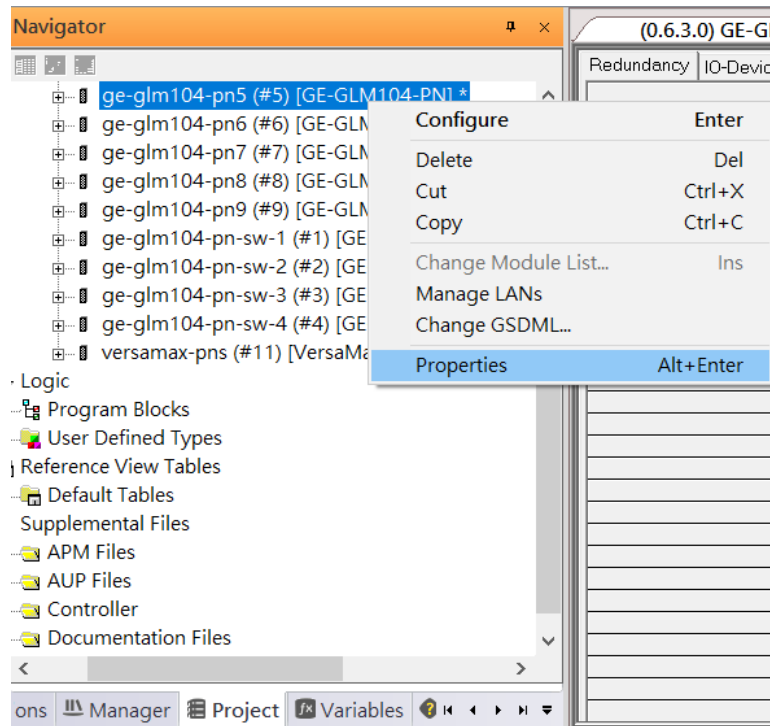


Figure 284

We modify device name to “ge-glm104-pn-sw-5” and IP address to “192.168.0.25” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-5” later.

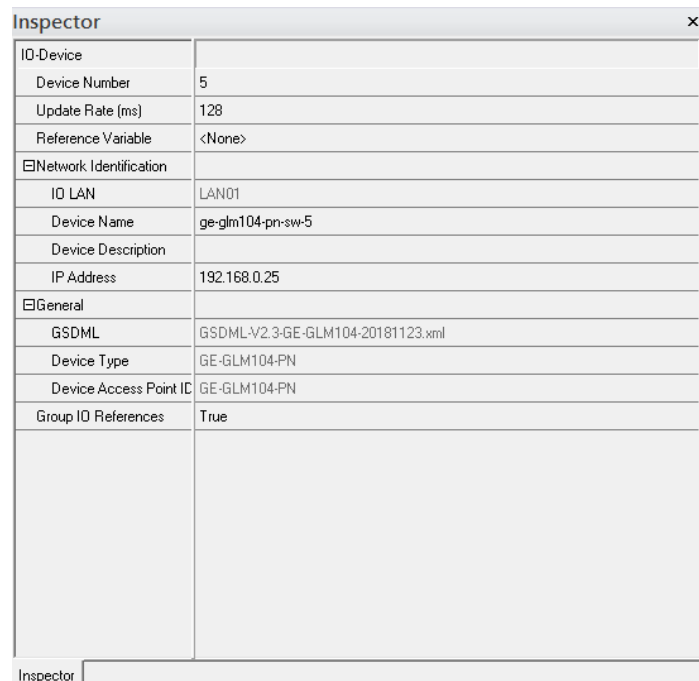


Figure 285

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn6, and click the right button. Select [Properties], see the following picture.

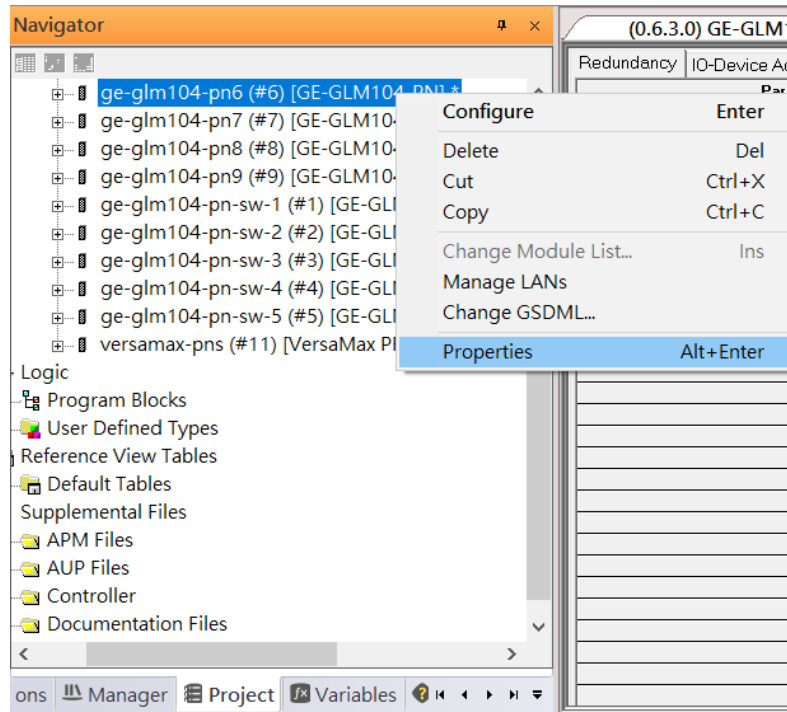


Figure 286

We modify device name to “ge-glm104-pn-sw-6” and IP address to “192.168.0.26” then we use I/O Device DiscoveryTool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-6” later.

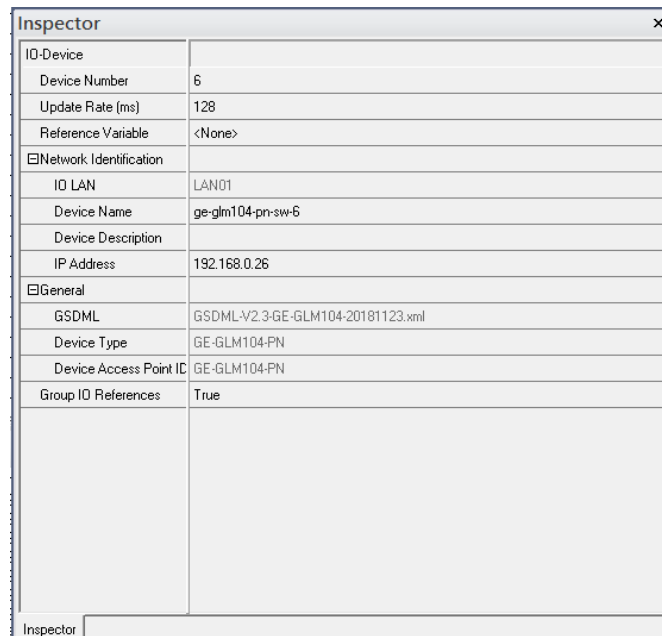


Figure 287

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn7, and click the right button. Select [Properties], see the following picture.

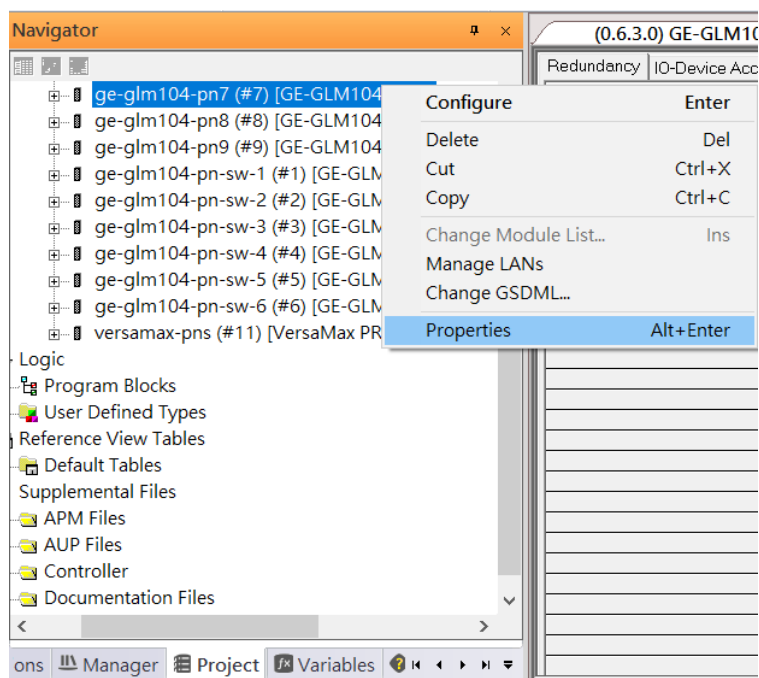


Figure 288

We modify device name to “ge-glm104-pn-sw-7” and IP address to “192.168.0.27” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-7” later.

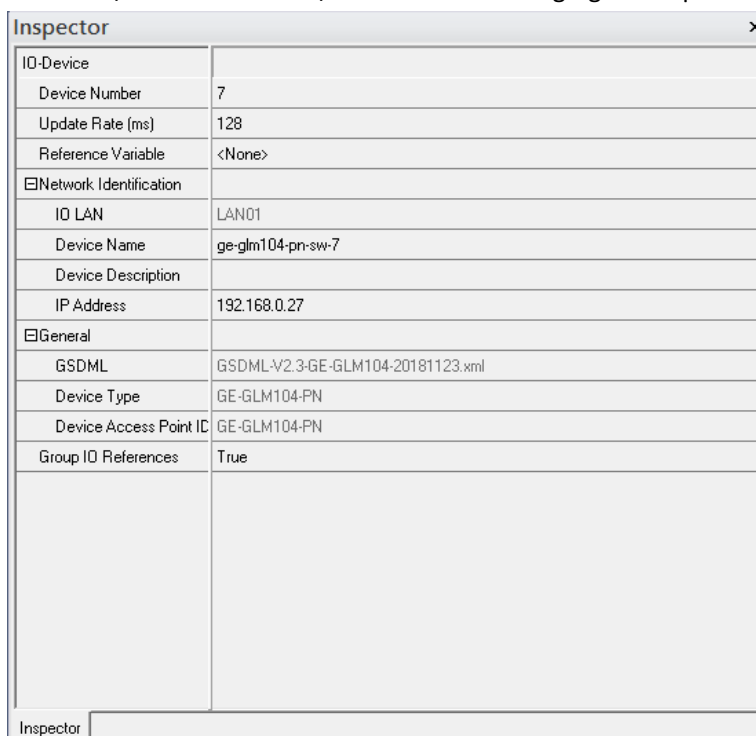


Figure 289

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn8, and click the right button. Select [Properties], see the following picture.

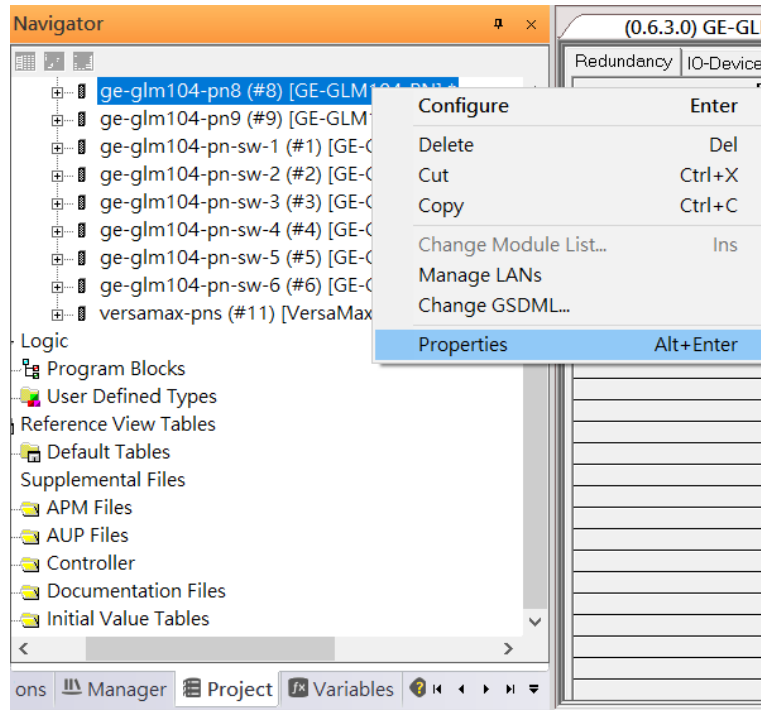


Figure 290

We modify device name to “ge-glm104-pn-sw-8” and IP address to “192.168.0.28” then we use I/O Device DiscoveryTool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-8” later.

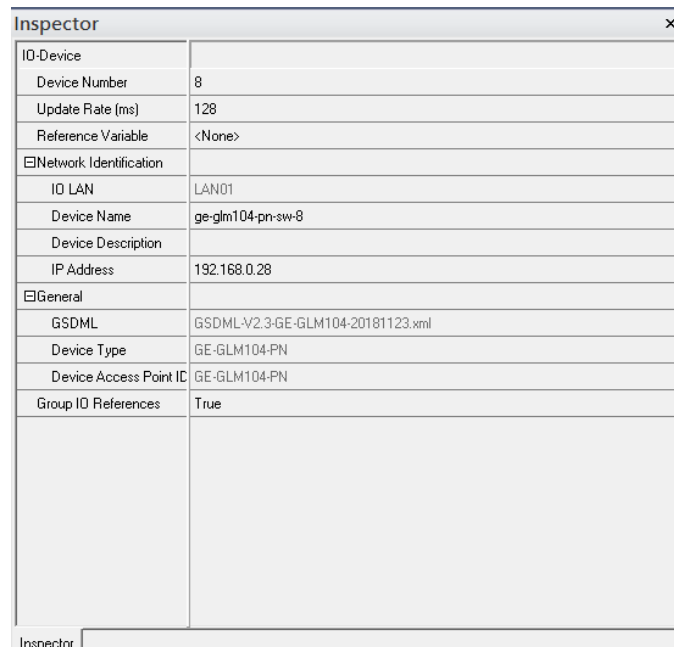


Figure 291

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn9, and click the right button. Select [Properties], see the following picture.

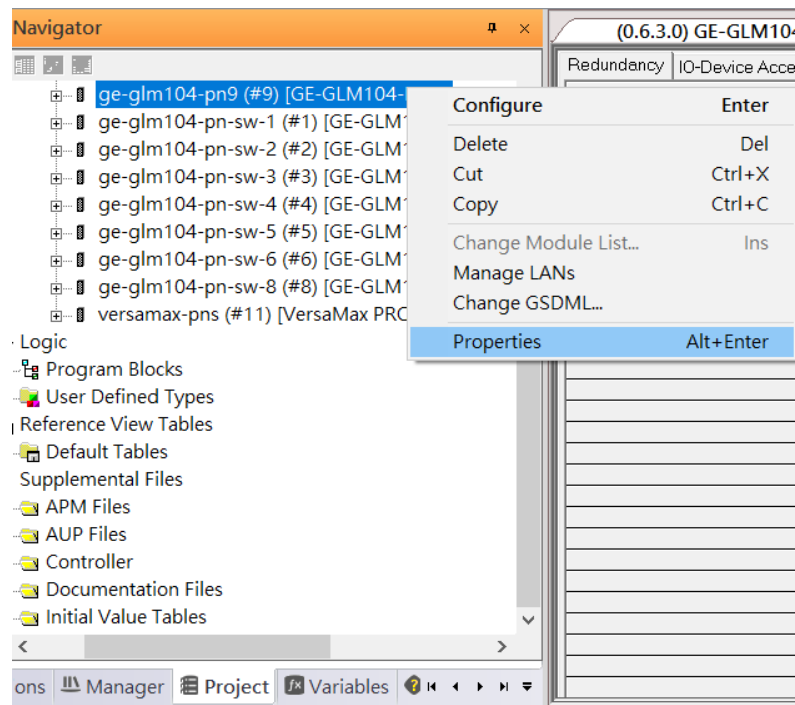


Figure 292

We modify device name to “ge-glm104-pn-sw-9” and IP address to “192.168.0.29” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-9” later.

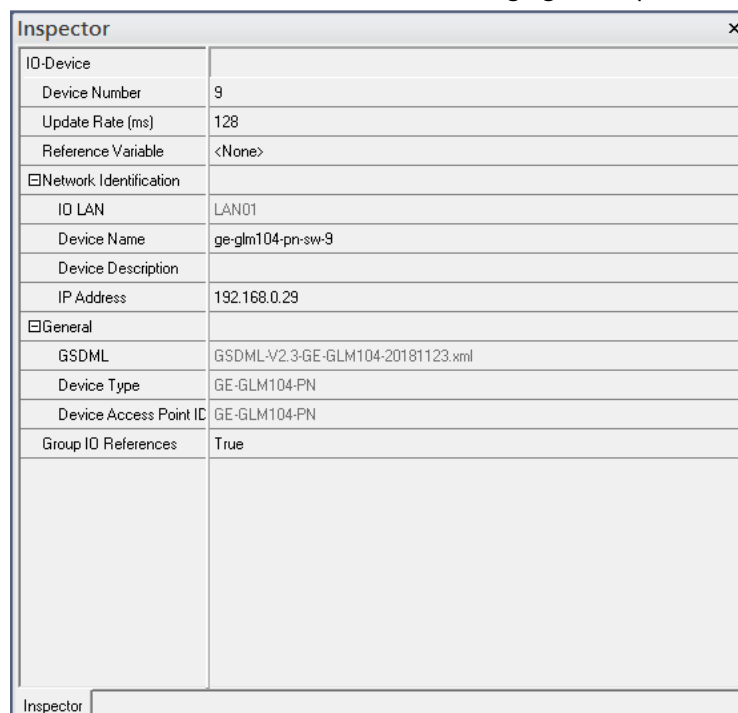


Figure 293

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn10, and click the right button. Select [Properties], see the following picture.

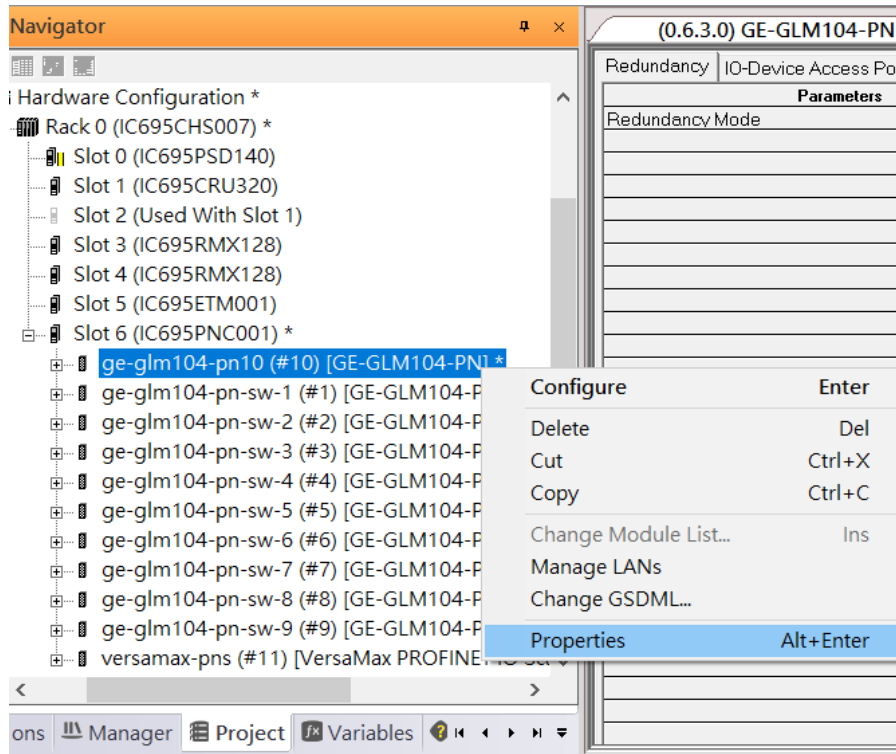


Figure 294

We modify device name to “ge-glm104-pn-sw-10” and IP address to “192.168.0.30” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-10” later.

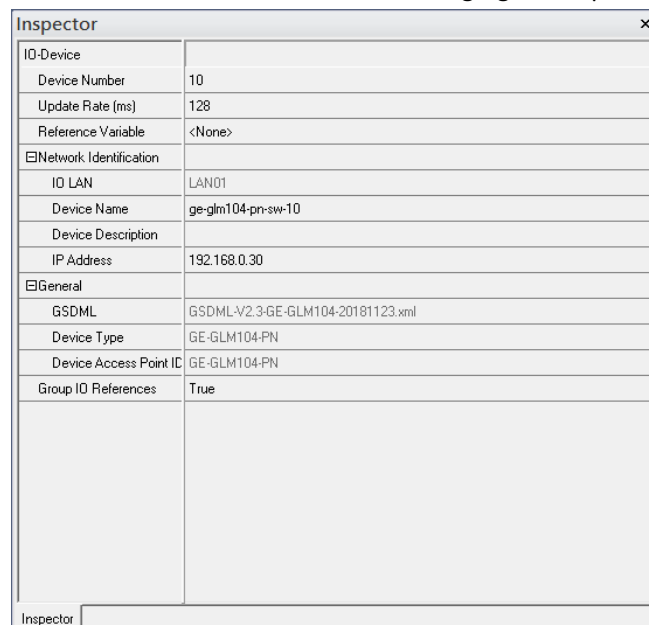


Figure 295

Under the slot 6, PNC001, select the I/O Device, versamax-pns, and click the right button. Select [Properties], see the following picture

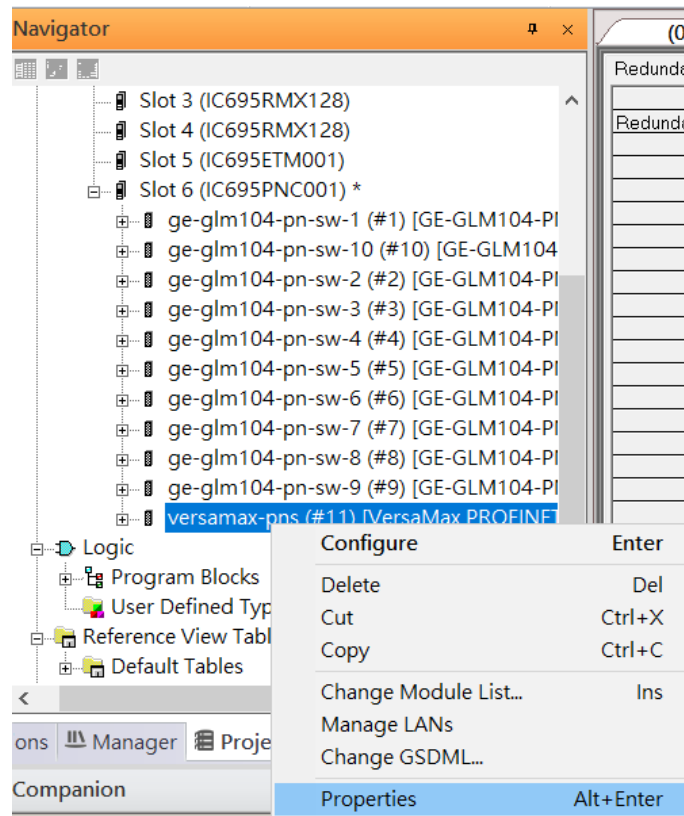


Figure 296

We modify device name to “versamax-pns-pnio-1” and IP address to “192.168.0.55” then we use I/O Device DiscoveryTool to observed an I/O Device and set I/O Device’s name to “versamax-pns-pnio-1” later.

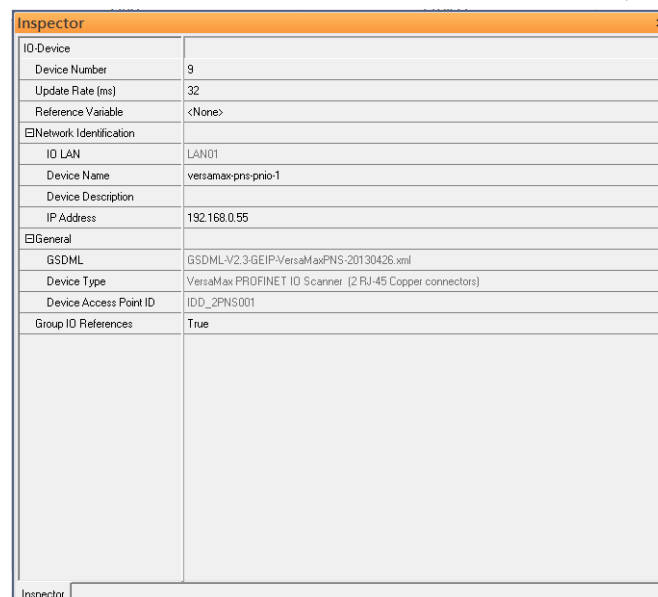


Figure 297

Now all the devices have been changed their device name and IP address like the following picture.



Figure 298

5.2.5 I/O Device Scan

The Proficy Machine Edition also supports the function to scan the connected I/O Devices. First the observed I/O Device shall be connected to the ETM001 on the [Primary] hardware configuration, then using the function [Launch Discovery Tool].

Note: Before we finish downloading the configuration to CRU320, need to unplug the block port according to the hardware topology to avoid loop.

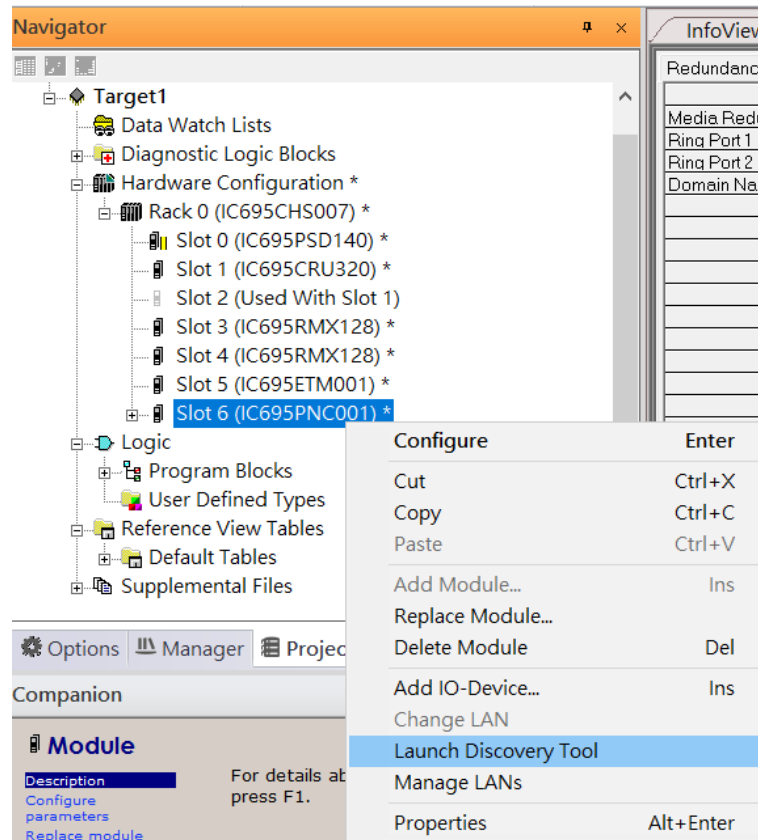


Figure 299

The tool is shown in the following picture, then press [Refresh Device List].

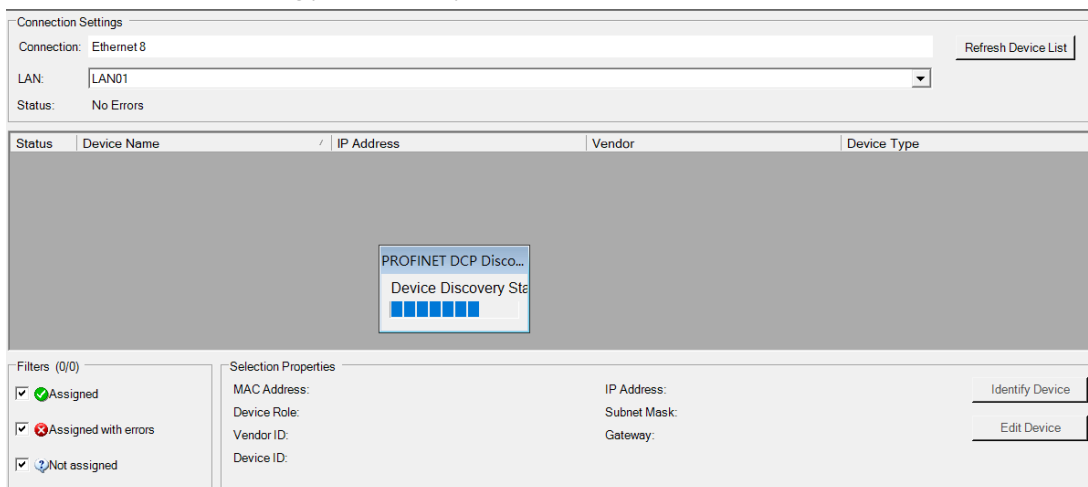
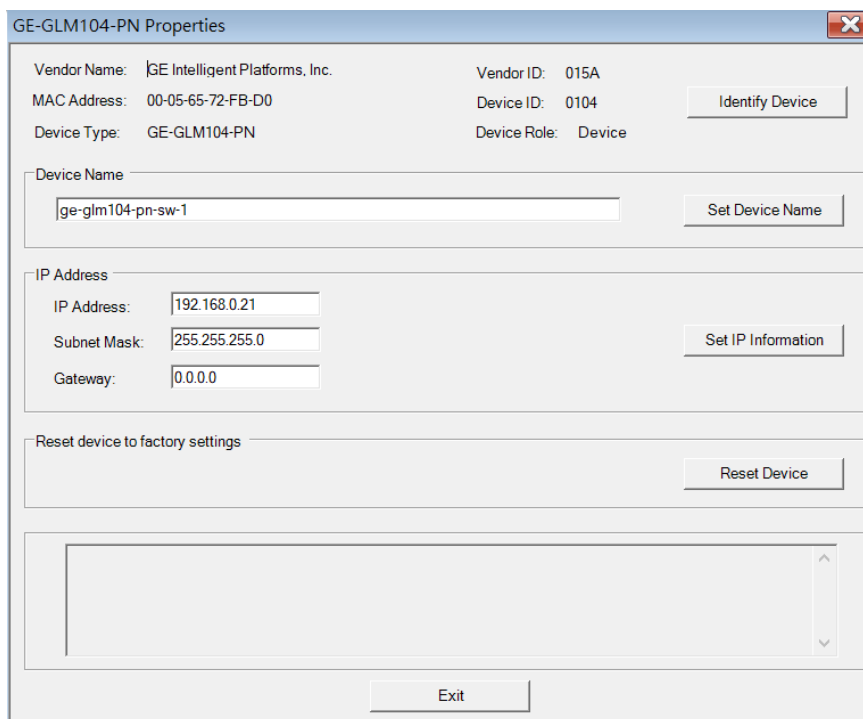


Figure 300

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-1” and click [Set Device Name] button, then set IP Address to “192.168.0.21”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.



GE-GLM104-PN Properties

Vendor Name:	GE Intelligent Platforms, Inc.	Vendor ID:	015A	Identify Device
MAC Address:	00-05-65-72-FB-D0	Device ID:	0104	
Device Type:	GE-GLM104-PN	Device Role:	Device	

Device Name: Set Device Name

IP Address:

IP Address:

Subnet Mask: Set IP Information

Gateway:

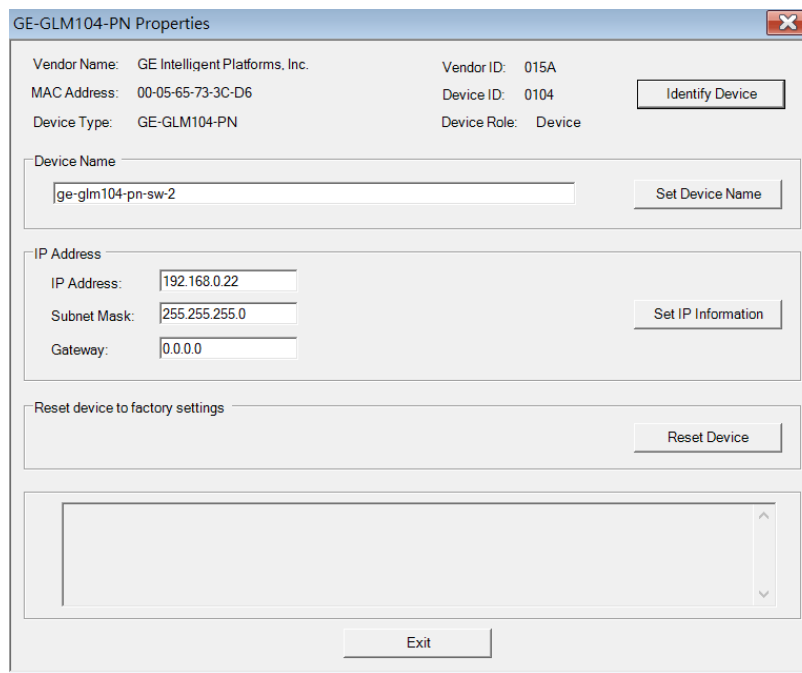
Reset device to factory settings: Reset Device

Exit

Figure 303

Then set SW-2 device name and IP address

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-2” and click [Set Device Name] button, then set IP Address to “192.168.0.22”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.



GE-GLM104-PN Properties

Vendor Name:	GE Intelligent Platforms, Inc.	Vendor ID:	015A	Identify Device
MAC Address:	00-05-65-73-3C-D6	Device ID:	0104	
Device Type:	GE-GLM104-PN	Device Role:	Device	

Device Name: Set Device Name

IP Address:

IP Address:

Subnet Mask: Set IP Information

Gateway:

Reset device to factory settings: Reset Device

Exit

Figure 304

Then set SW-3 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-3” and click [Set Device Name] button, then set IP Address to “192.168.0.23”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name: GE Intelligent Platforms, Inc.
- Vendor ID: 015A
- MAC Address: 00-05-65-73-3D-7E
- Device ID: 0104
- Device Type: GE-GLM104-PN
- Device Role: Device
- [Identify Device] button
- Device Name: ge-glm104-pn-sw-3
- [Set Device Name] button
- IP Address: 192.168.0.23
- Subnet Mask: 255.255.255.0
- Gateway: 0.0.0.0
- [Set IP Information] button
- Reset device to factory settings
- [Reset Device] button
- [Exit] button

Figure 305

Then set SW-4 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-4” and click [Set Device Name] button, then set IP Address to “192.168.0.24”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name: GE Intelligent Platforms, Inc.
- Vendor ID: 015A
- MAC Address: 00-05-65-73-3C-BE
- Device ID: 0104
- Device Type: GE-GLM104-PN
- Device Role: Device
- [Identify Device] button
- Device Name: ge-glm104-pn-sw-4
- [Set Device Name] button
- IP Address: 192.168.0.24
- Subnet Mask: 255.255.255.0
- Gateway: 0.0.0.0
- [Set IP Information] button
- Reset device to factory settings
- [Reset Device] button
- [Exit] button

Figure 306

Then set SW-5 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-5” and click [Set Device Name] button, then set IP Address to “192.168.0.25”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name: GE Intelligent Platforms, Inc. | Vendor ID: 015A
- MAC Address: 00-05-65-73-3C-D6 | Device ID: 0104 | **Identify Device**
- Device Type: GE-GLM104-PN | Device Role: Device
- Device Name: | **Set Device Name**
- IP Address:
 - IP Address:
 - Subnet Mask:
 - Gateway: | **Set IP Information**
- Reset device to factory settings | **Reset Device**
- Message box: The IP address information was written to the device successfully
The Device Name was written to the device successfully (ge-glm104-pn changed to ge-glm104-pn-sw-5)
- Exit**

Figure 307

Then set SW-6 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-6” and click [Set Device Name] button, then set IP Address to “192.168.0.26”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name: GE Intelligent Platforms, Inc. | Vendor ID: 015A
- MAC Address: 00-05-65-73-3C-F6 | Device ID: 0104 | **Identify Device**
- Device Type: GE-GLM104-PN | Device Role: Device
- Device Name: | **Set Device Name**
- IP Address:
 - IP Address:
 - Subnet Mask:
 - Gateway: | **Set IP Information**
- Reset device to factory settings | **Reset Device**
- Message box: The IP address information was written to the device successfully
The Device Name was written to the device successfully (ge-glm104-pn changed to ge-glm104-pn-sw-6)
- Exit**

Figure 308

Then set SW-7 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-7” and click [Set Device Name] button, then set IP Address to “192.168.0.27”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows a window titled "GE-GLM104-PN Properties". It contains the following fields and buttons:

- Vendor Name: GE Intelligent Platforms, Inc. (read-only)
- Vendor ID: 015A (read-only)
- MAC Address: 00-05-65-73-3C-5E (read-only)
- Device ID: 0104 (read-only)
- Device Type: GE-GLM104-PN (read-only)
- Device Role: Device (read-only)
- [Identify Device] button
- Device Name section:
 - Text box containing "ge-glm104-pn-sw-7"
 - [Set Device Name] button
- IP Address section:
 - IP Address: 192.168.0.27
 - Subnet Mask: 255.255.255.0
 - Gateway: 0.0.0.0
 - [Set IP Information] button
- Reset device to factory settings section:
 - [Reset Device] button
- Log area (scrollable):
 - The IP address information was written to the device successfully
 - The Device Name was written to the device successfully (ge-glm104-pn changed to ge-glm104-pn-sw-7)
- [Exit] button at the bottom center.

Figure 309

Then set SW-8 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-8” and click [Set Device Name] button, then set IP Address to “192.168.0.28”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name:** GE Intelligent Platforms, Inc.
- Vendor ID:** 015A
- MAC Address:** 00-05-65-73-3C-8E
- Device ID:** 0104
- Device Type:** GE-GLM104-PN
- Device Role:** Device
- Buttons:** Identify Device, Set Device Name, Set IP Information, Reset Device, Exit.
- Device Name:** ge-glm104-pn-sw-8
- IP Address:** 192.168.0.28
- Subnet Mask:** 255.255.255.0
- Gateway:** 0.0.0.0
- Message Log:** The IP address information was written to the device successfully. The Device Name was written to the device successfully (ge-glm104-pn changed to ge-glm104-pn-sw-8)

Figure 310

Then set SW-9 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-9” and click [Set Device Name] button, then set IP Address to “192.168.0.29”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box with the following fields and buttons:

- Vendor Name:** GE Intelligent Platforms, Inc.
- Vendor ID:** 015A
- MAC Address:** 00-05-65-73-3C-5E
- Device ID:** 0104
- Device Type:** GE-GLM104-PN
- Device Role:** Device
- Buttons:** Identify Device, Set Device Name, Set IP Information, Reset Device, Exit.
- Device Name:** ge-glm104-pn-sw-9
- IP Address:** 192.168.0.29
- Subnet Mask:** 255.255.255.0
- Gateway:** 0.0.0.0
- Message Log:** (Empty)

Figure 311

Then set SW-10 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-10” and click [Set Device Name] button, then set IP Address to “192.168.0.30”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

GE-GLM104-PN Properties

Vendor Name: GE Intelligent Platforms, Inc. Vendor ID: 015A
 MAC Address: 00-05-65-73-3C-8E Device ID: 0104
 Device Type: GE-GLM104-PN Device Role: Device

Identify Device

Device Name
 ge-glm104-pn-sw-10 Set Device Name

IP Address
 IP Address: 192.168.0.30
 Subnet Mask: 255.255.255.0
 Gateway: 0.0.0.0 Set IP Information

Reset device to factory settings
 Reset Device

Exit

Figure 312

Then set PNIO-1 device name and IP address.

Click [Edit Device], set Device Name to “versamax-pns-pnio-1” and click [Set Device Name] button, then set IP Address to “192.168.0.55”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

IC200PNS001 Properties

Vendor Name: GE Intelligent Platforms, Inc. Vendor ID: 015A
 MAC Address: 00-09-91-56-C3-0E Device ID: 0003
 Device Type: IC200PNS001 Device Role: Device

Identify Device

Device Name
 versamax-pns-pnio-1 Set Device Name

IP Address
 IP Address: 192.168.0.55
 Subnet Mask: 255.255.255.0
 Gateway: 0.0.0.0 Set IP Information

Reset device to factory settings
 Reset Device

Exit

Figure 313

After assigning Device Name and IP Address correctly, the Status will be in “Assigned” status.

PROFINET DCP - Direct Connection

Connection Settings

Connection: Ethernet 8 Refresh Device List

LAN: LAN01

Status: No Errors

Status	Device Name	IP Address	Vendor	Device Type
✓	ge-glm104-pn-sw-1	192.168. 0. 21	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-10	192.168. 0. 30	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-2	192.168. 0. 22	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-3	192.168. 0. 23	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-4	192.168. 0. 24	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-5	192.168. 0. 25	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-6	192.168. 0. 26	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-7	192.168. 0. 27	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-8	192.168. 0. 28	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-9	192.168. 0. 29	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	iolan-controller01	192.168. 0. 1	GE Intelligent Platforms, Inc.	IC695PNC001
✓	versamax-pns-pnio-1	192.168. 0. 55	GE Intelligent Platforms, Inc.	IC200PNS001

Filters (12/12)

☒ Assigned

☒ Assigned with errors

☒ Not assigned

Selection Properties

MAC Address: 00-05-65-72-FB-D0

Device Role: Device

Vendor ID: 015A

Device ID: 0104

IP Address: 192.168.0.21

Subnet Mask: 255.255.255.0

Gateway: 0.0.0.0

Identify Device

Edit Device

Figure 314

5.2.6 MRP Setting

Setting MRP for I/O controller and I/O devices according to the following figure.

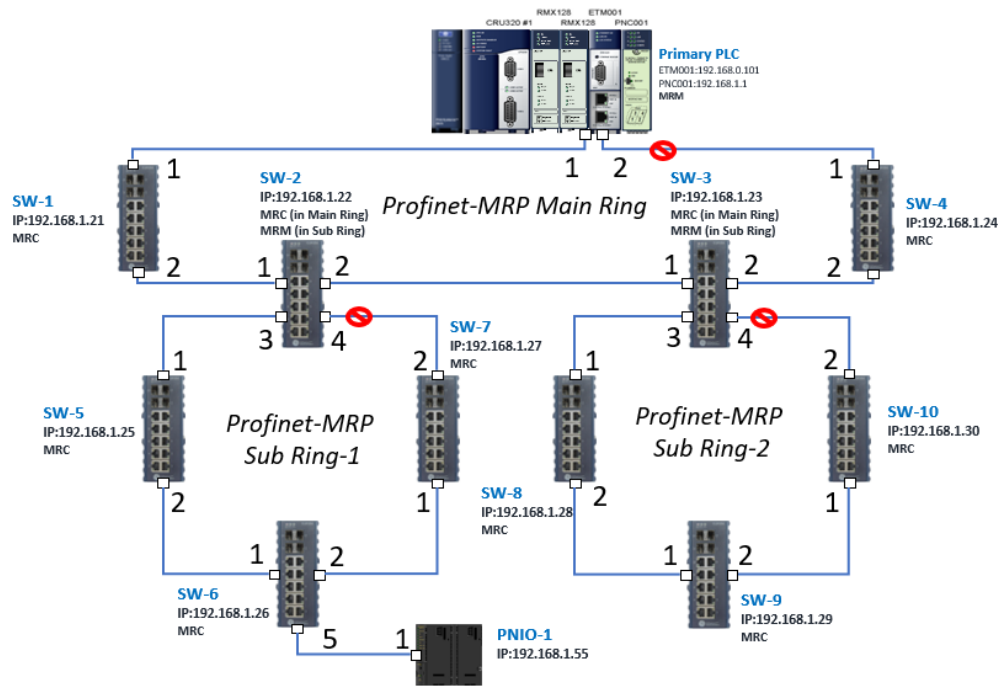


Figure 315

First, configure the MRP in Profinet MRP Main Ring (in the box).

Configure MRP Main Ring

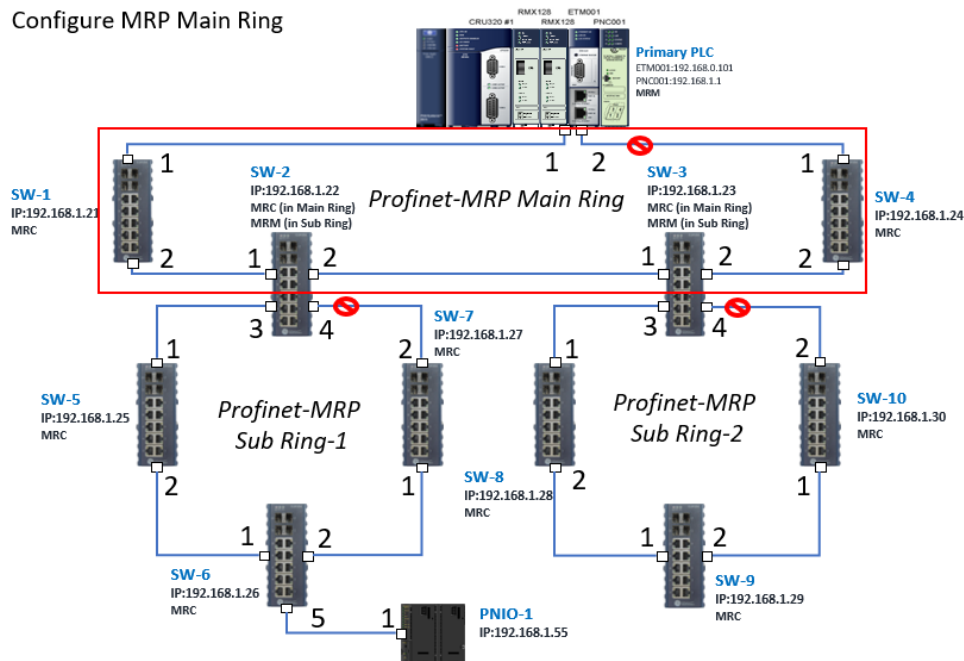


Figure 316

In order to enable MRP function in I/O controller, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

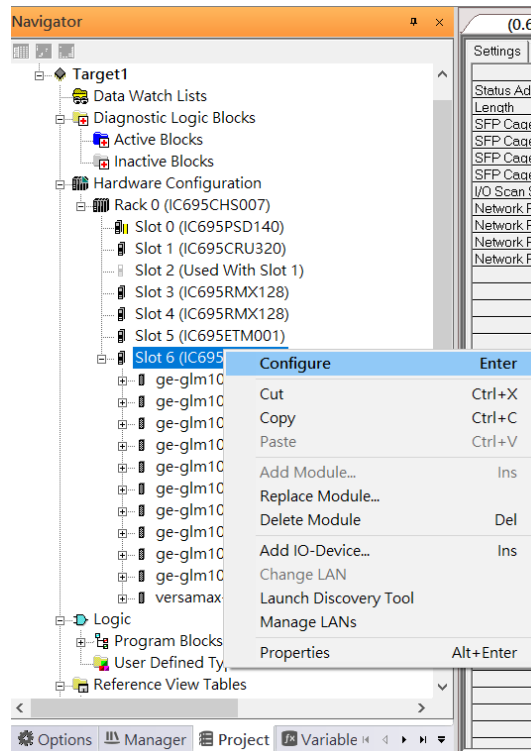


Figure 317

Enable MRP function by changing the value of “Media Redundancy” to Manager and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

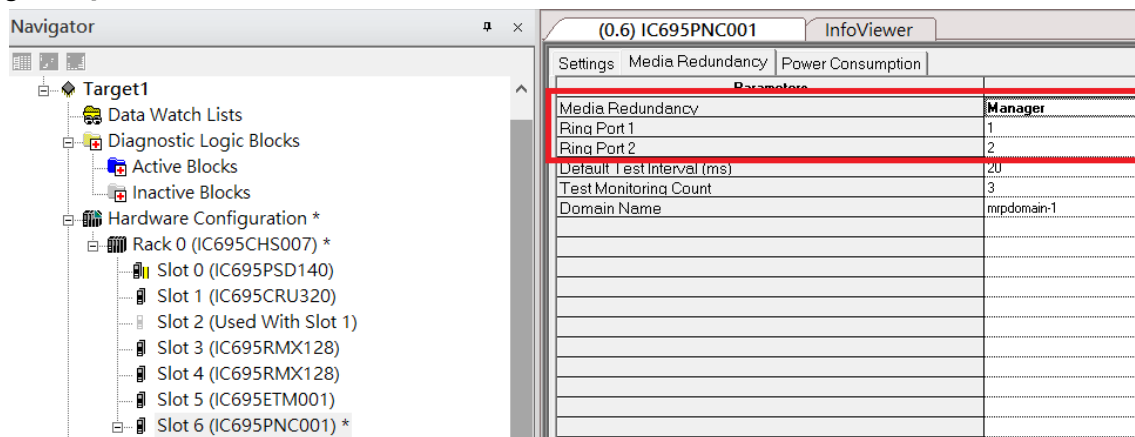


Figure 318

In order to enable MRP function in SW1, click the right button and choose [Configure].
It will show “Media Redundancy” on the right window.

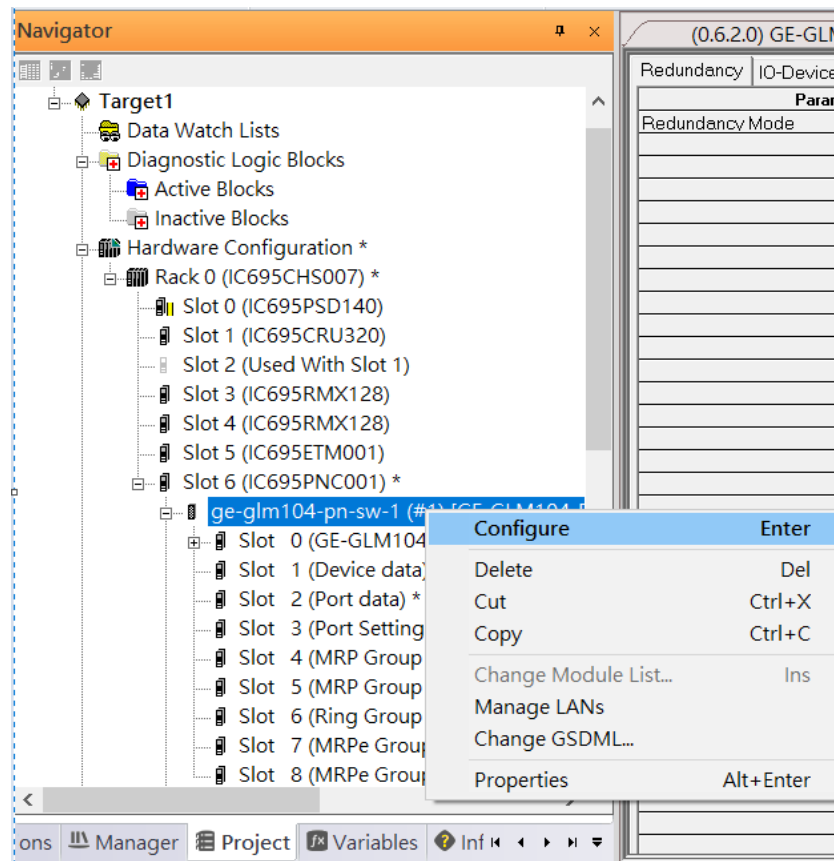


Figure 319

Enable MRP function by changing the value of “Media Redundancy” to manager and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

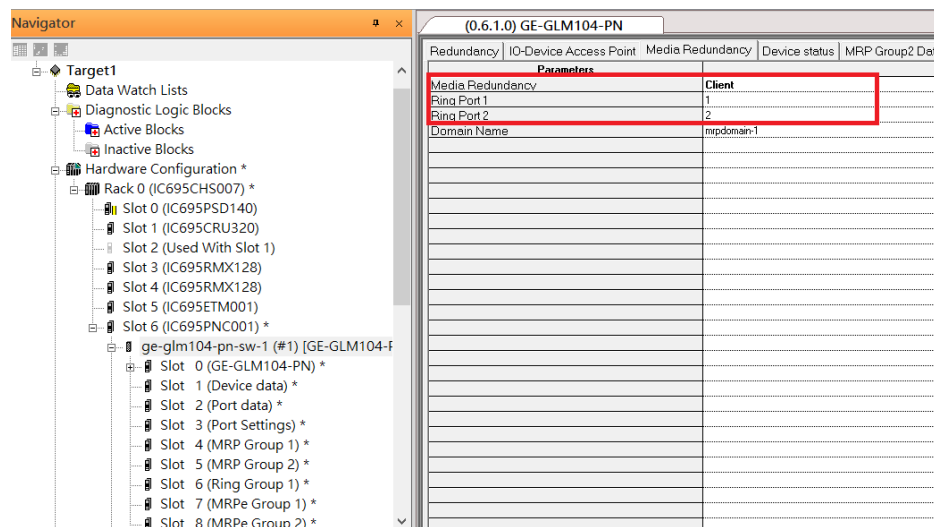


Figure 320

To enable MRP function in SW2, click the right button and choose [Configure].

It will show “Media Redundancy” on the right window.

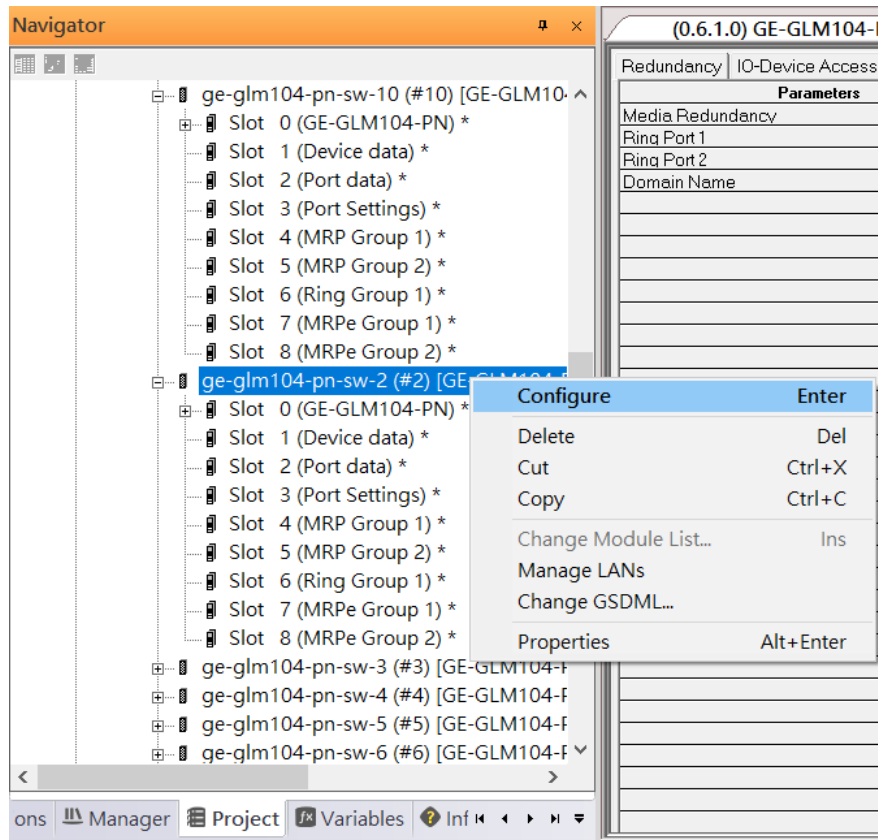


Figure 321

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1]to “1”, [Ring Port 2] to “2”.

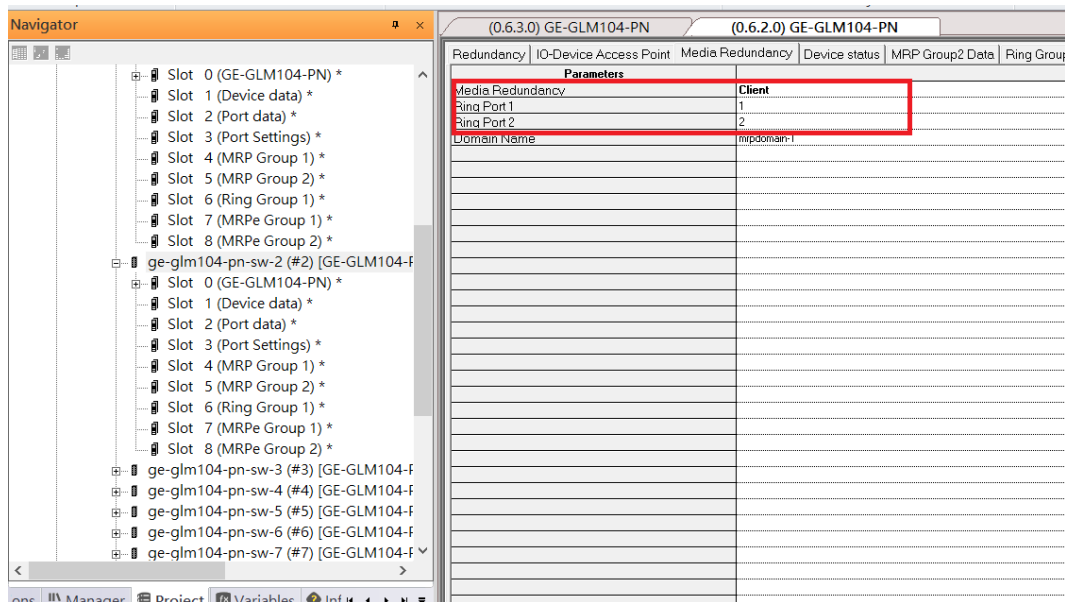


Figure 322

To enable MRP function in SW3, click the right button and choose [Configure].
It will show “Media Redundancy” on the right window.

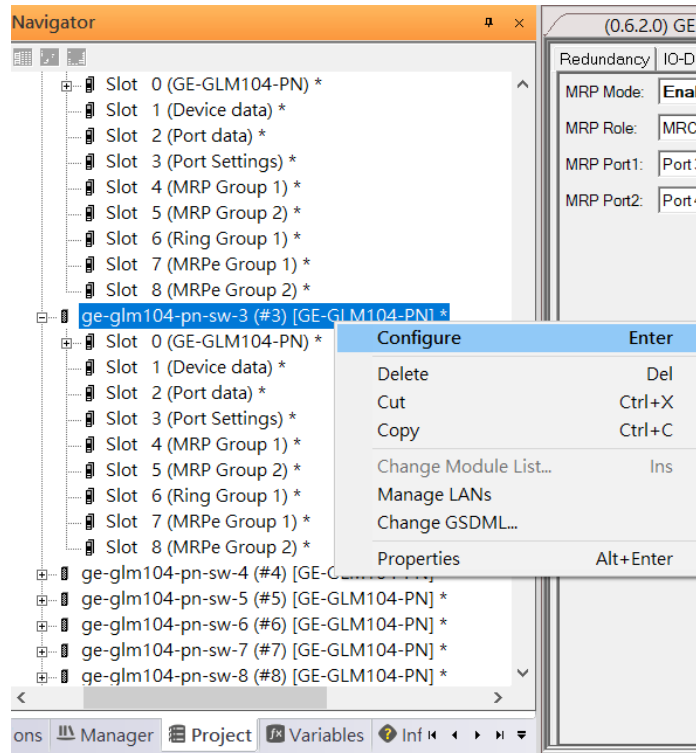


Figure 323

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

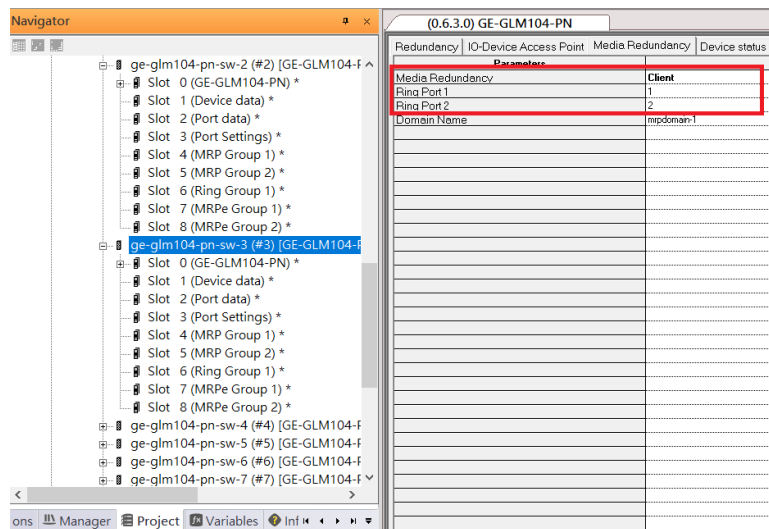


Figure 324

To enable MRP function in SW4, click the right button and choose [Configure].
It will show “Media Redundancy” on the right window.

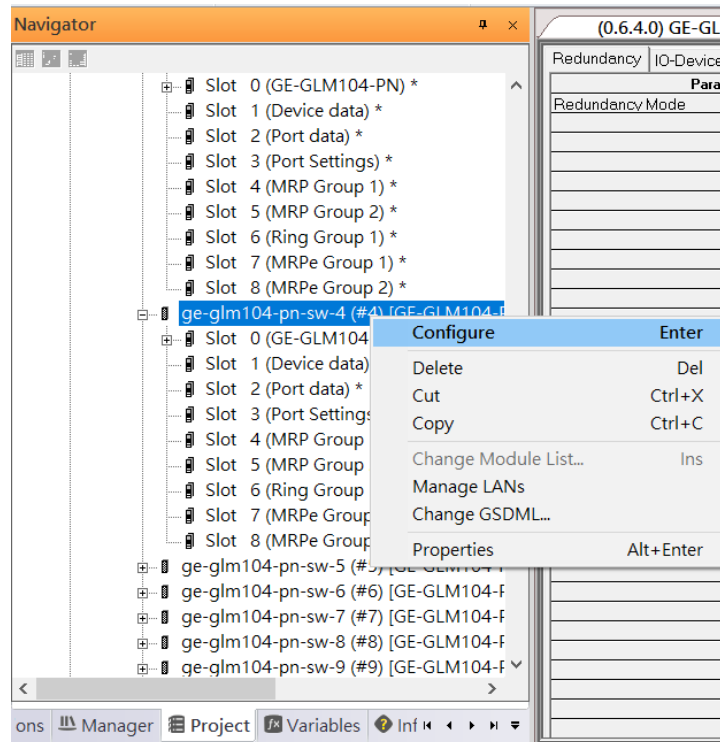


Figure 325

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

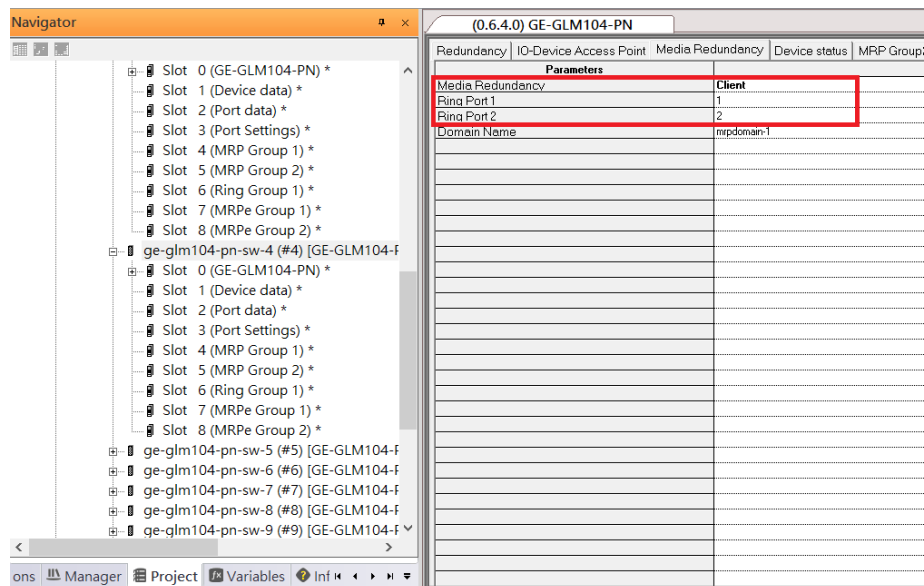


Figure 326

Then configure the MRP in Profinet MRP Sub Ring-1 (in the box).

Configure MRP Sub Ring-1

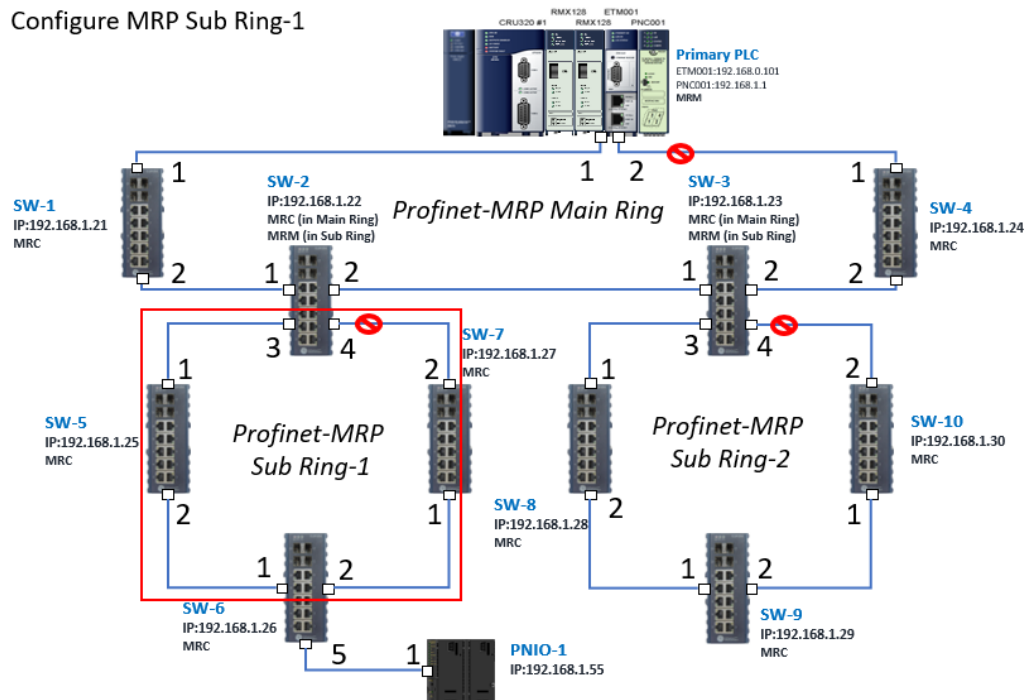


Figure 327

To enable MRP function in SW2, click the right button and choose [Configure].

It will show “Media Redundancy” on the right window.

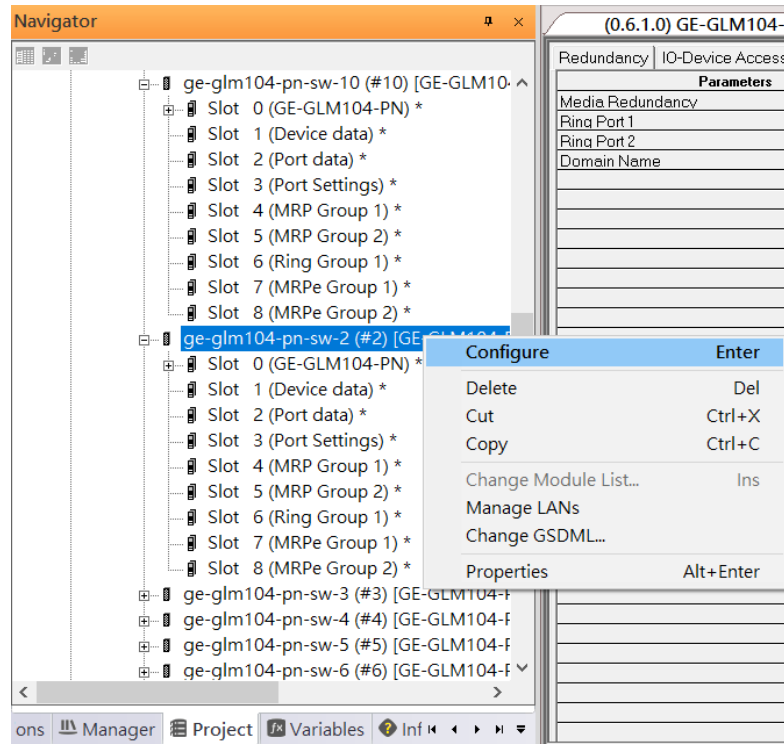


Figure 328

Enable MRP function by changing the value of “MRP group2 Data” to manager and select [Ring Port 1] to “3”, [Ring Port 2] to “4”

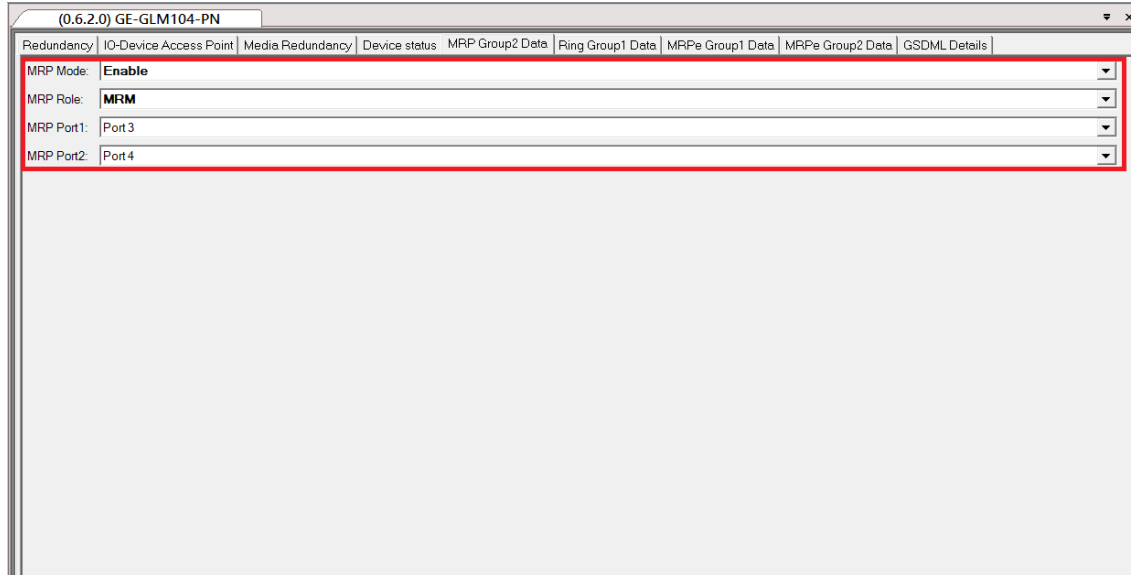


Figure 329

To enable MRP function in SW5, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

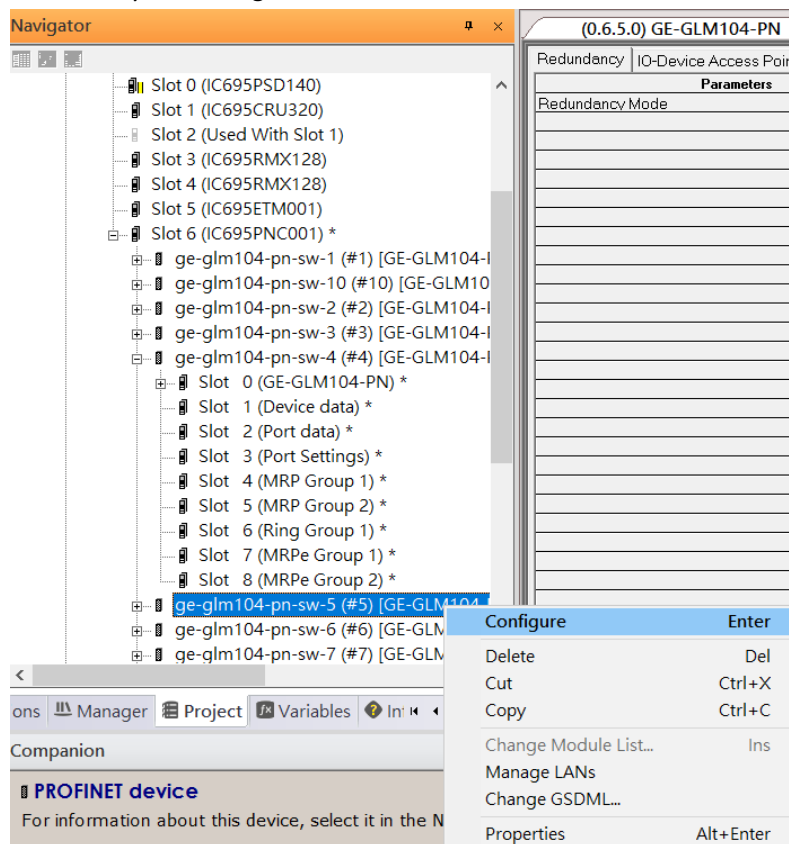


Figure 330

Enable MRP function by changing the value of “Media Redundancy” to manager and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

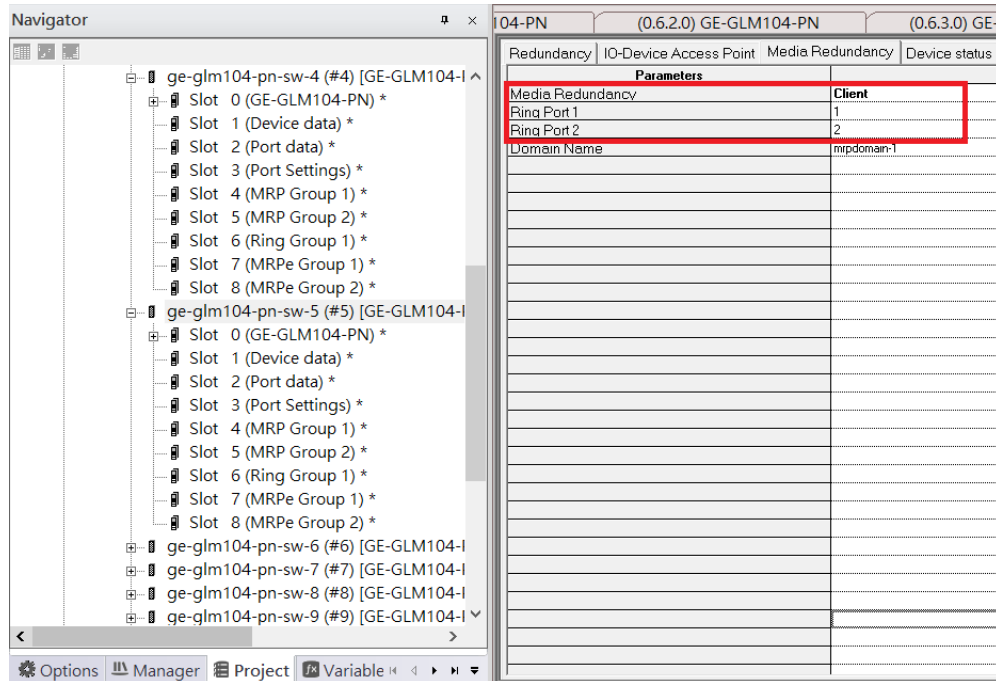


Figure 331

To enable MRP function in SW6, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

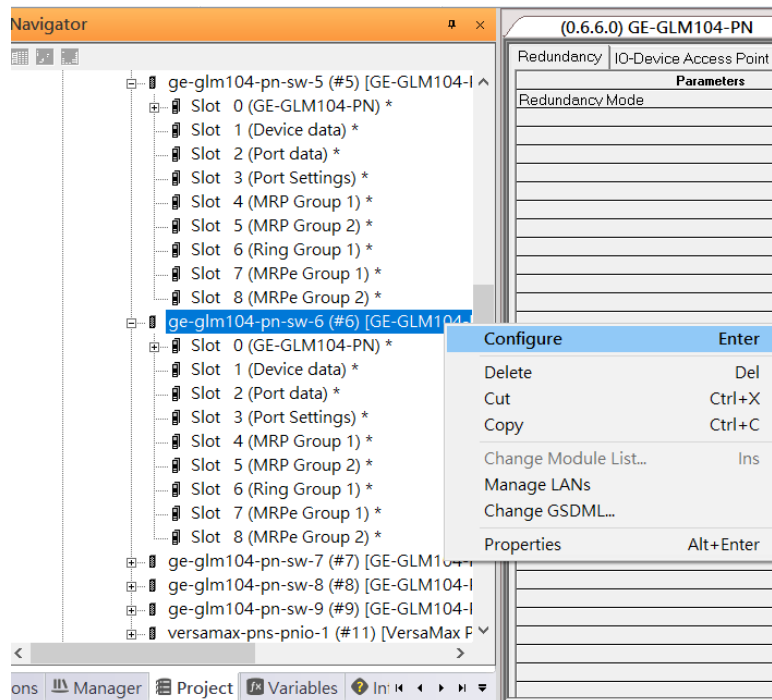


Figure 332

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1]to “1”, [Ring Port 2] to “2”.

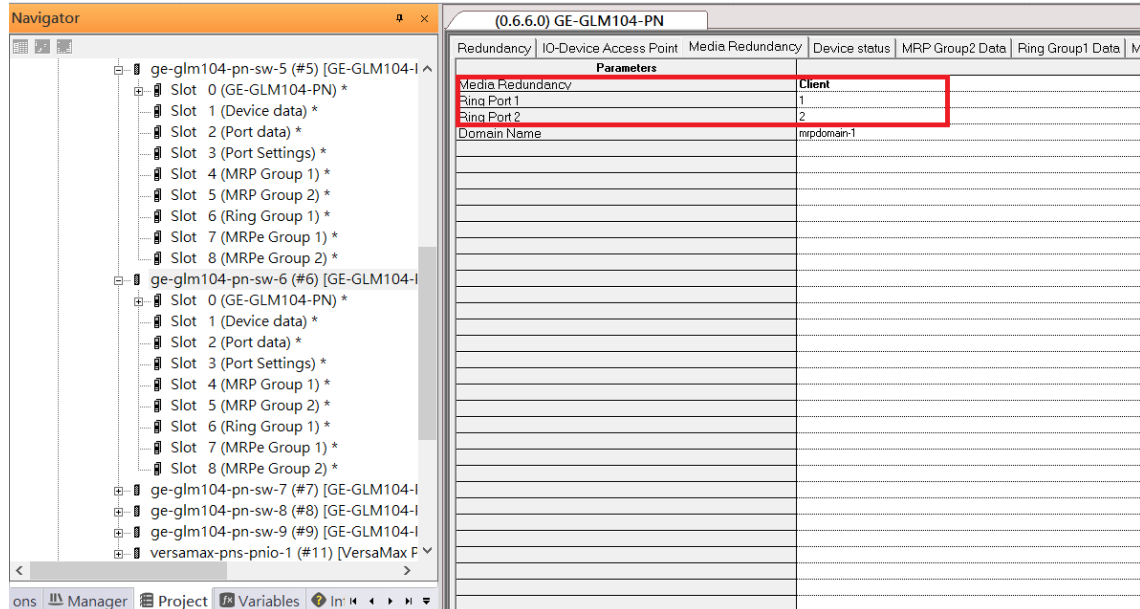


Figure 333

To enable MRP function in SW7, click the right button and choose [Configure].

It will show “Media Redundancy” on the right window.

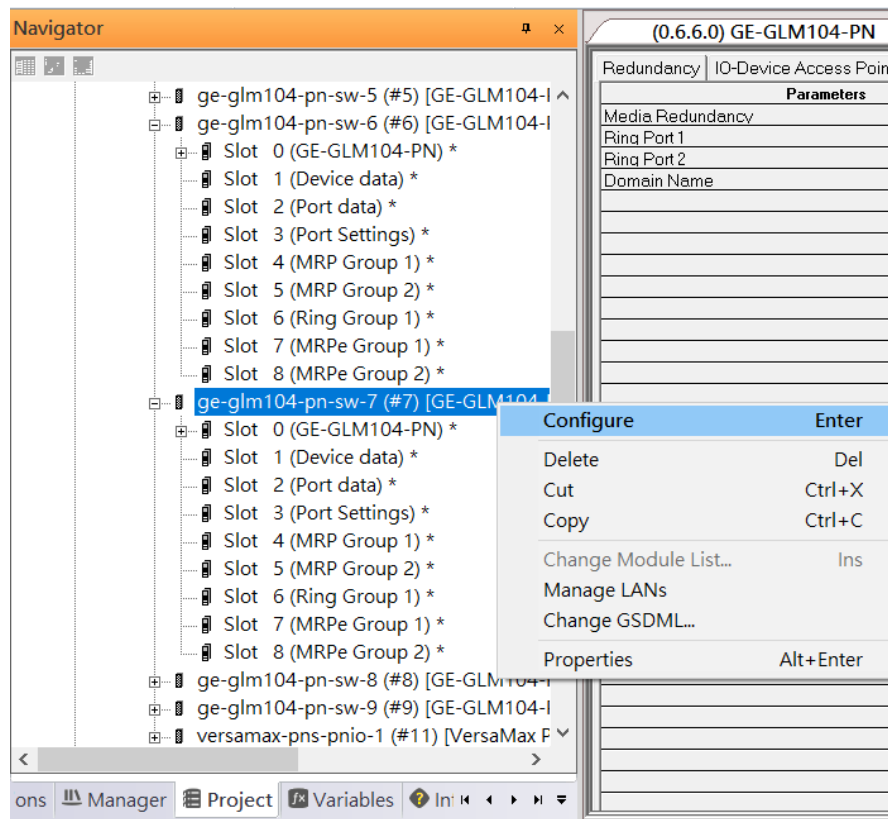


Figure 334

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1]to “1”, [Ring Port 2]to “2”.

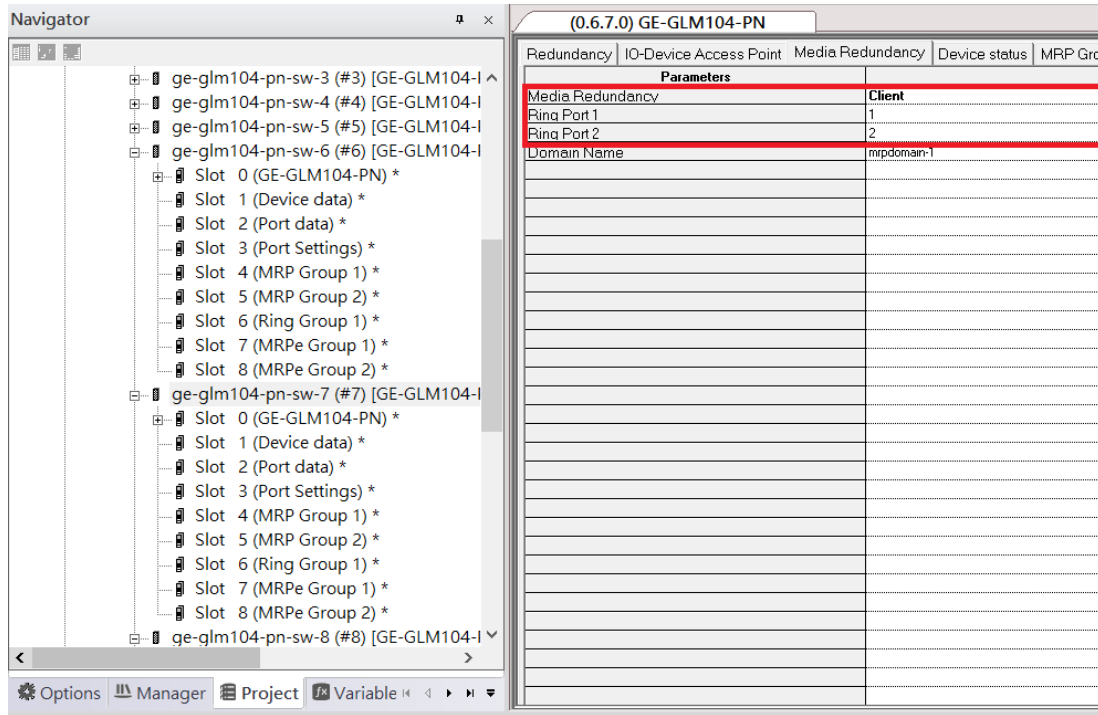


Figure 335

Then configure the MRP in Profinet MRP Sub Ring-2 (in the box).

Configure MRP Sub Ring-2

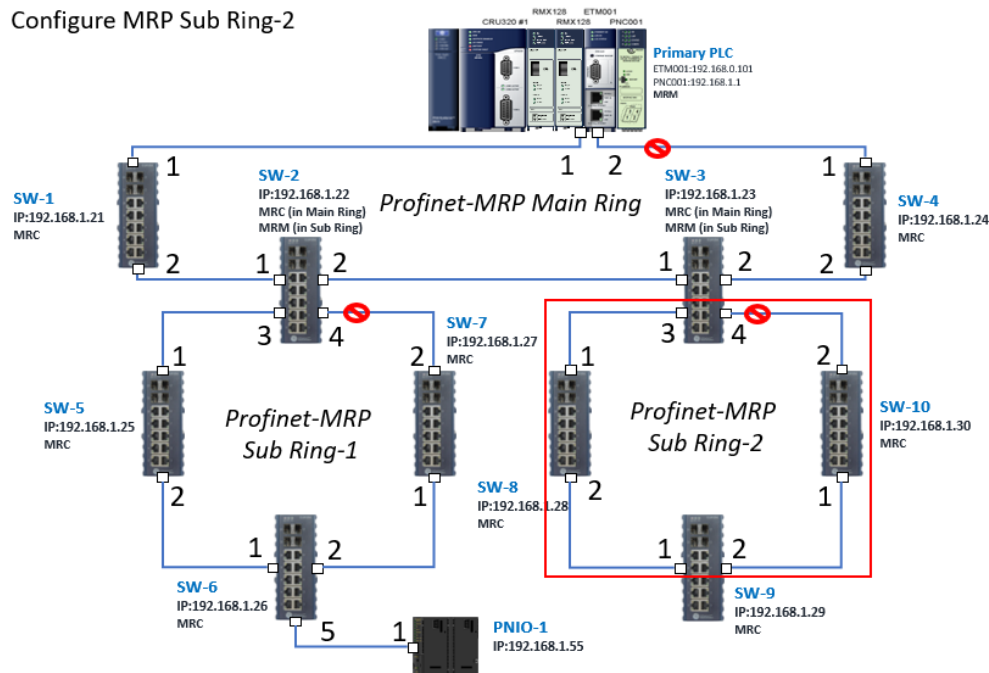


Figure 336

To enable MRP function in SW8, click the right button and choose [Configure].
It will show “Media Redundancy” on the right window.

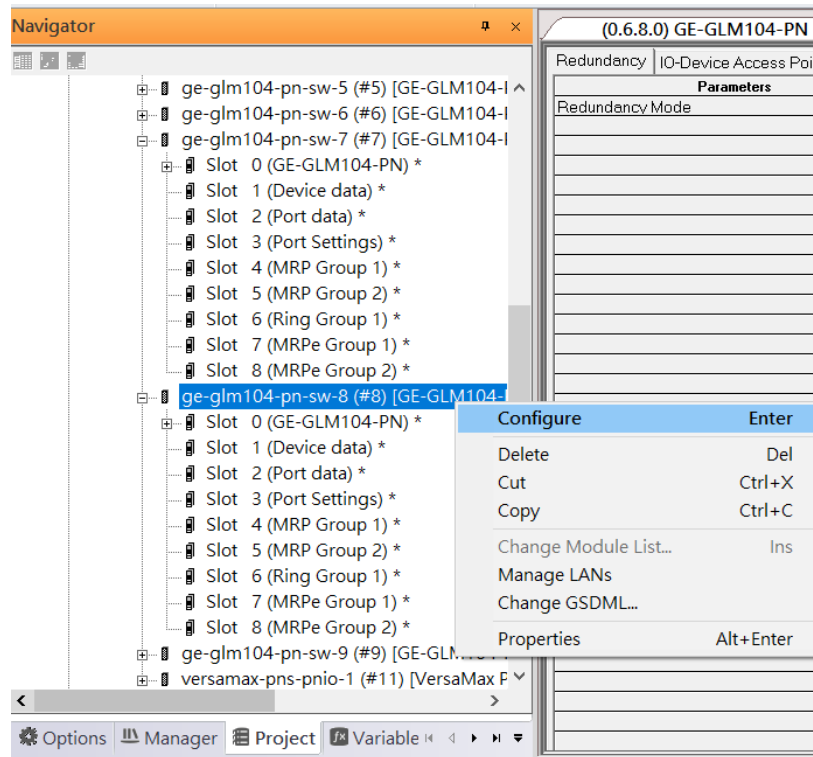


Figure 337

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

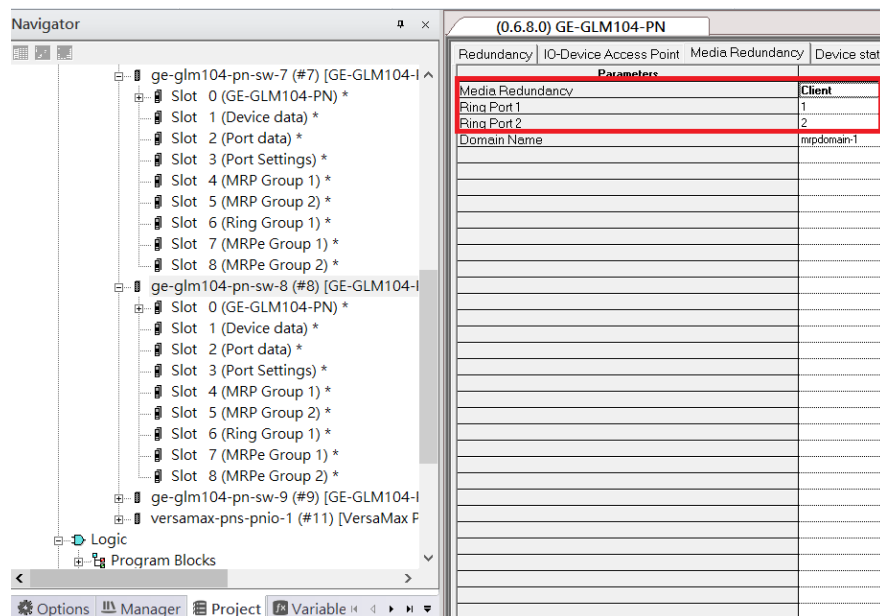


Figure 338

To enable MRP function in SW9, click the right button and choose[Configure].

It will show “Media Redundancy” on the right window.

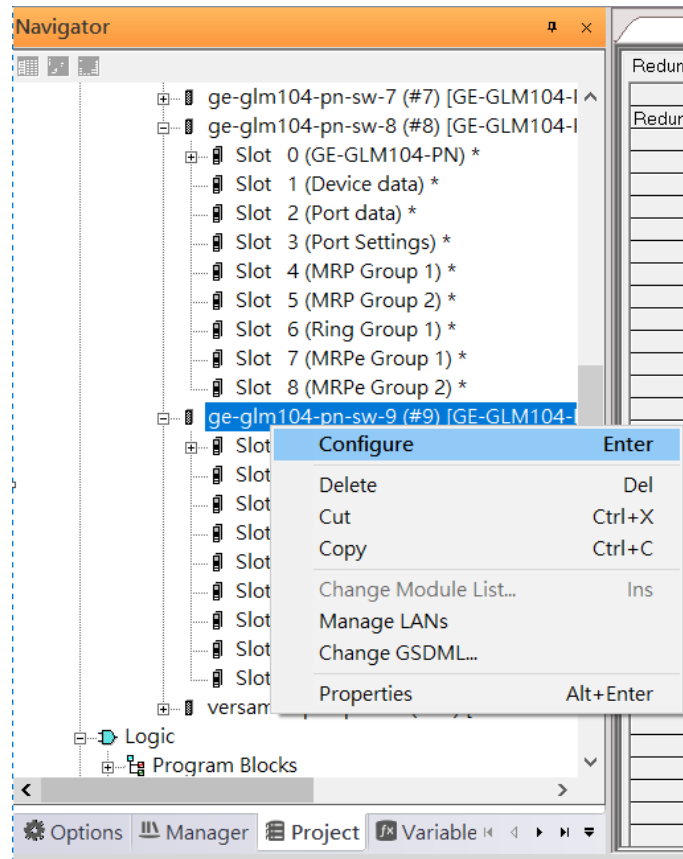


Figure 339

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

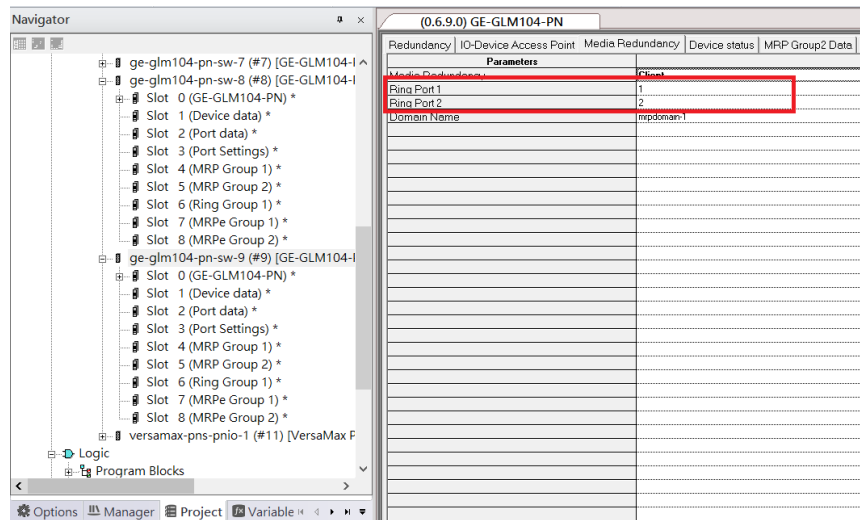


Figure 340

To enable MRP function in SW10, click the right button and choose [Configure].
It will show “Media Redundancy” on the right window.

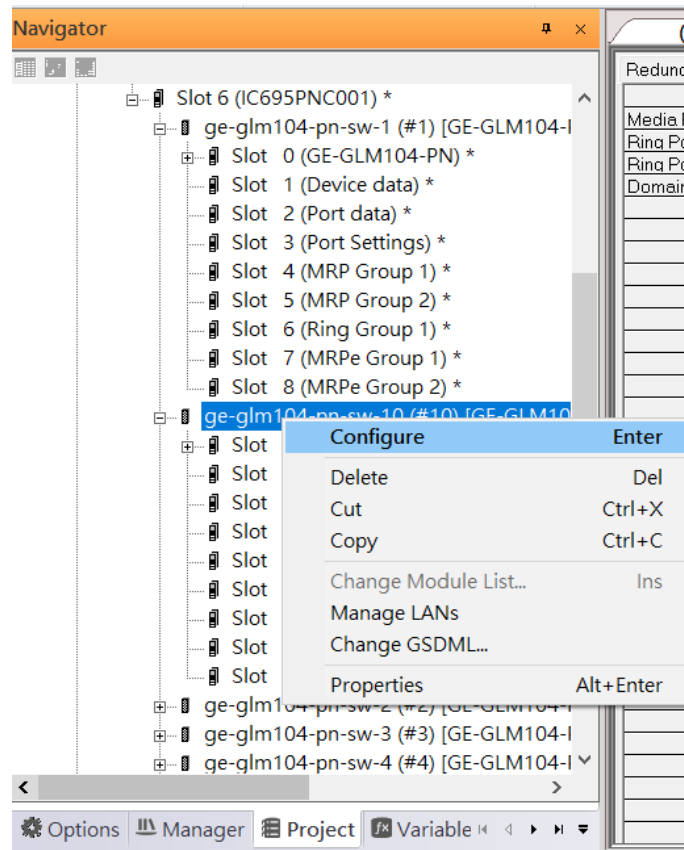


Figure 341

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1” [Ring Port 2] to “2”.

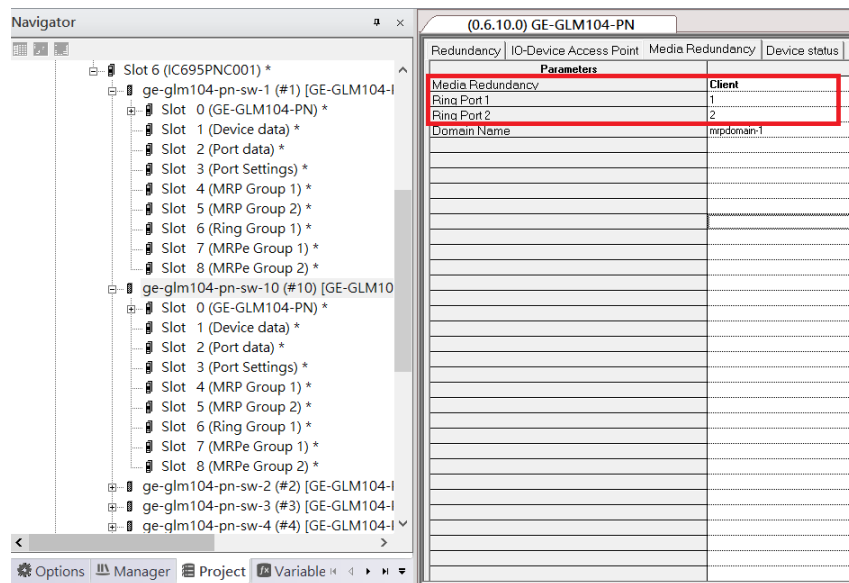


Figure 342

To enable MRP function in SW3, click the right button and choose [Configure].

It will show “Media Redundancy” on the right window.

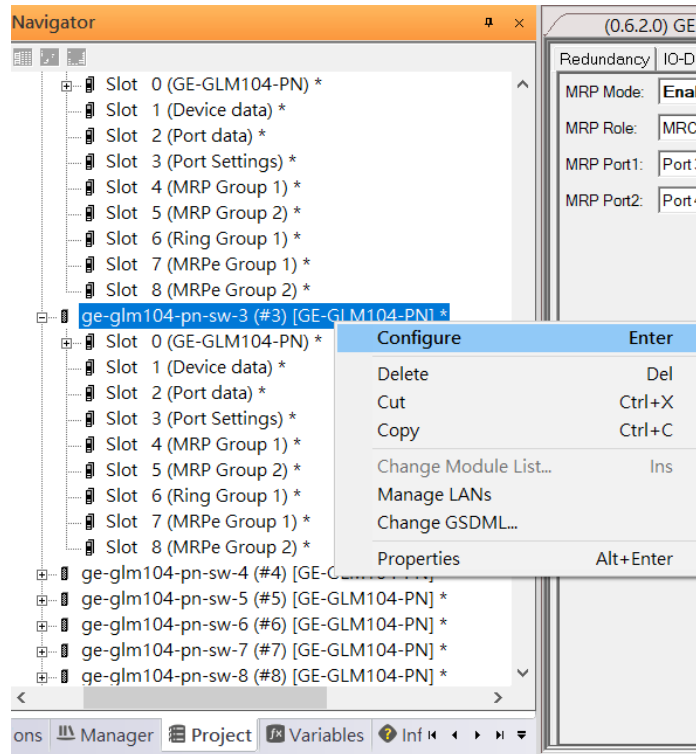


Figure 343

Enable MRP function by changing the value of “MRP group2 Data” to manager and select [Ring Port 1]to “3”, [Ring Port 2] to “4”

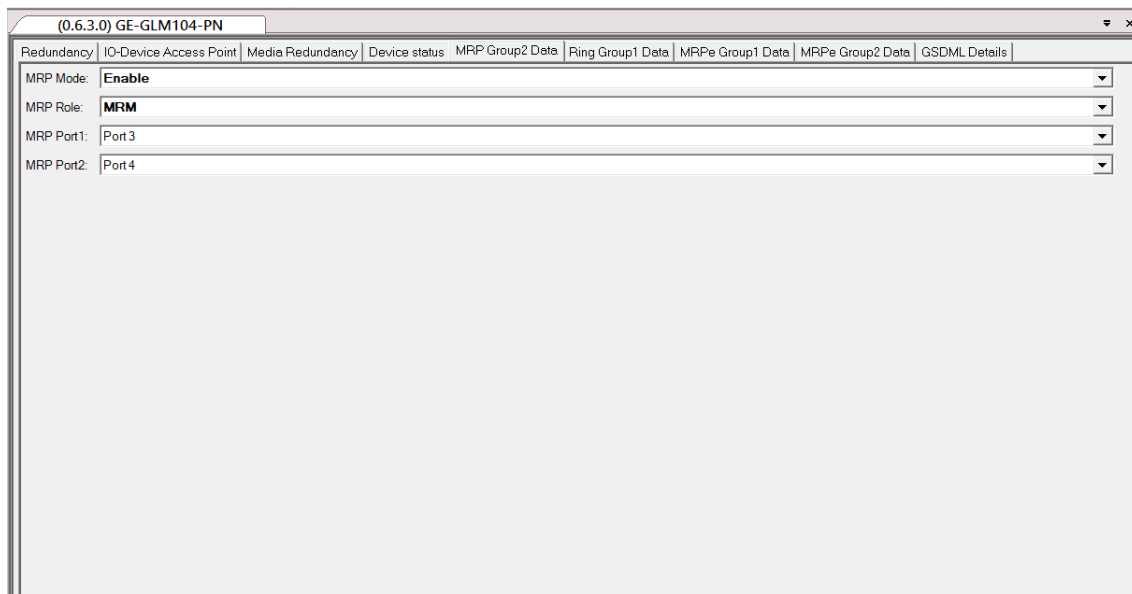


Figure 344

5.2.7 Network Setting

To establish the communication to the I/O Controller from Proficy Machine Edition, the interface of I/O Controller shall be specified.

It should be noted that there is only 1 I/O Controller (Primary or Secondary) is able to communicate with Proficy Machine Edition. Therefore, there are 3 rules of communication are defined.

I/O Controller Communication Rule

Rule	Description
1	The communicated I/O Controller shall be specified. Click primary or secondary hardware configuration, click the right button, and select [Set as Selected HWC]
2	During the communication, the cable shall be connected to the ETM001 in specified hardware (Primary or Secondary)
3	Specify the interface and IP address for communicated I/O Controller

For rule 3, click [Target 1] and Select [Property]

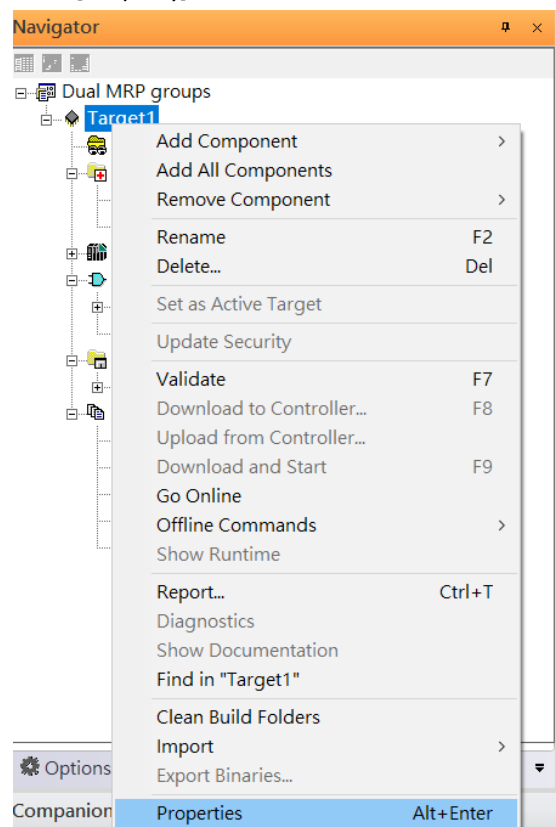


Figure 345

Then the configuration table is shown.

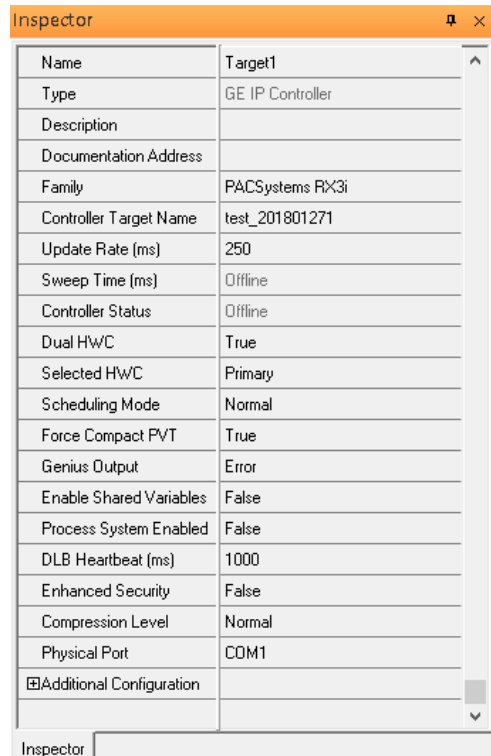


Figure 346

Select [Physical Port] to [Ethernet]

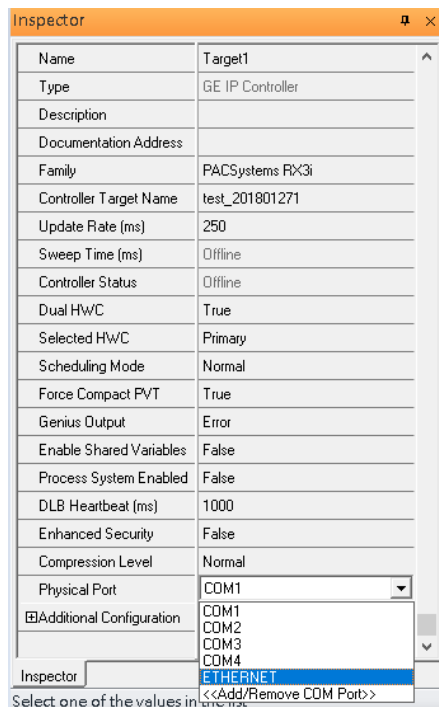


Figure 347

Also, the IP address of communicated I/O Controller shall be set. Here the [Primary] setting is shown.

Note, the specified IP address is set as the IP address on ETM001.

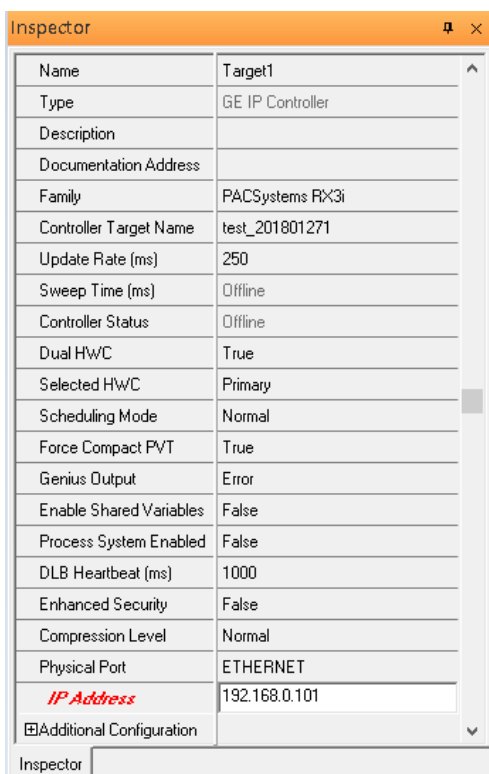


Figure 348

5.2.8 PC Network

The IP address of PC with Proficy Machine Edition shall be set in the same network area.

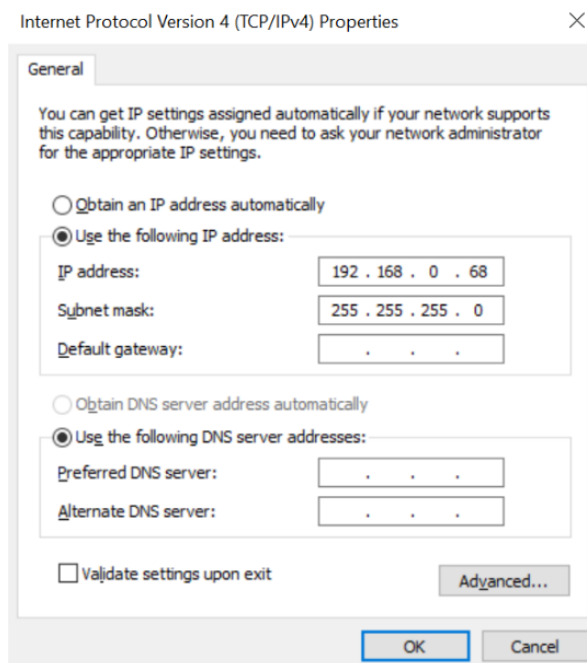


Figure 349

5.2.9 Temporary IP

However, if the IP address of ETM001 is lost or forgotten, the IP address can be changed by the function [Set Temporary IP Address] according to the MAC address of ETM001. In the following figure, the MAC address is referenced to the ETM001, and the IP address can be defined by user.

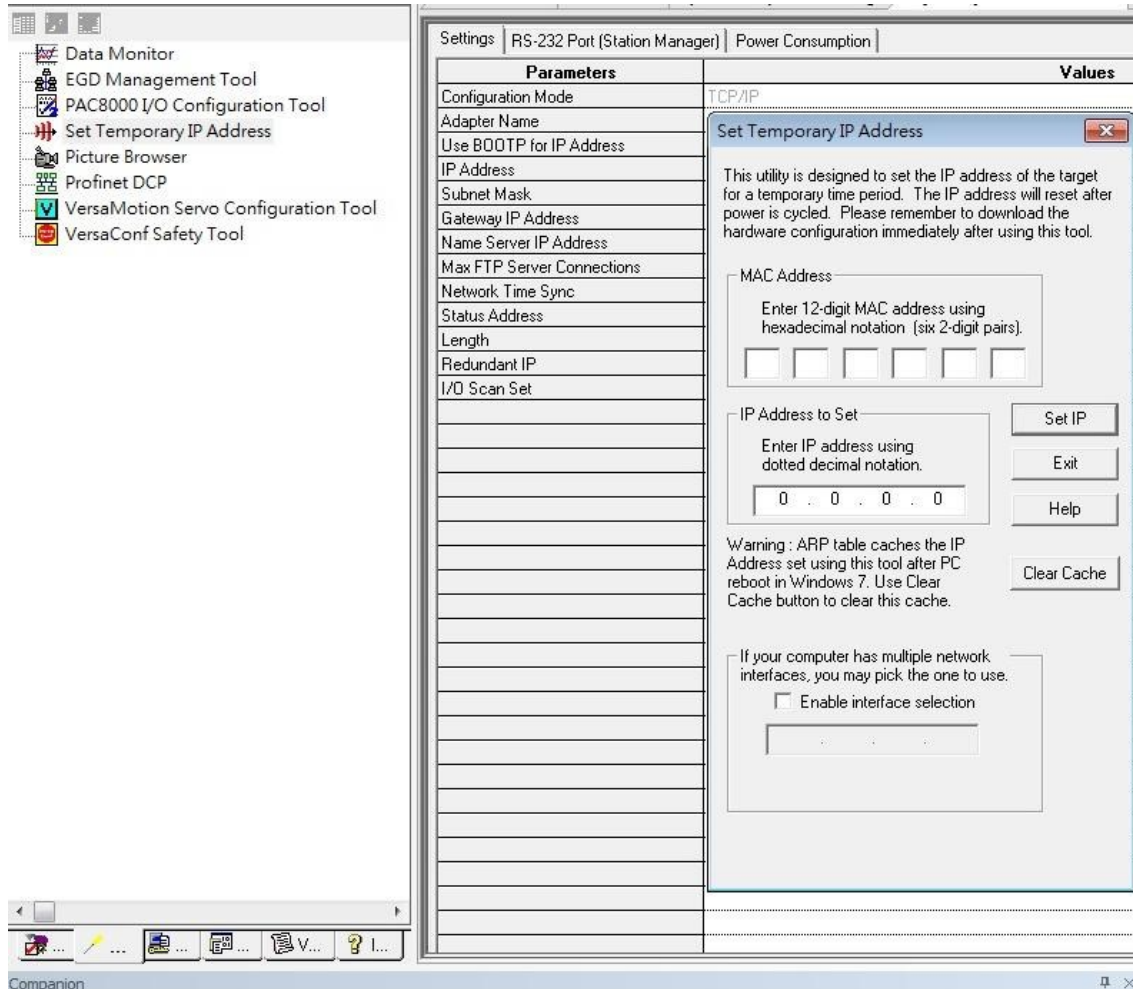


Figure 350

5.3 Implementation

To download the configuration to hardware, the following steps shall be applied.

First, press the [Connect] icon.

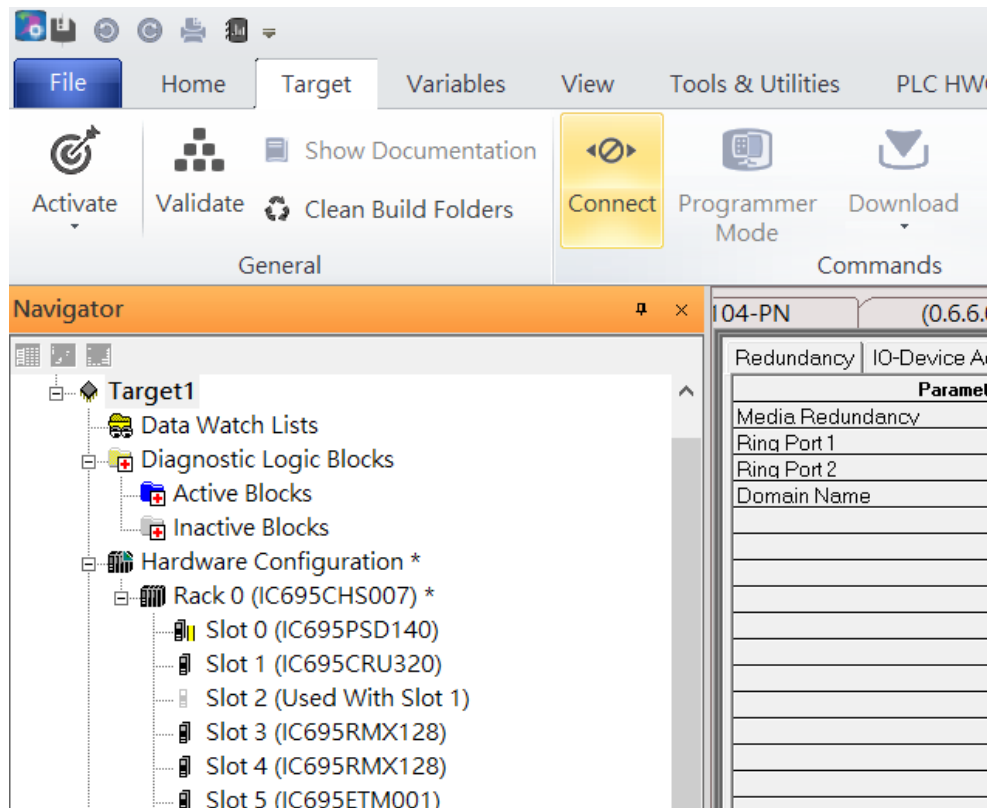


Figure 351

Then press the icon [Programmer Mode]

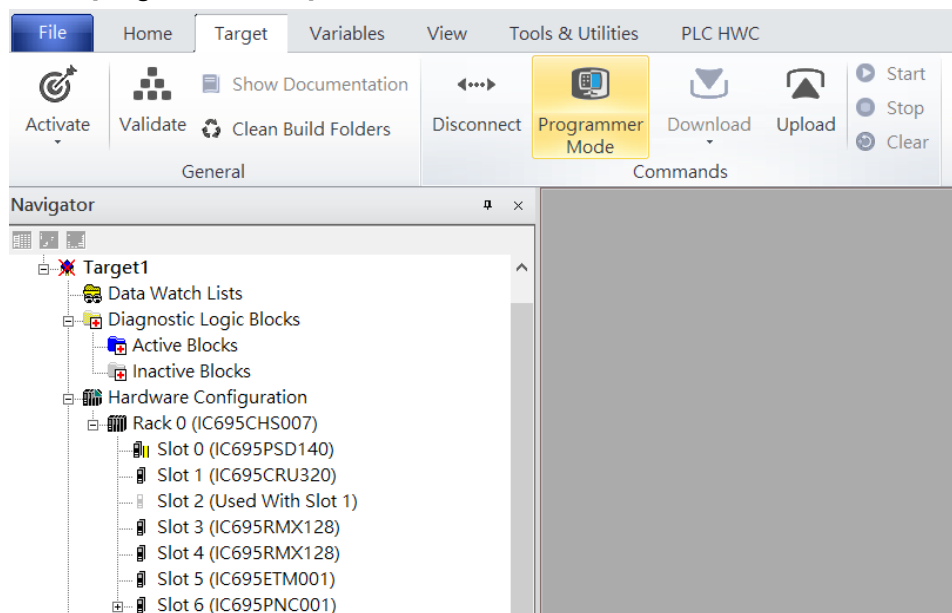


Figure 352

Then press icon [Download] and select “Download”

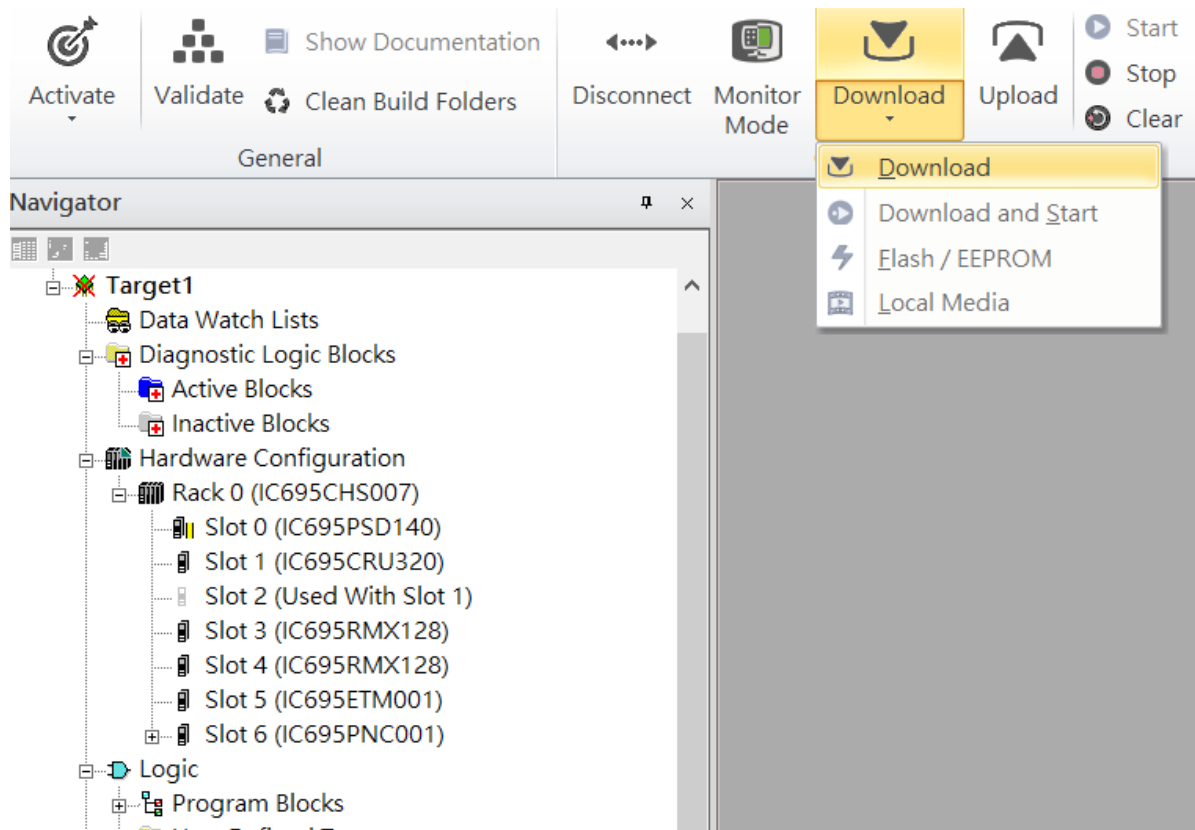


Figure 353

Then the dialogue is appeared to make sure the initialization procedure, select [OK]

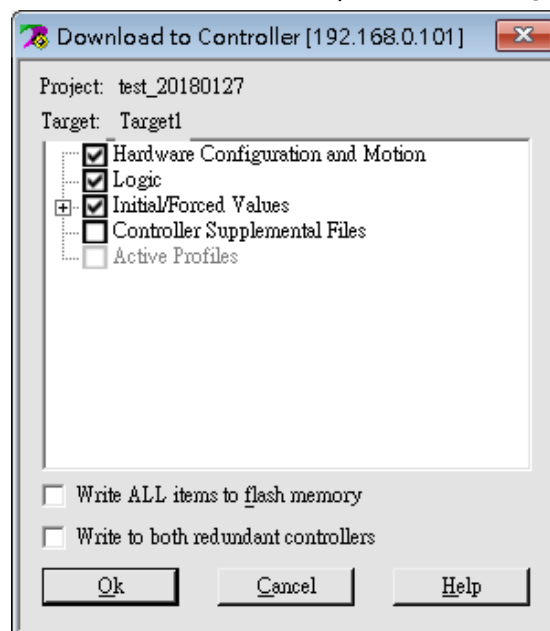


Figure 354

After download completely, press icon [Start] to active PLC.

Note: After downloading completely, switch CRU320 to “Run I/O Enable”

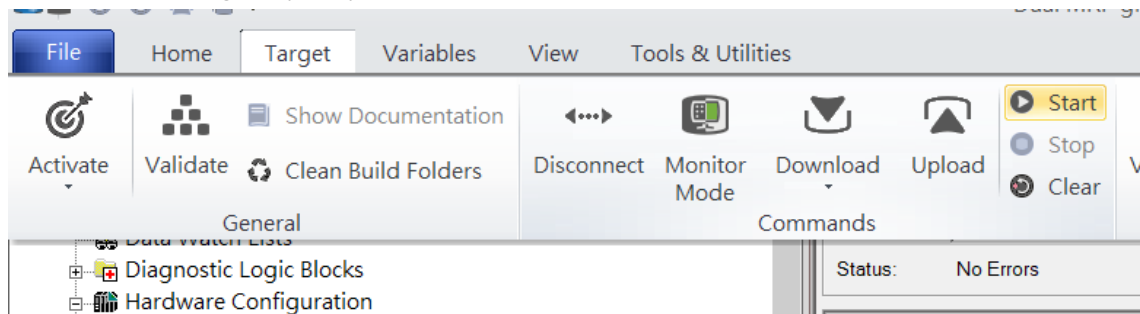


Figure 355

Then the dialogue is appeared, please select [OK]

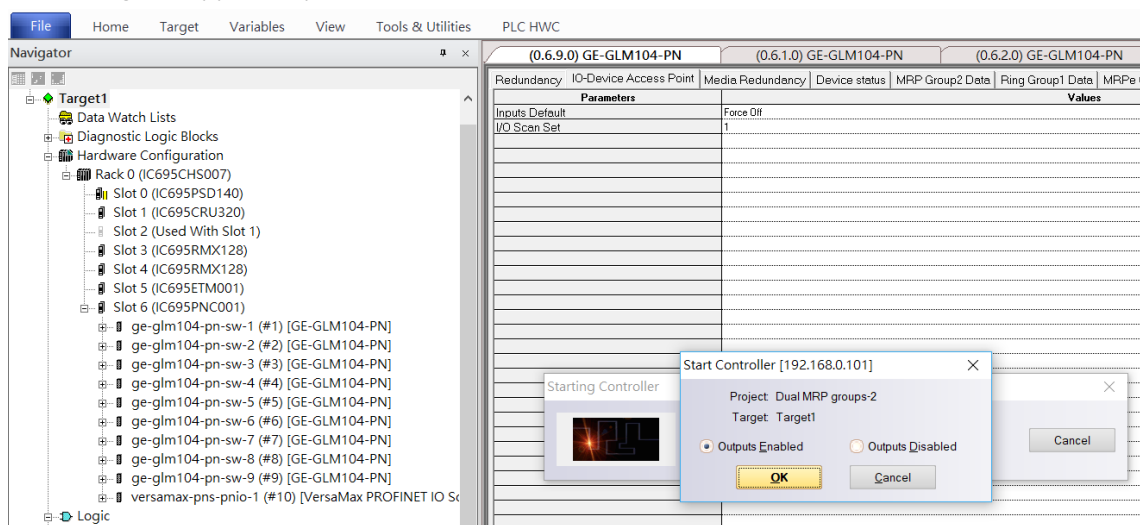


Figure 356

If PLC has started successfully, a message “The Controller was successfully started”.

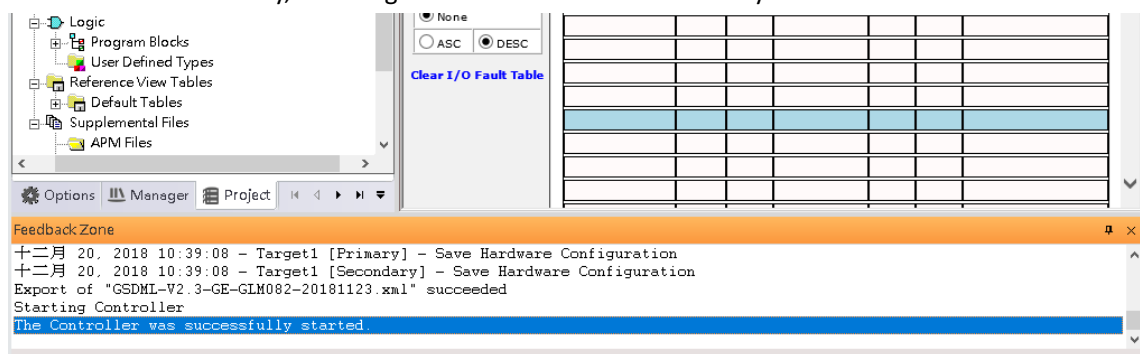


Figure 357

Chapter 6 Multiple PROFINET MRP Ring and Subring

6.1 Network Topology

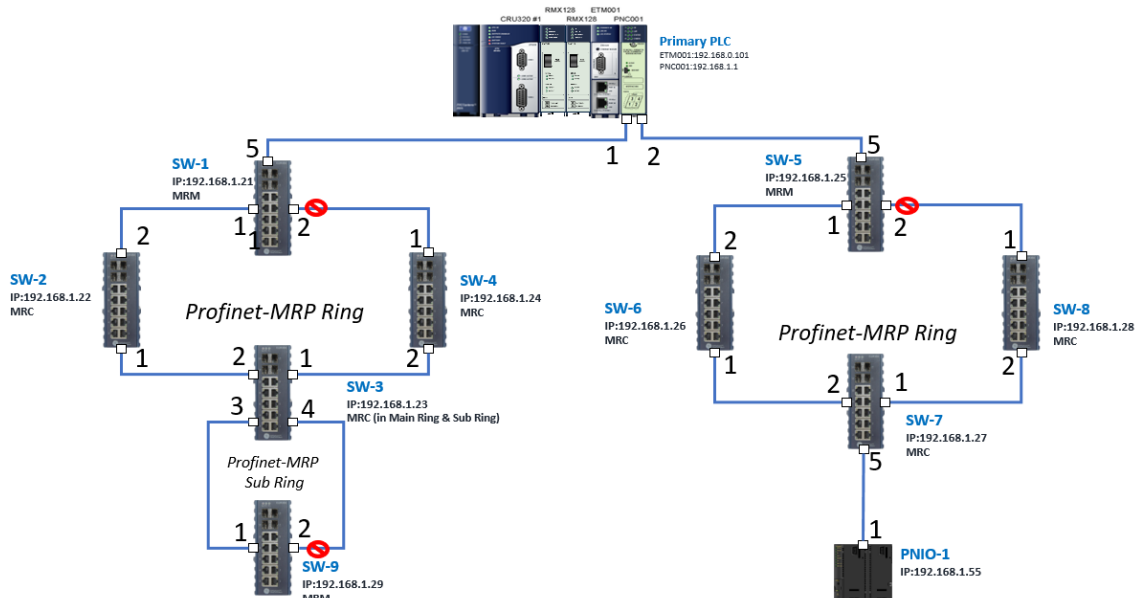


Figure 358

6.2 Hardware Configuration

On the CRU320, the I/O data can be set to “STOP”, “RUN OUTPUT DISABLE” or “RUN I/O Enable” states by a switch imbedded on CRU320.

During the configuration, the switches on both 2 CRU320s must be set to “STOP”

6.2.1 Project Open

To start the software Proficy Machine Edition, please follow the steps below:

(1) Click [Start] -> [Proficy] -> [Proficy Machine Edition] -> [Proficy Machine Edition]. See the following picture.



Figure 359

(2) Select the empty project and click [OK].

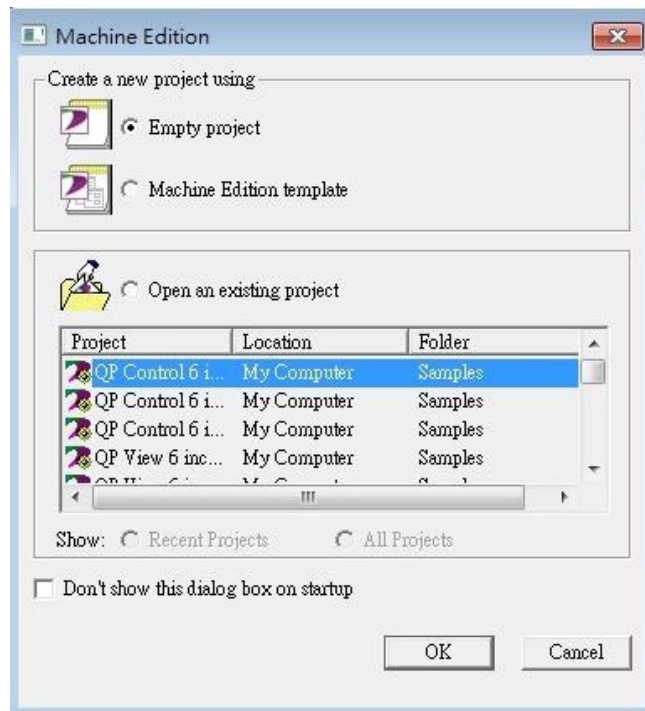


Figure 360

(3) Set the project name and click [OK]

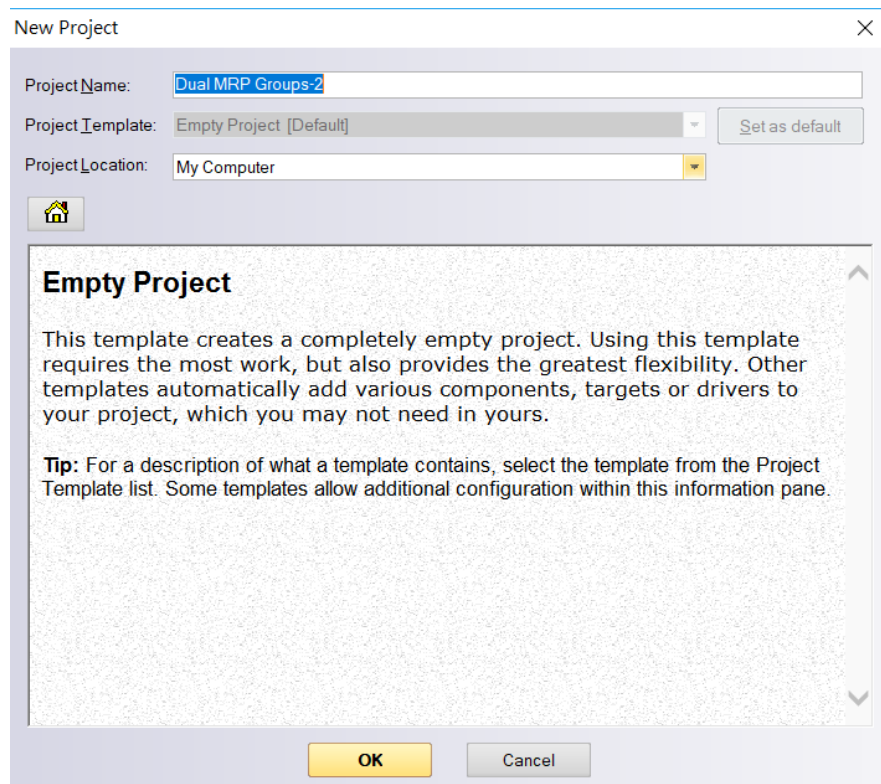


Figure 361

6.2.2 I/O Controller Setting

Next step is to add a target for this project.

Click right button on project name “GLM act as MRC in single MRC group” and select [Add Target] -> [GE Intelligent Platforms Controller] -> [PACSystems RX3i].

The PACSystems RX3i is the I/O Controller to be tested. See the following picture.

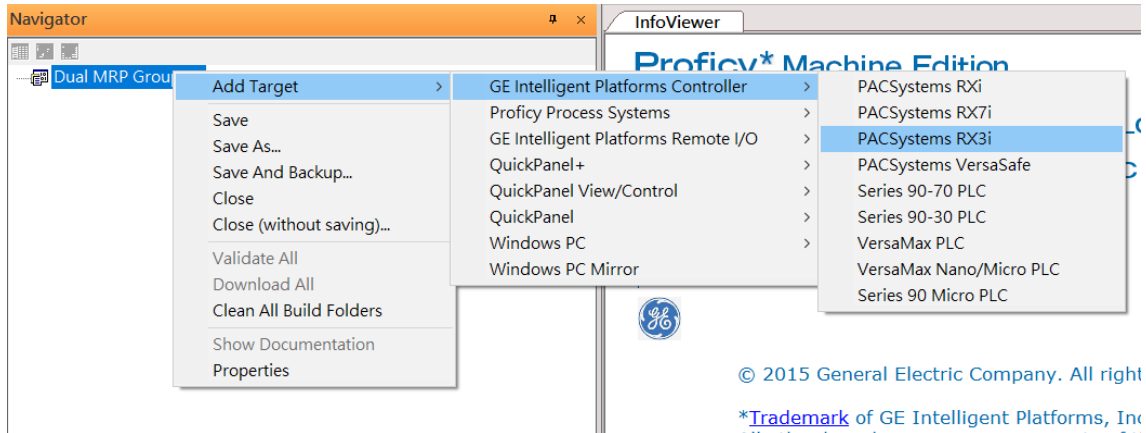


Figure 362

Originally the I/O Controller is described as the rack with 12 slots, each slot can be regarded as the chassis for device installation such as power card, communication module, or bus controller.

However, there are only 7 chassis can be used in the I/O Controller CRU320. Thus, replace the rack for 7 slots. Click right button on “Rack0 (IC695CHS012)” and select [Replace Rack...]

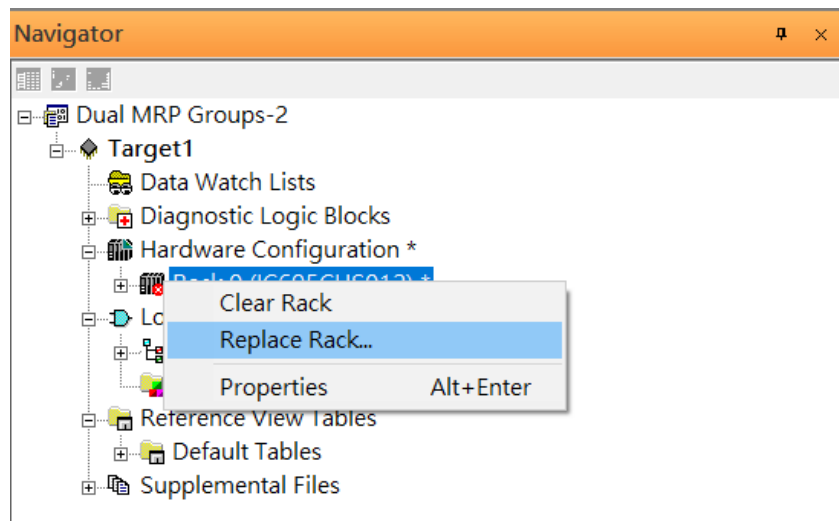


Figure 363

Select “IC695CHS007” and click [OK]

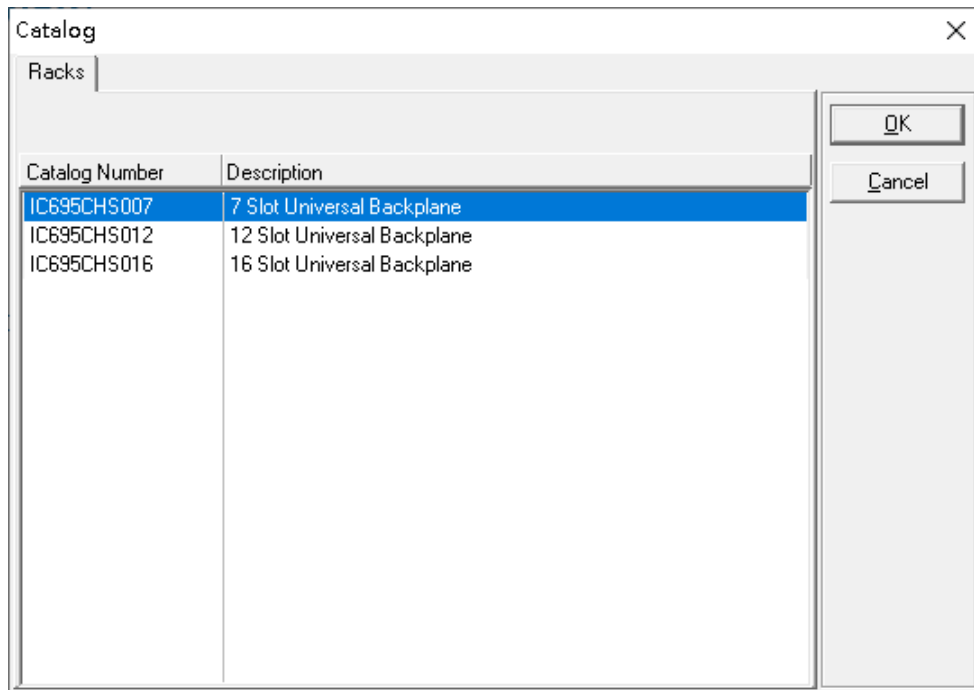


Figure 364

After the rack and the number of slots is defined, select the corresponding devices into the slots according to the I/O Controller. The following picture is the current installation for each device on the I/O Controller



Figure 365

From left to right, the installed devices on the I/O Controller are

Devices on I/O Controller

Device Type	Device Name	Chassis index
Power Card	PSD140	0
Central Processing Unit	CRU320	1 ~ 2
Communication Module	RMX128	3
Communication Module	RMX128	4
Communication Module	ETM001	5
Bus Controller	PNC001	6

Now, add the module into the slots by the current devices on the I/O Controller, the chassis index is corresponding to the slot index.

First, replace the power card. Click slot 0 and click the right button, select [Replace Module ...], and specify the installed power card, PSD140, then click [OK]

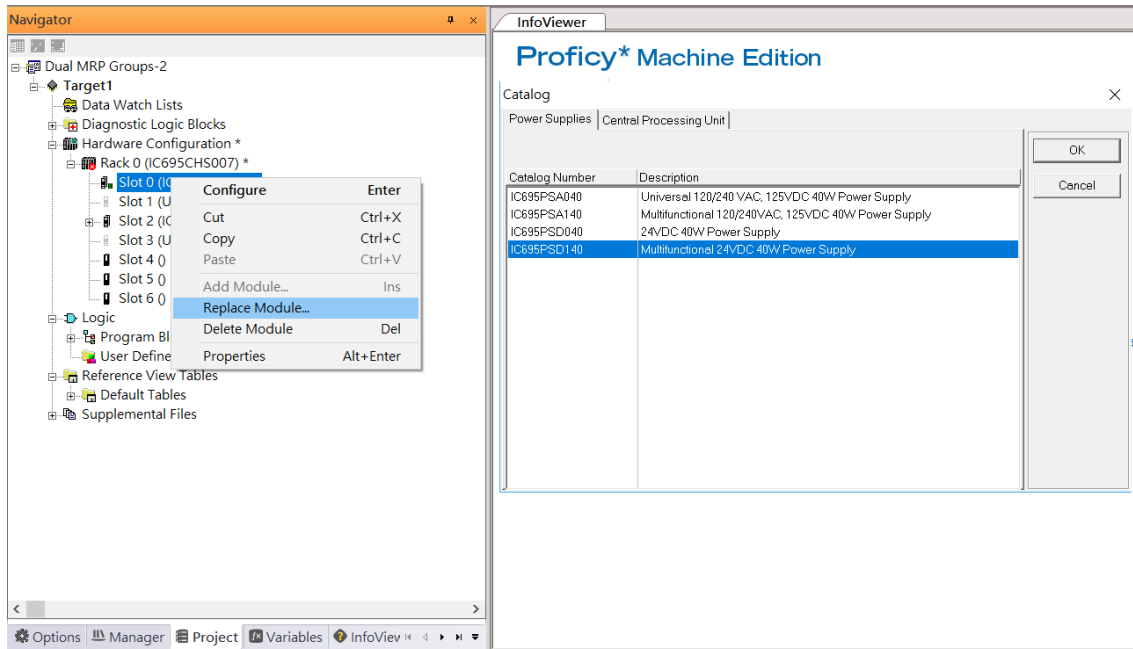


Figure 366

Slot 0 is replaced by current power card, PSD140

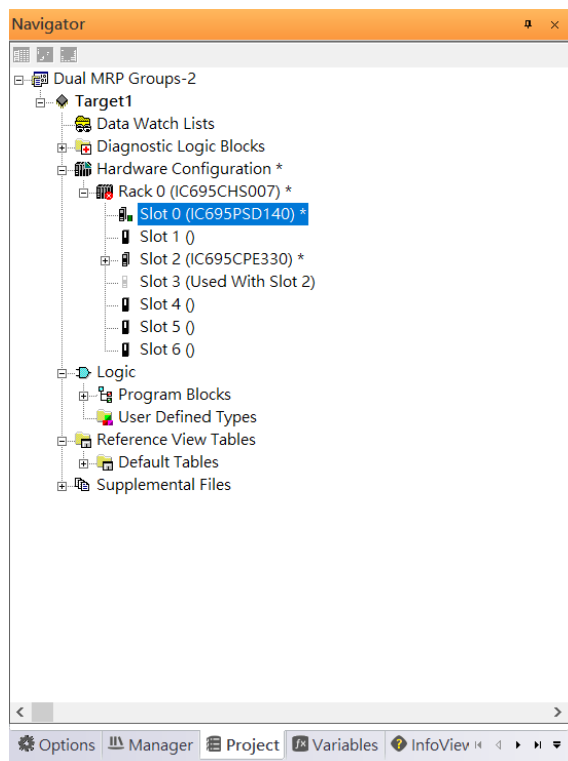


Figure 367

For slot 1 and 2, 2 chassis (1 and 2) is occupied by the Central Processing Unit, CRU320. To integrate slot 1 and 2, pull the slot 2 to slot 1

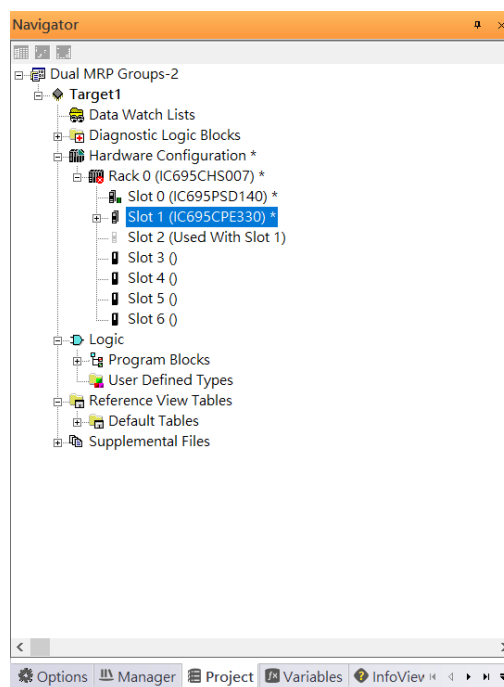


Figure 368

Now the slot 2 is cleaned.

To select the Central Processing Unit, click slot 1 and click the right button, select [Replace Module ...] to choose CRU320

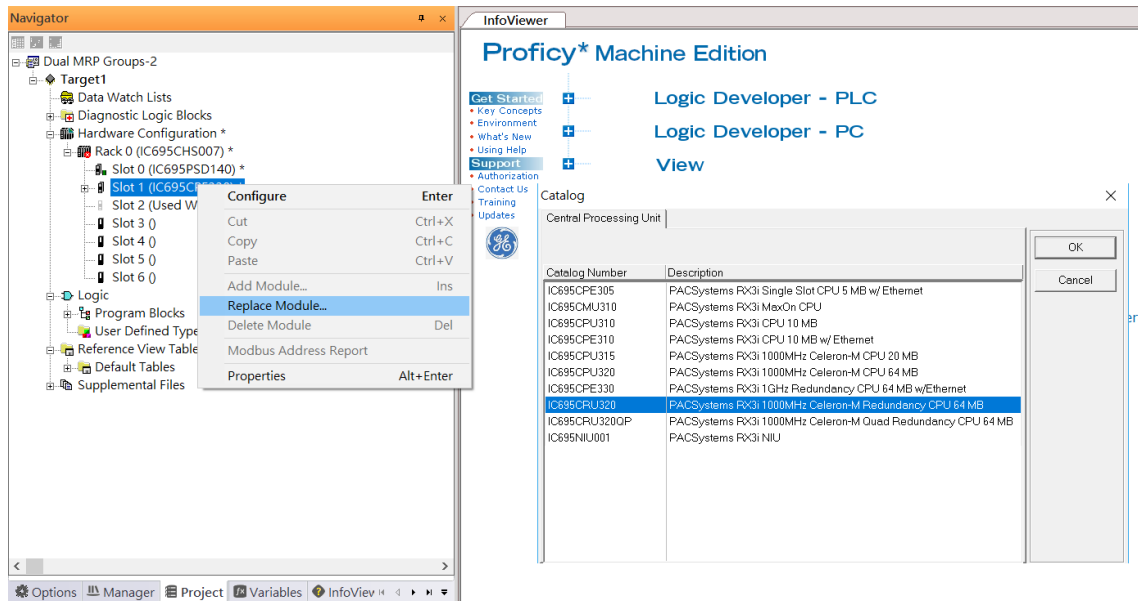


Figure 369

Then choose [No].

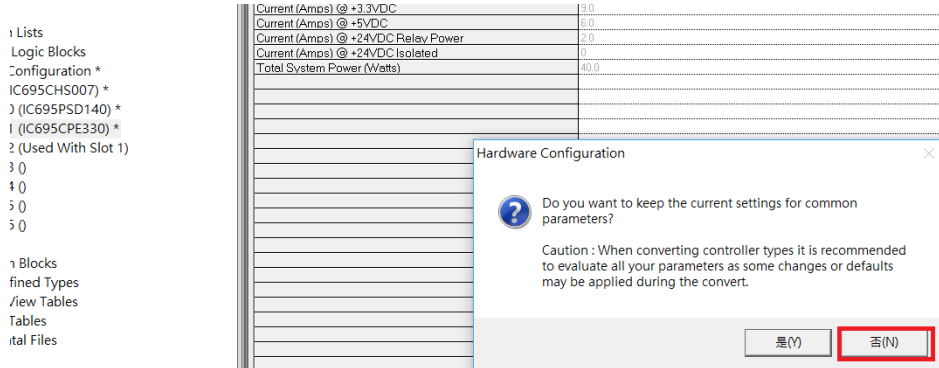


Figure 370

Now the CRU320 is specified.

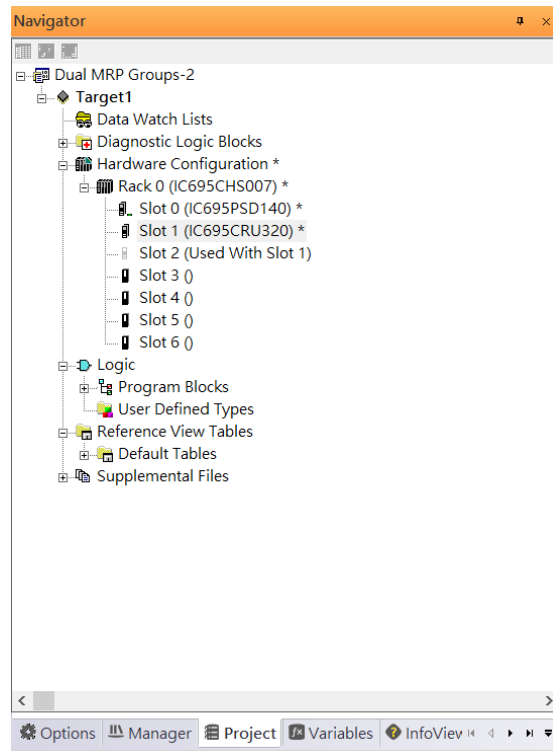


Figure 371

Next is to add RMX128 module for slot 3.

Click the right button on slot 3, select [Add Module ...]

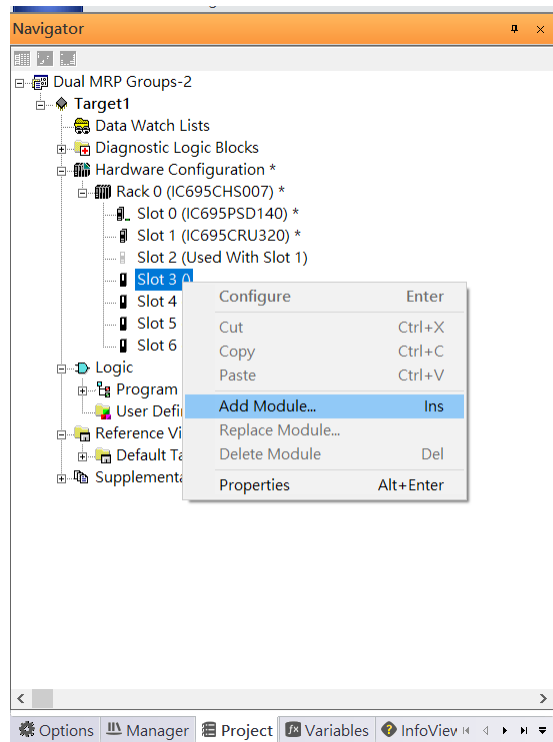


Figure 372

According to the current installation on the I/O Controller, the RMX128 s shall be select.

Select [Communications] -> [IC695RMX128] and click [OK].

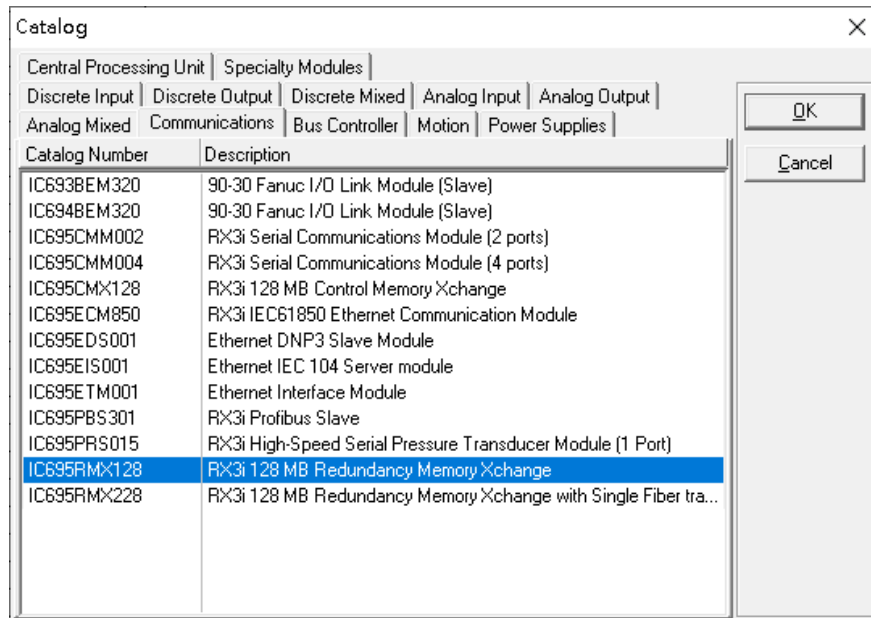


Figure 373

Now the RMX128 is ready on slot 3.

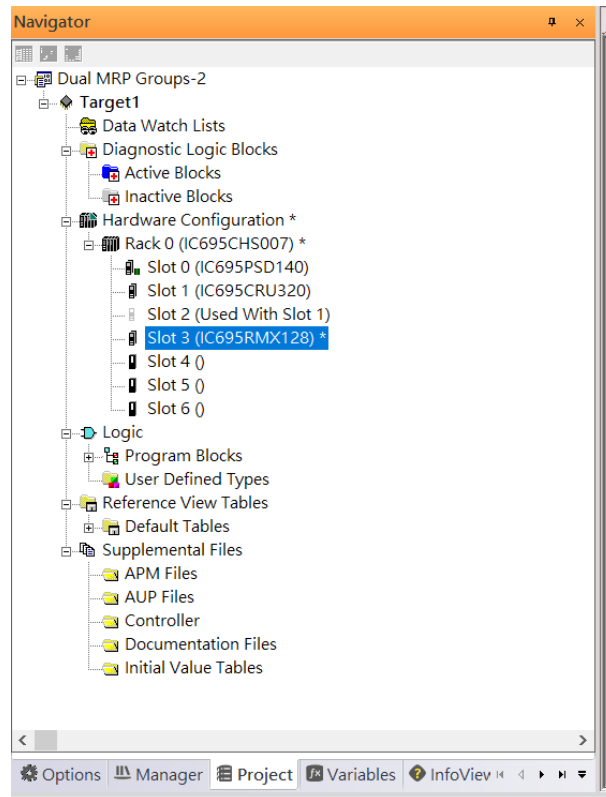


Figure 374

Continuously, select RMX128 for slot 4.

Click the right button on slot 4, select [Add Module ...], select [Communications] -> [IC695RMX128] and click [OK]

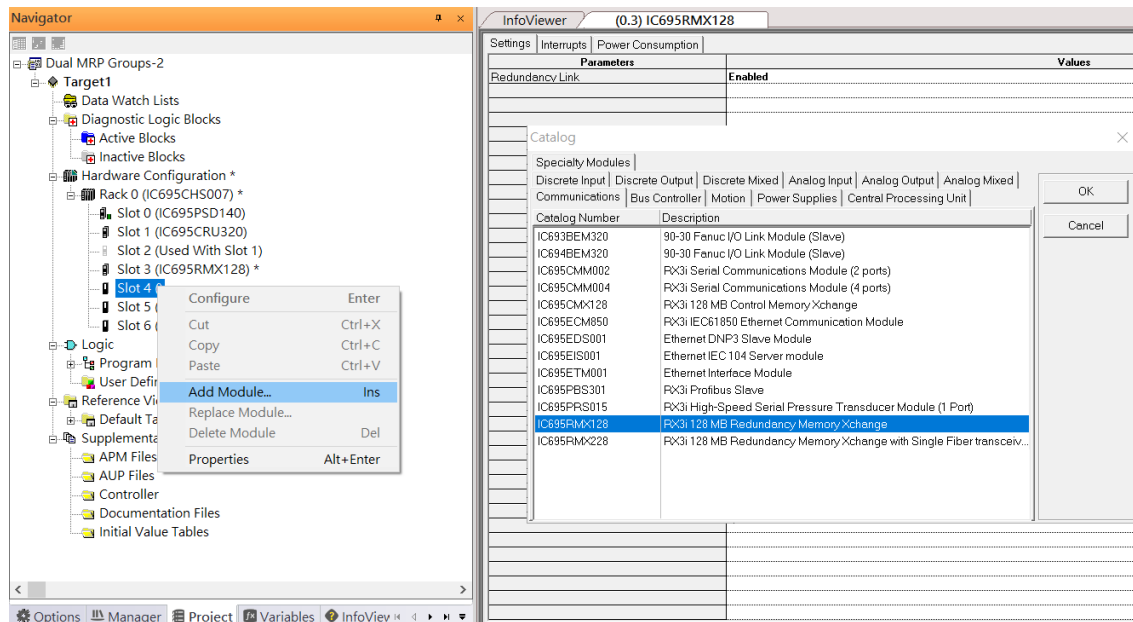


Figure 375

Continuously, select ETM001 for slot 5.

Click the right button on slot 5, select [Add Module ...], select [Communications] -> [IC695ETM001] and click [OK]

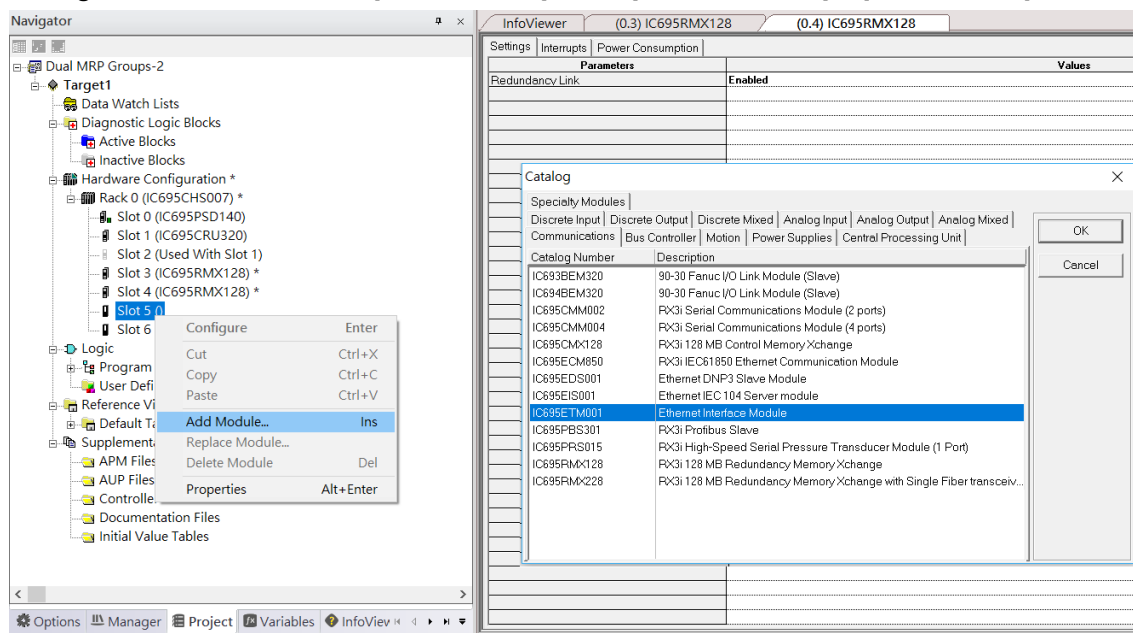


Figure 376

It should be noted that the ETM001 is the management device for Proficy Machine Edition. The communication interface is Ethernet network. The IP address and Subnet Mask shall be specified.

In the following picture, the IP address 192.168.0.101 and mask 255.255.255.0 is specified on ETM001.

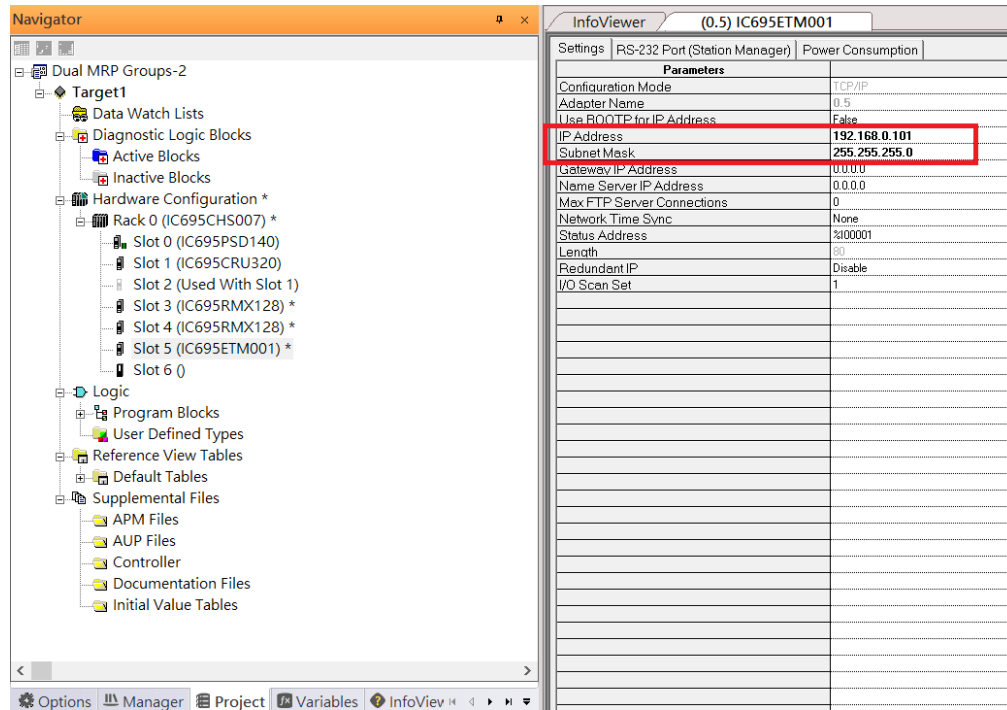


Figure 377

Continuously, select PNC001 for slot 6.

Click slot 6 and click the right button, select [Add Module ...], specify the installed Bus Controller, PNC001 and click [OK]

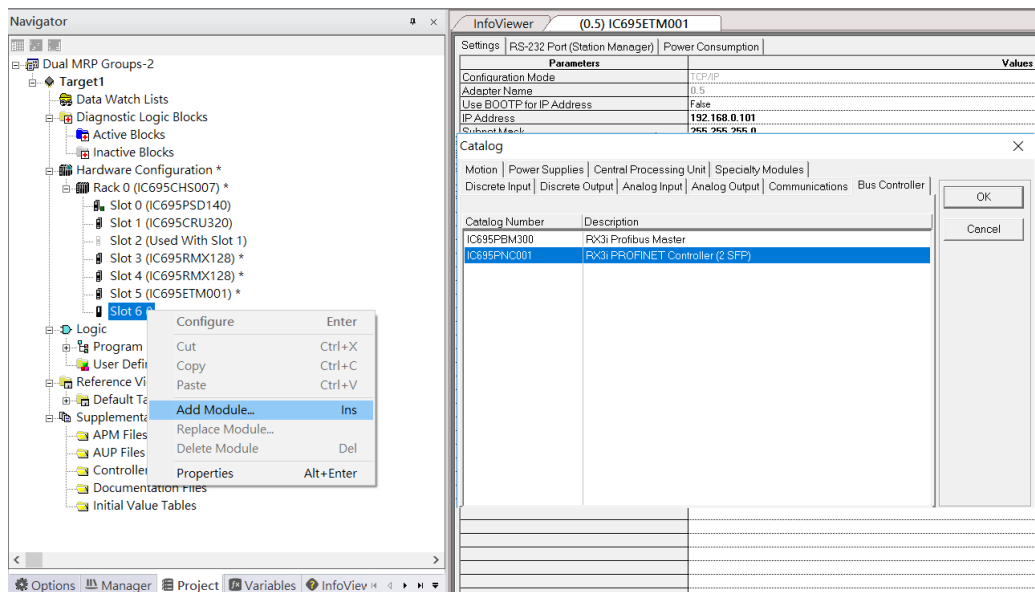


Figure 378

Now all the devices on the I/O Controller are ready on the slots on the rack, the following picture is the current status, and we shall save it.

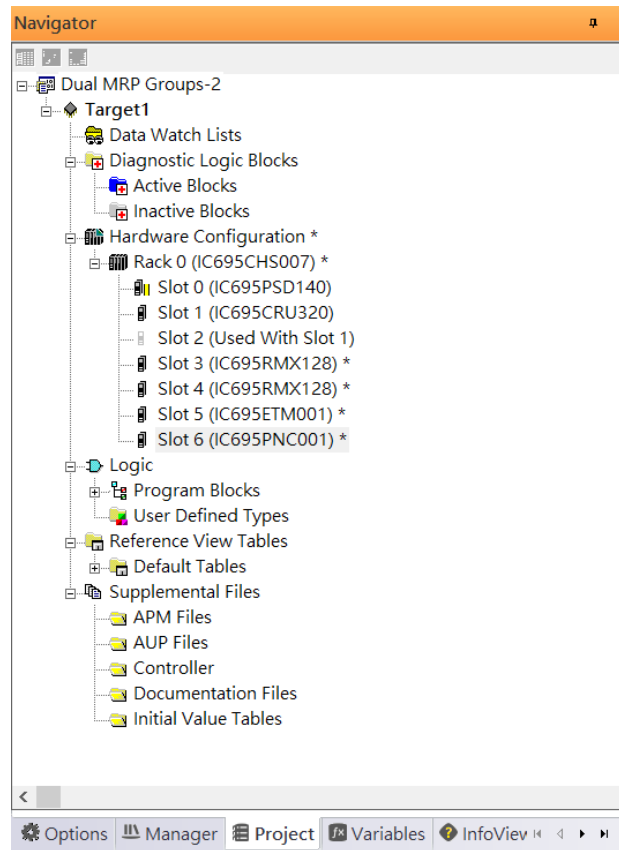
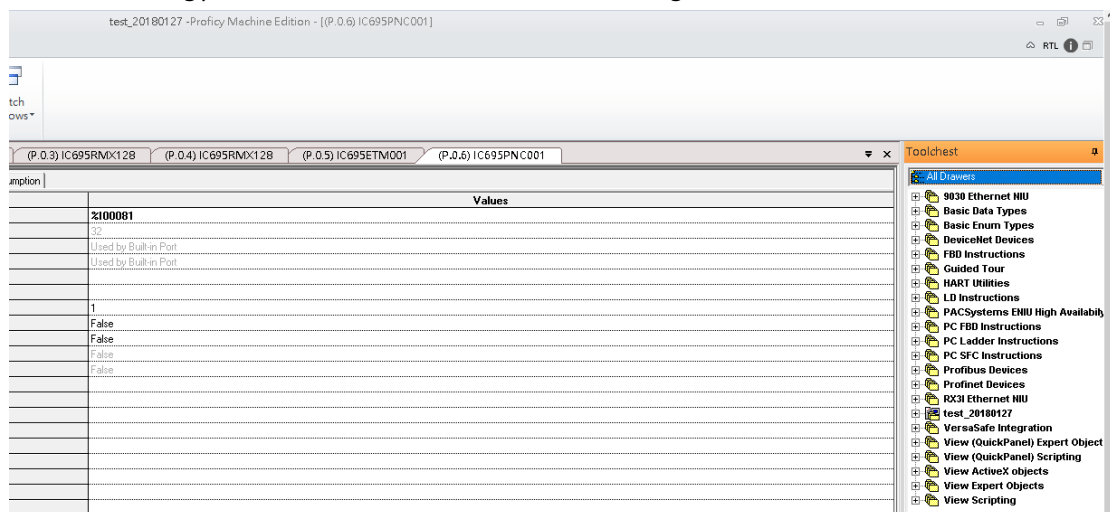


Figure 379

[illegible]

As shown in the following picture, a new interface is created on the right-hand side.



Select Profinet Devices.

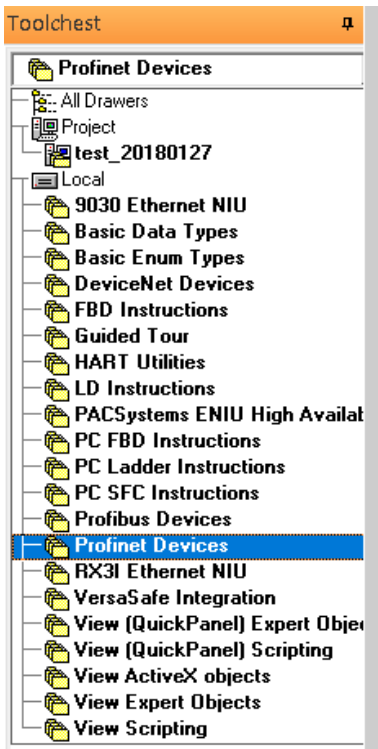


Figure 382

Click right button, select [Assistants] -> [Import GSDML File ...]

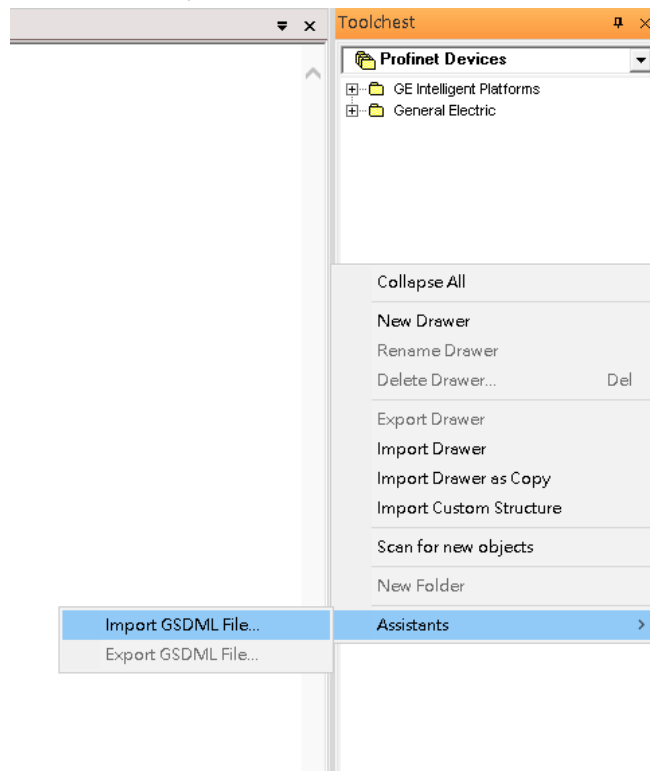


Figure 383

Select the GSDML File.

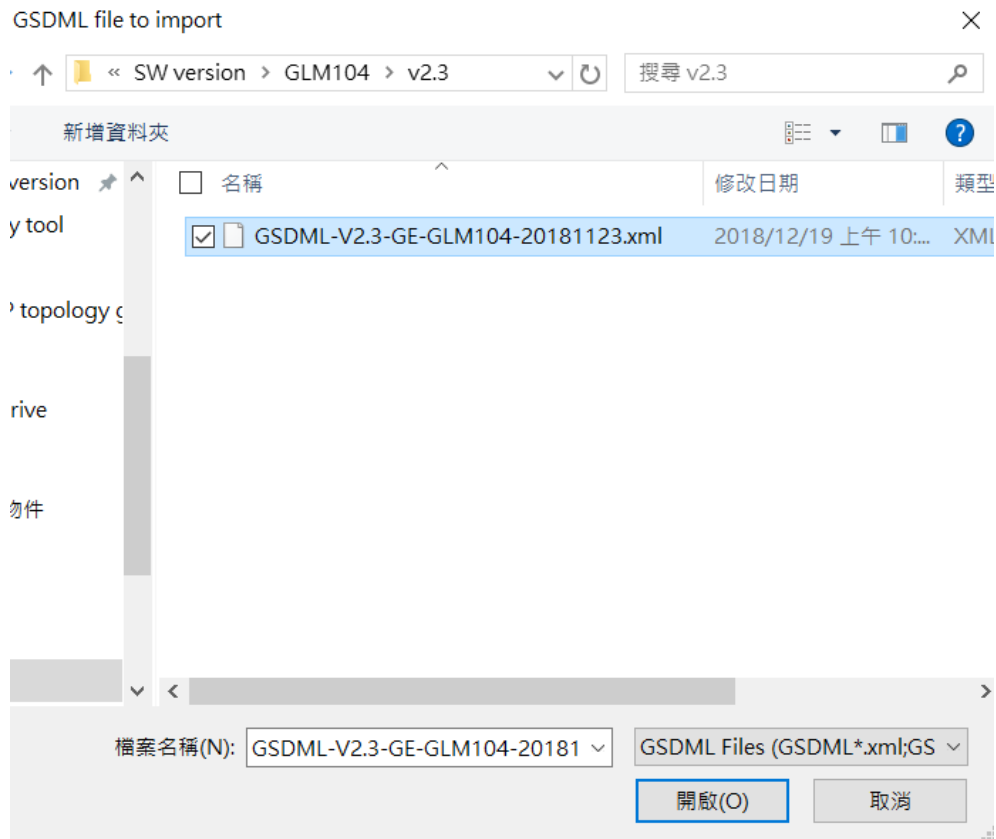


Figure 384

Then the corresponding I/O Device of GSDML File is added in the [Toolchest].

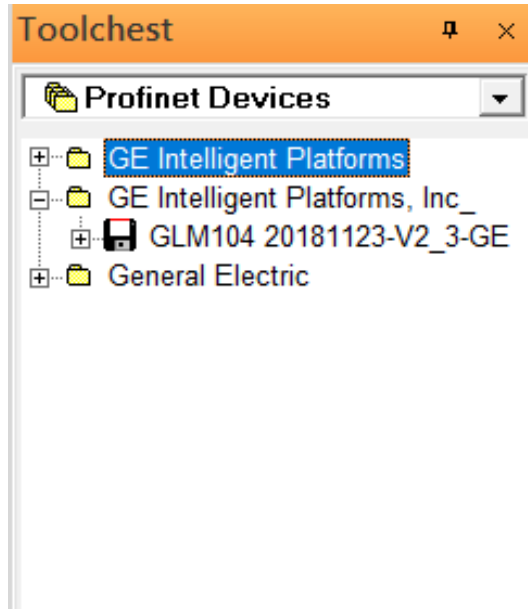


Figure 385

In this document, there are ten I/O devices and one I/O controller. I/O devices are nine switches and one GE VersaMax PROFINET I/O Scanner.

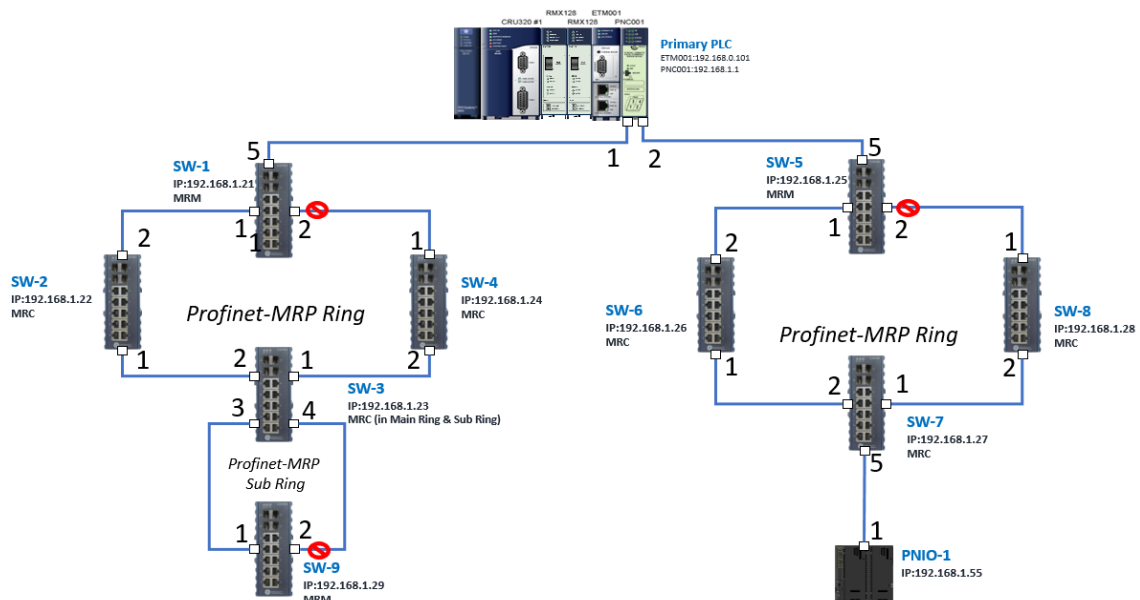


Figure 386

The I/O Device is connected to the Bus Controller on the I/O Controller. Click the slot 6 and click the right button to add the I/O Device on the PNC001.

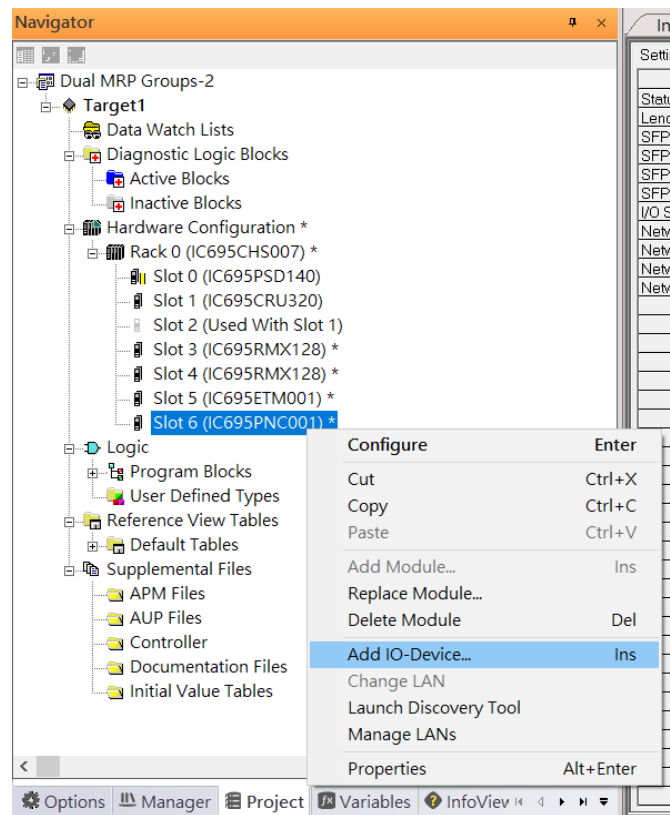


Figure 387

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

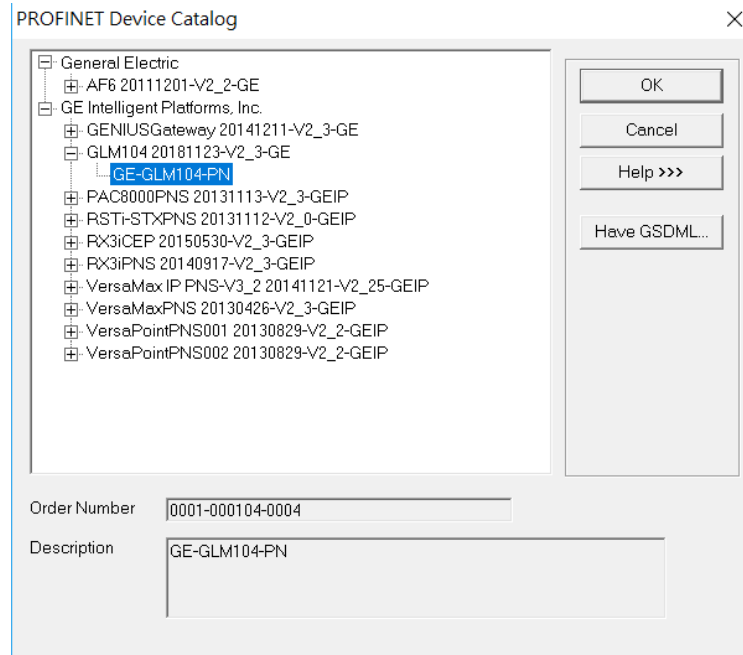


Figure 388

Now the I/O device GLM104(SW1) is ready and is a sub slot on PNC001.

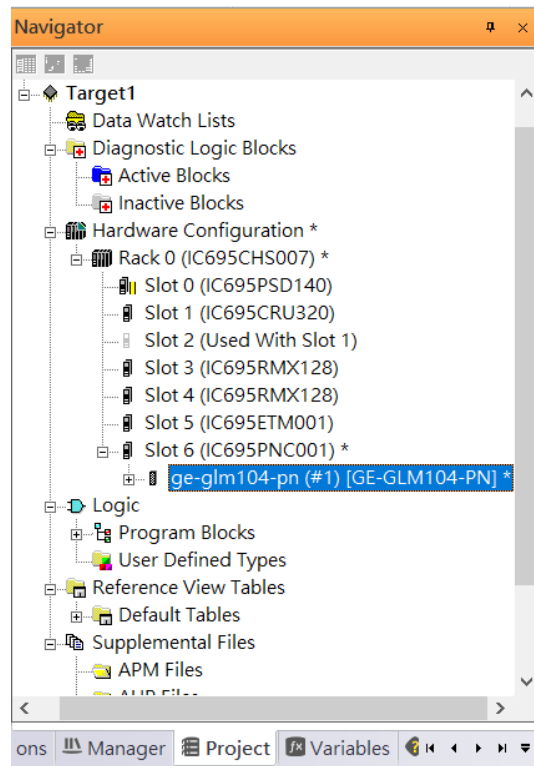


Figure 389

Then add the second I/O device in the PNC001.

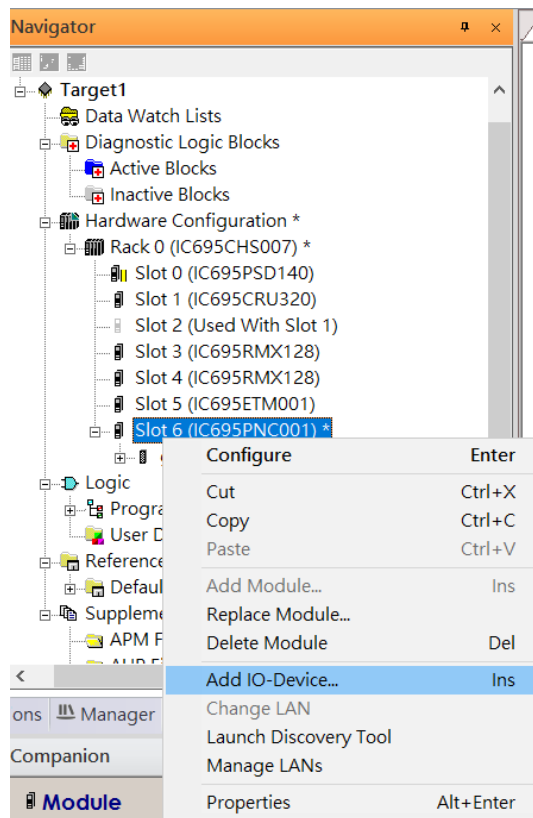


Figure 390

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

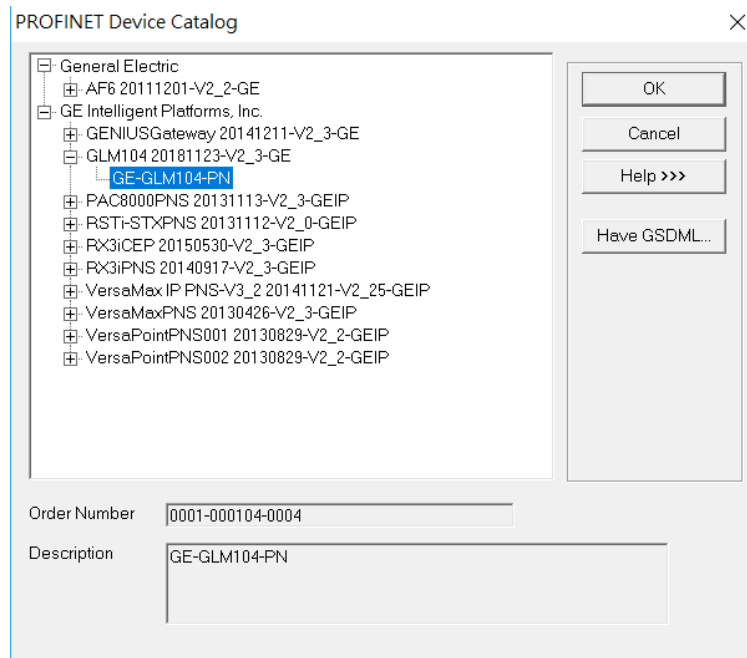


Figure 391

Now the I/O device GLM104(SW2) is ready and is a sub slot on PNC001.

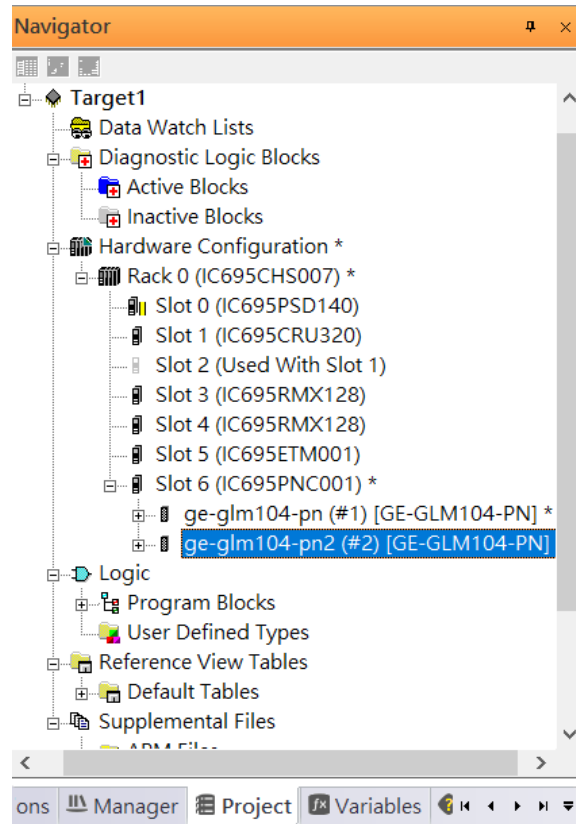


Figure 392

Then add the third I/O device in the PNC001.

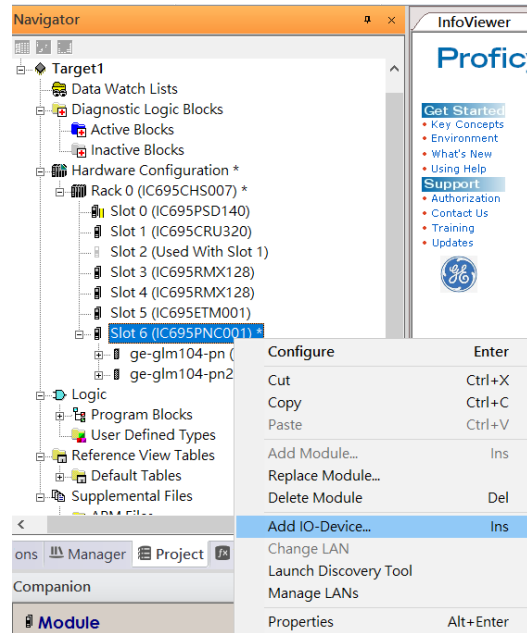


Figure 393

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

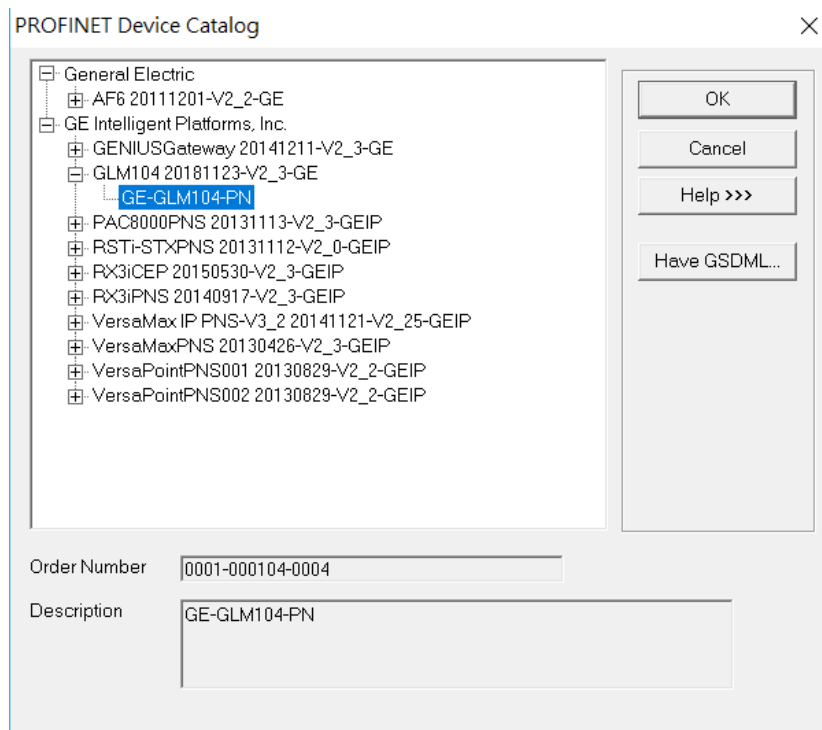


Figure 394

Now the I/O device GLM104(SW3) is ready and is a sub slot on PNC001

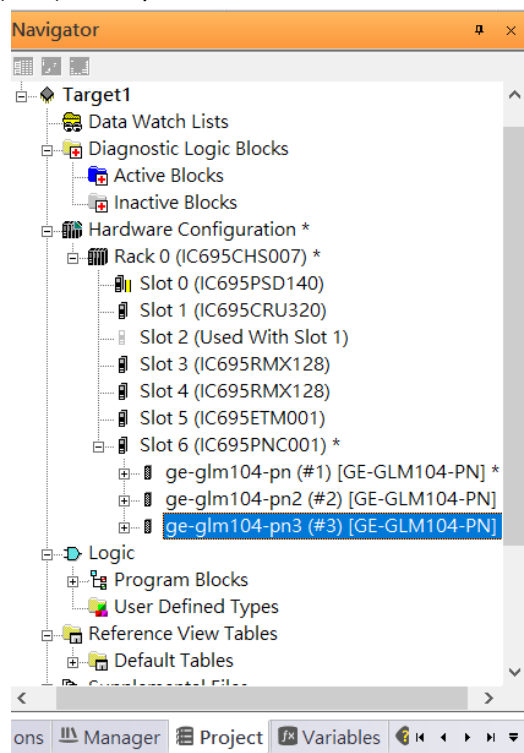


Figure 395

Then add the fourth I/O device in the PNC001.

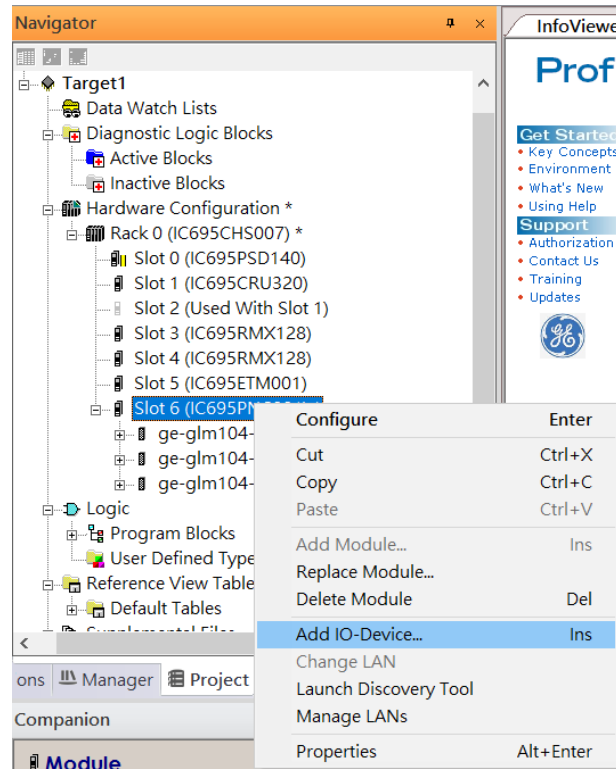


Figure 396

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE] -> [GE-GLM104-PN] and click [OK]

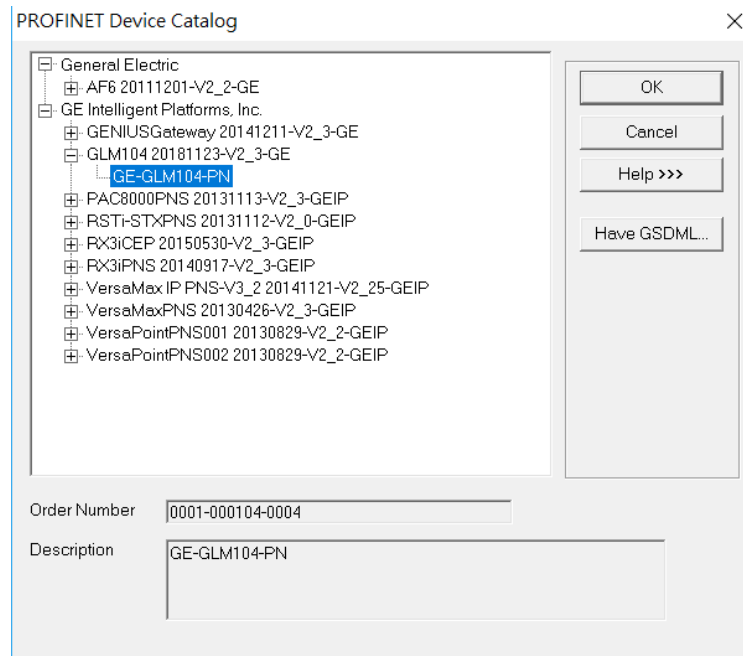


Figure 397

Now the I/O device GLM104(SW4) is ready and is a sub slot on PNC001.

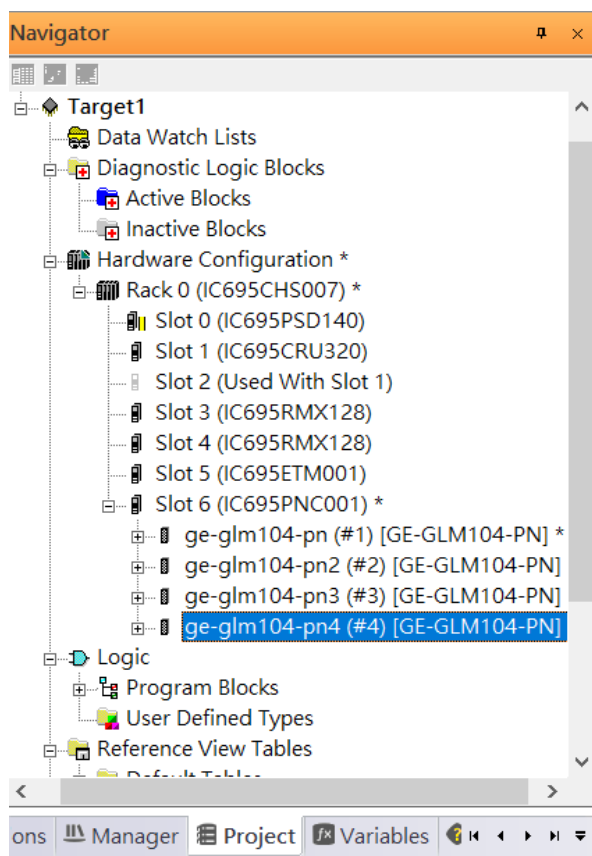


Figure 398

Then add the fifth I/O device in the PNC001.

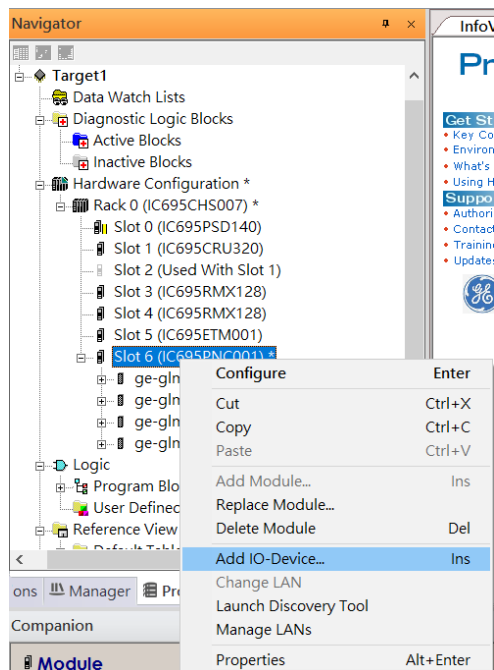


Figure 399

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

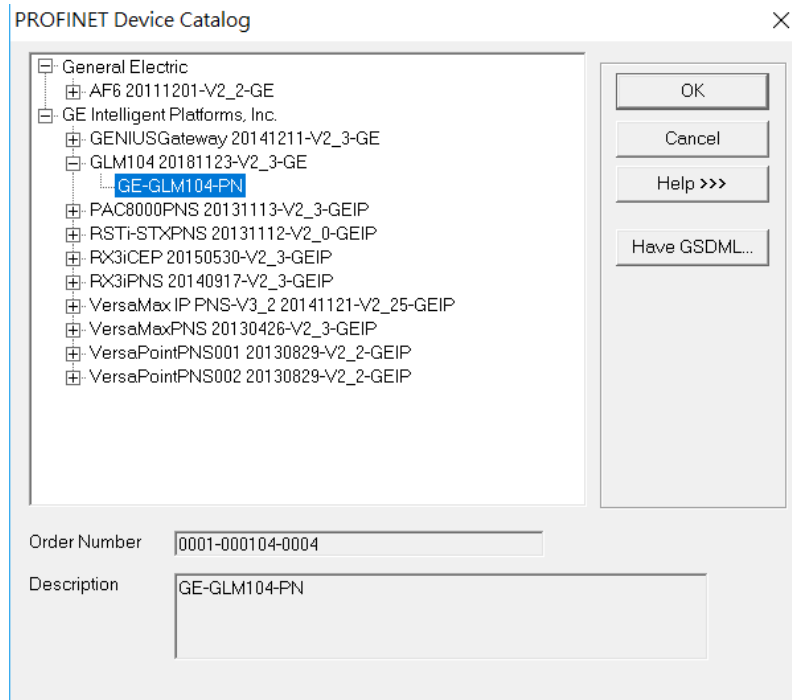


Figure 400

Now the I/O device GLM104(SW5) is ready and is a sub slot on PNC001.

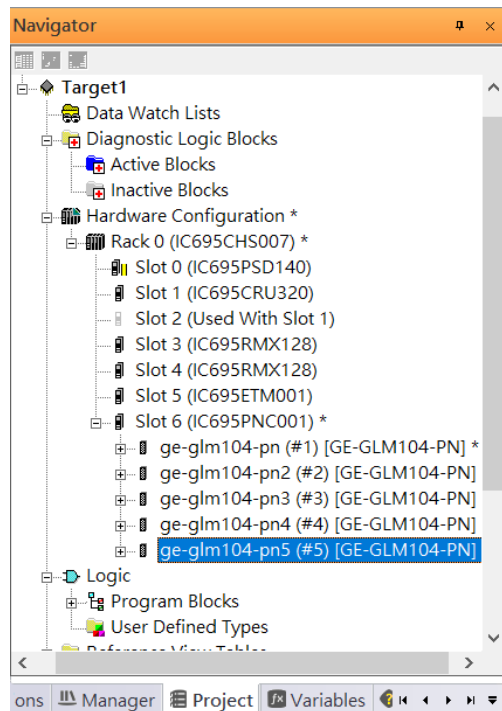


Figure 401

Then add the sixth I/O device in the PNC001.

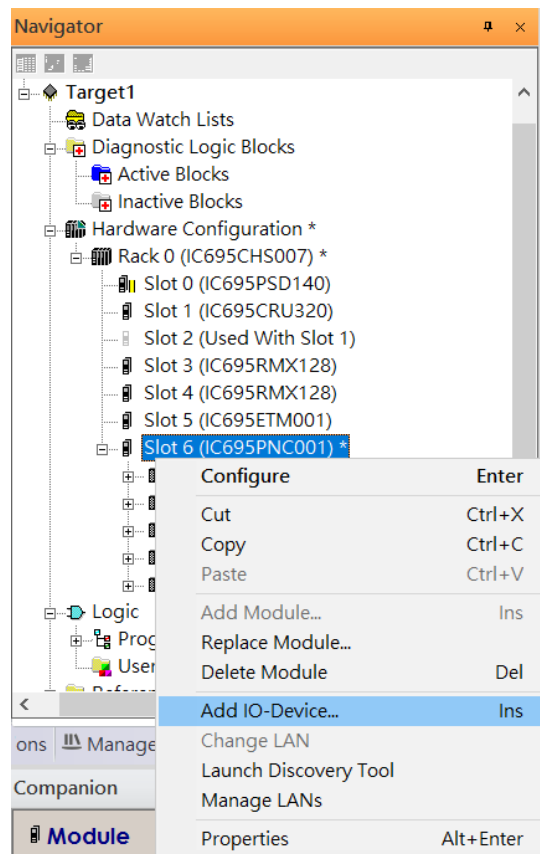


Figure 402

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

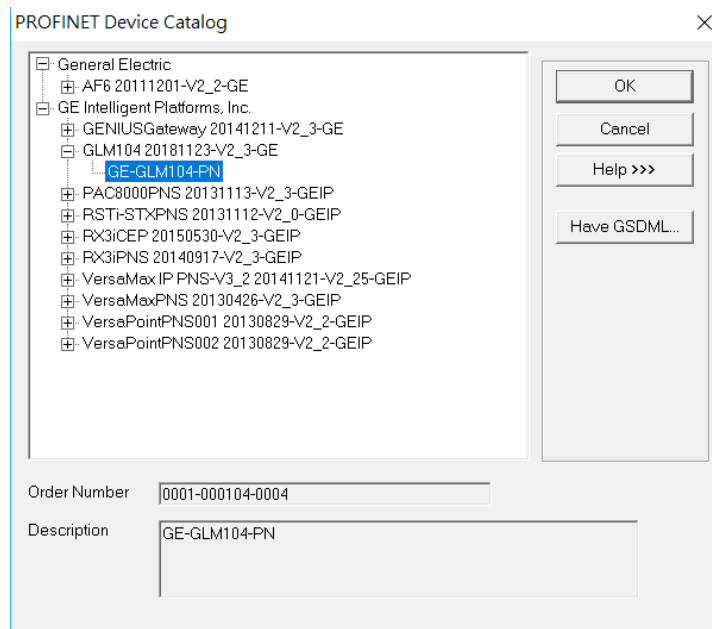


Figure 403

Now the I/O device GLM104(SW6) is ready and is a sub slot on PNC001.

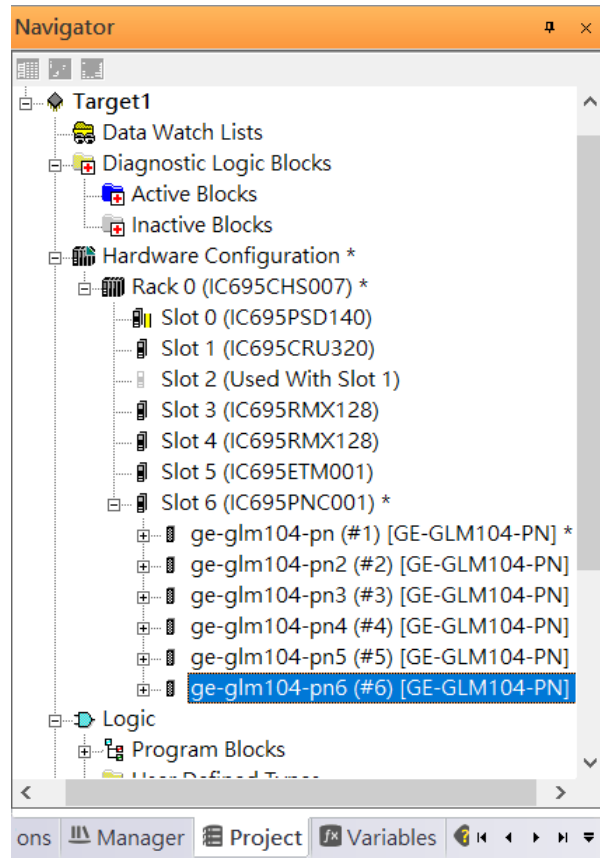


Figure 404

Then add the seventh I/O device in the PNC001.

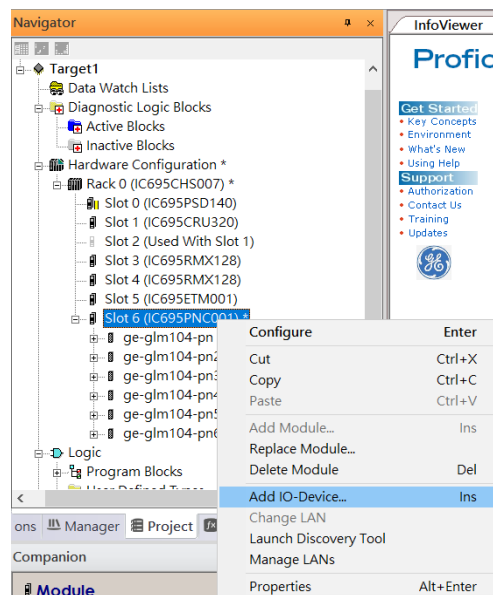


Figure 405

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

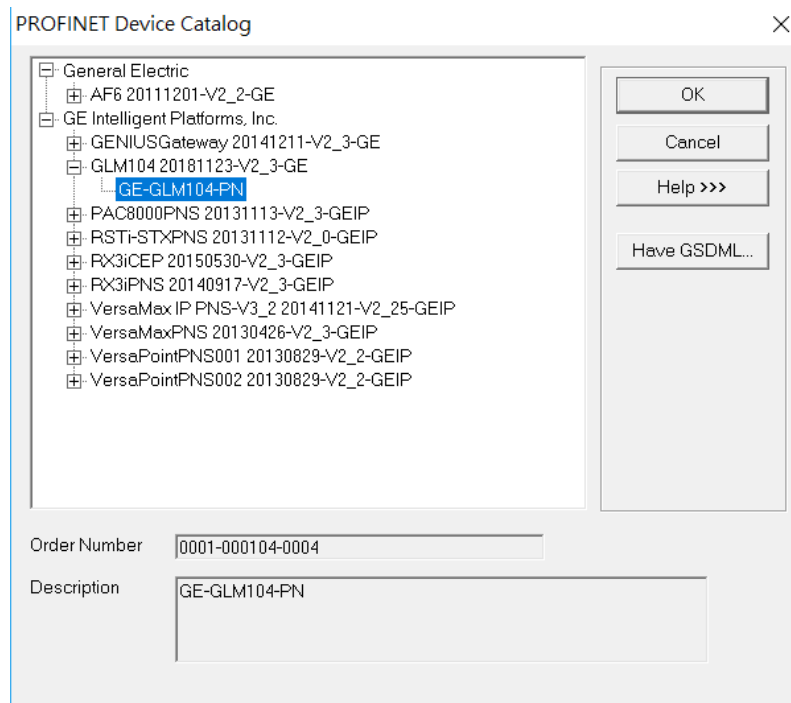


Figure 406

Now the I/O device GLM104(SW7) is ready and is a sub slot on PNC001.

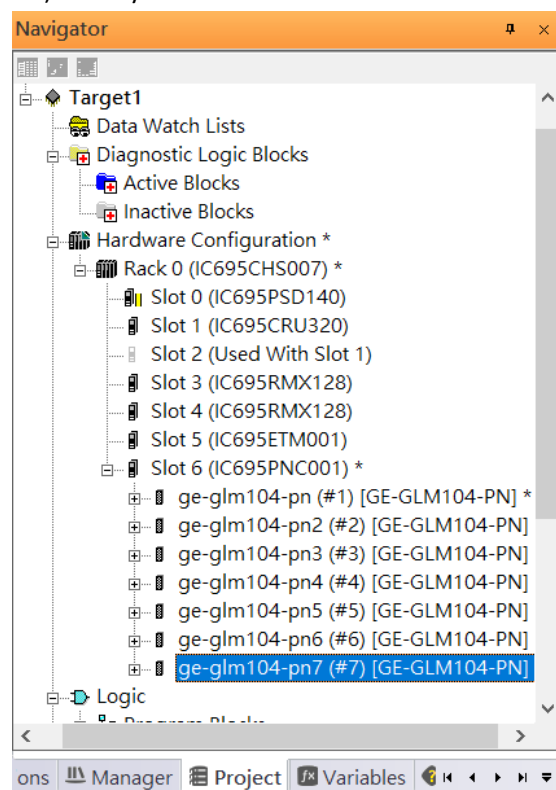


Figure 407

Then add the eighth I/O device in the PNC001.

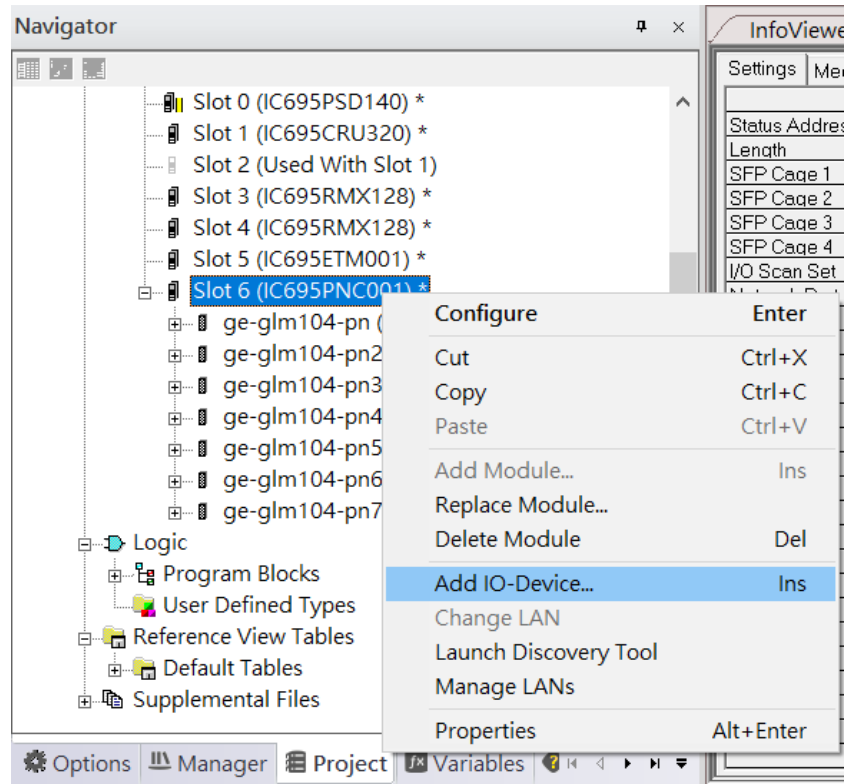


Figure 408

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

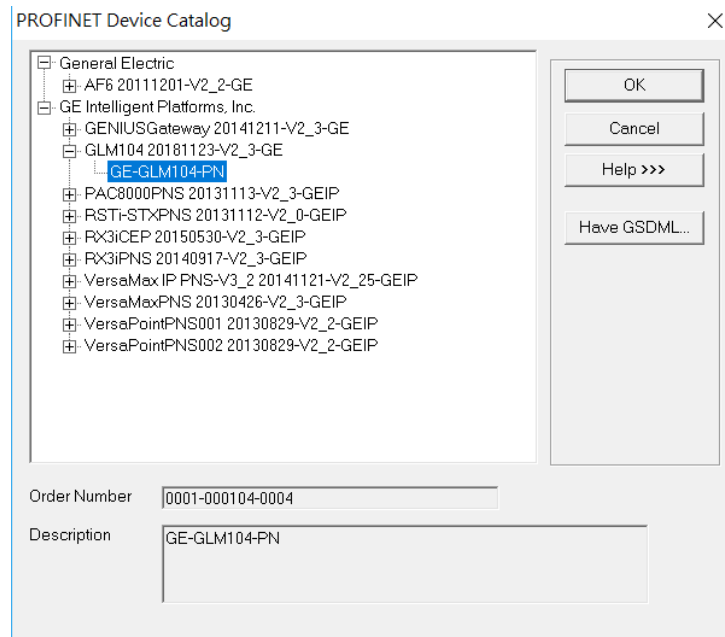


Figure 409

Now the I/O device GLM104(SW8) is ready and is a sub slot on PNC001.

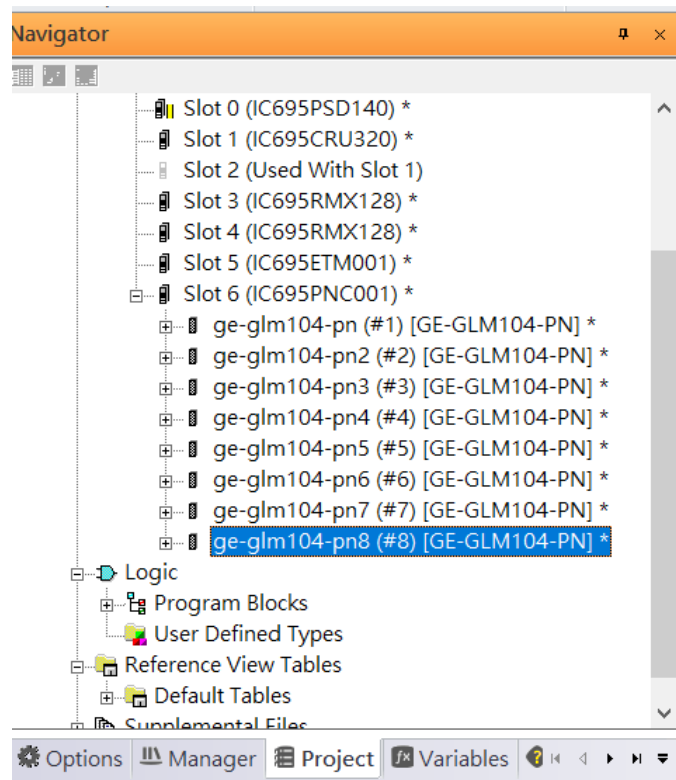


Figure 410

Then add the ninth I/O device in the PNC001.

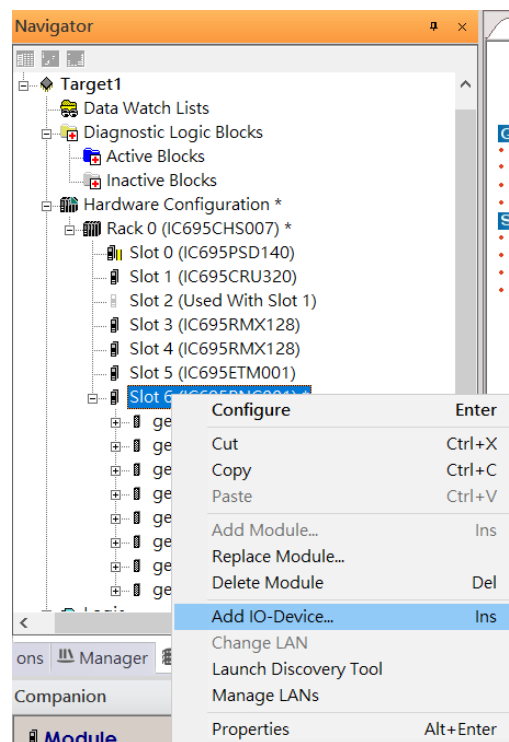


Figure 411

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

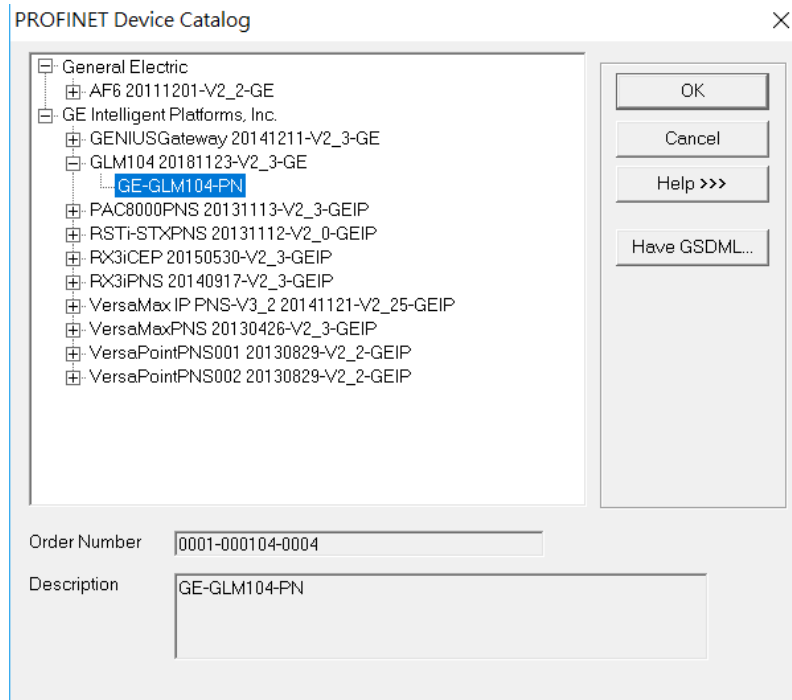


Figure 412

Now the I/O device GLM104(SW9) is ready and is a sub slot on PNC001.

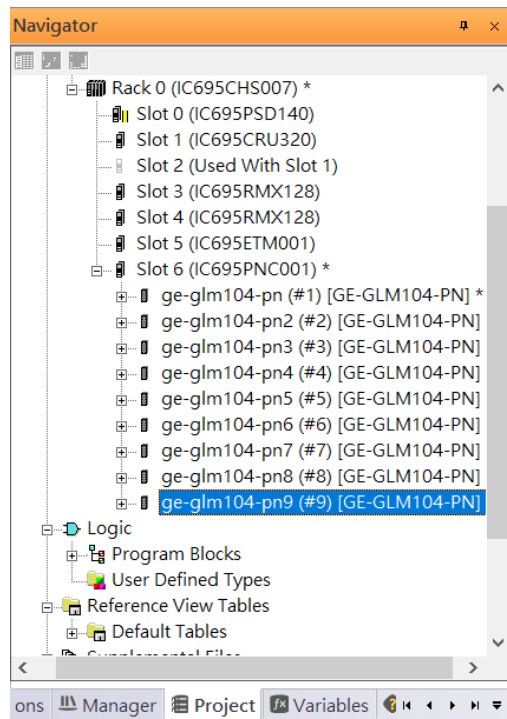


Figure 413

Then add the tenth I/O device in the PNC001.

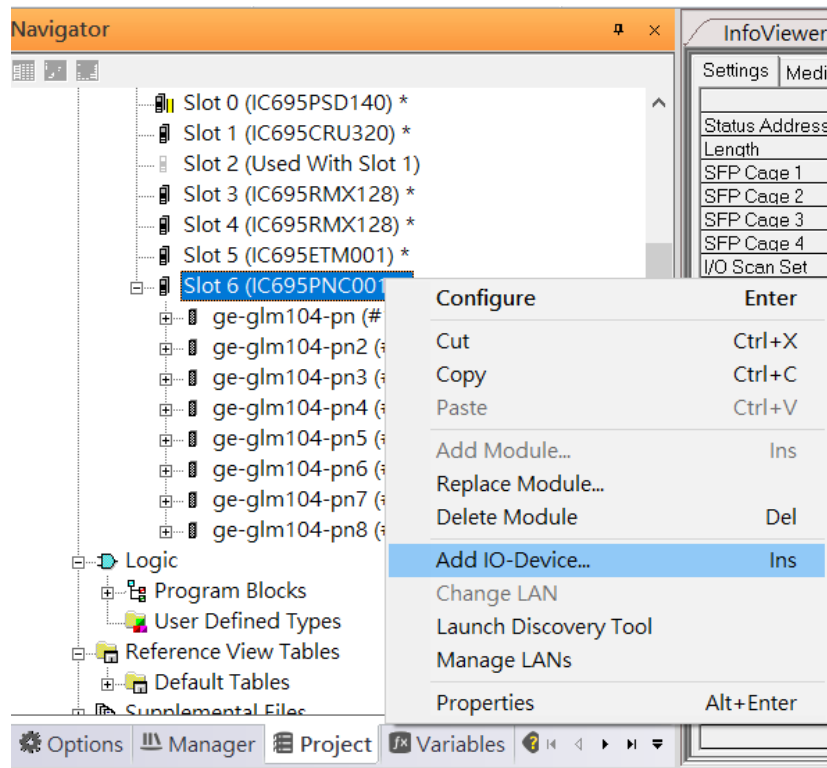


Figure 414

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [VersaMaxPNS 20130426-V2_3-GEIP] -> [VersaMax PROFINET IO Scanner (2 RJ-45 Copper connectors)] and click [OK]

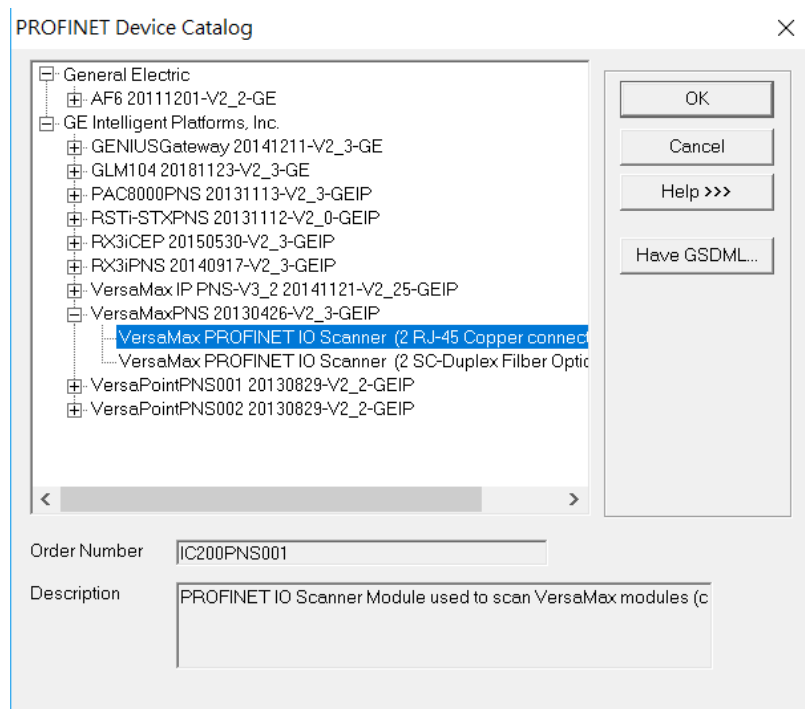


Figure 415

Now the I/O device VersaMax PROFINET IO Scanner is ready and is a subslot on PNC001.

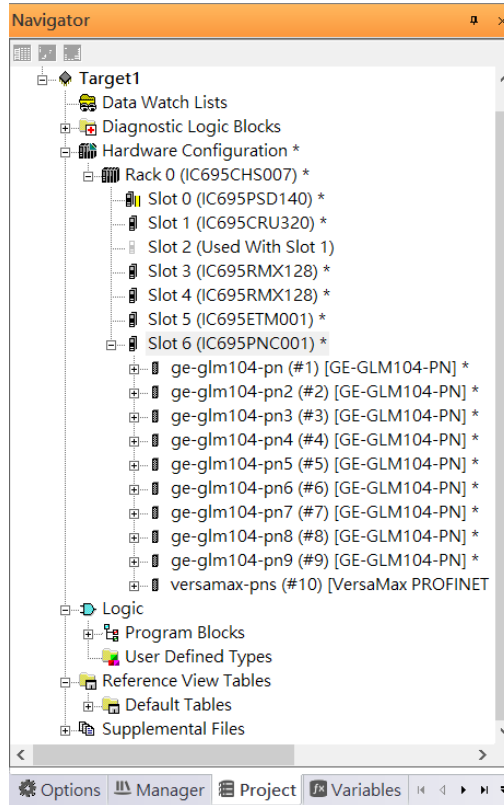


Figure 416

6.2.4 DCP Set Command

To configure the setting or monitor the status on the I/O Device, the communication interface is also based on Ethernet network. We can specify the IP address and the device name from I/O Controller via the DCP (Discovery and Configuration Protocol).

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn, and click the right button.

Select [Properties], see the following picture.

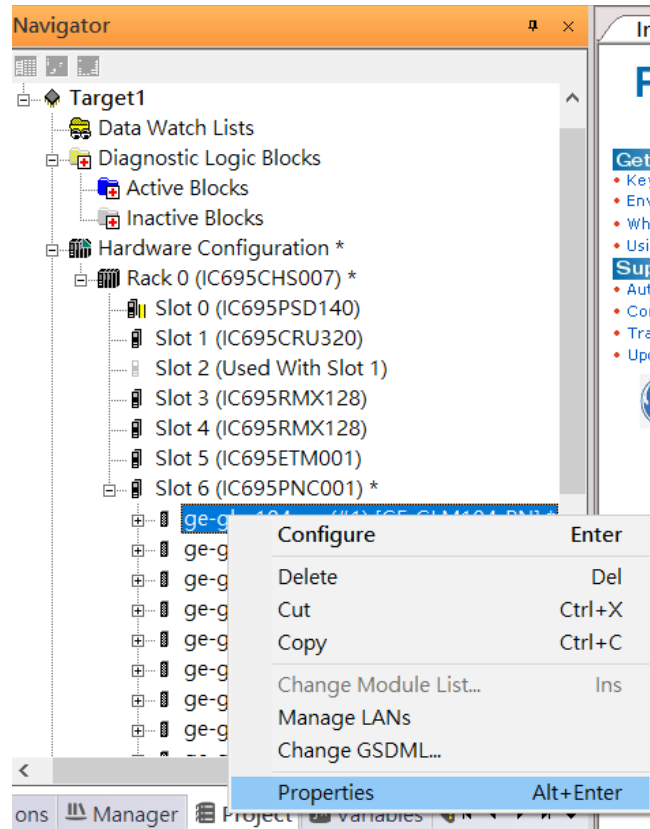


Figure 417

In this table, the I/O Device name can be specified in field [Device Name], and the IP address can be set in field [IP address]. We modify device name to “ge-glm104-pn-sw-1” and IP address to “192.168.0.21” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-1” later.

Inspector	
I/O-Device	
Device Number	1
Update Rate (ms)	128
Reference Variable	<None>
Network Identification	
I/O LAN	LAN01
Device Name	ge-glm104-pn-sw-1
Device Description	
IP Address	192.168.0.21
General	
GSDML	GSDML-V2.3-GE-GLM104-20181123.xml
Device Type	GE-GLM104-PN
Device Access Point ID	GE-GLM104-PN
Group I/O References	True

Figure 418

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn2, and click the right button. Select [Properties], see the following picture.

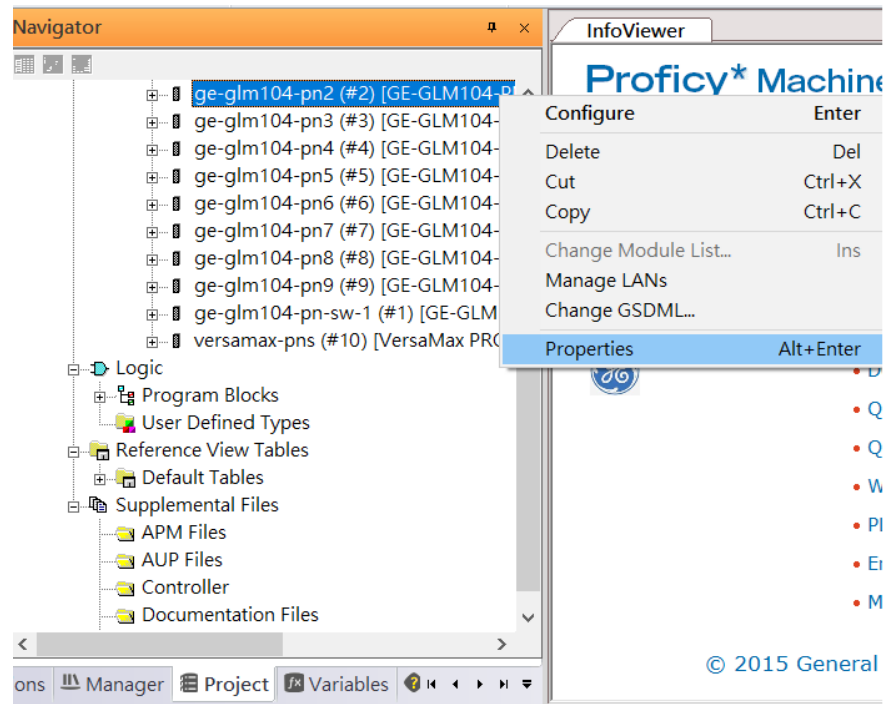


Figure 419

We modify device name to “ge-glm104-pn-sw-2” and IP address to “192.168.0.22” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-2” later

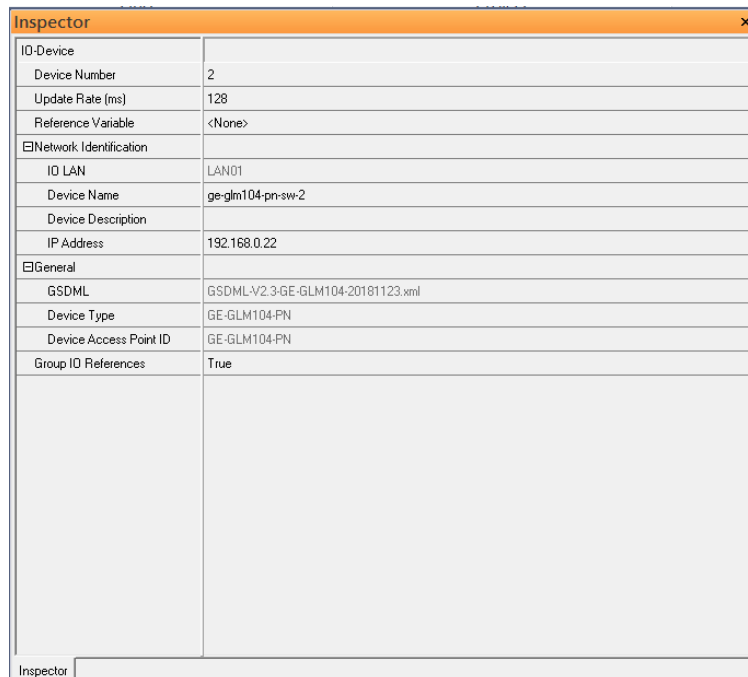


Figure 420

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn3, and click the right button. Select [Properties], see the following picture.

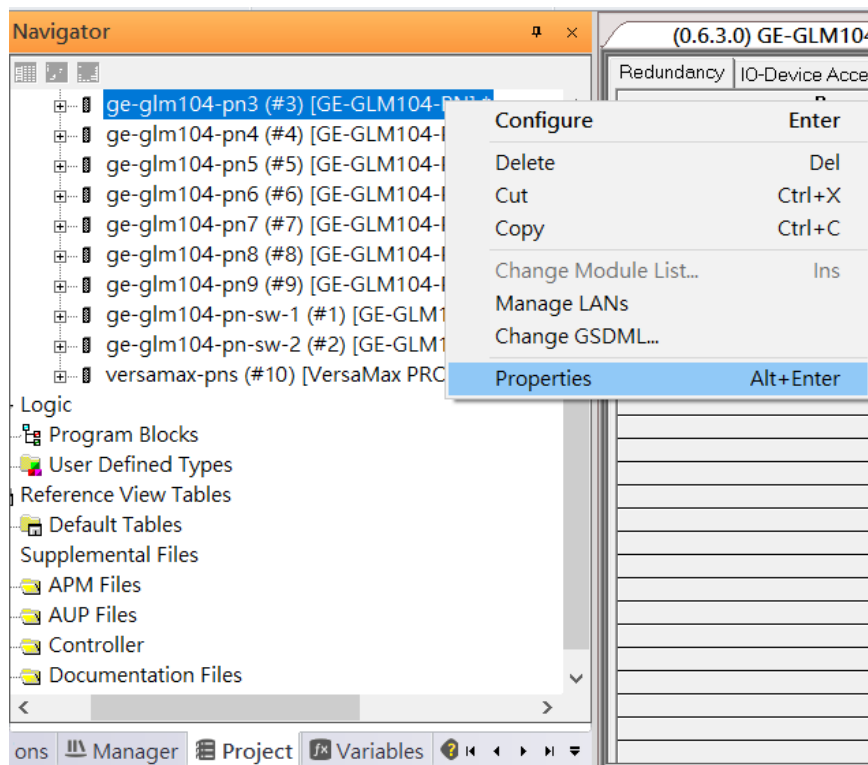


Figure 421

We modify device name to “ge-glm104-pn-sw-3” and IP address to “192.168.0.23” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-3” later.

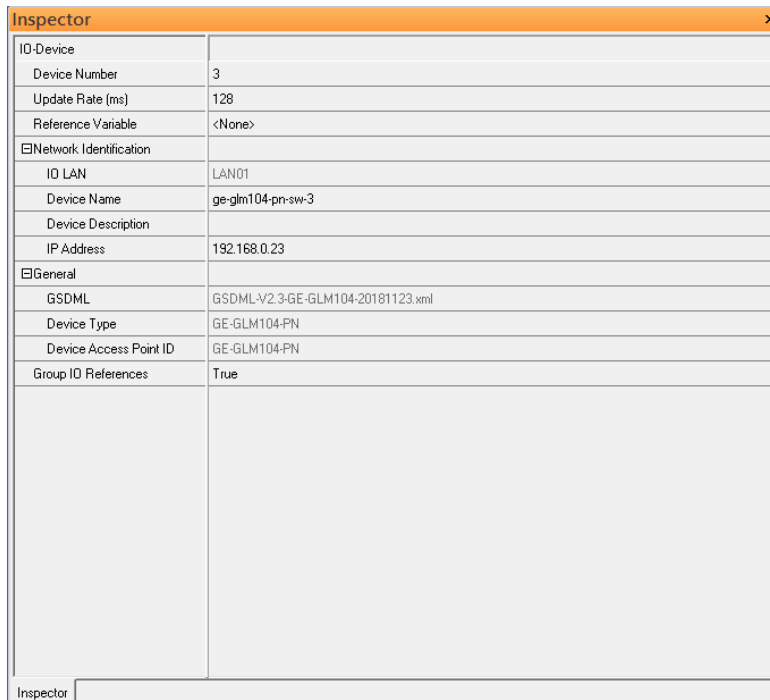


Figure 422

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn4, and click the right button. Select [Properties], see the following picture.

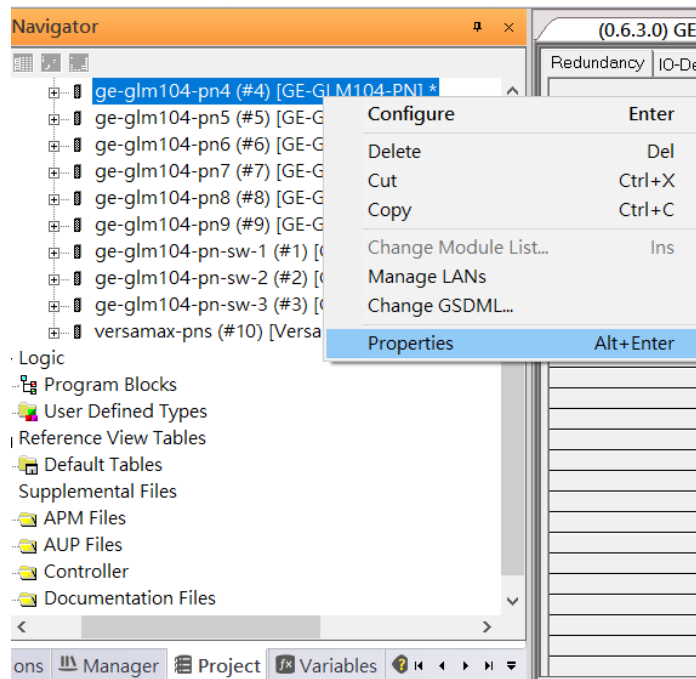


Figure 423

We modify device name to “ge-glm104-pn-sw-4” and IP address to “192.168.0.24” then we use I/O Device DiscoveryTool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-4” later.

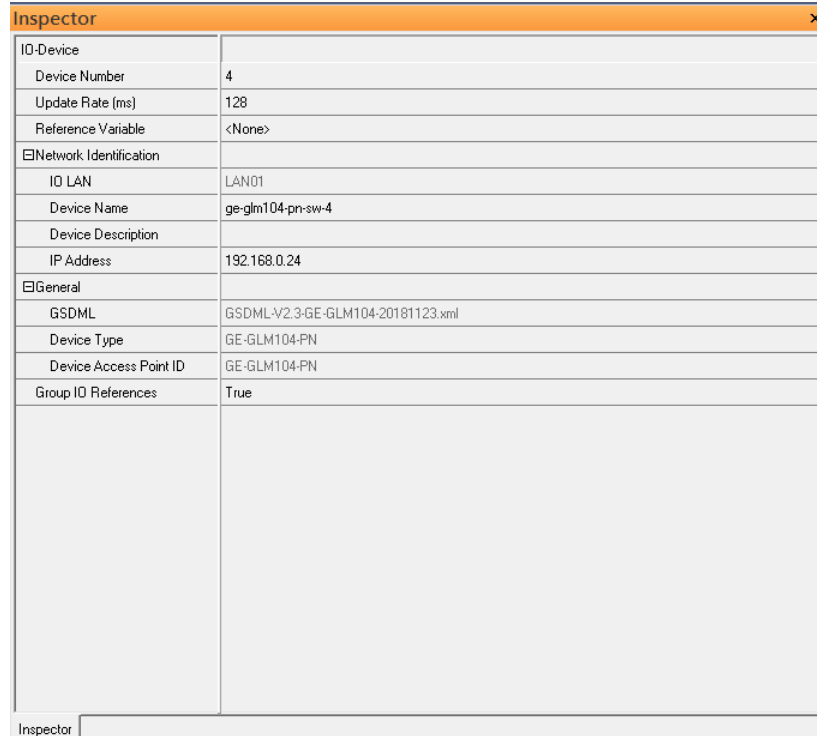


Figure 424

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn5, and click the right button. Select [Properties], see the following picture.

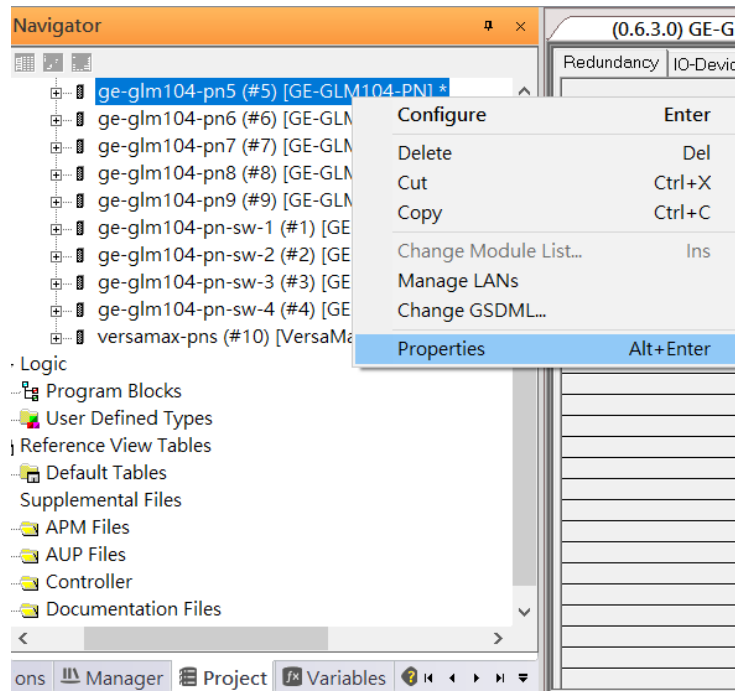


Figure 425

We modify device name to “ge-glm104-pn-sw-5” and IP address to “192.168.0.25” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-5” later.

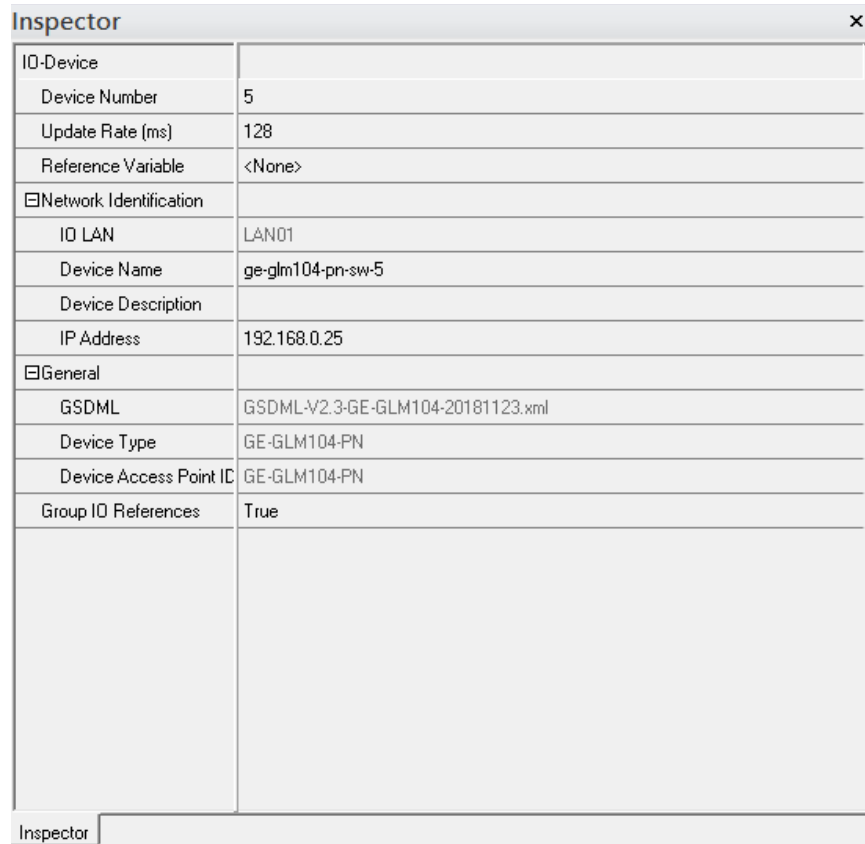


Figure 426

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn6, and click the right button. Select [Properties], see the following picture.

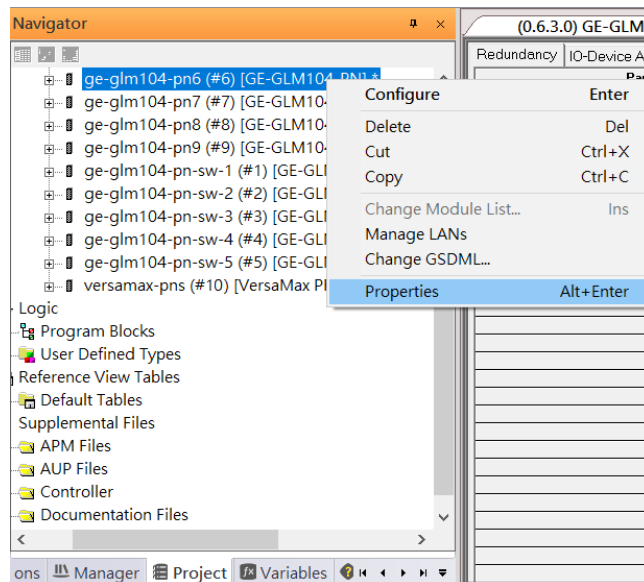


Figure 427

We modify device name to “ge-glm104-pn-sw-6” and IP address to “192.168.0.26” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-6” later.

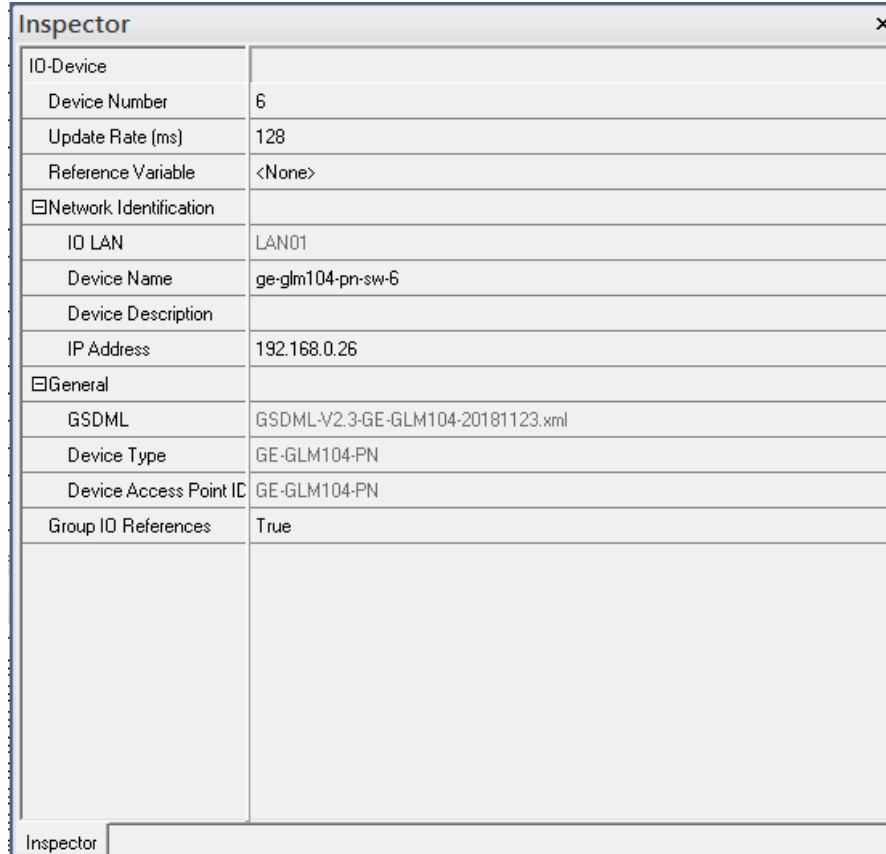


Figure 428

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn7, and click the right button. Select [Properties], see the following picture.

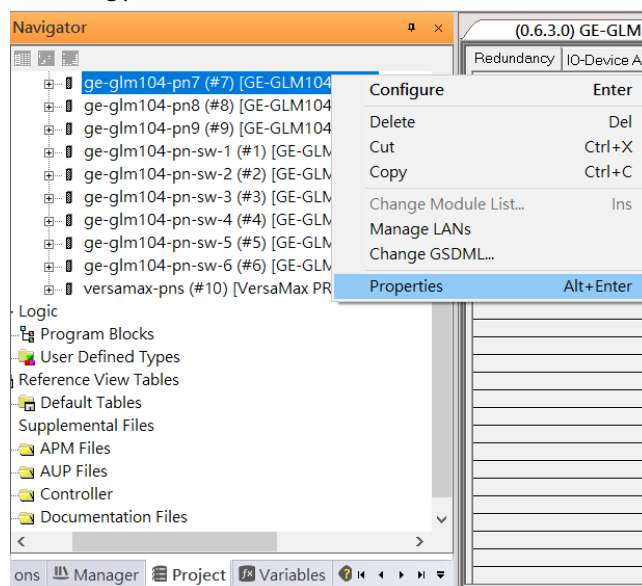


Figure 429

We modify device name to “ge-glm104-pn-sw-7” and IP address to “192.168.0.27” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-7” later.

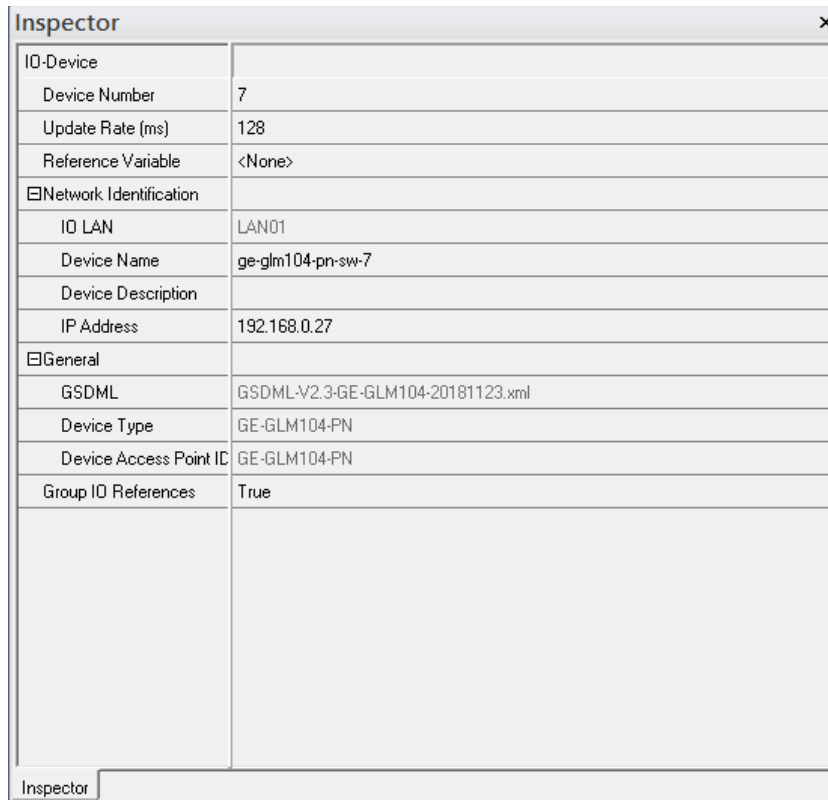


Figure 430

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn8, and click the right button. Select [Properties], see the following picture.

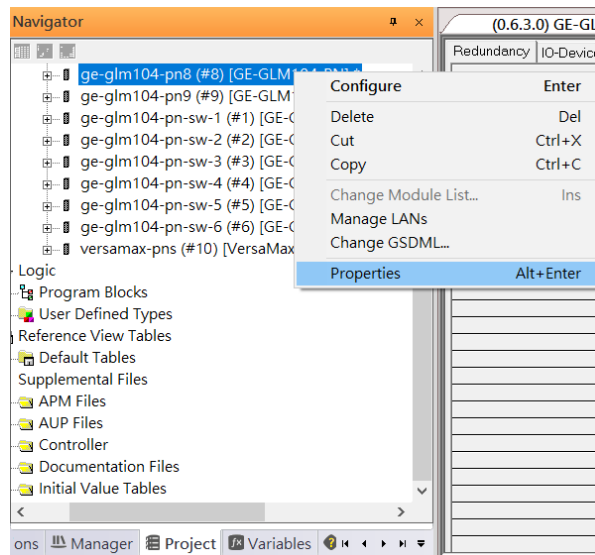


Figure 431

We modify device name to “ge-glm104-pn-sw-8” and IP address to “192.168.0.28” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-8” later.

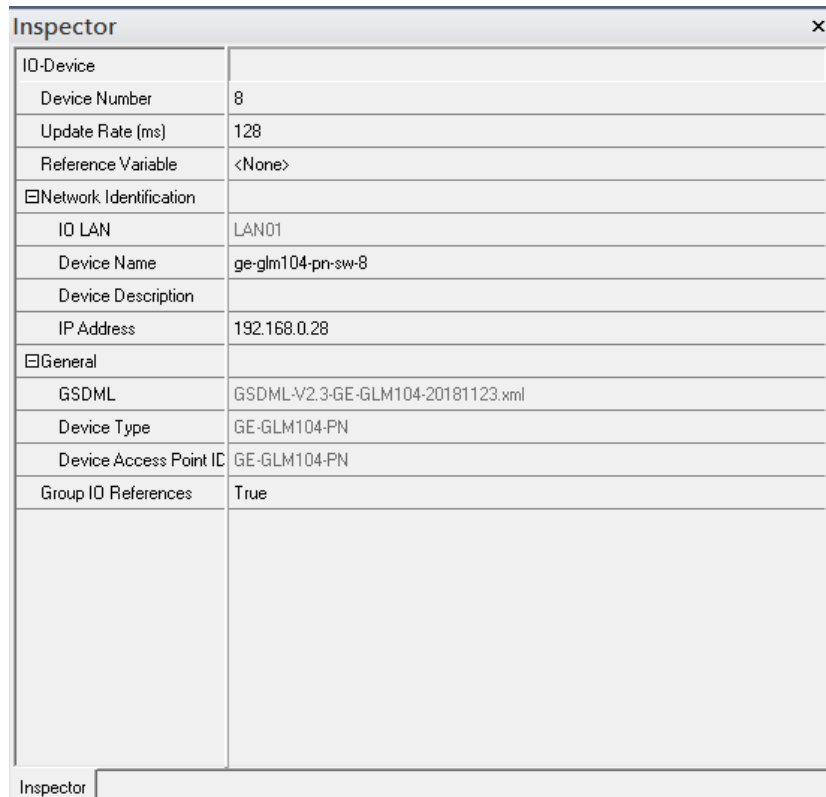


Figure 432

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn9, and click the right button. Select [Properties], see the following picture.

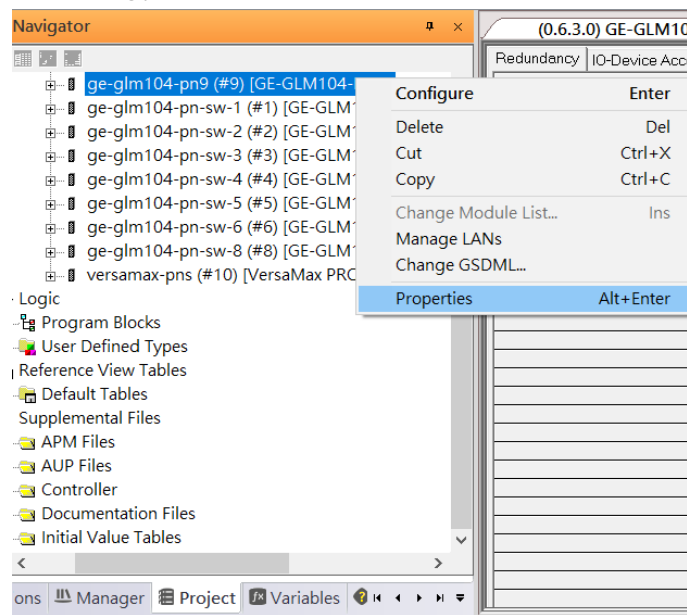


Figure 433

We modify device name to “ge-glm104-pn-sw-9” and IP address to “192.168.0.29” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-9” later.

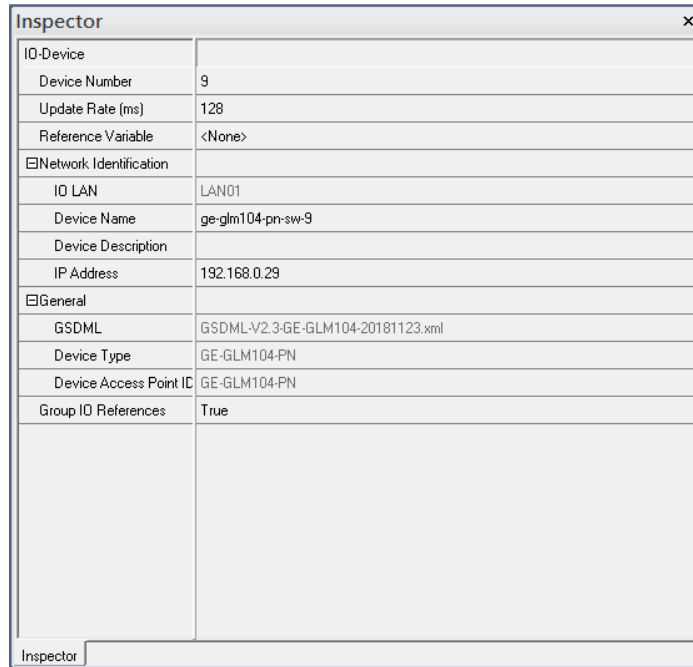


Figure 434

Under the slot 6, PNC001, select the I/O Device, versamax-pns, and click the right button. Select [Properties], see the following picture

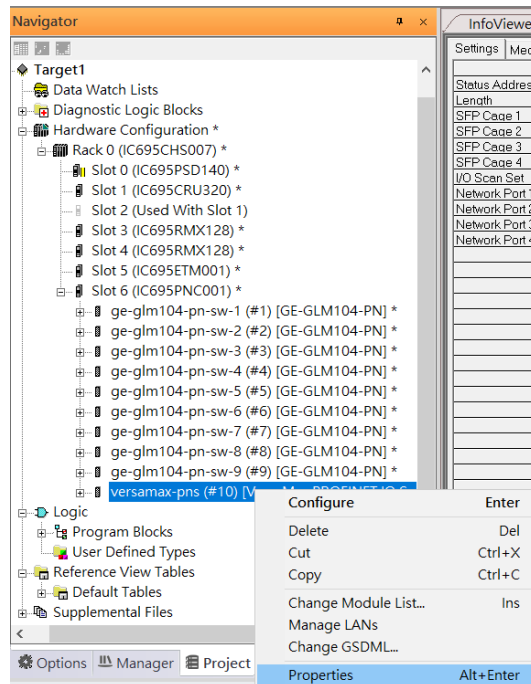


Figure 435

We modify device name to “versamax-pns-pnio-1” and IP address to “192.168.0.55” then we use I/O Device DiscoveryTool to observed an I/O Device and set I/O Device’s name to “versamax-pns-pnio-1” later.

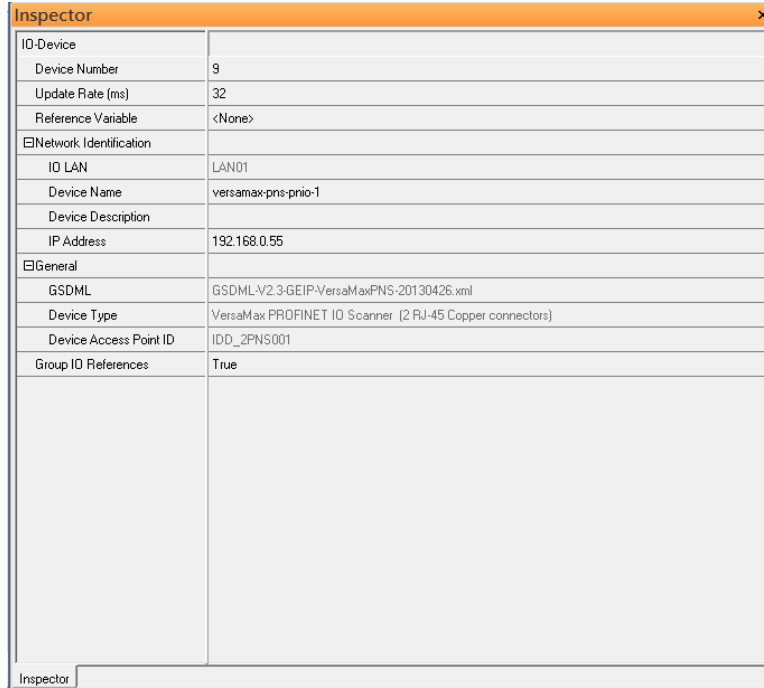


Figure 436

Now all the devices have been changed their device name and IP address like the following picture.

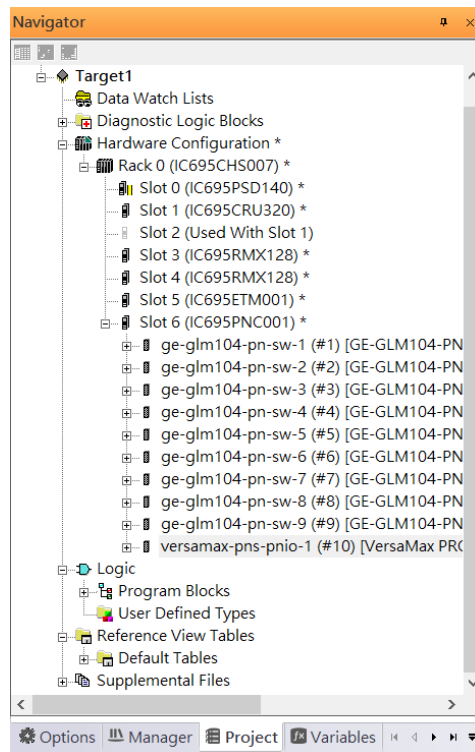


Figure 437

6.2.5 I/O Device Scan

The Proficy Machine Edition also supports the function to scan the connected I/O Devices. First the observed I/O Device shall be connected to the ETM001 on the [Primary] hardware configuration, then using the function [Launch Discovery Tool].

Note: Before we finish downloading the configuration to CRU320, need to unplug the block port according to the hardware topology to avoid loop.

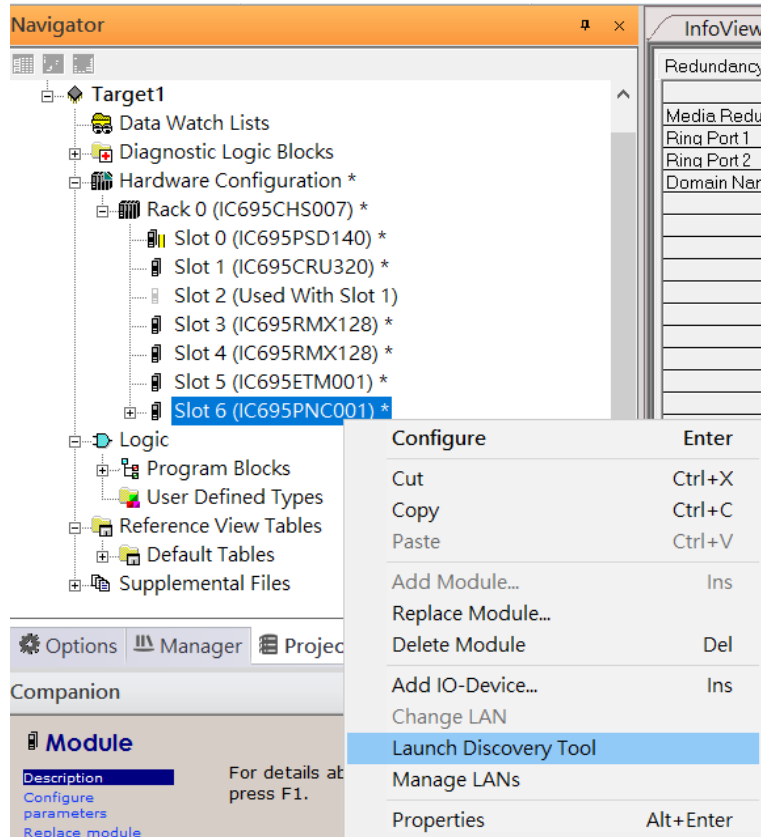


Figure 438

The tool is shown in the following picture, then press [Refresh Device List].

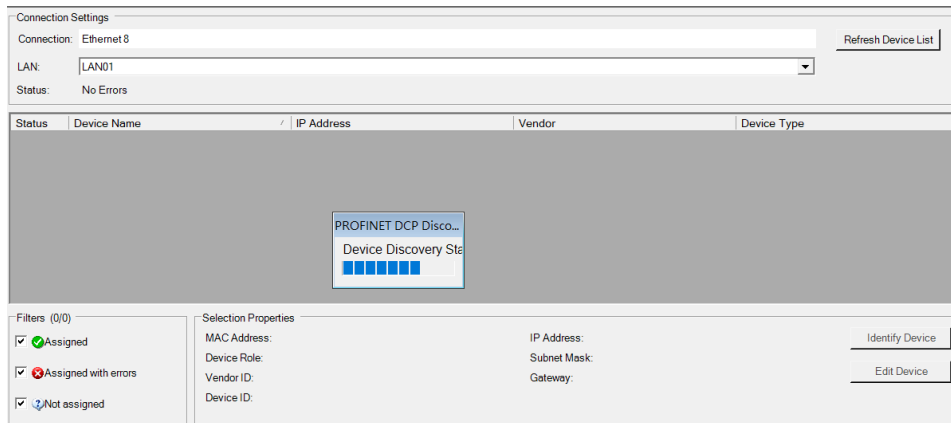


Figure 439

Then the connected I/O Device is listed in the following table.

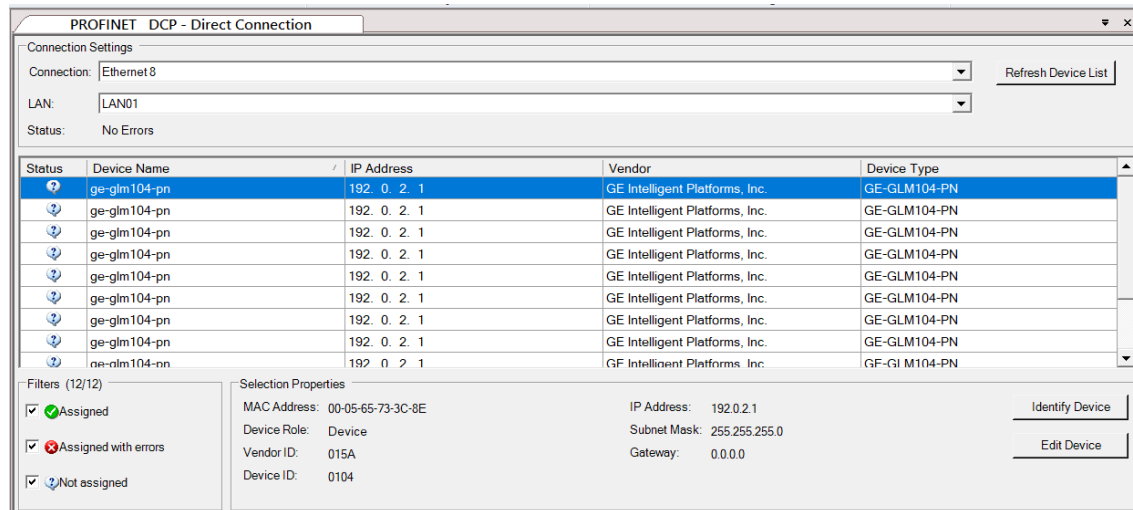


Figure 440

There are I/O Devices and their status are in “Not assigned”. We need to change their device name to and IP address. Use [Identify Device] to make sure which device we set according to the hardware topology. Then start to set SW-1 device name and IP address.

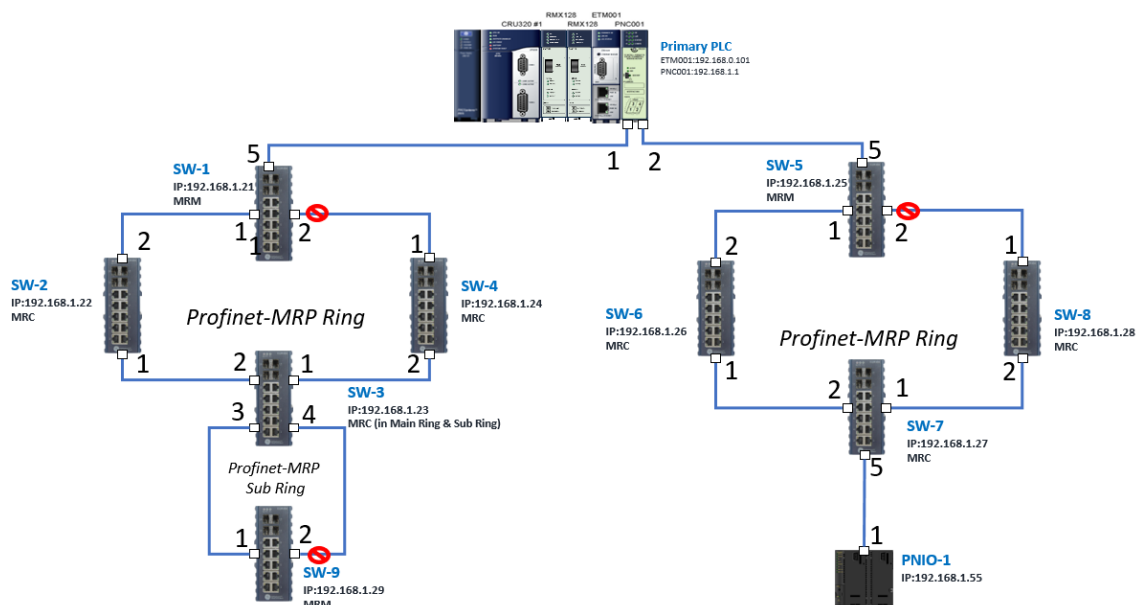


Figure 441

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-1” and click [Set Device Name] button, then set IP Address to “192.168.0.21”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

GE-GLM104-PN Properties

Vendor Name: GE Intelligent Platforms, Inc. Vendor ID: 015A
 MAC Address: 00-05-65-72-FB-D0 Device ID: 0104 Identify Device
 Device Type: GE-GLM104-PN Device Role: Device

Device Name
 ge-glm104-pn-sw-1 Set Device Name

IP Address
 IP Address: 192.168.0.21
 Subnet Mask: 255.255.255.0 Set IP Information
 Gateway: 0.0.0.0

Reset device to factory settings
 Reset Device

Exit

Figure 442

Then set SW-2 device name and IP address

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-2” and click [Set Device Name] button, then set IP Address to “192.168.0.22”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

GE-GLM104-PN Properties

Vendor Name: GE Intelligent Platforms, Inc. Vendor ID: 015A
 MAC Address: 00-05-65-73-3C-D6 Device ID: 0104 Identify Device
 Device Type: GE-GLM104-PN Device Role: Device

Device Name
 ge-glm104-pn-sw-2 Set Device Name

IP Address
 IP Address: 192.168.0.22
 Subnet Mask: 255.255.255.0 Set IP Information
 Gateway: 0.0.0.0

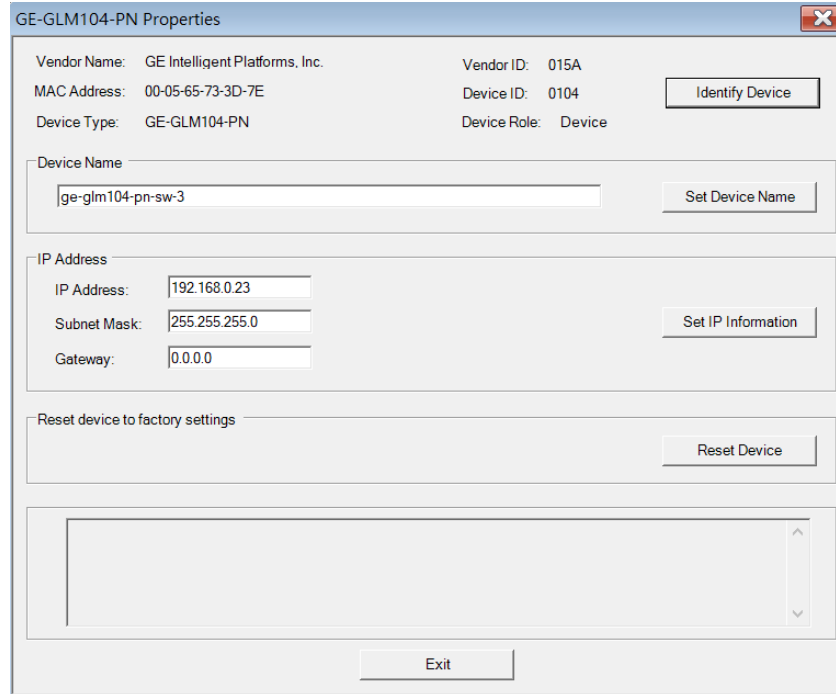
Reset device to factory settings
 Reset Device

Exit

Figure 443

Then set SW-3 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-3” and click [Set Device Name] button, then set IP Address to “192.168.0.23”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.



GE-GLM104-PN Properties

Vendor Name:	GE Intelligent Platforms, Inc.	Vendor ID:	015A
MAC Address:	00-05-65-73-3D-7E	Device ID:	0104
Device Type:	GE-GLM104-PN	Device Role:	Device

Identify Device

Device Name

ge-glm104-pn-sw-3

Set Device Name

IP Address

IP Address: 192.168.0.23

Subnet Mask: 255.255.255.0

Gateway: 0.0.0.0

Set IP Information

Reset device to factory settings

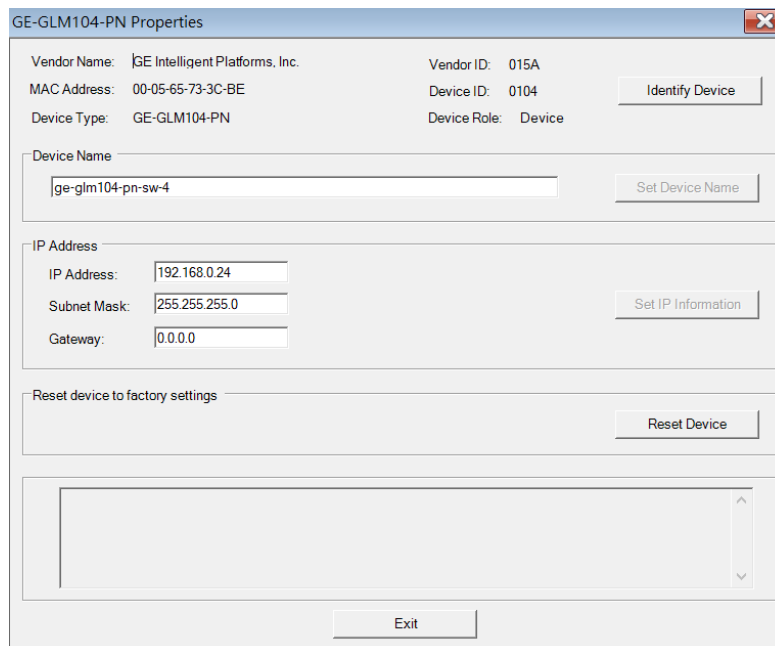
Reset Device

Exit

Figure 444

Then set SW-4 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-4” and click [Set Device Name] button, then set IP Address to “192.168.0.24”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.



GE-GLM104-PN Properties

Vendor Name:	GE Intelligent Platforms, Inc.	Vendor ID:	015A
MAC Address:	00-05-65-73-3C-BE	Device ID:	0104
Device Type:	GE-GLM104-PN	Device Role:	Device

Identify Device

Device Name

ge-glm104-pn-sw-4

Set Device Name

IP Address

IP Address: 192.168.0.24

Subnet Mask: 255.255.255.0

Gateway: 0.0.0.0

Set IP Information

Reset device to factory settings

Reset Device

Exit

Figure 445

Then set SW-5 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-5” and click [Set Device Name] button, then set IP Address to “192.168.0.25”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name:** GE Intelligent Platforms, Inc.
- Vendor ID:** 015A
- MAC Address:** 00-05-65-73-3C-D6
- Device ID:** 0104
- Device Type:** GE-GLM104-PN
- Device Role:** Device
- Buttons:** Identify Device, Set Device Name, Set IP Information, Reset Device, Exit.
- Device Name:** ge-glm104-pn-sw-5
- IP Address:** 192.168.0.25
- Subnet Mask:** 255.255.255.0
- Gateway:** 0.0.0.0
- Reset device to factory settings:** (checkbox)
- Status Message:** The IP address information was written to the device successfully. The Device Name was written to the device successfully (ge-glm104-pn changed to ge-glm104-pn-sw-5)

Figure 446

Then set SW-6 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-6” and click [Set Device Name] button, then set IP Address to “192.168.0.26”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name:** GE Intelligent Platforms, Inc.
- Vendor ID:** 015A
- MAC Address:** 00-05-65-73-3C-F6
- Device ID:** 0104
- Device Type:** GE-GLM104-PN
- Device Role:** Device
- Buttons:** Identify Device, Set Device Name, Set IP Information, Reset Device, Exit.
- Device Name:** ge-glm104-pn-sw-6
- IP Address:** 192.168.0.26
- Subnet Mask:** 255.255.255.0
- Gateway:** 0.0.0.0
- Reset device to factory settings:** (checkbox)
- Status Message:** The IP address information was written to the device successfully. The Device Name was written to the device successfully (ge-glm104-pn changed to ge-glm104-pn-sw-6)

Figure 447

Then set SW-7 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-7” and click [Set Device Name] button, then set IP Address to “192.168.0.27”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name:** GE Intelligent Platforms, Inc.
- Vendor ID:** 015A
- MAC Address:** 00-05-65-73-3C-5E
- Device ID:** 0104
- Device Type:** GE-GLM104-PN
- Device Role:** Device
- Buttons:** Identify Device
- Device Name Section:**
 - Device Name:** ge-glm104-pn-sw-7
 - Button:** Set Device Name
- IP Address Section:**
 - IP Address:** 192.168.0.27
 - Subnet Mask:** 255.255.255.0
 - Gateway:** 0.0.0.0
 - Button:** Set IP Information
- Reset device to factory settings** (with **Reset Device** button)
- Status Log:**
 - The IP address information was written to the device successfully
 - The Device Name was written to the device successfully (ge-glm104-pn changed to ge-glm104-pn-sw-7)
- Exit** button

Figure 448

Then set SW-8 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-8” and click [Set Device Name] button, then set IP Address to “192.168.0.28”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box with the following configuration:

- Vendor Name:** GE Intelligent Platforms, Inc.
- Vendor ID:** 015A
- MAC Address:** 00-05-65-73-3C-8E
- Device ID:** 0104
- Device Type:** GE-GLM104-PN
- Device Role:** Device
- Buttons:** Identify Device
- Device Name Section:**
 - Device Name:** ge-glm104-pn-sw-8
 - Button:** Set Device Name
- IP Address Section:**
 - IP Address:** 192.168.0.28
 - Subnet Mask:** 255.255.255.0
 - Gateway:** 0.0.0.0
 - Button:** Set IP Information
- Reset device to factory settings** (with **Reset Device** button)
- Status Log:**
 - The IP address information was written to the device successfully
 - The Device Name was written to the device successfully (ge-glm104-pn changed to ge-glm104-pn-sw-8)
- Exit** button

Figure 449

Then set SW-9 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-9” and click [Set Device Name] button, then set IP Address to “192.168.0.29”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

GE-GLM104-PN Properties

Vendor Name:	GE Intelligent Platforms, Inc.	Vendor ID:	015A	Identify Device
MAC Address:	00-05-65-73-3C-5E	Device ID:	0104	
Device Type:	GE-GLM104-PN	Device Role:	Device	

Device Name: Set Device Name

IP Address:
Subnet Mask:
Gateway: Set IP Information

Reset device to factory settings: Reset Device

Exit

Figure 450

Then set PNIO-1 device name and IP address.

Click [Edit Device], set Device Name to “versamax-pns-pnio-1” and click [Set Device Name] button, then set IP Address to “192.168.0.55”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

IC200PNS001 Properties

Vendor Name:	GE Intelligent Platforms, Inc.	Vendor ID:	015A	Identify Device
MAC Address:	00-09-91-56-C3-0E	Device ID:	0003	
Device Type:	IC200PNS001	Device Role:	Device	

Device Name: Set Device Name

IP Address:
Subnet Mask:
Gateway: Set IP Information

Reset device to factory settings: Reset Device

Exit

Figure 451

After assigning Device Name and IP Address correctly, the Status will be in “Assigned” status.

Connection Settings

Connection: Ethernet 8

Refresh Device List

LAN: LAN01

Status: No Errors

Status	Device Name	IP Address	Vendor	Device Type
✓	ge-glm104-pn-sw-1	192.168. 0. 21	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-2	192.168. 0. 22	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-3	192.168. 0. 23	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-4	192.168. 0. 24	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-5	192.168. 0. 25	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-6	192.168. 0. 6	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-7	192.168. 0. 27	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-8	192.168. 0. 28	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-9	192.168. 0. 29	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	iolan-controller01	192.168. 0. 1	GE Intelligent Platforms, Inc.	IC695PNC001
✓	versamax-pns-pnio-1	192.168. 0. 55	GE Intelligent Platforms, Inc.	IC200PNS001

Filters (11/11)

☒ ✓ Assigned
 ☒ ✗ Assigned with errors
 ☒ ? Not assigned

Selection Properties

MAC Address: 00-05-65-72-FB-D0

Device Role: Device

Vendor ID: 015A

Device ID: 0104

IP Address: 192.168.0.21

Subnet Mask: 255.255.255.0

Gateway: 0.0.0.0

Identify Device

Edit Device

Figure 452

6.2.6 MRP Setting

Setting MRP for I/O controller and I/O devices according to the following figure.

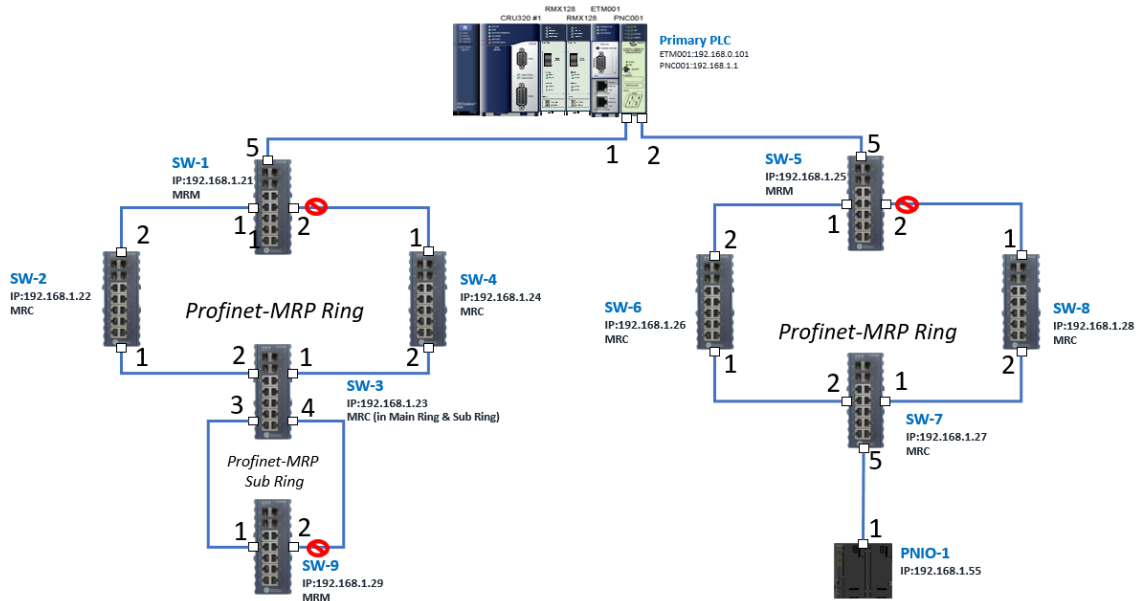


Figure 453

First, configure the MRP in Profinet MRP left ring (in the box).

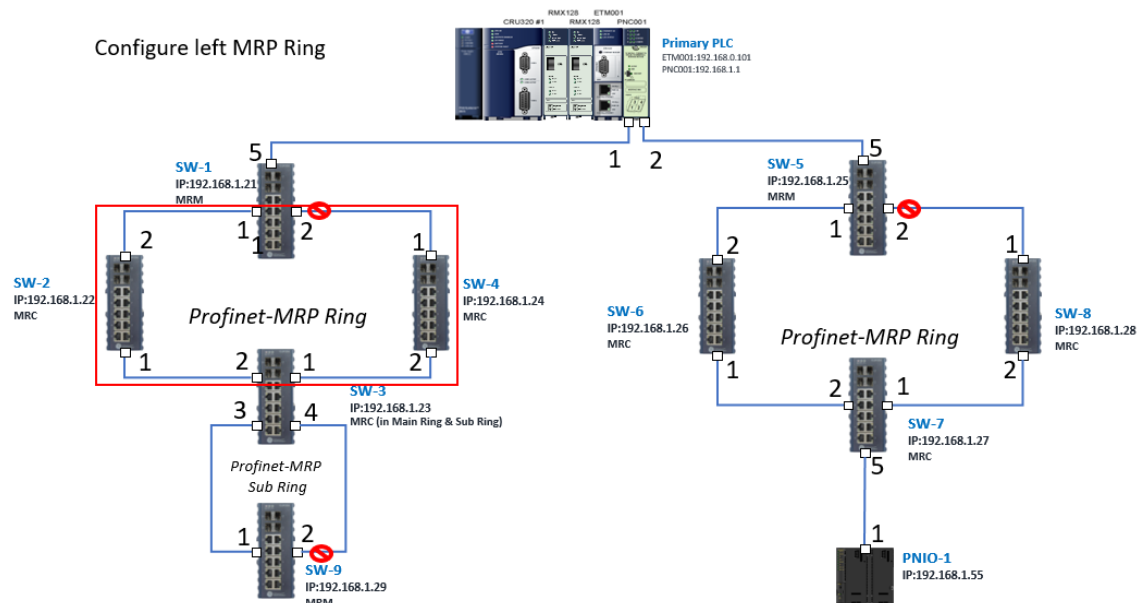


Figure 454

In order to enable MRP function in SW1, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

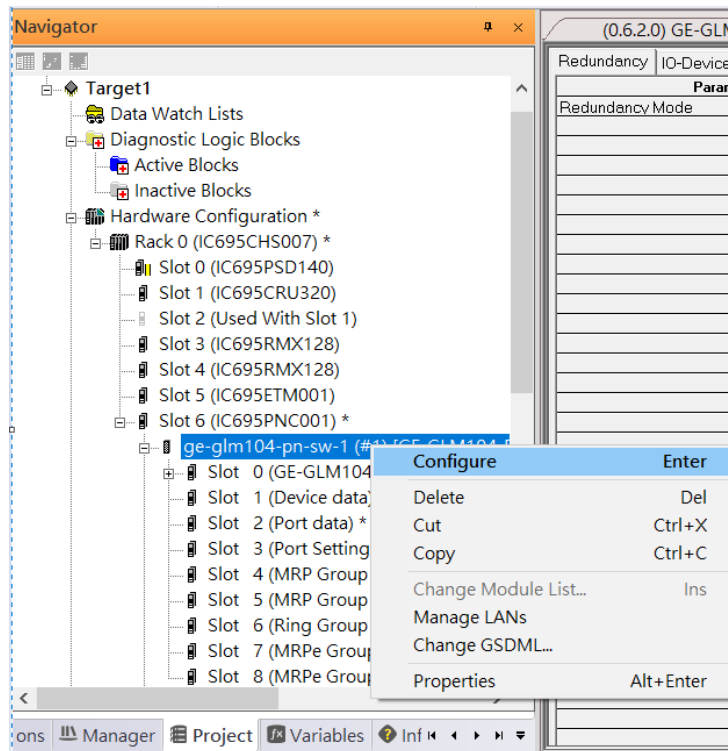


Figure 455

Enable MRP function by changing the value of “Media Redundancy” to manager and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

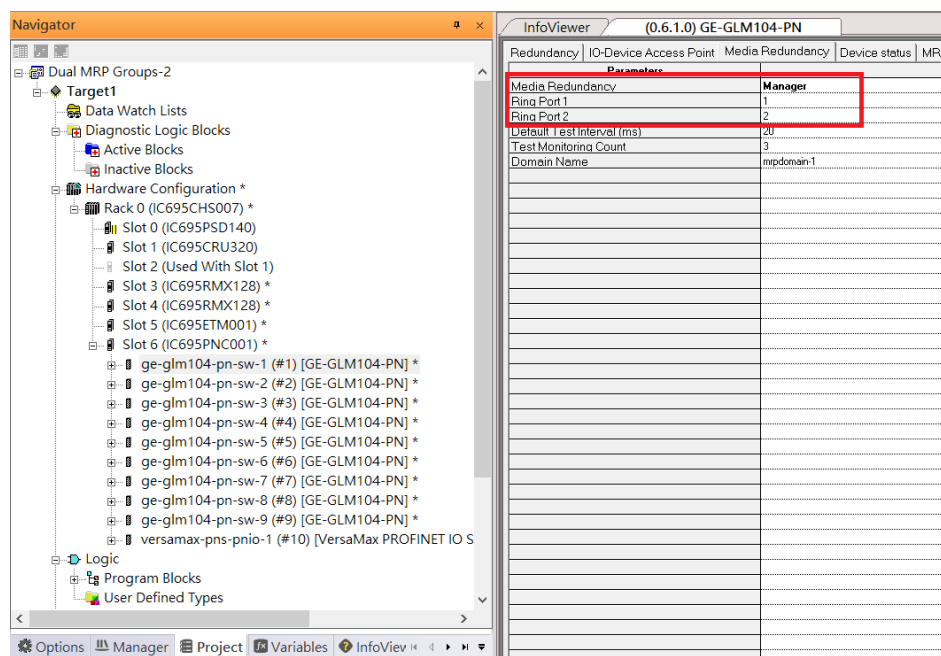


Figure 456

In order to enable MRP function in SW2, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

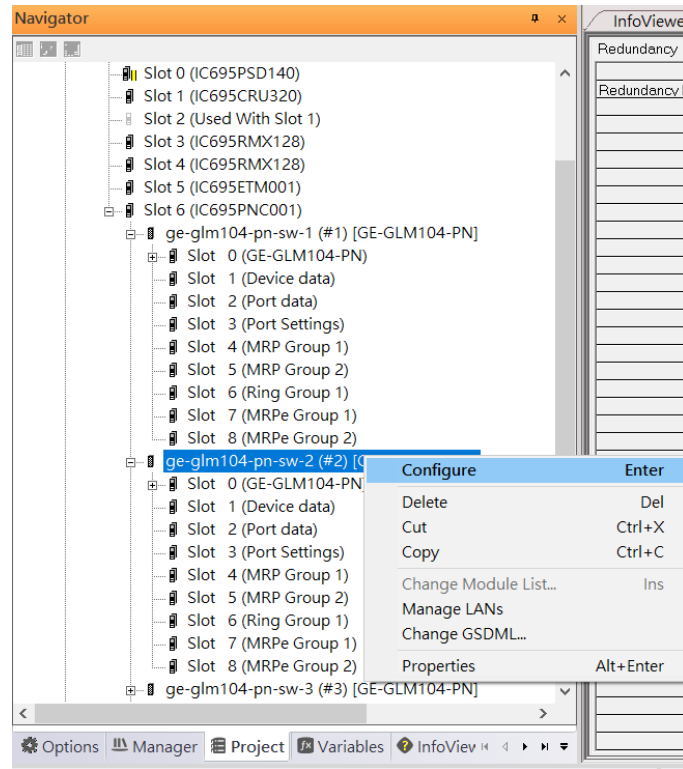


Figure 457

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

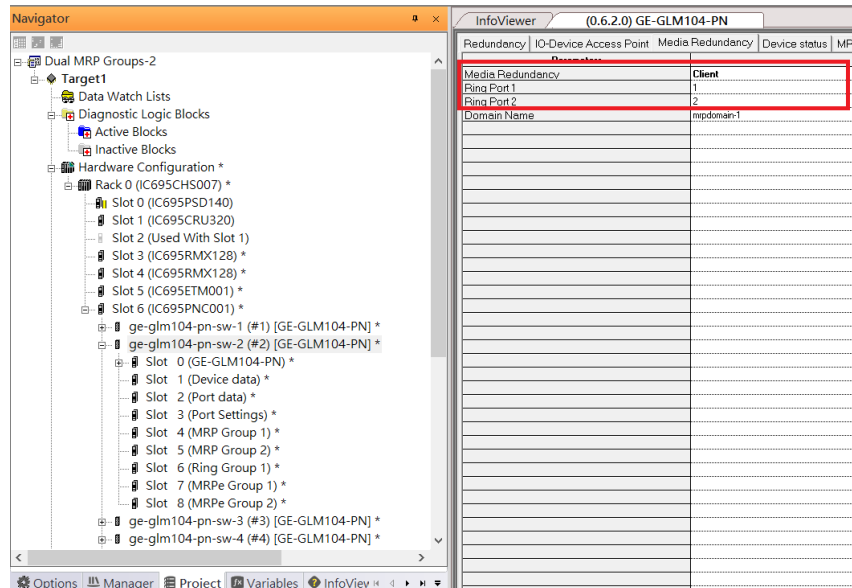


Figure 458

In order to enable MRP function in SW3, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

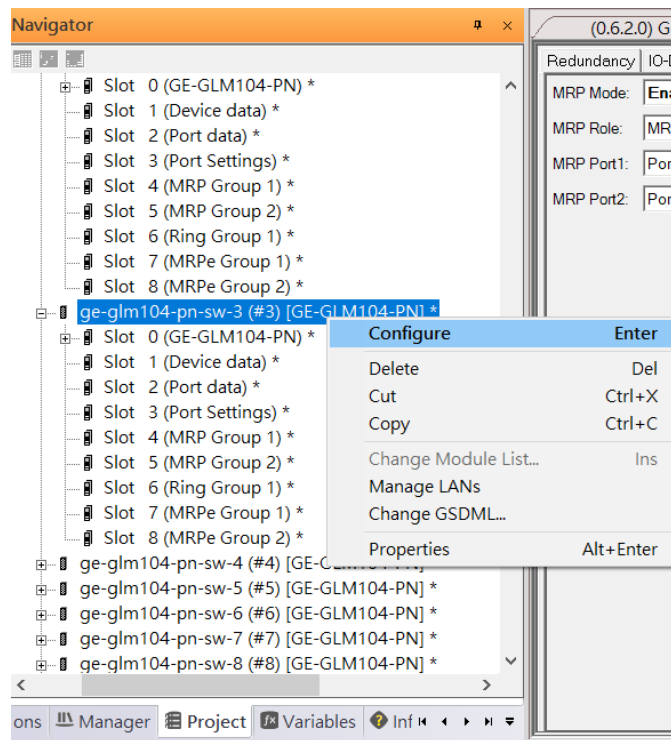


Figure 459

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

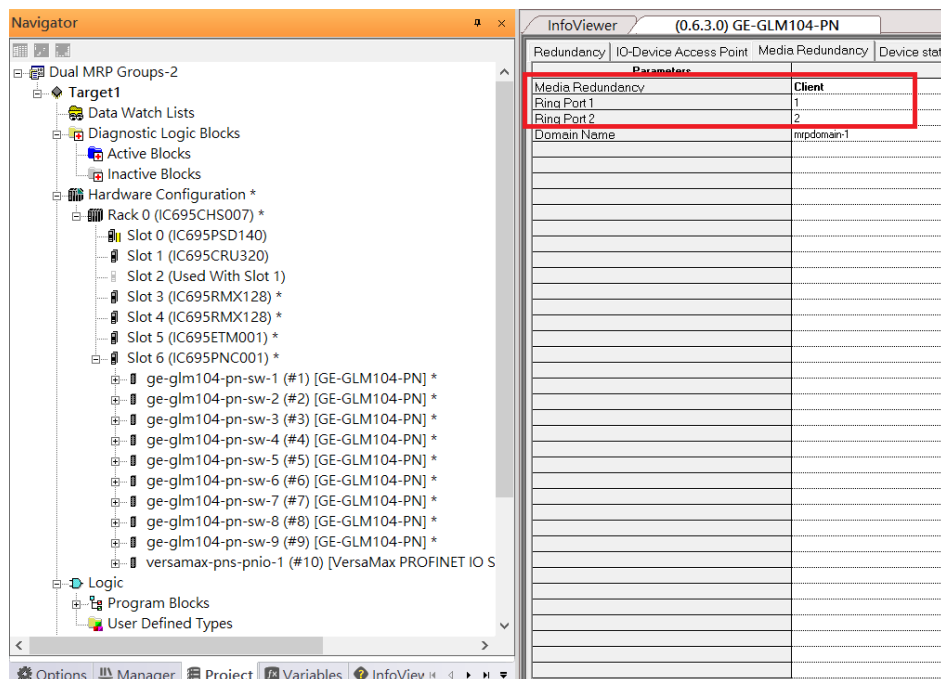


Figure 460

To enable MRP function in SW4, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

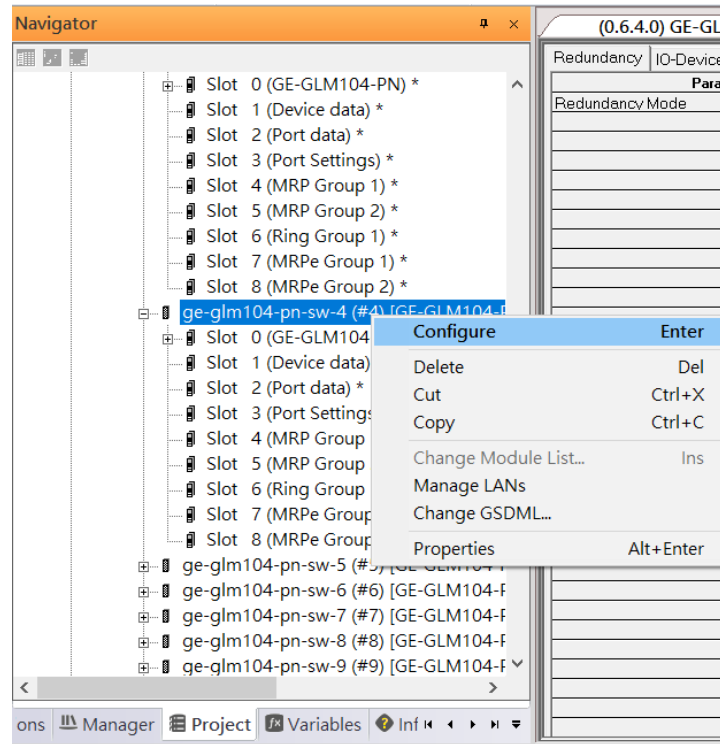


Figure 461

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

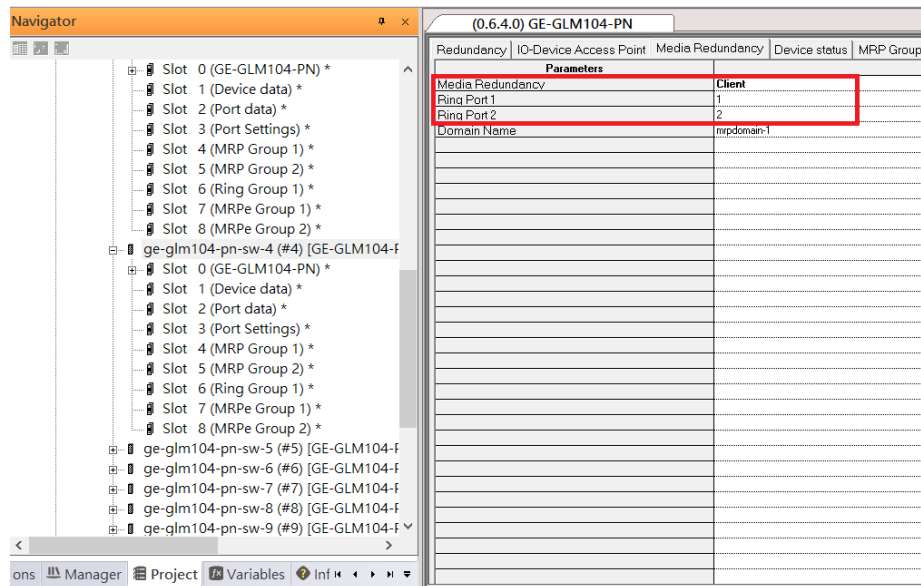


Figure 462

Then configure the MRP in Profinet MRP right ring (in the box).

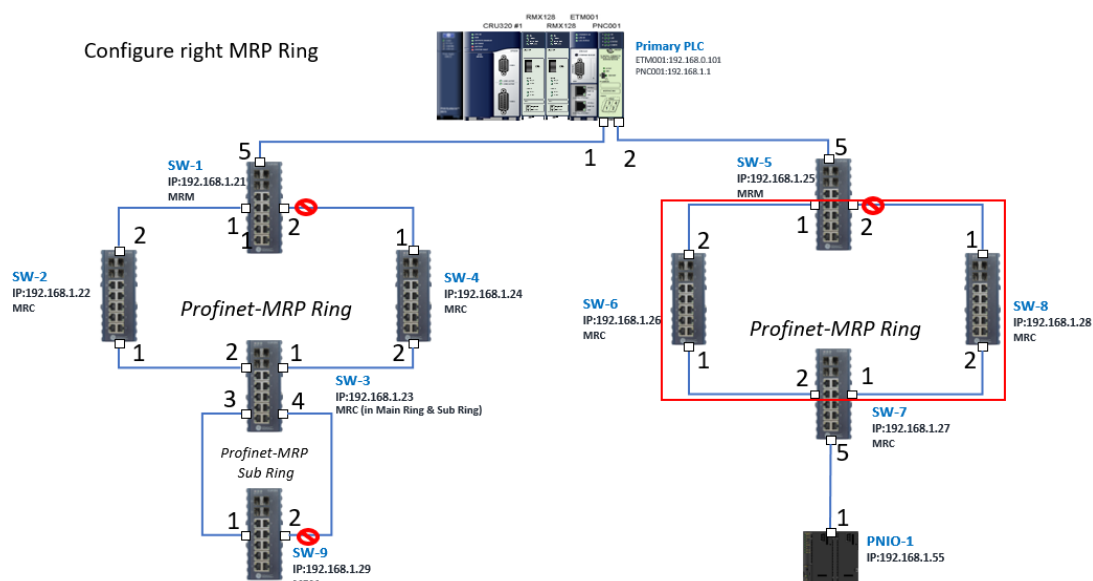


Figure 463

To enable MRP function in SW5, click the right button and choose [Configure].

It will show “Media Redundancy” on the right window.

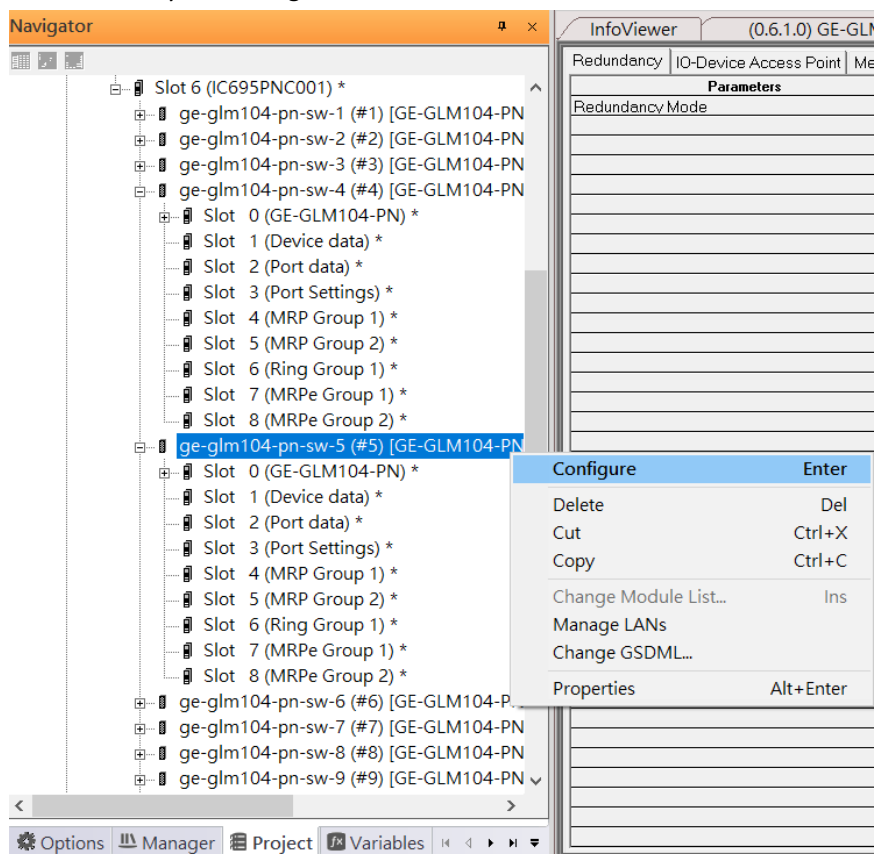


Figure 464

Enable MRP function by changing the value of “Media Redundancy” to manager and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

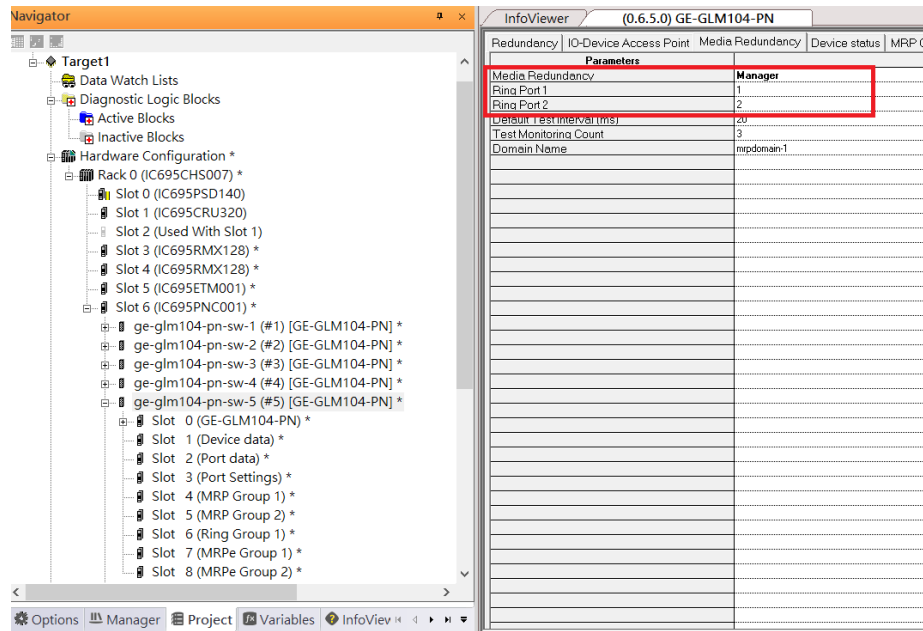


Figure 465

To enable MRP function in SW6, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

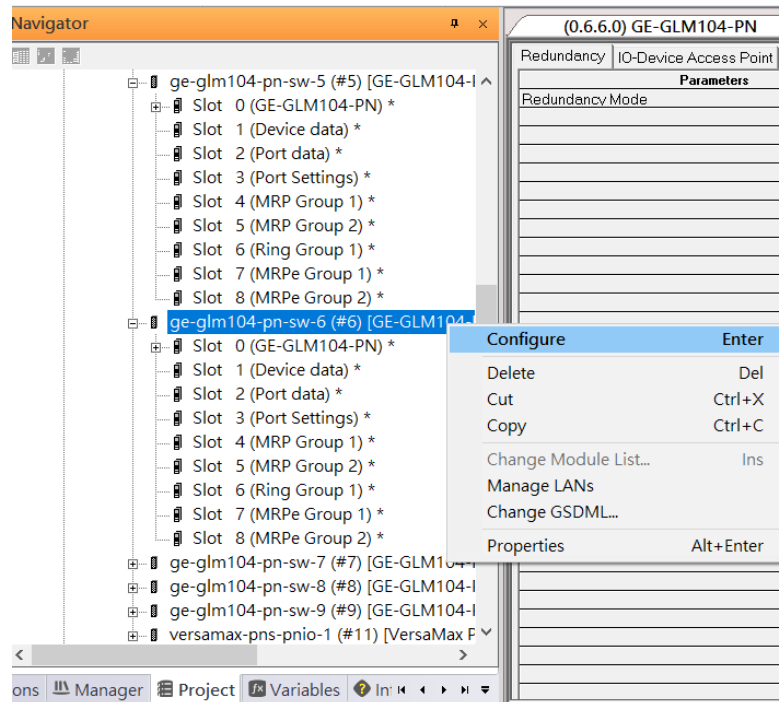


Figure 466

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

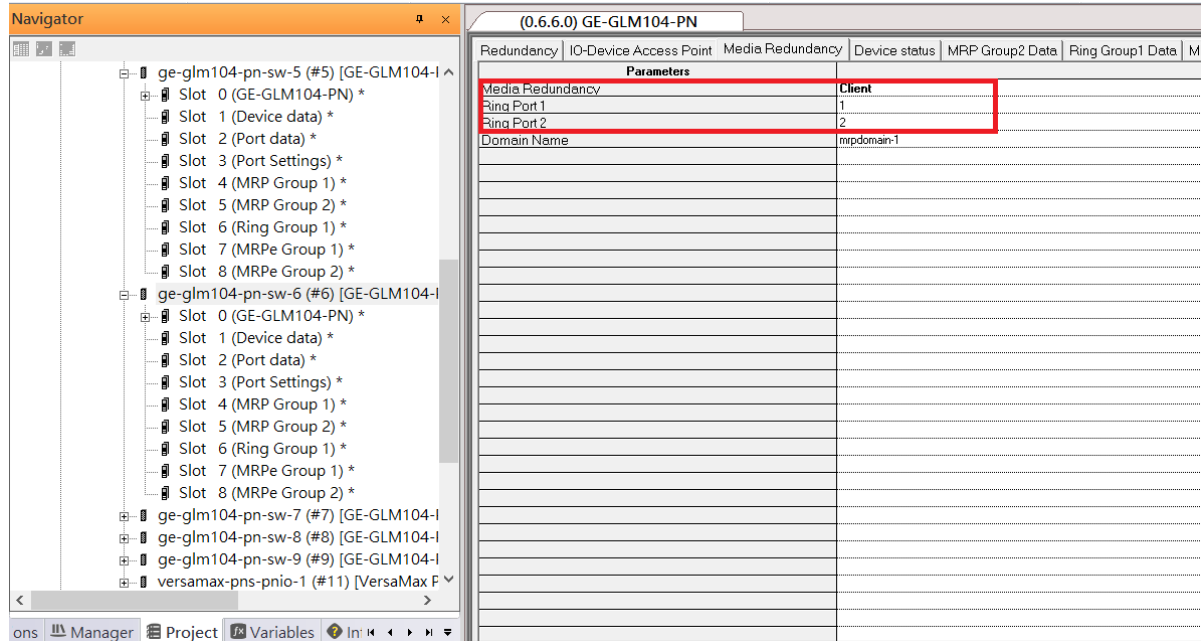


Figure 467

To enable MRP function in SW7, click the right button and choose [Configure].

It will show “Media Redundancy” on the right window.

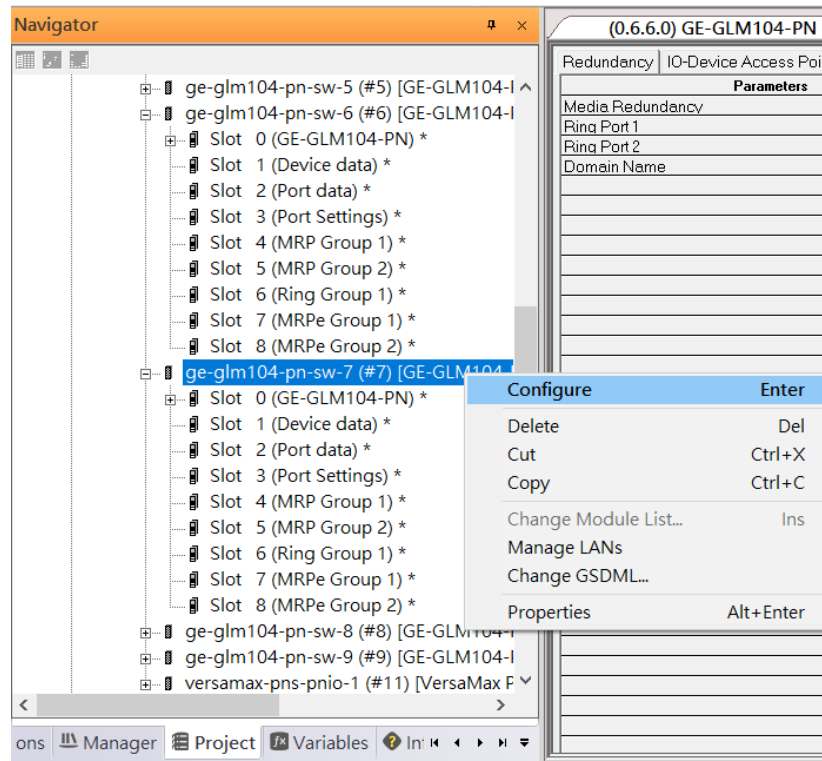


Figure 468

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

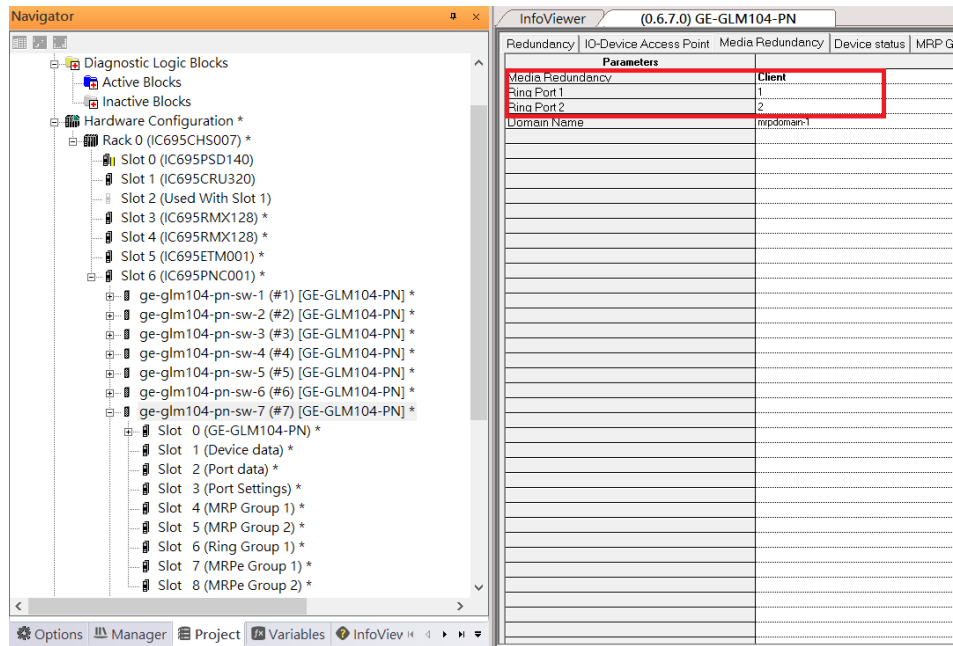


Figure 469

To enable MRP function in SW8, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

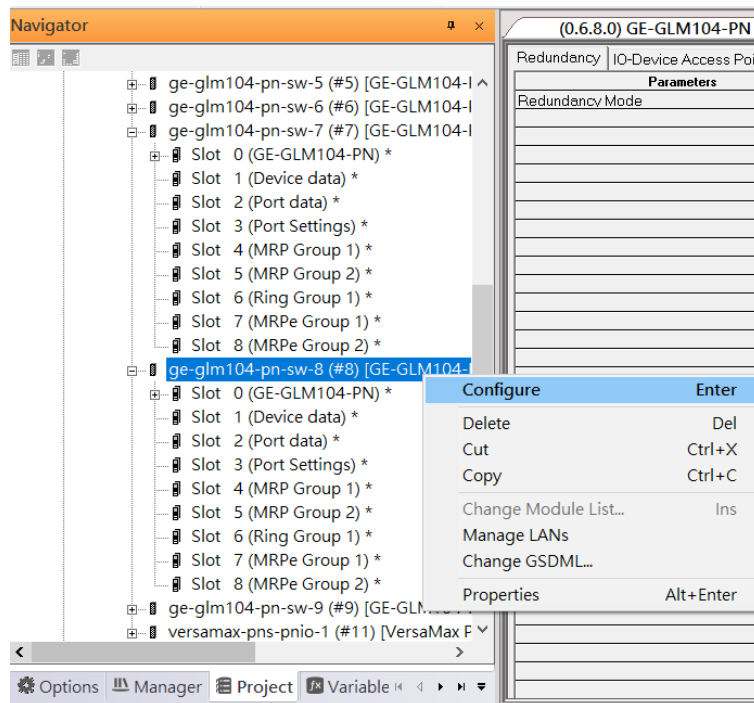


Figure 470

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

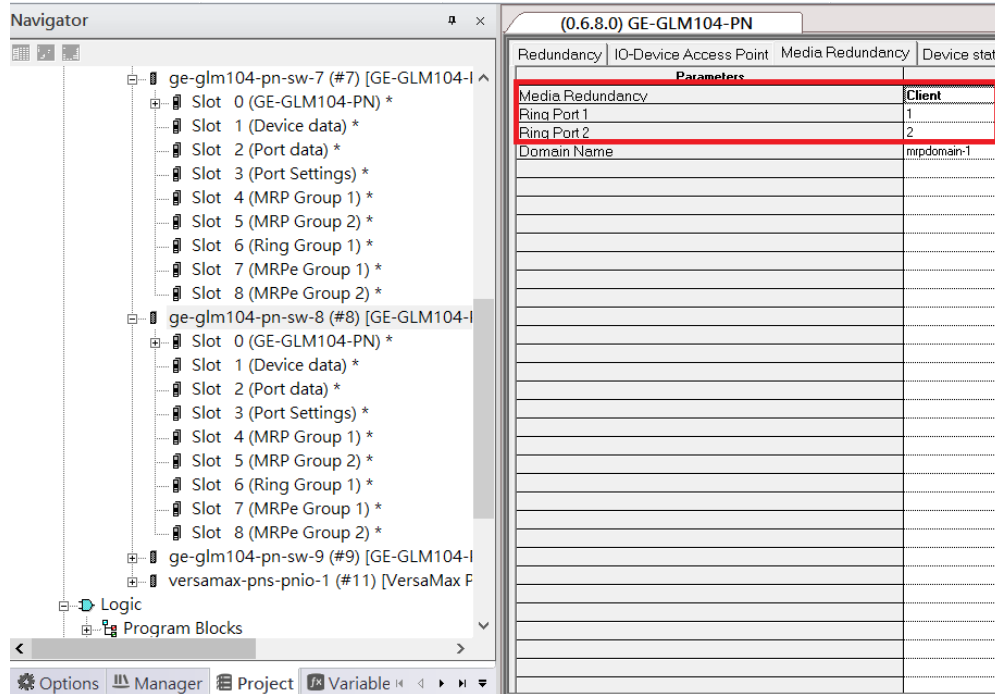


Figure 471

Then configure the MRP in Profinet MRP Sub ring (in the box).

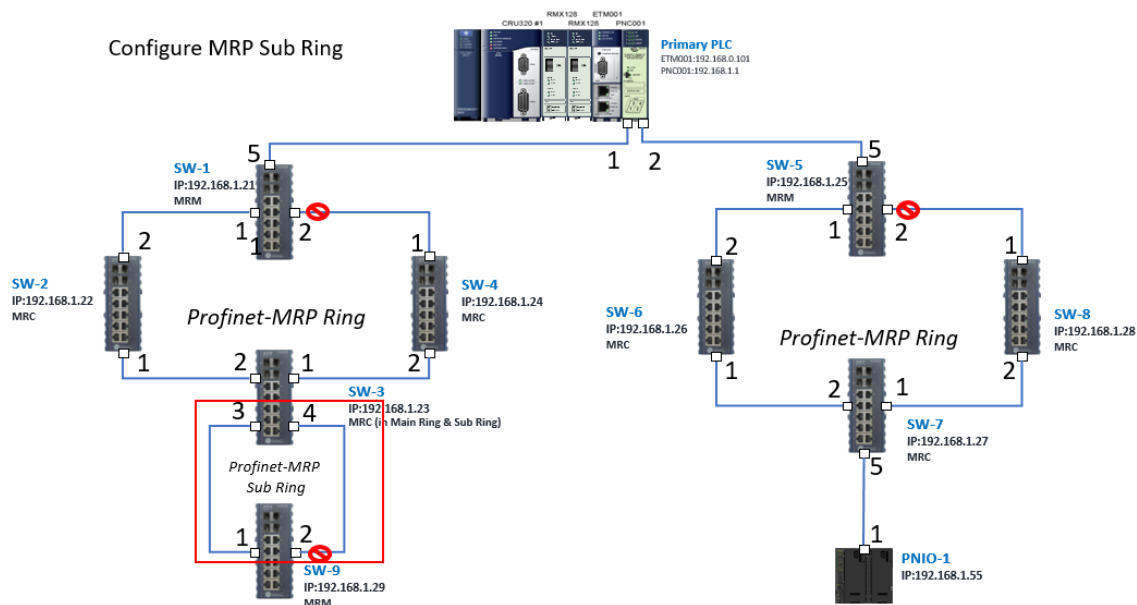


Figure 472

In order to enable MRP function in SW3, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

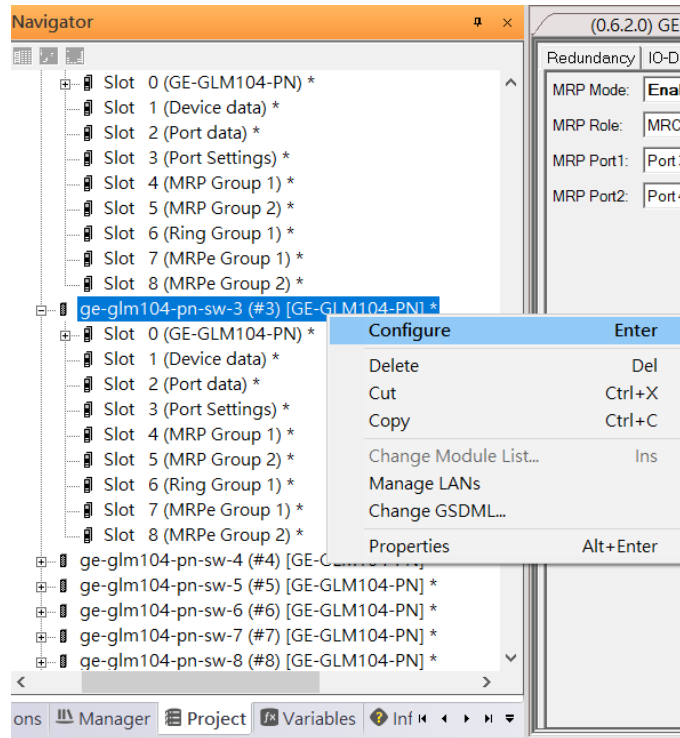


Figure 473

Enable MRP function by changing the value of “MRP Group2 Data” to client and select [MRP Port 1] to “3”, [MRP Port 2] to “4”.

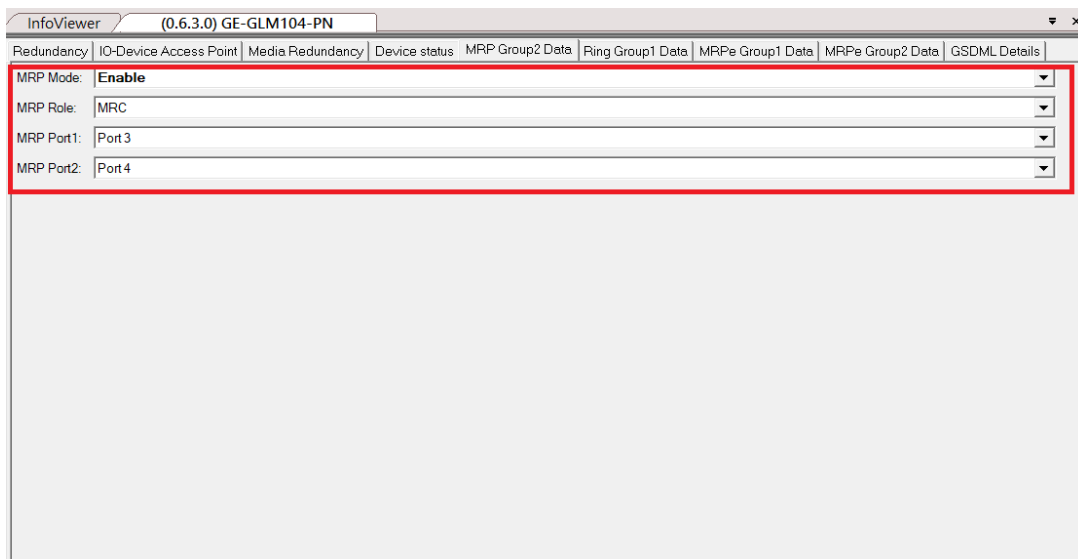


Figure 474

To enable MRP function in SW9, click the right button and choose [Configure].

It will show “Media Redundancy” on the right window.

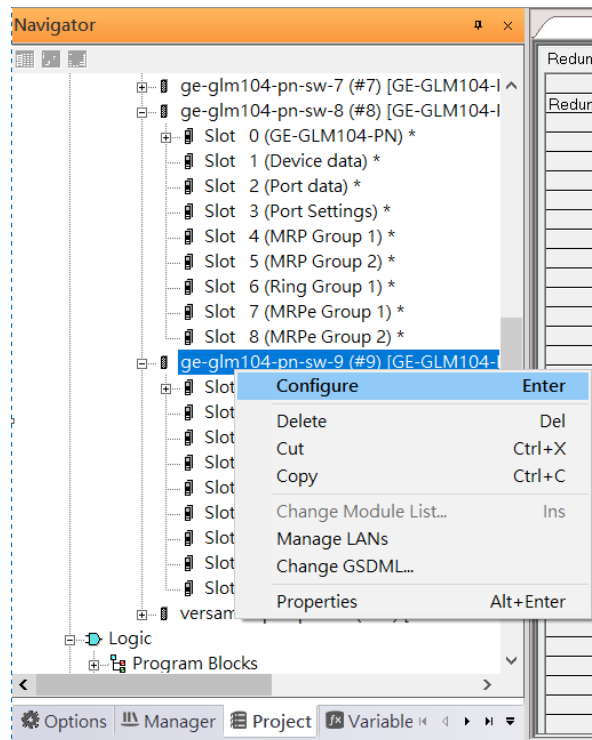


Figure 475

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

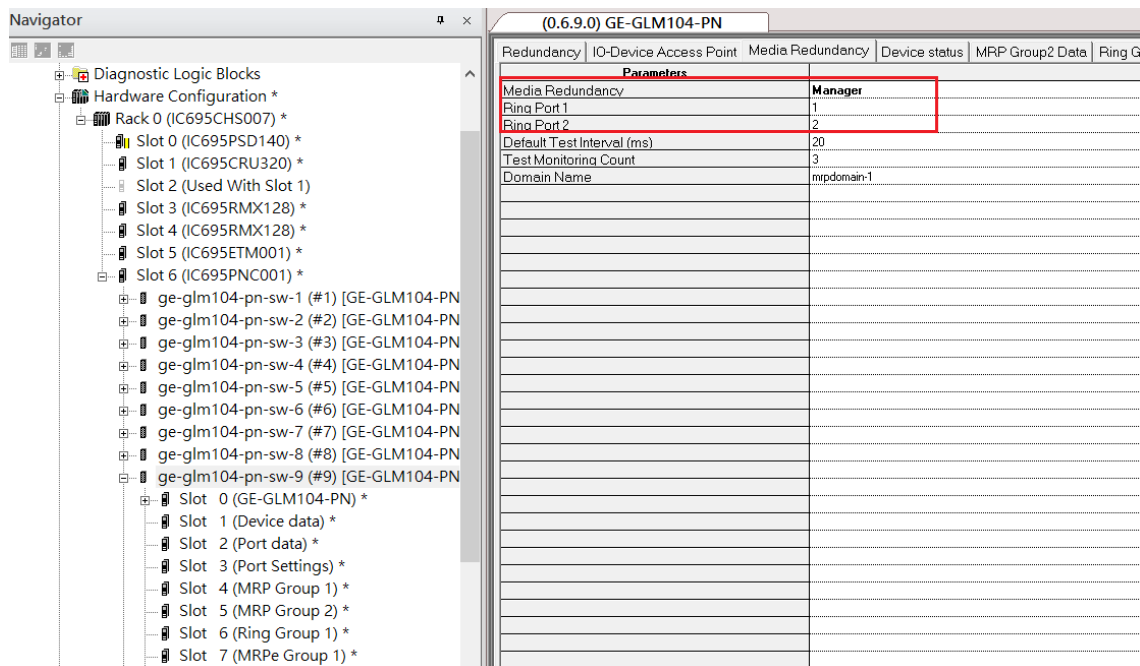


Figure 476

6.2.7 Network Setting

To establish the communication to the I/O Controller from Proficy Machine Edition, the interface of I/O Controller shall be specified.

It should be noted that there is only 1 I/O Controller (Primary or Secondary) is able to communicate with Proficy Machine Edition. Therefore, there are 3 rules of communication are defined.

I/O Controller Communication Rule

Rule	Description
1	The communicated I/O Controller shall be specified. Click primary or secondary hardware configuration, click the right button, and select [Set as Selected HWC]
2	During the communication, the cable shall be connected to the ETM001 in specified hardware (Primary or Secondary)
3	Specify the interface and IP address for communicated I/O Controller

For rule 3, click [Target 1] and Select [Property]

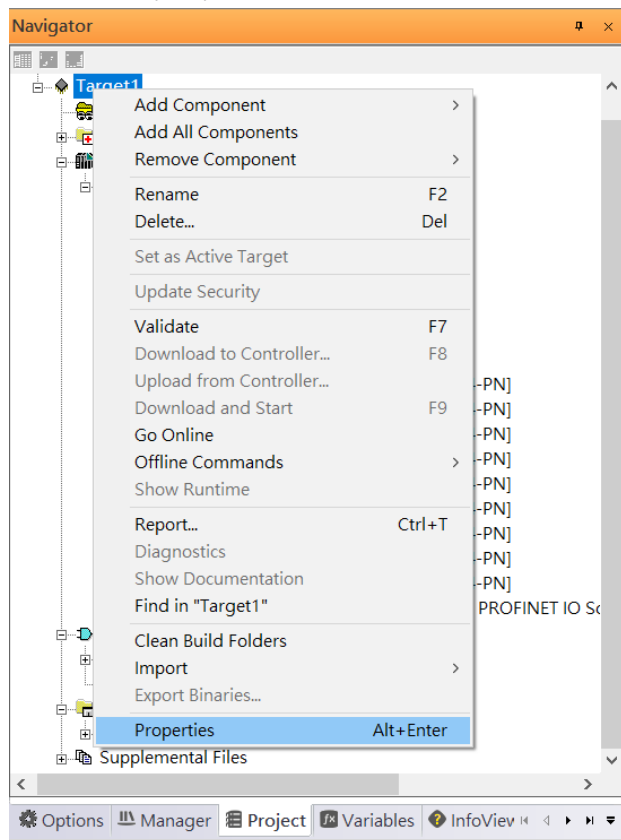


Figure 477

Then the configuration table is shown.

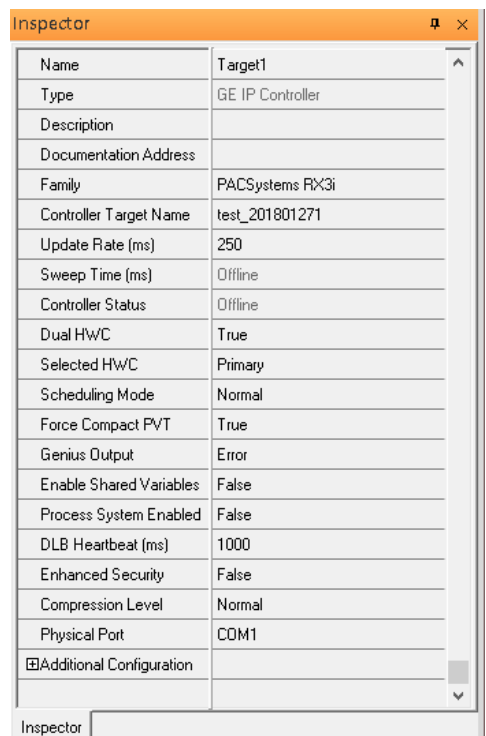


Figure 478

Select [Physical Port] to [Ethernet]

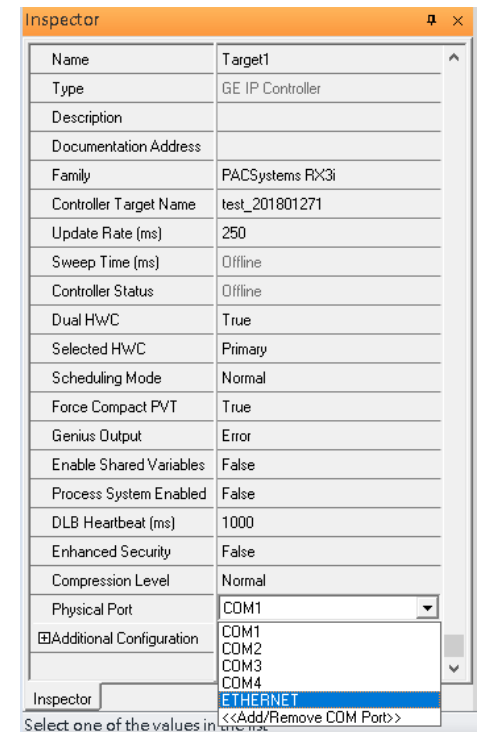


Figure 479

Also, the IP address of communicated I/O Controller shall be set. Here the [Primary] setting is shown.

Note, the specified IP address is set as the IP address on ETM001.

Inspector	
Name	Target1
Type	GE IP Controller
Description	
Documentation Address	
Family	PACSystems RX3i
Controller Target Name	test_201801271
Update Rate (ms)	250
Sweep Time (ms)	Offline
Controller Status	Offline
Dual HwC	True
Selected HwC	Primary
Scheduling Mode	Normal
Force Compact PVT	True
Genius Output	Error
Enable Shared Variables	False
Process System Enabled	False
DLB Heartbeat (ms)	1000
Enhanced Security	False
Compression Level	Normal
Physical Port	ETHERNET
IP Address	192.168.0.101
Additional Configuration	

Figure 480

6.2.8 PC Network

The IP address of PC with Proficy Machine Edition shall be set in the same network area.

Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address: 192 . 168 . 0 . 68

Subnet mask: 255 . 255 . 255 . 0

Default gateway: . . .

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

Preferred DNS server: . . .

Alternate DNS server: . . .

☐ Validate settings upon exit

Advanced...

OK Cancel

Figure 481

6.2.9 Temporary IP

However, if the IP address of ETM001 is lost or forgotten, the IP address can be changed by the function [Set Temporary IP Address] according to the MAC address of ETM001. In the following figure, the MAC address is referenced to the ETM001, and the IP address can be defined by user.

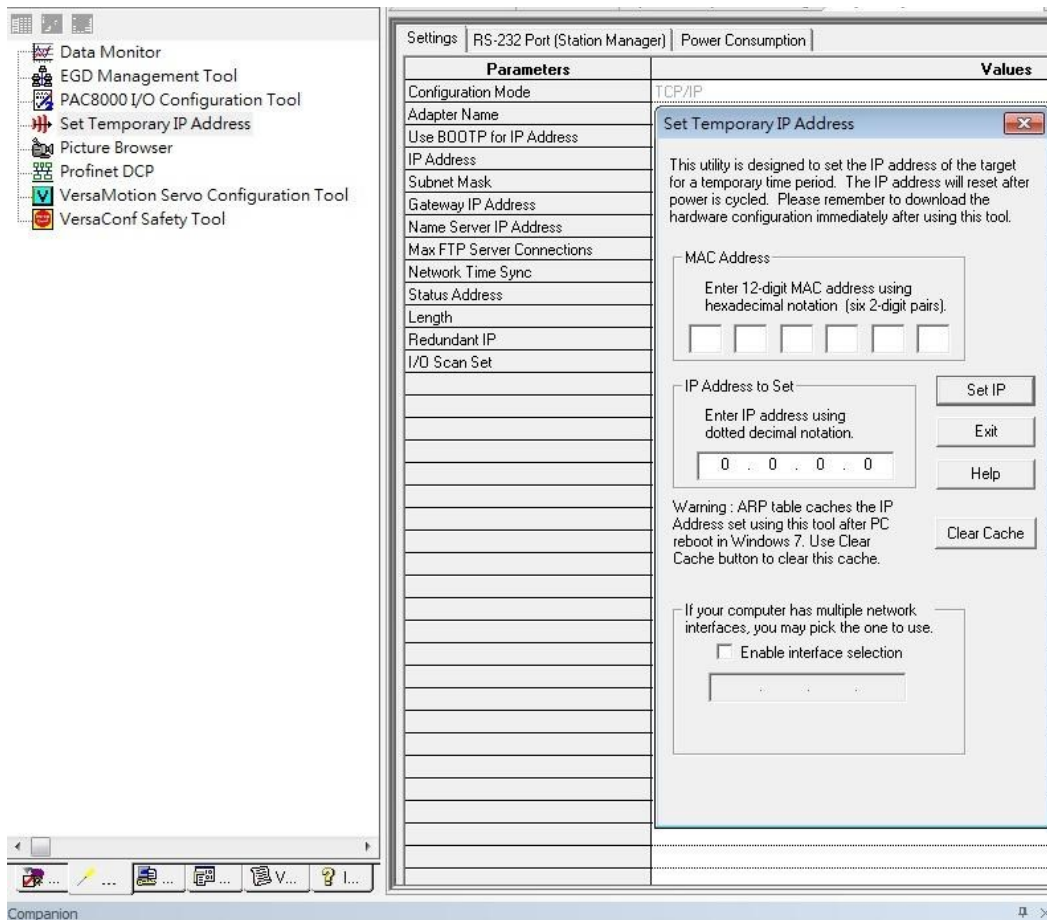


Figure 482

6.3 Implementation

To download the configuration to hardware, the following steps shall be applied.

First, press the [Connect] icon.

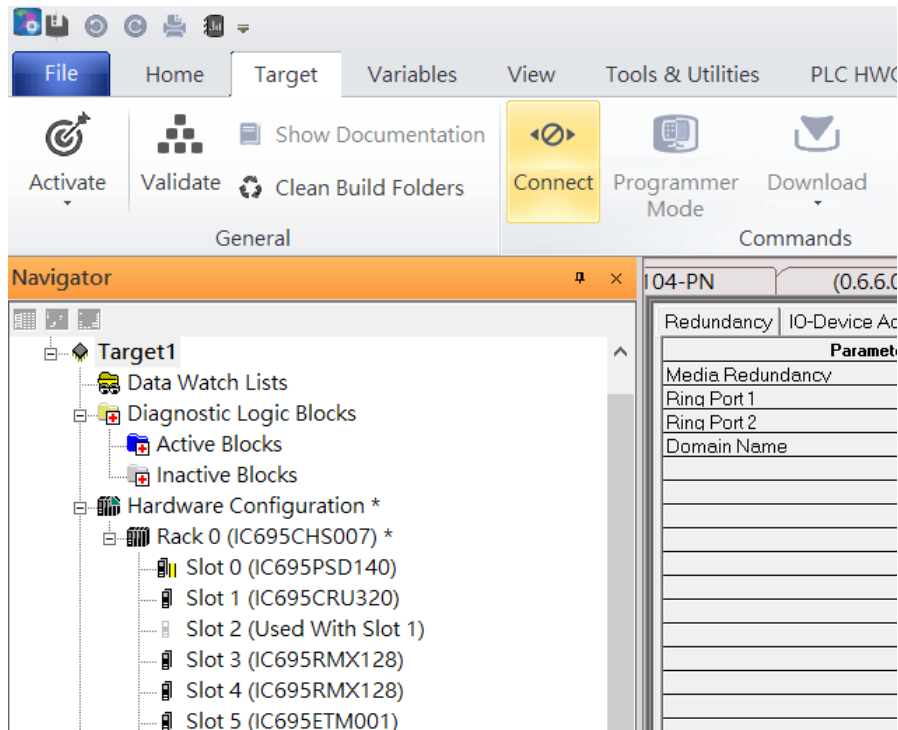


Figure 483

Then press the icon [Programmer Mode]

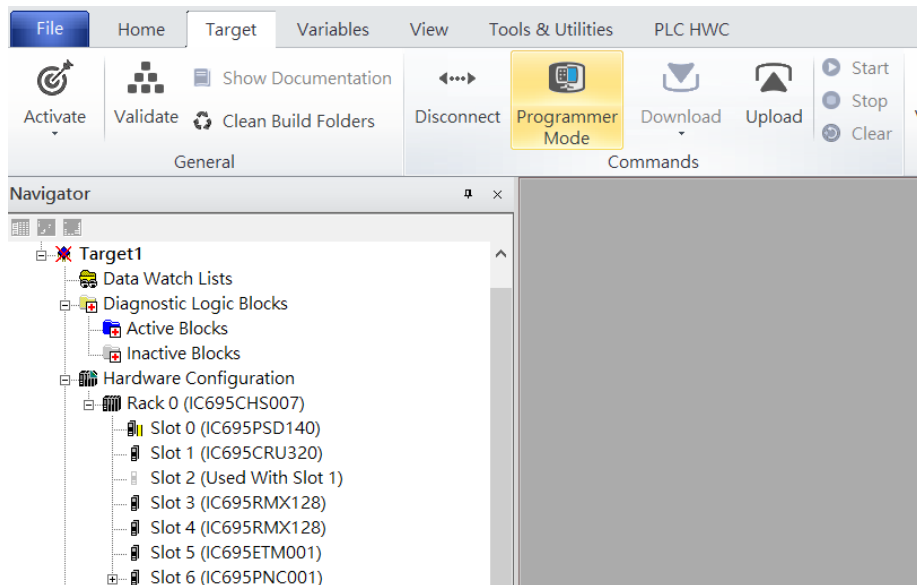


Figure 484

Then press icon [Download] and select “Download”

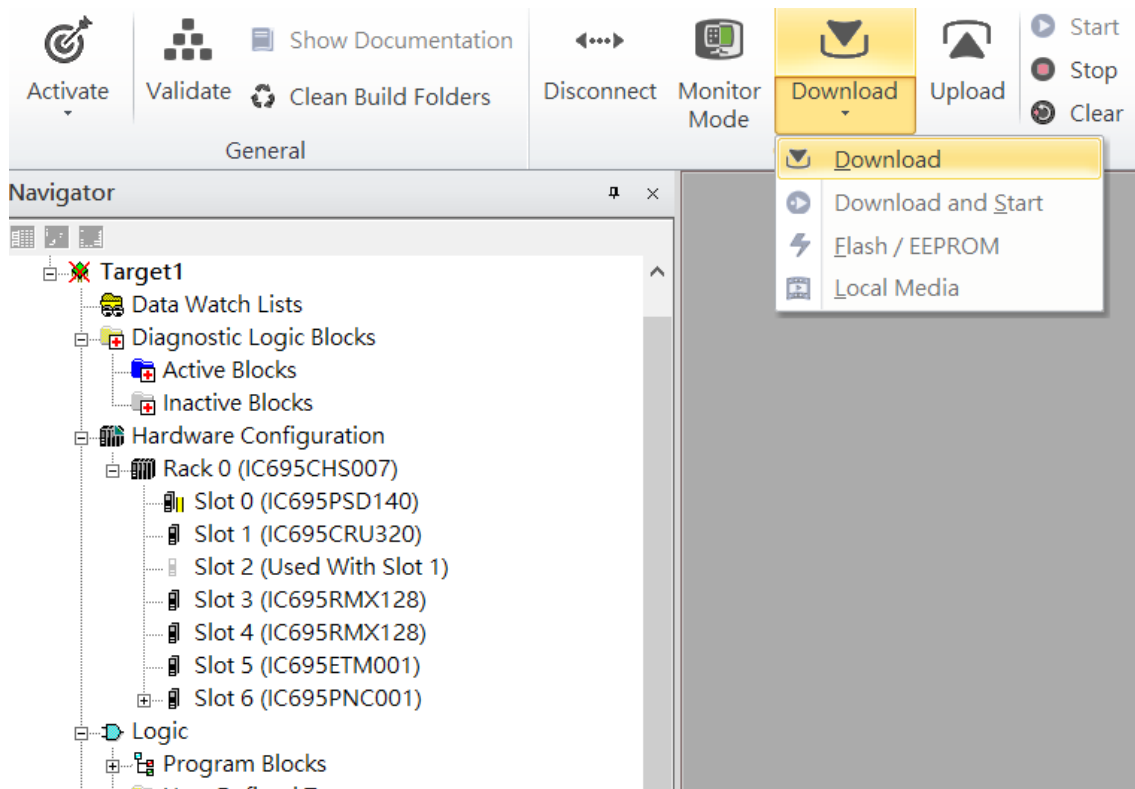


Figure 485

Then the dialogue is appeared to make sure the initialization procedure, select [OK]

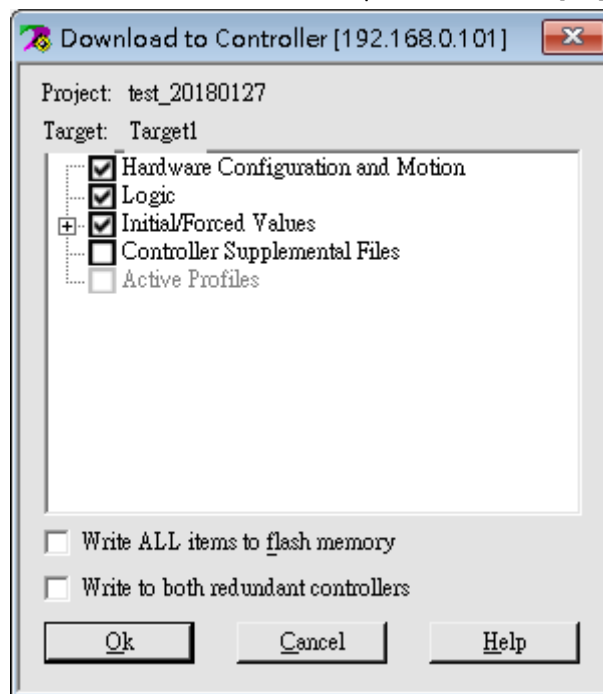


Figure 486

After download completely, press icon [Start] to active PLC.

Note: After downloading completely, switch CRU320 to “Run I/O Enable”

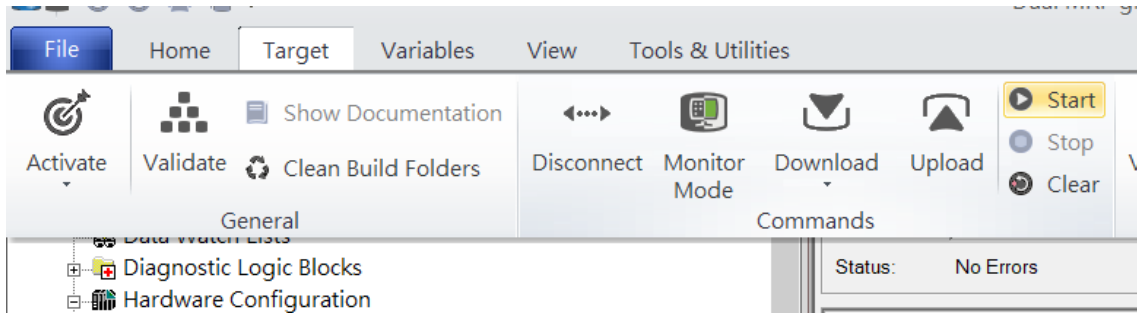


Figure 487

Then the dialogue is appeared, please select [OK]

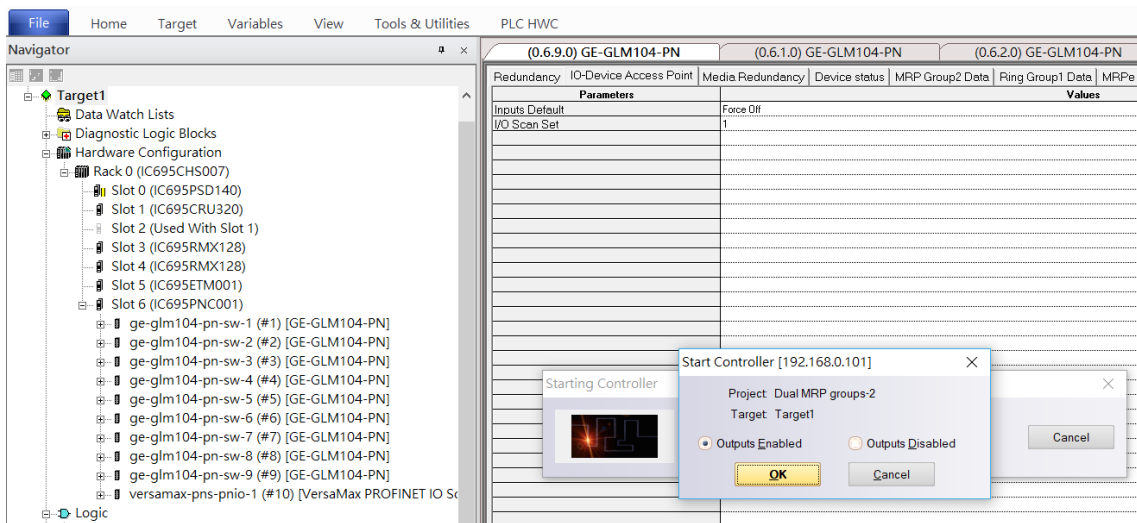


Figure 488

If PLC has started successfully, a message “The Controller was successfully started”.

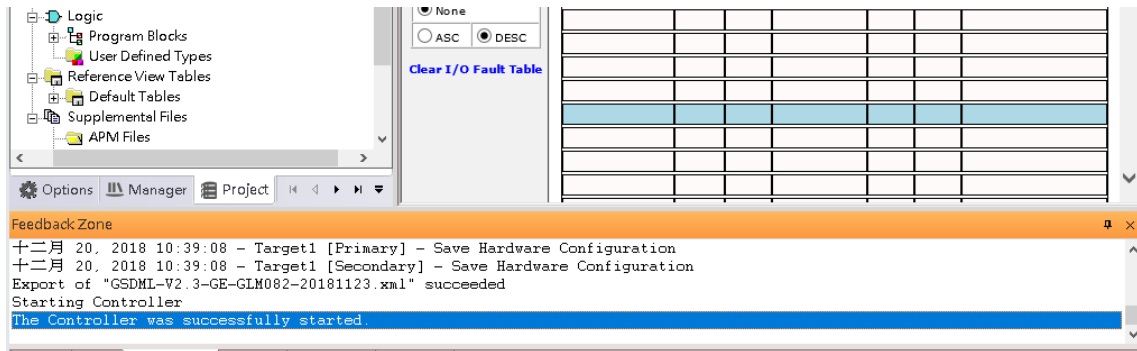


Figure 489

Chapter 7 PROFINET-MRP Main Ring couples with coupled two PROFINET-MRP Subring

7.1 Network Topology

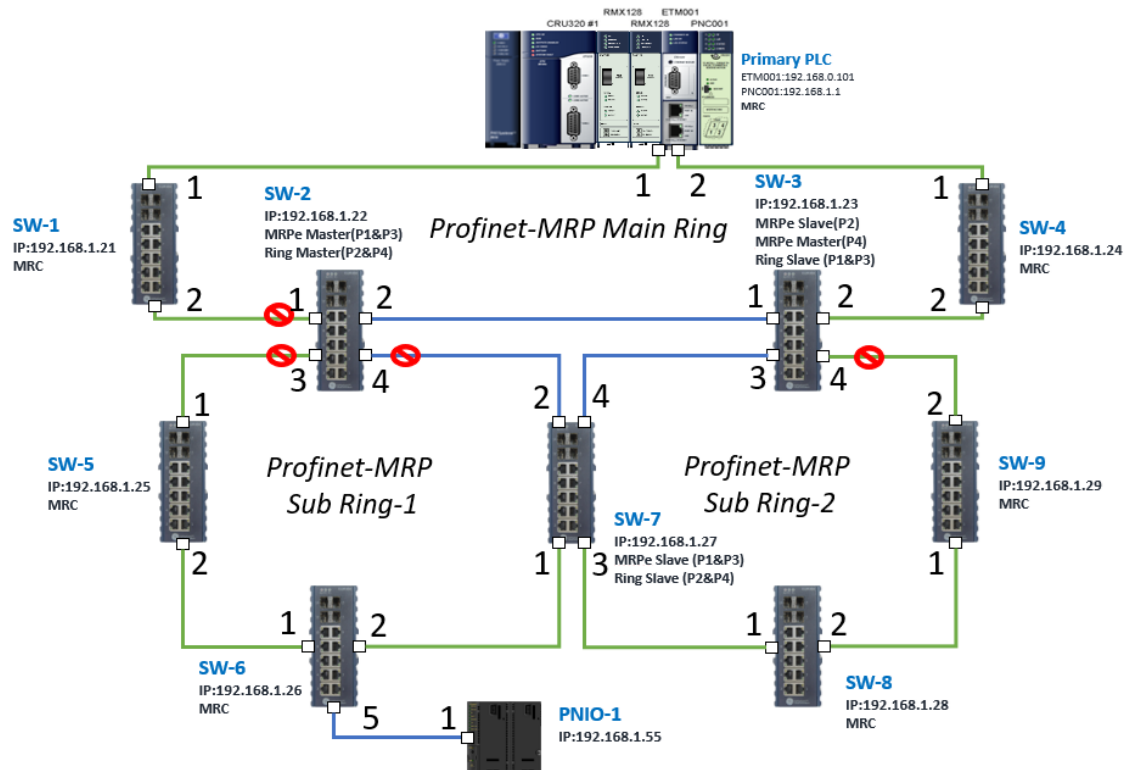


Figure 490

7.2 Hardware Configuration

On the CRU320, the I/O data can be set to "STOP", "RUN OUTPUT DISABLE" or "RUN I/O Enable" states by a switch imbedded on CRU320.

During the configuration, the switches on both 2 CRU320s must be set to "STOP"

7.2.1 Project Open

To start the software Proficy Machine Edition, please follow the steps below:

Click [Start] -> [Proficy] -> [ProficyMachine Edition] -> [ProficyMachine Edition]. See the following picture.



Figure 491

(2) Select the empty project and click [OK].

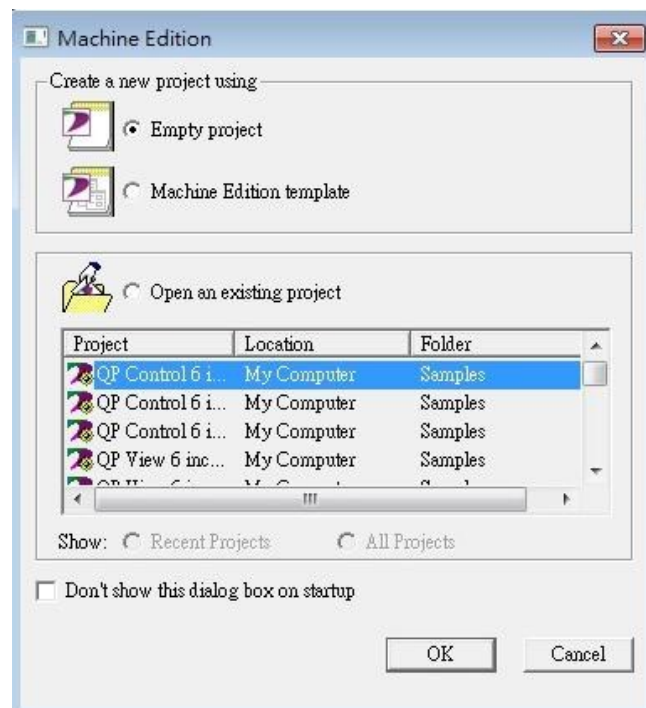


Figure 492

(3) Set the project name and click [OK]

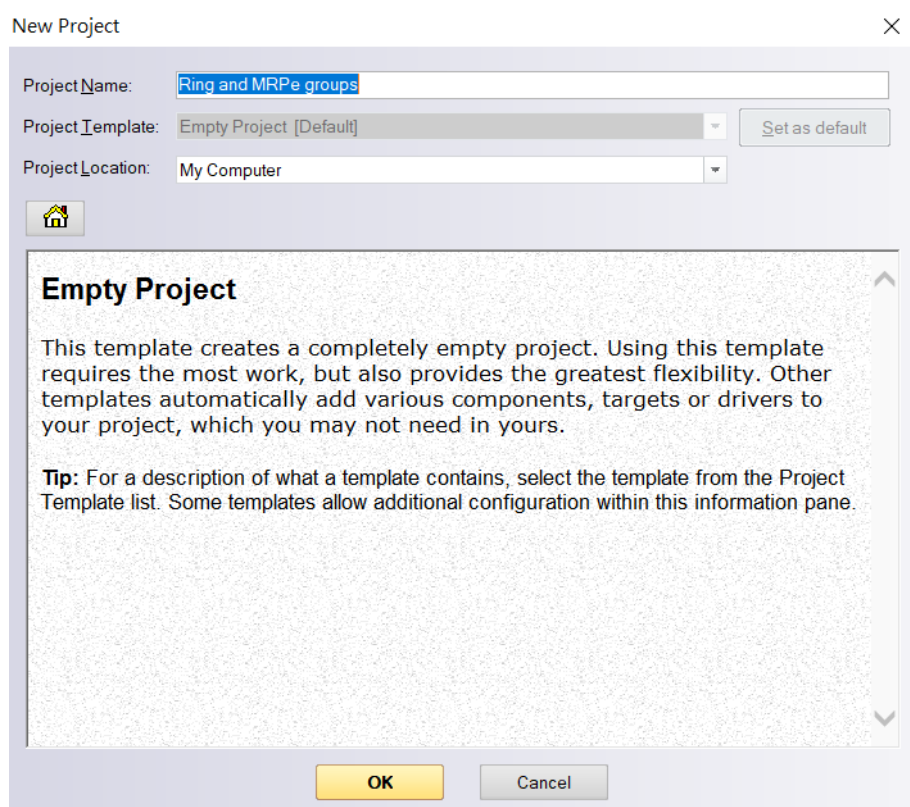


Figure 493

7.2.2 I/O Controller Setting

Next step is to add a target for this project.

Click right button on project name “GLM act as MRC in single MRC group” and select [Add Target] -> [GE Intelligent Platforms Controller] -> [PACSystems RX3i].

The PACSystems RX3i is the I/O Controller to be tested. See the following picture.

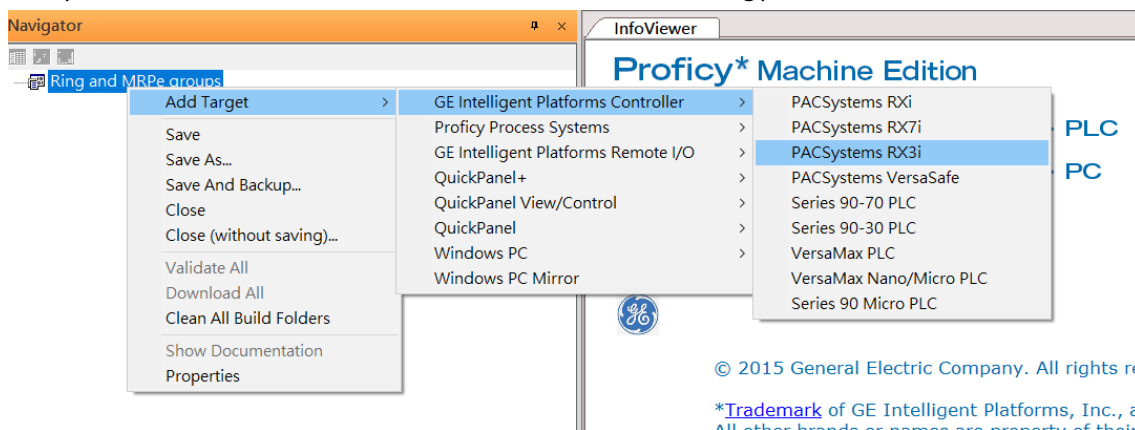


Figure 494

Originally the I/O Controller is described as the rack with 12 slots, each slot can be regarded as the chassis for device installations such as power card, communication module, or bus controller. However, there are only 7 chassis can be used in the I/O Controller CRU320. Thus, replace the rack for 7 slots.

Click right button on "Rack0 (IC695CHS012)" and select [Replace Rack...]

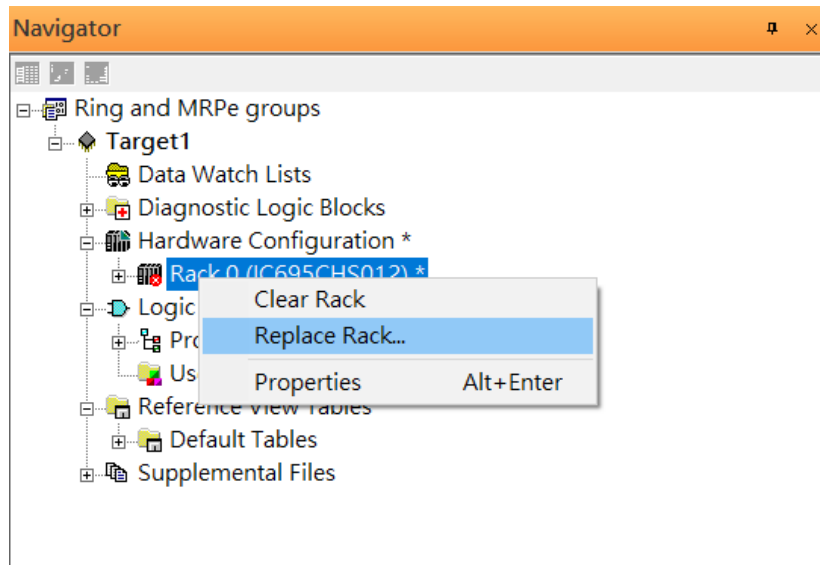


Figure 495

Select "IC695CHS007" and click [OK]

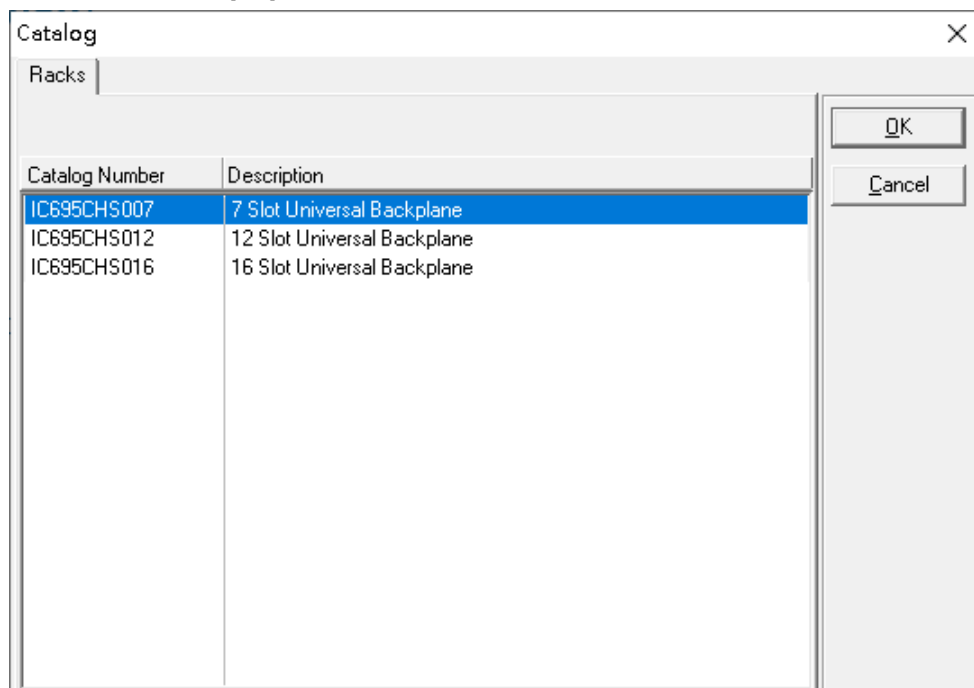


Figure 496

After the rack and the number of slots is defined, select the corresponding devices into the slots according to the I/O Controller. The following picture is the current installation for each device on the I/O Controller



Figure 497

From left to right, the installed devices on the I/O Controller are
Devices on I/O Controller

Device Type	Device Name	Chassis index
Power Card	PSD140	0
Central Processing Unit	CRU320	1 ~ 2
Communication Module	RMX128	3
Communication Module	RMX128	4
Communication Module	ETM001	5
Bus Controller	PNC001	6

Now, add the module into the slots by the current devices on the I/O Controller, the chassis index is corresponding to the slot index.

First, replace the power card. Click slot 0 and click the right button, select [Replace Module ...], and specify the installed power card, PSD140, then click [OK]

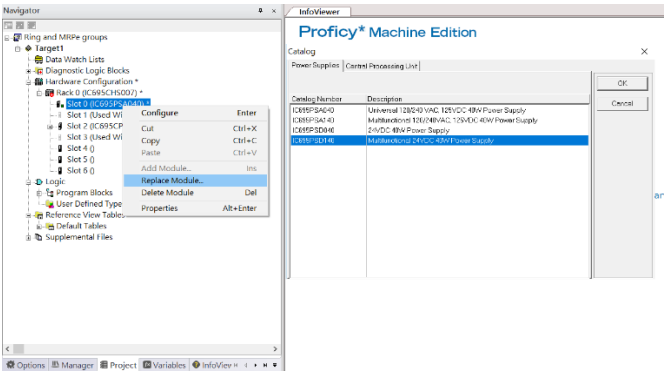


Figure 498

Slot 0 is replaced by current power card, PSD140

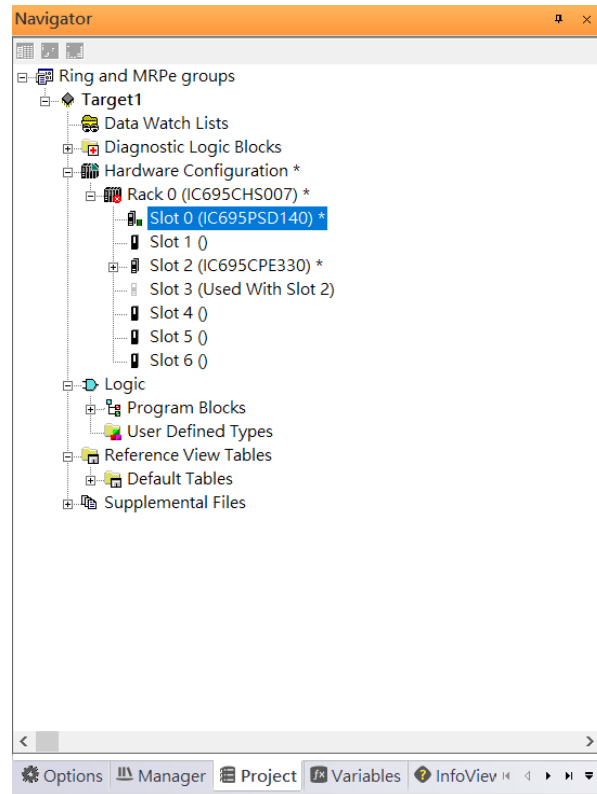


Figure 499

For slot 1 and 2, 2 chassis (1 and 2) is occupied by the Central Processing Unit, CRU320. To integrate slot 1 and 2, pull the slot 2 to slot 1

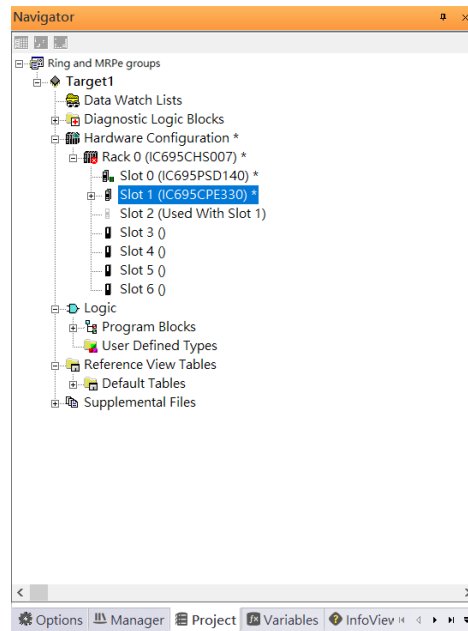


Figure 500

Now the slot 2 is cleaned.

To select the Central Processing Unit, click slot 1 and click the right button, select [Replace Module ...] to choose CRU320

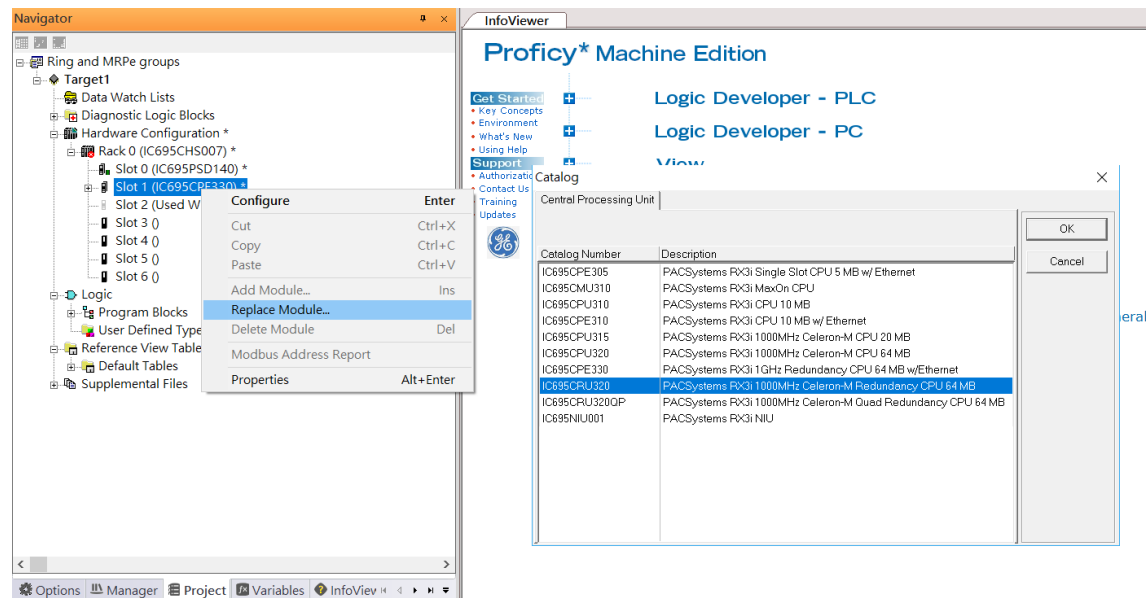


Figure 501

Then choose [No].

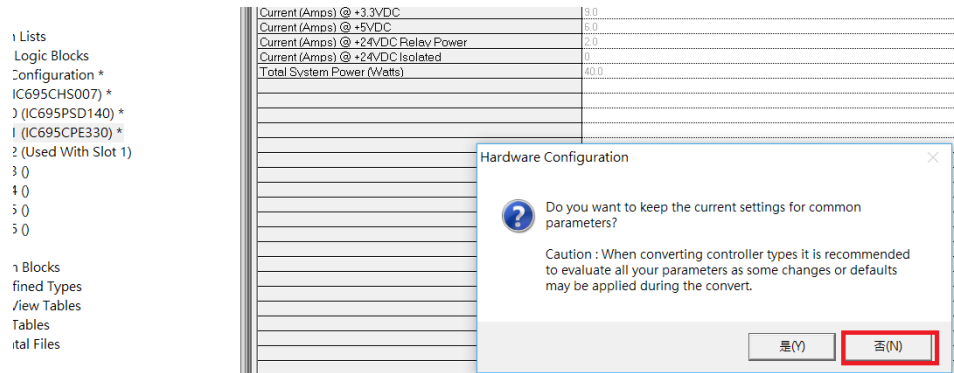


Figure 502

Now the CRU320 is specified.

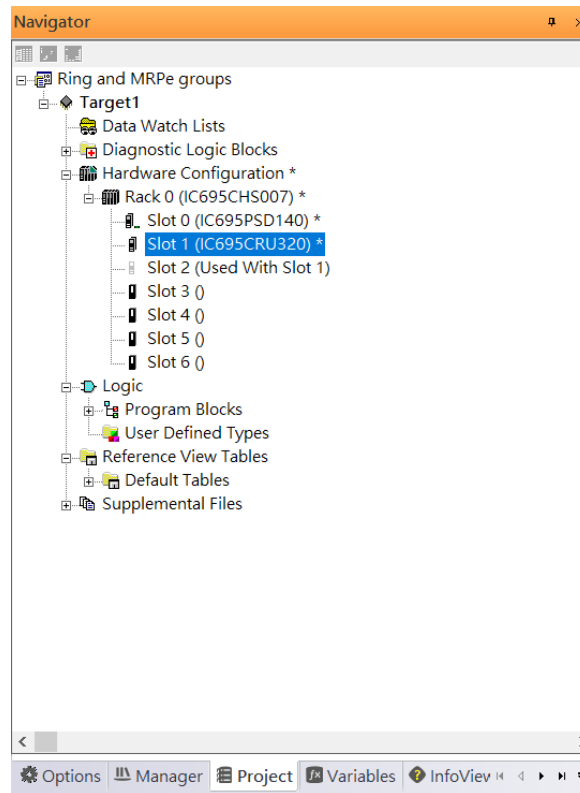


Figure 503

Next is to add RMX128 module for slot 3.

Click the right button on slot 3, select [Add Module ...]

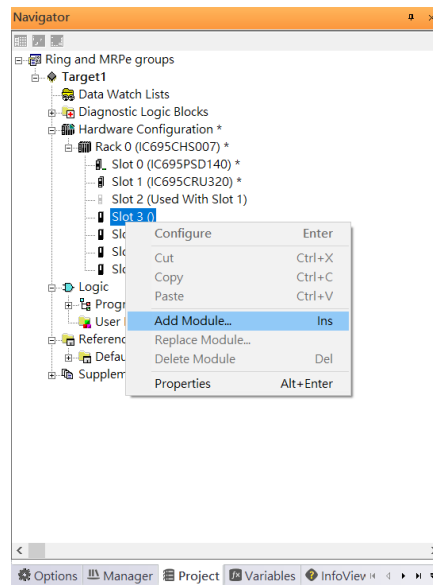


Figure 504

According to the current installation on the I/O Controller, the RMX128 shall be select.
Select [Communications] -> [IC695RMX128] and click [OK].

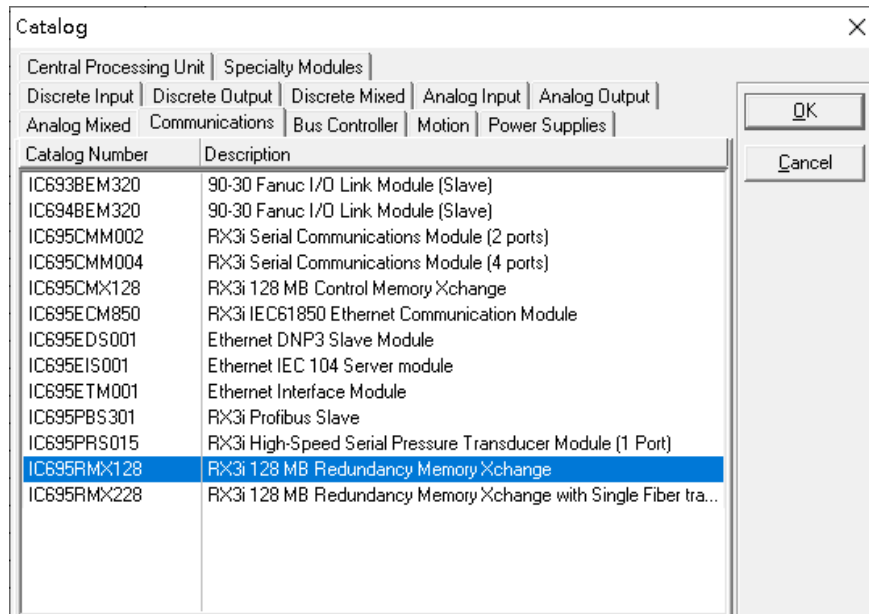


Figure 505

Now the RMX128 is ready on slot 3.

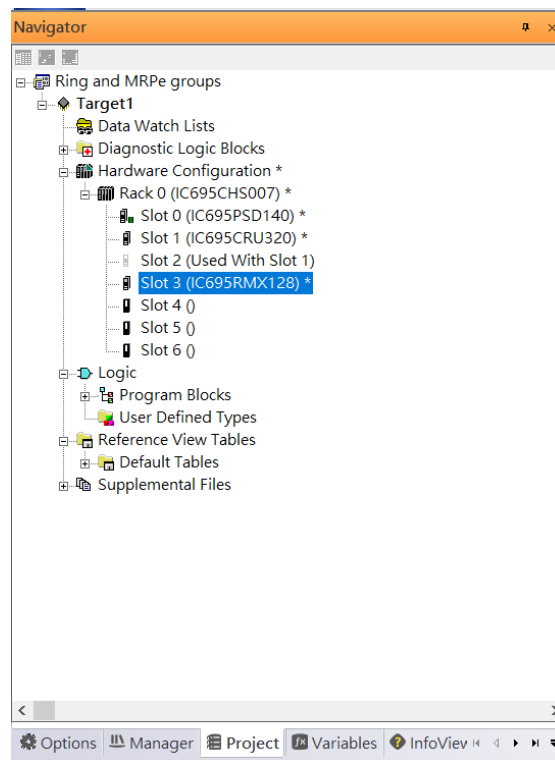


Figure 506

Continuously, select RMX128 for slot 4.

Click the right button on slot 4, select [Add Module ...], select [Communications] -> [IC695RMX128] and click [OK]

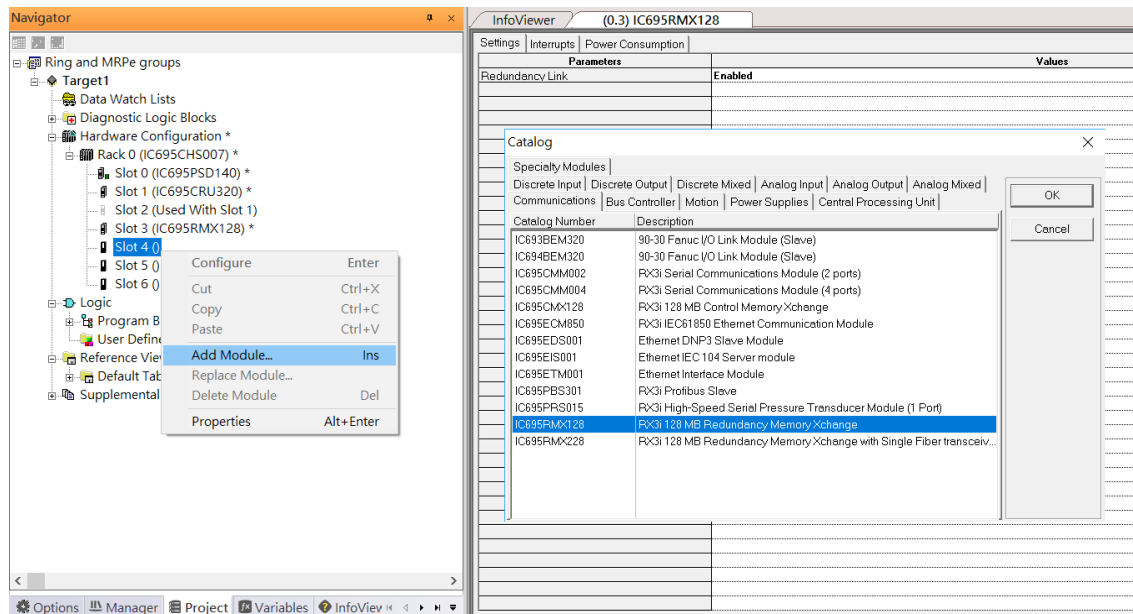


Figure 507

Continuously, select ETM001 for slot 5.

Click the right button on slot 5, select [Add Module ...], select [Communications] -> [IC695ETM001] and click [OK]

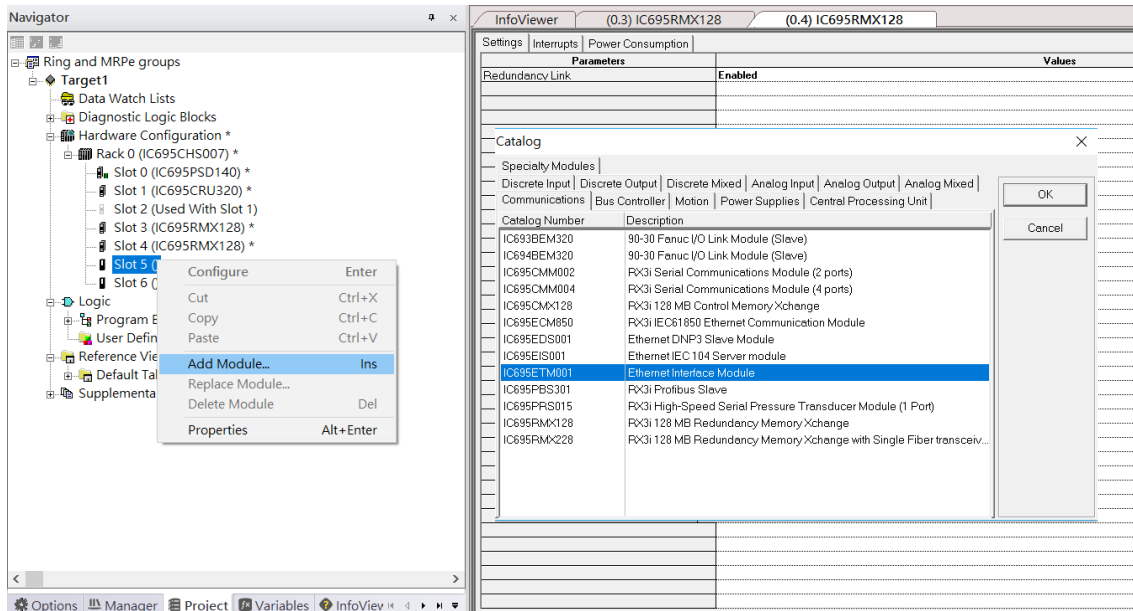


Figure 508

It should be note that the ETM001 is the management device for Proficy Machine Edition. The communication interface is Ethernet network. The IP address and Subnet Mask shall be specified.

In the following picture, the IP address 192.168.0.101 and mask 255.255.255.0 is specified on ETM001.

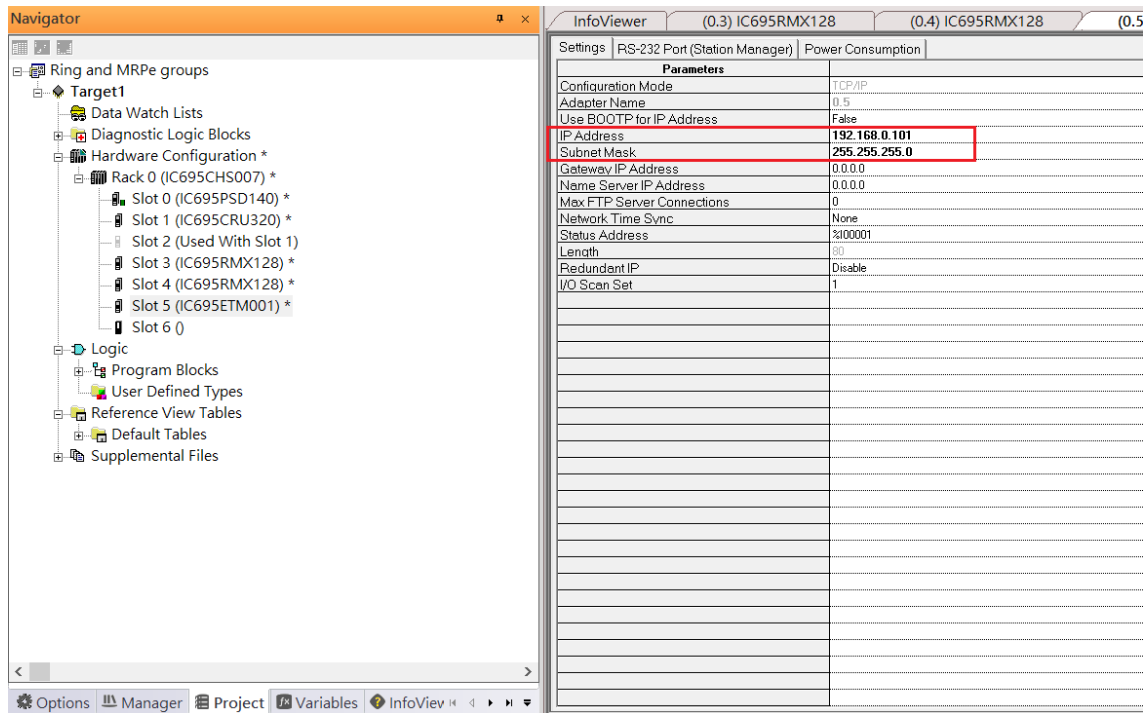


Figure 509

Continuously, select PNC001 for slot 6.

Click slot 6 and click the right button, select [Add Module ...], specify the installed Bus Controller, PNC001 and click [OK]

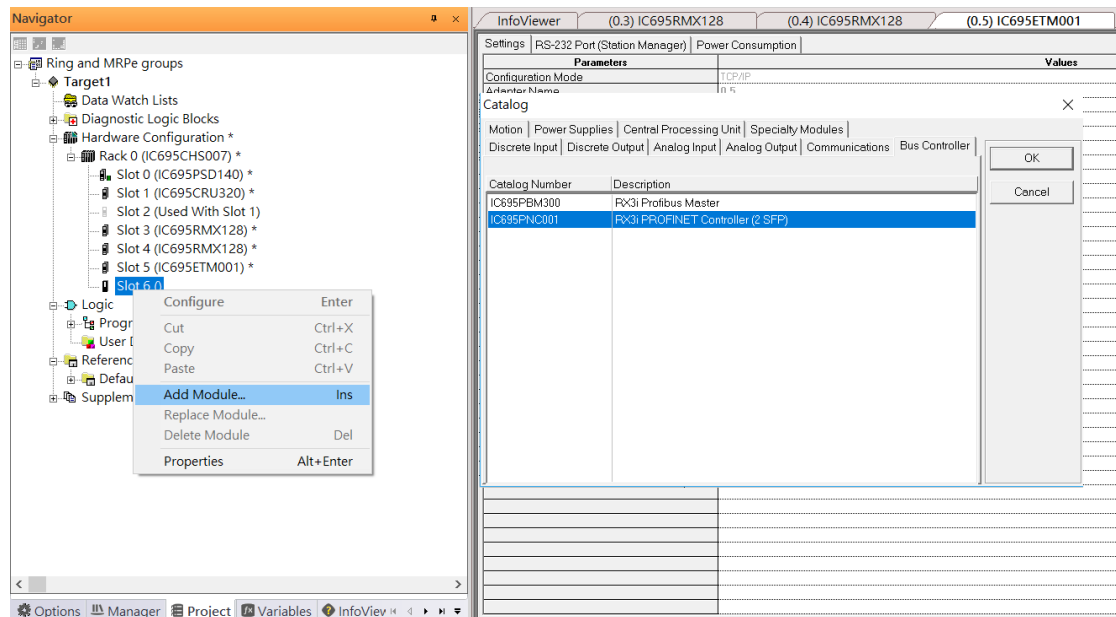


Figure 510

Now all the devices on the I/O Controller are ready on the slots on the rack, the following picture is the current status, and we shall save it.

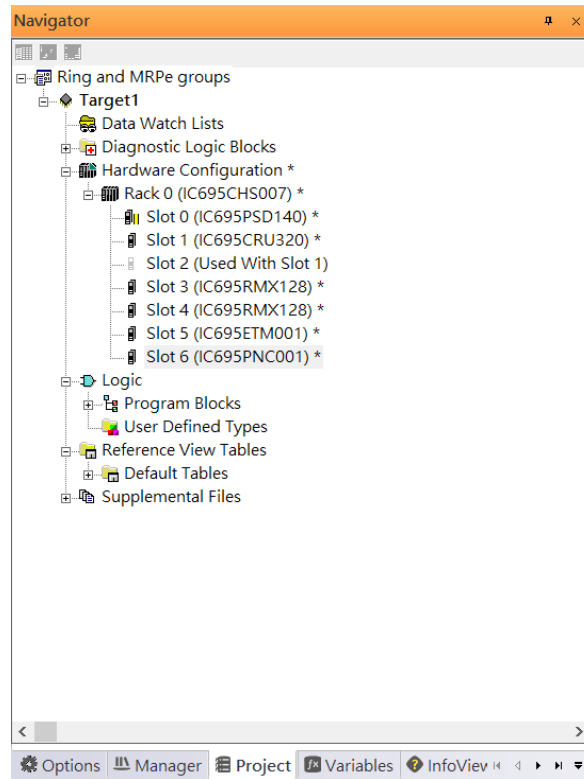


Figure 511

7.2.3 I/O Device Setting

This section introduces the I/O Device integration. To configure the I/O Device, the GSDML file is necessary. Now we create another interface to load the GSDML file by using [Toolchest].

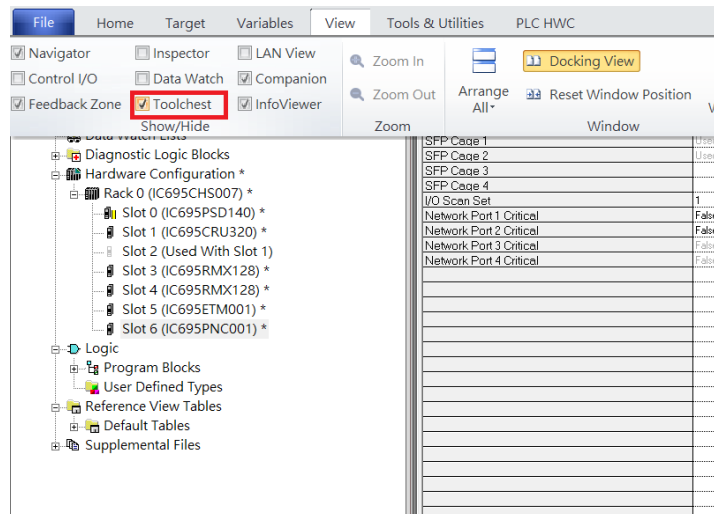


Figure 512

As shown in the following picture, a new interface is created on the right-hand side.

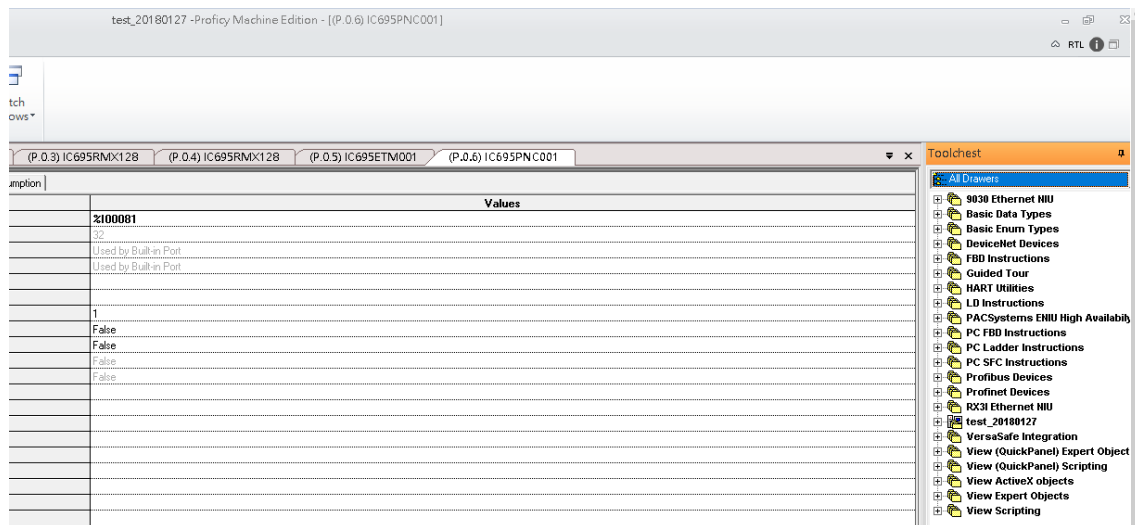


Figure 513

Select Profinet Devices.

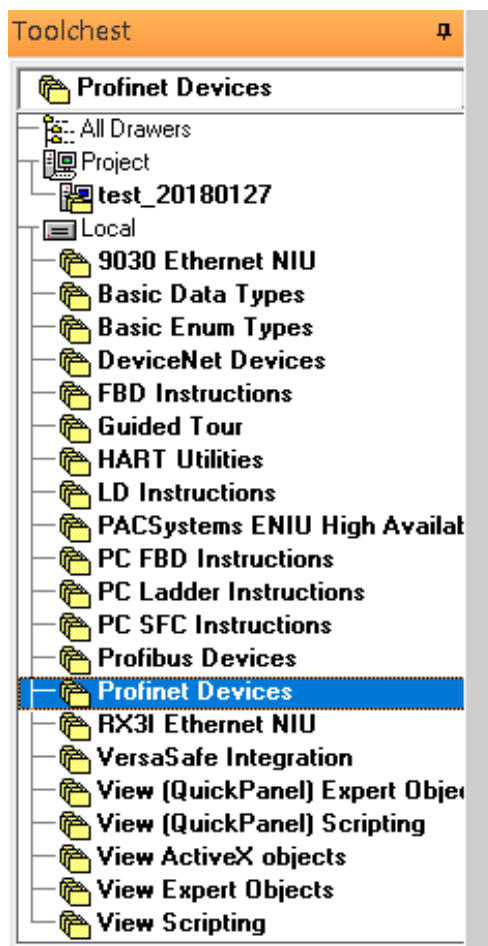


Figure 514

Click right button, select [Assistants] -> [Import GSDML File ...]

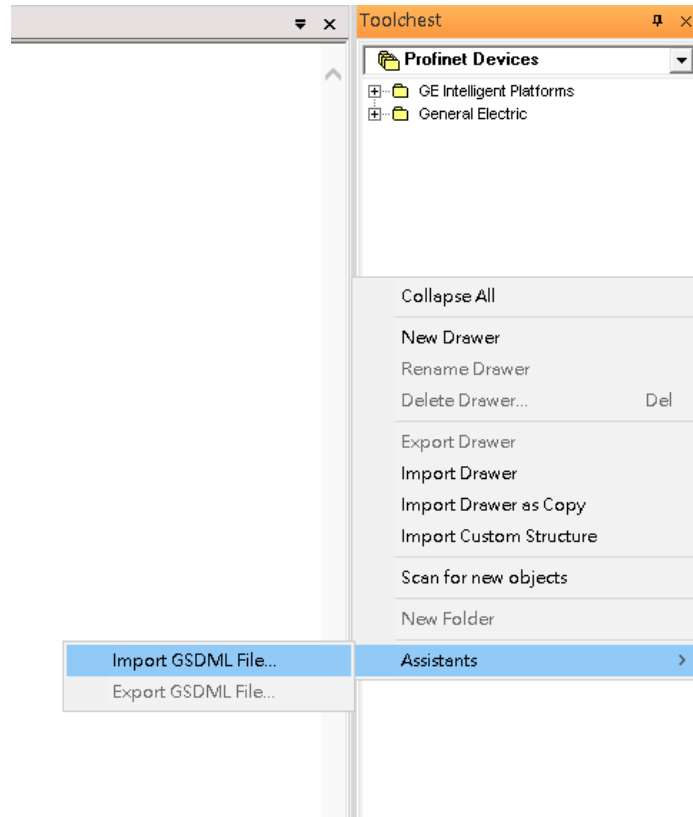


Figure 515

Select the GSDML File.

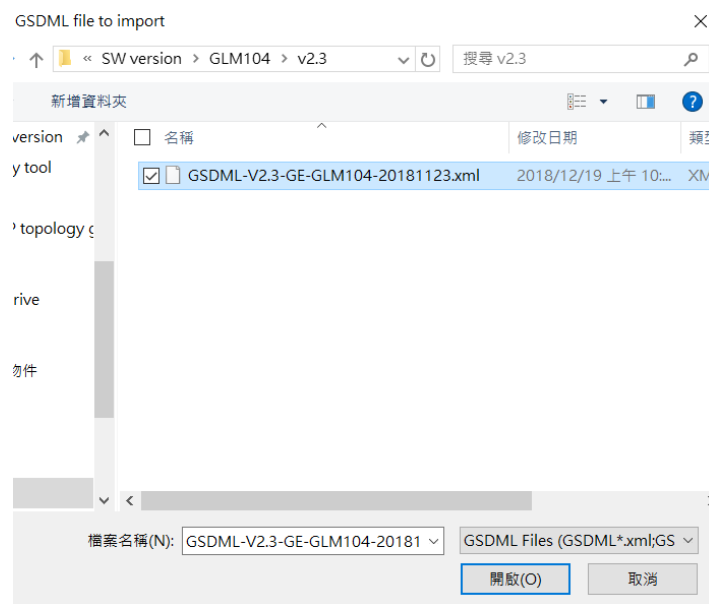


Figure 516

Then the corresponding I/O Device of GSDML File is added in the [Toolchest].



Figure 517

In this document, there are ten I/O devices and one I/O controller. I/O devices are nine switches and one GE VersaMax PROFINET I/O Scanner.

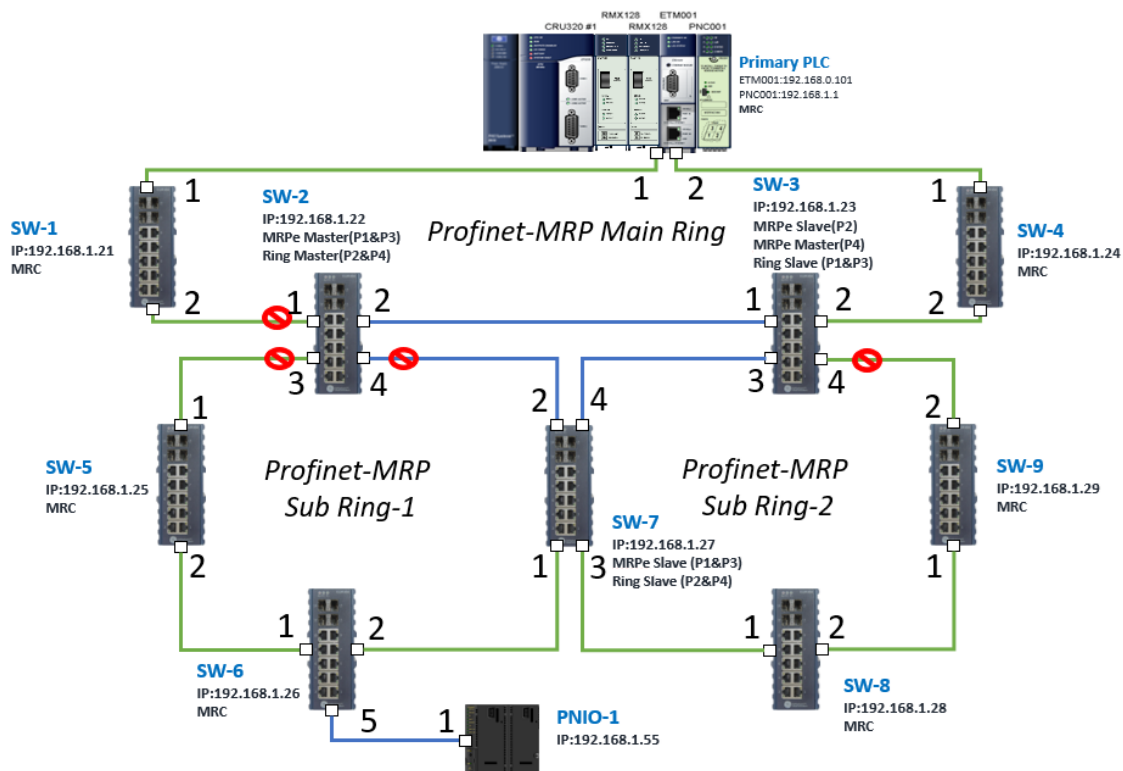


Figure 518

The I/O Device is connected to the Bus Controller on the I/O Controller. Click the slot 6 and click the right button to add the I/O Device on the PNC001.

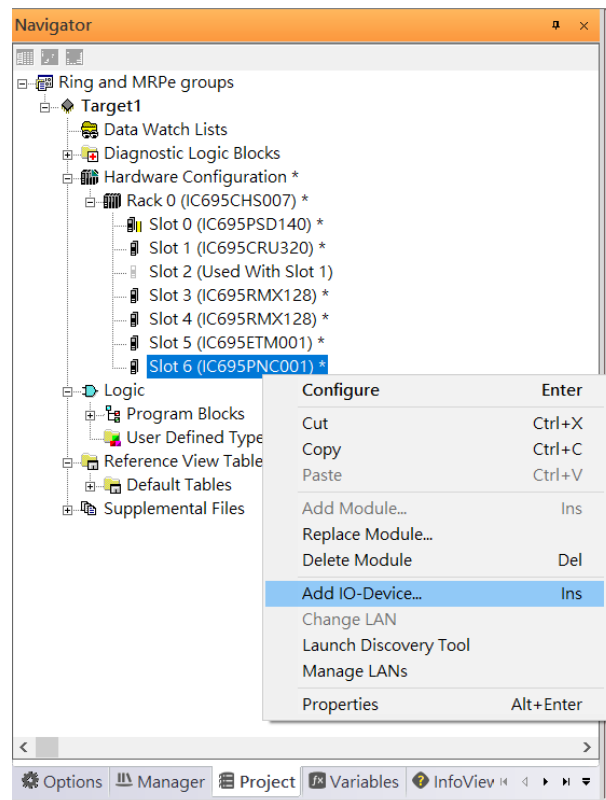


Figure 519

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE] -> [GE-GLM104-PN] and click [OK]

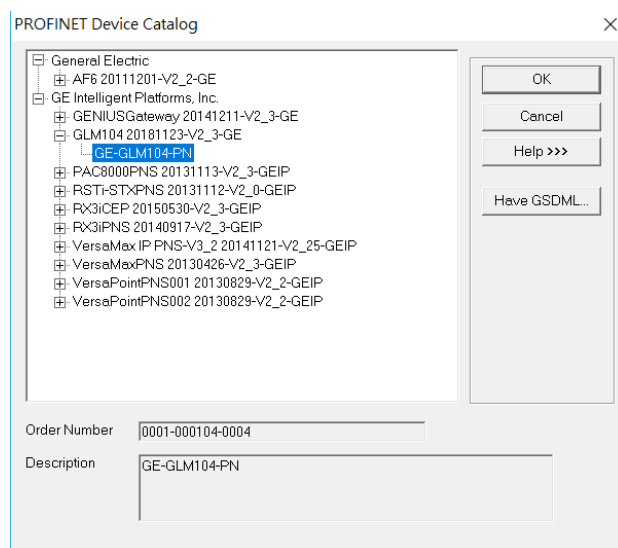


Figure 520

Now the I/O device GLM104(SW1) is ready and is a sub slot on PNC001.

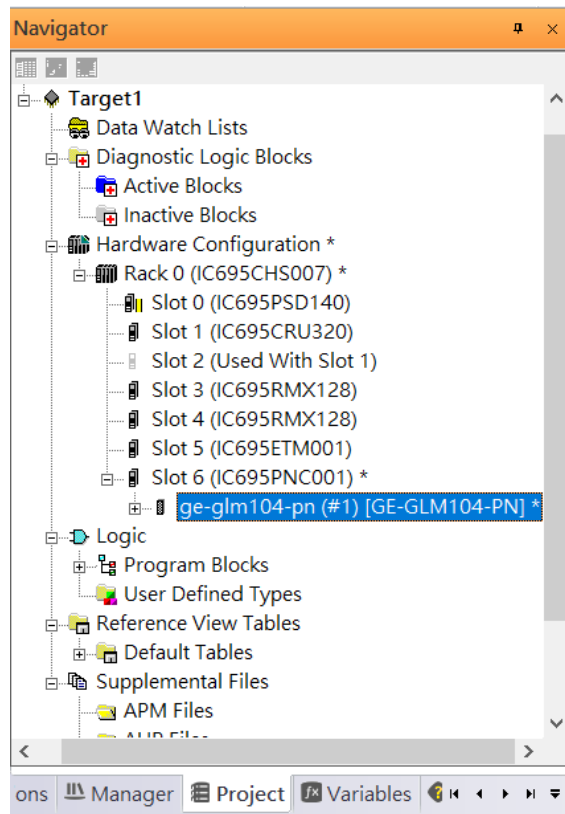


Figure 521

Then add the second I/O device in the PNC001.

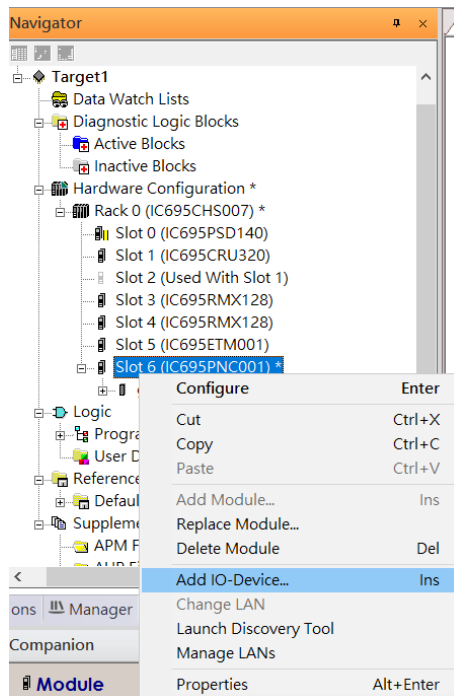


Figure 522

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

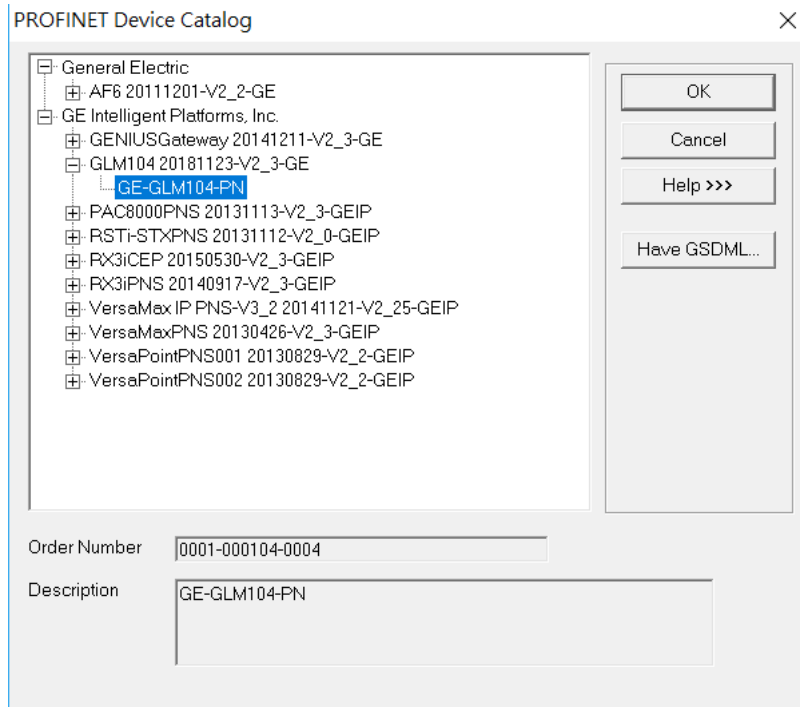


Figure 523

Now the I/O device GLM104(SW2) is ready and is a sub slot on PNC001.

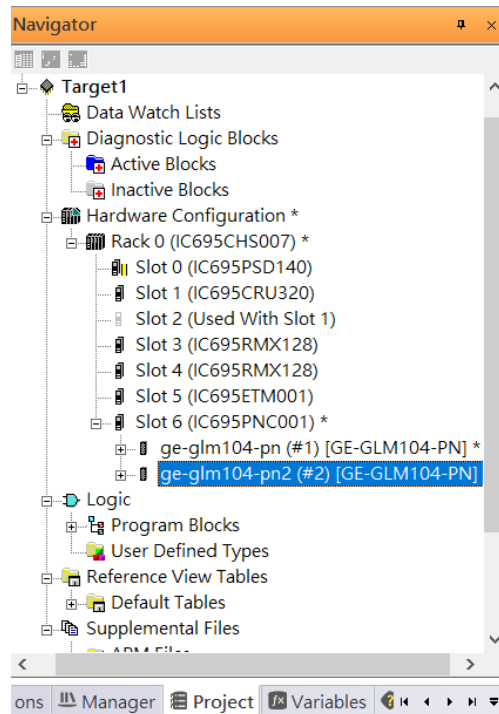


Figure 524

Then add the third I/O device in the PNC001.

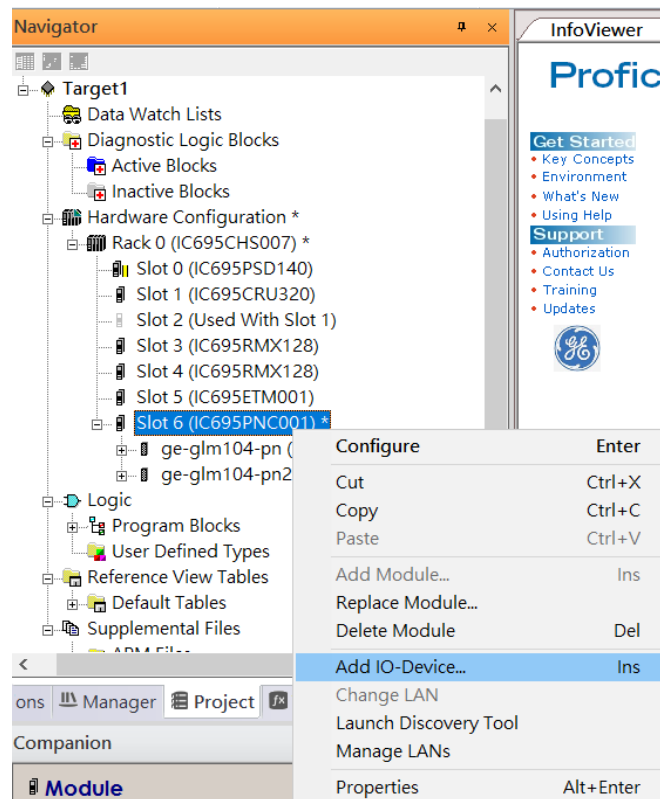


Figure 525

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

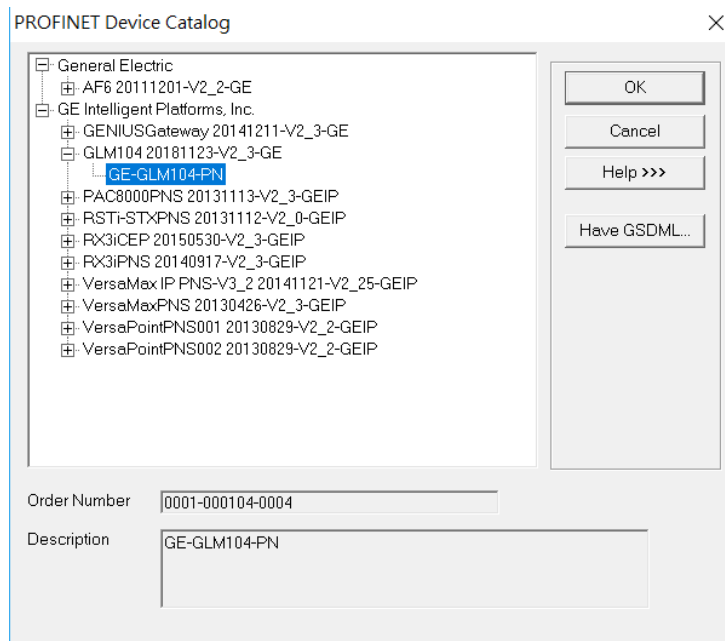


Figure 526

Now the I/O device GLM104(SW3) is ready and is a sub slot on PNC001

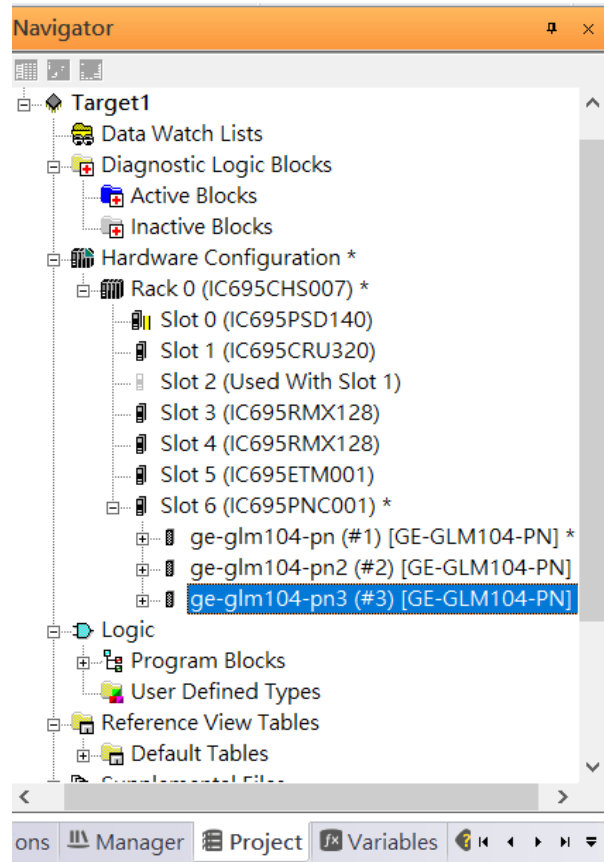


Figure 527

Then add the fourth I/O device in the PNC001.

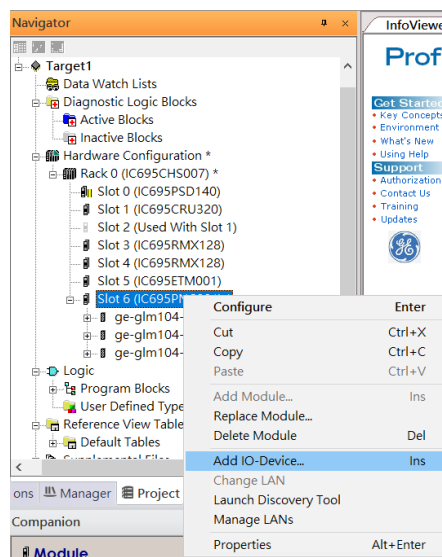


Figure 528

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

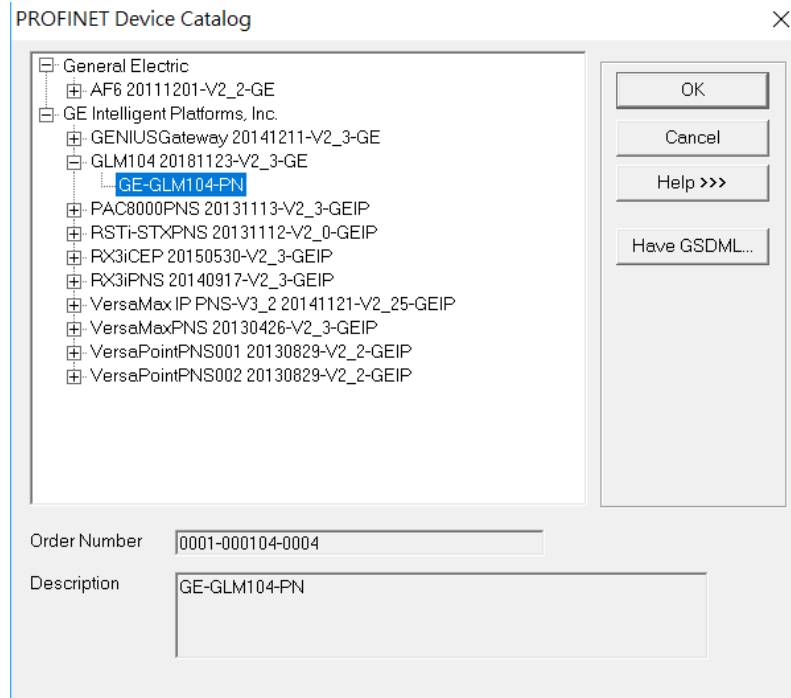


Figure 529

Now the I/O device GLM104(SW4) is ready and is a sub slot on PNC001.

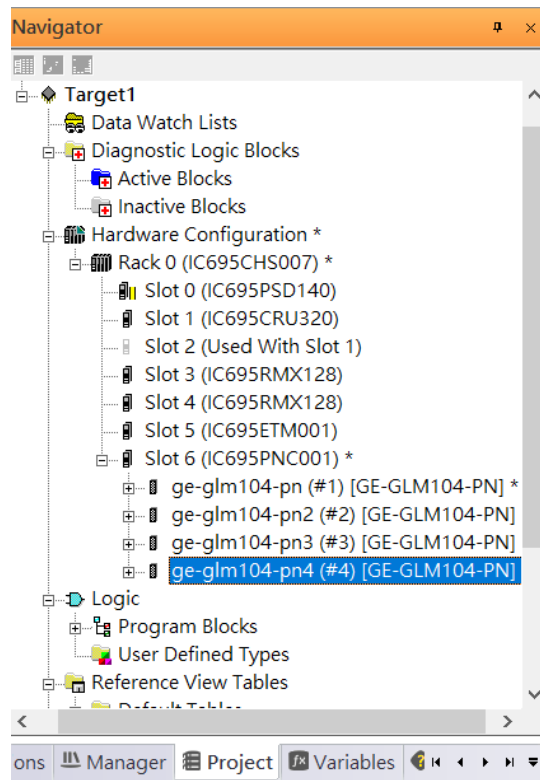


Figure 530

Then add the fifth I/O device in the PNC001.

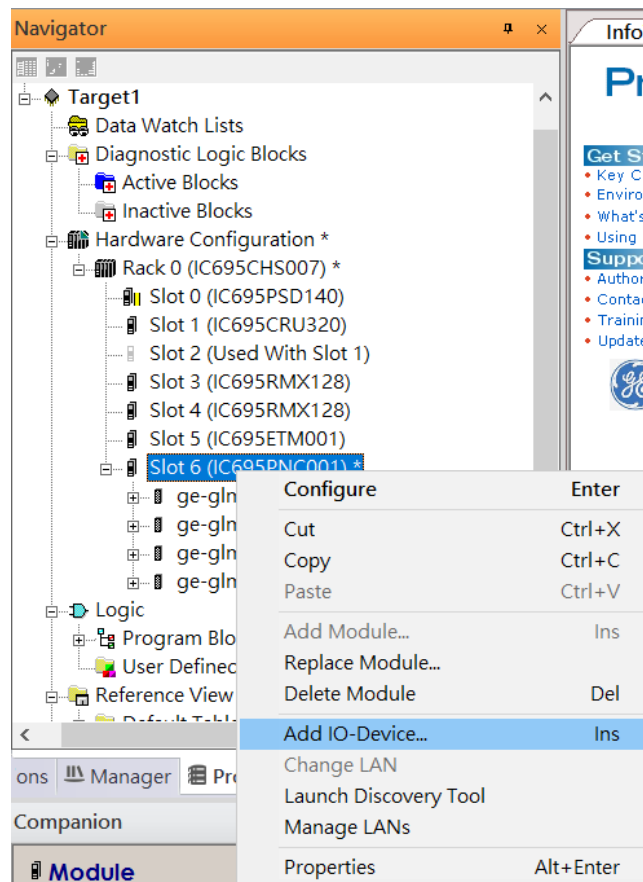


Figure 531

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

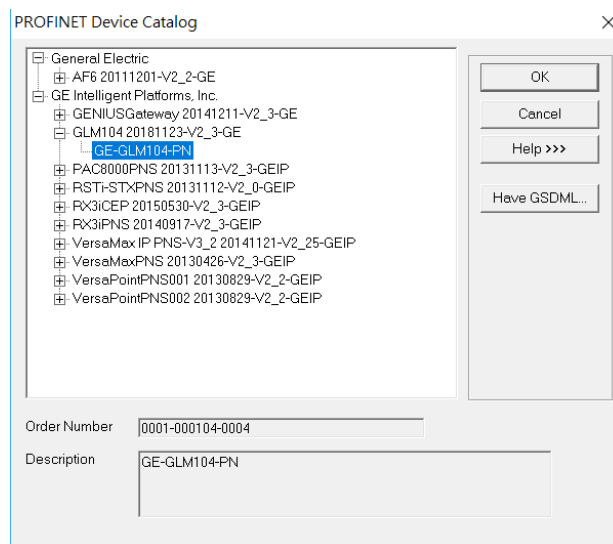


Figure 532

Now the I/O device GLM104(SW5) is ready and is a sub slot on PNC001.

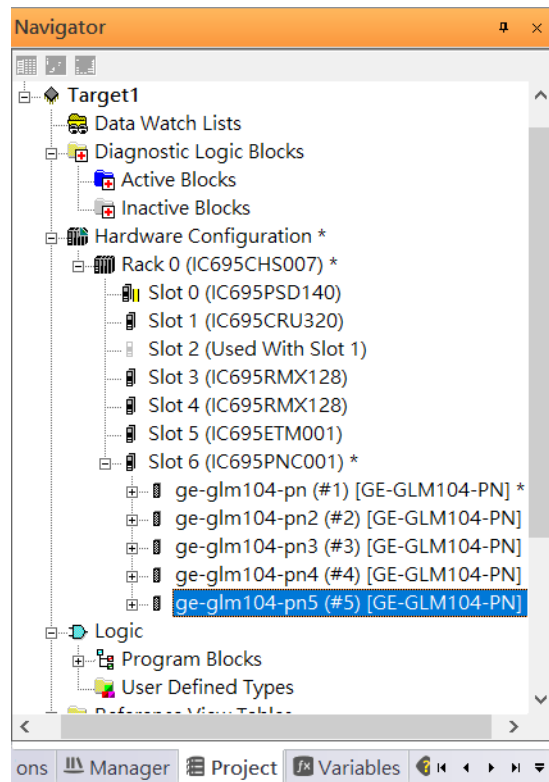


Figure 533

Then add the sixth I/O device in the PNC001.

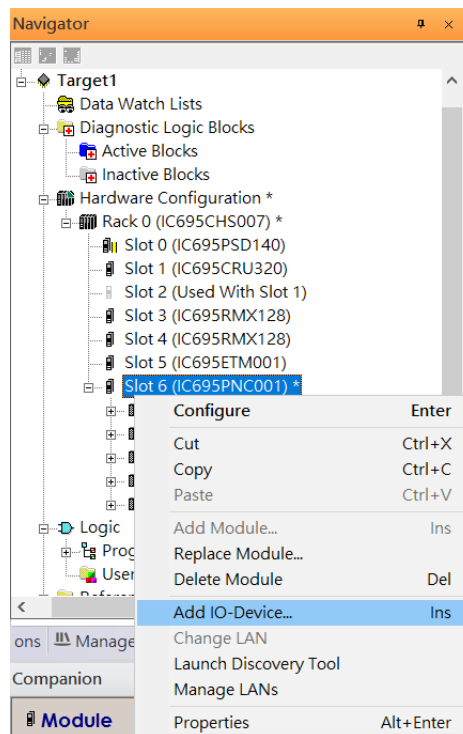


Figure 534

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

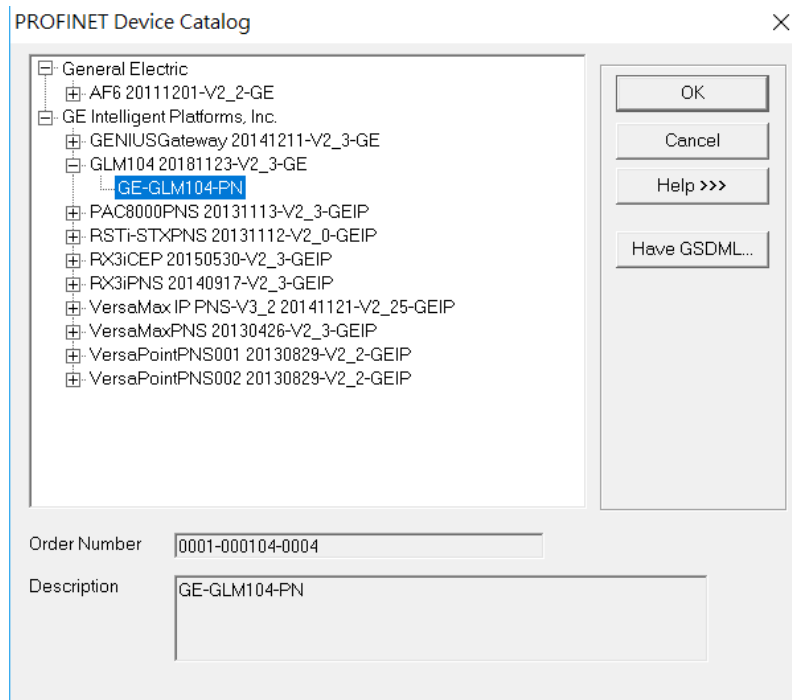


Figure 535

Now the I/O device GLM104(SW6) is ready and is a sub slot on PNC001.

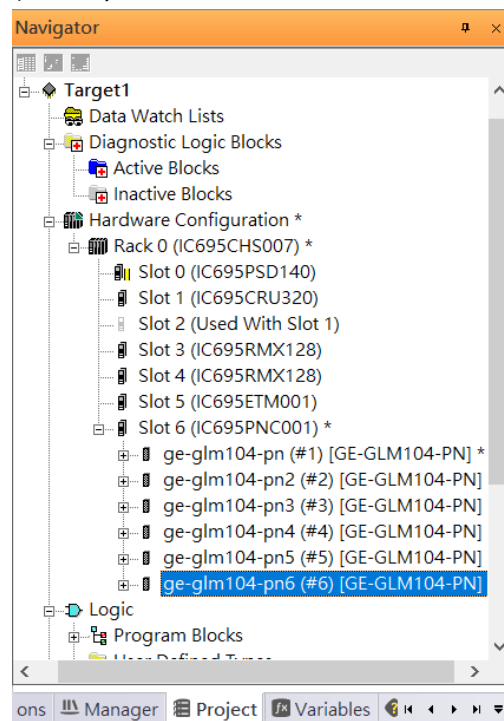


Figure 536

Then add the seventh I/O device in the PNC001.

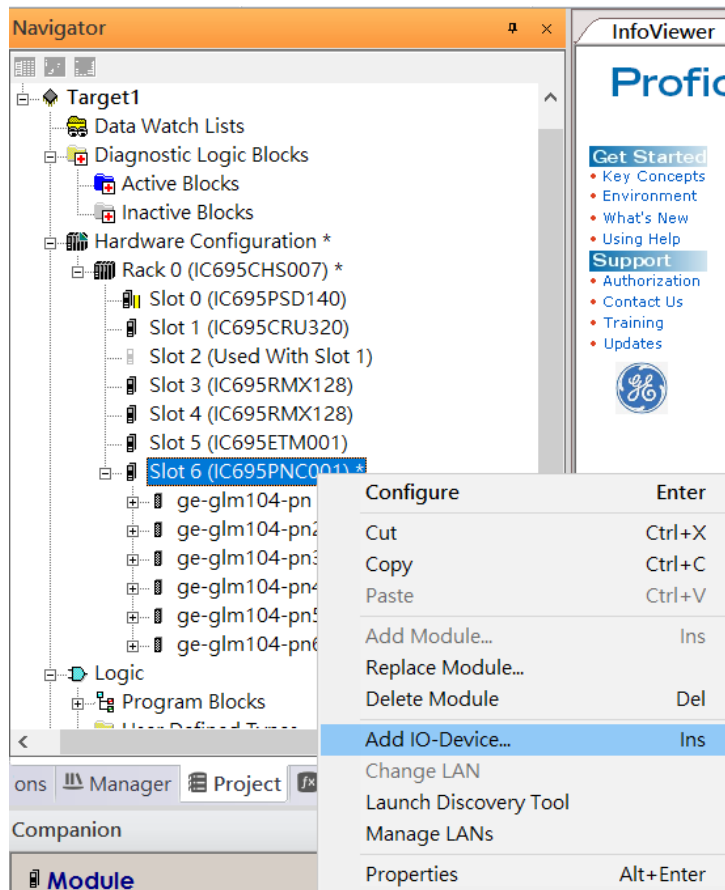


Figure 537

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

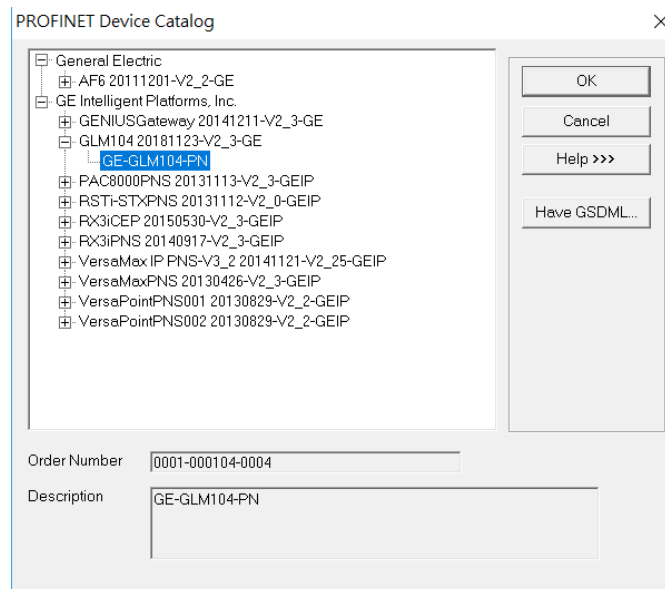


Figure 538

Now the I/O device GLM104(SW7) is ready and is a sub slot on PNC001.

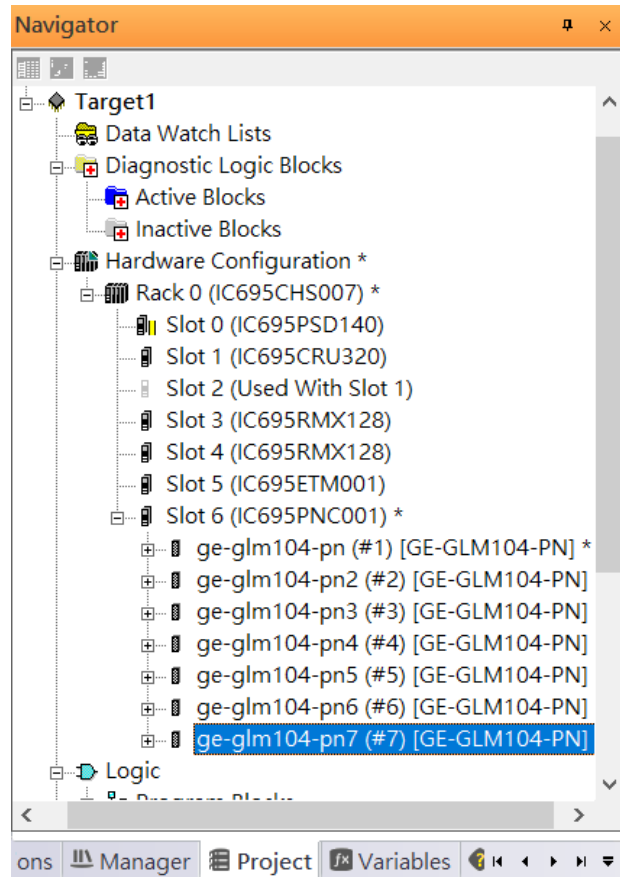


Figure 539

Then add the eighth I/O device in the PNC001.

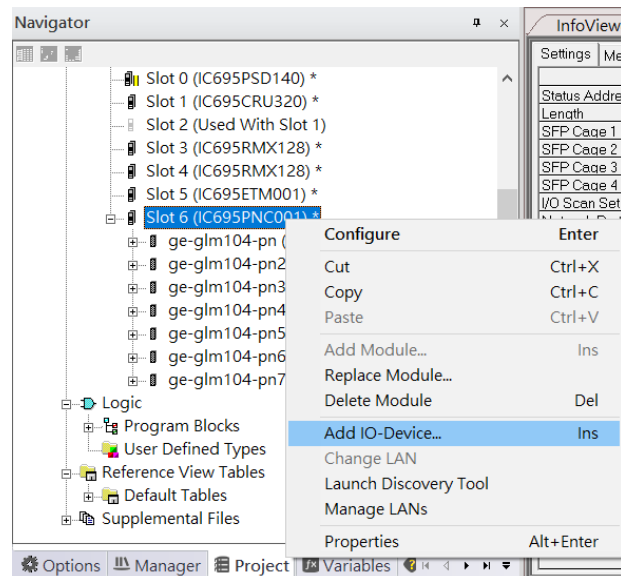


Figure 540

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE]-> [GE-GLM104-PN] and click [OK]

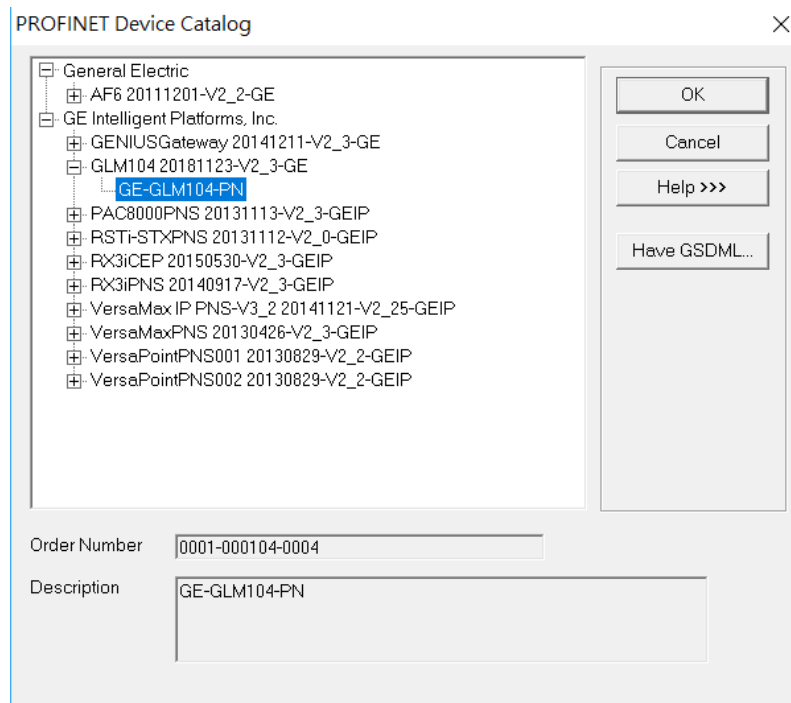


Figure 541

Now the I/O device GLM104(SW8) is ready and is a sub slot on PNC001.

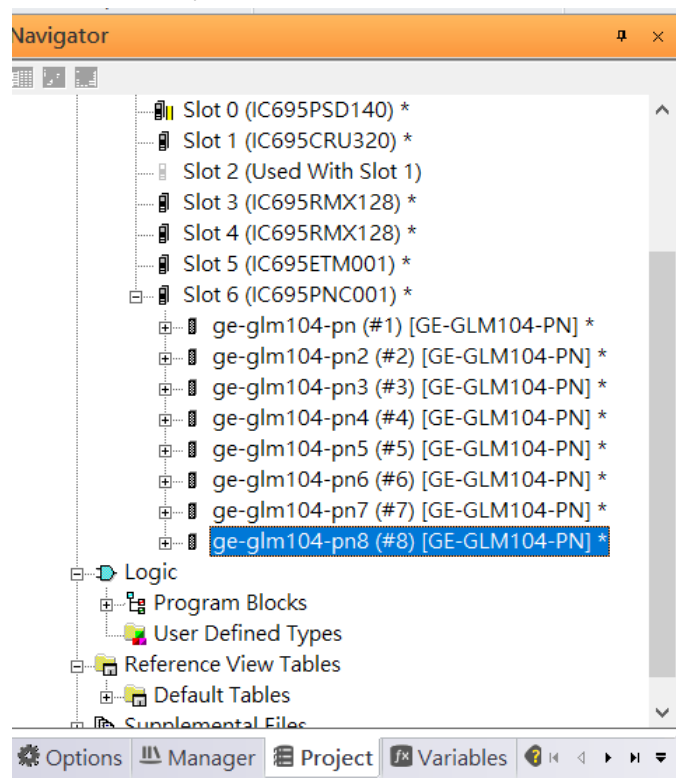


Figure 542

Then add the ninth I/O device in the PNC001.

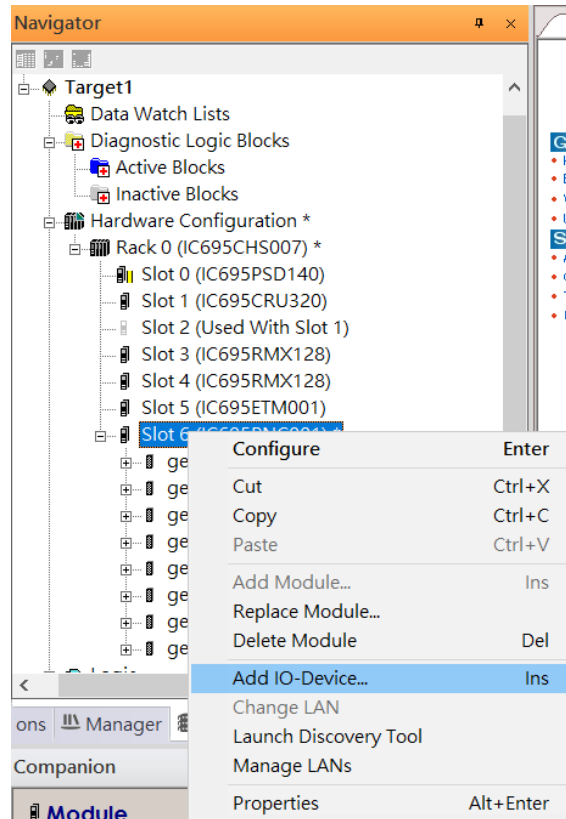


Figure 543

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM0104 20181123-V2_3-GE] -> [GE-GLM104-PN] and click [OK]

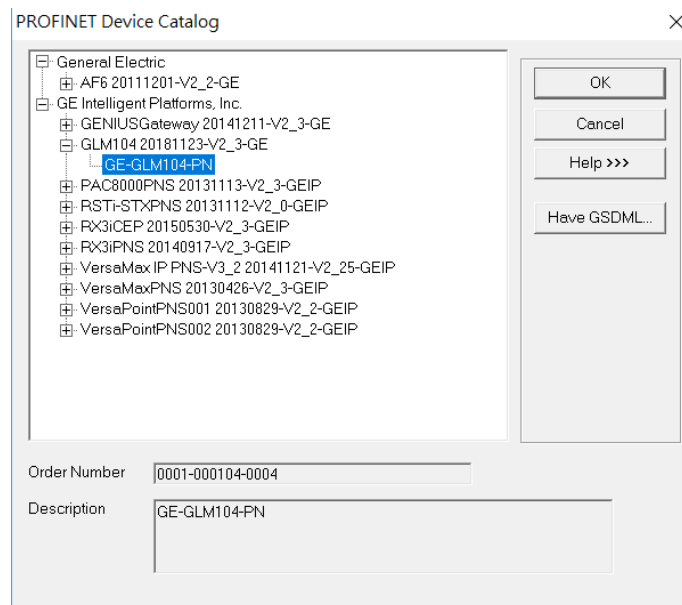


Figure 544

Now the I/O device GLM104(SW9) is ready and is a sub slot on PNC001.

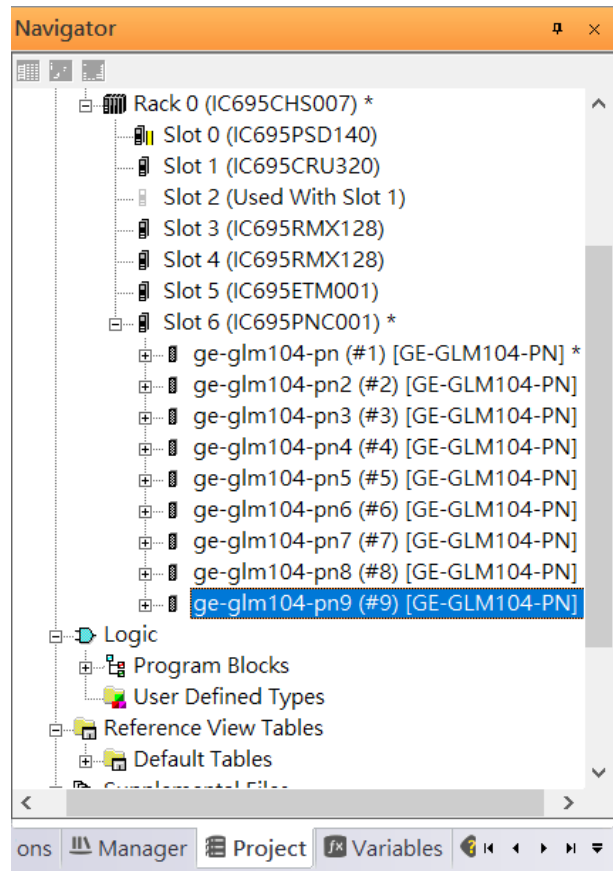


Figure 545

Then add the tenth I/O device in the PNC001.

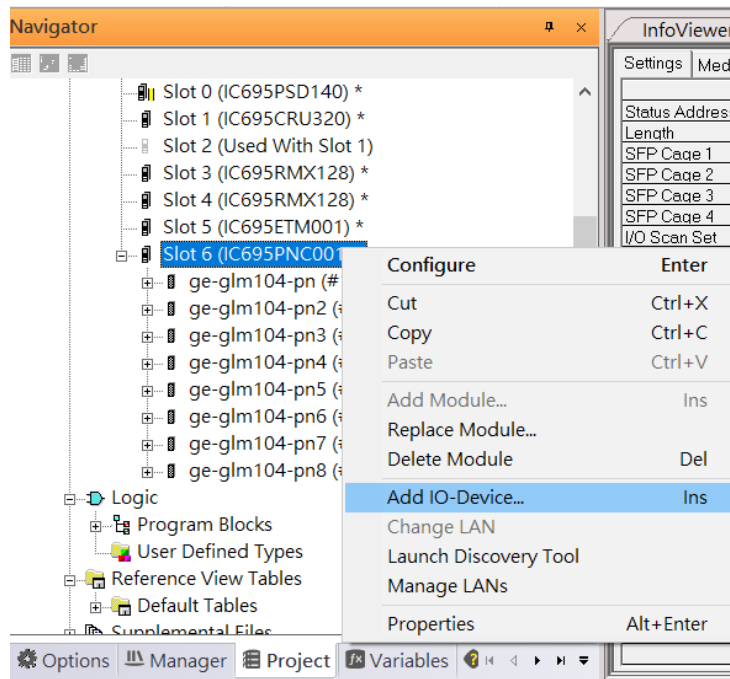


Figure 546

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [VersaMaxPNS 20130426-V2_3-GEIP] -> [VersaMax PROFINET IO Scanner (2 RJ-45 Copper connectors)] and click [OK]

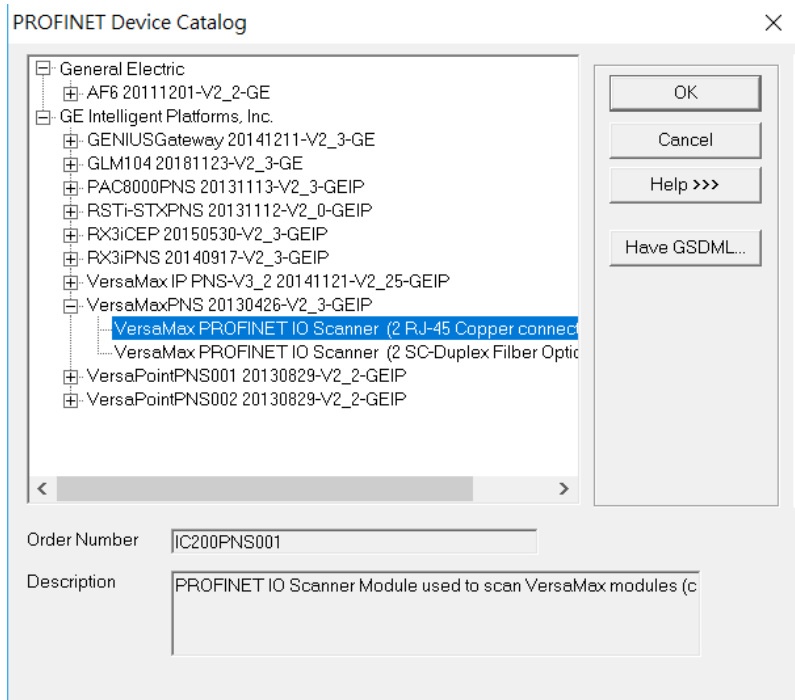


Figure 547

Now the I/O device VersaMax PROFINET IO Scanner is ready and is a sub slot on PNC001.

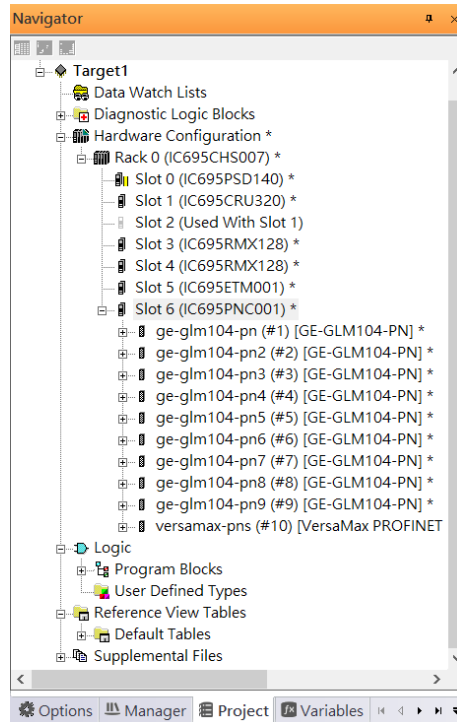


Figure 548

7.2.4 DCP Set Command

To configure the setting or monitor the status on the I/O Device, the communication interface is also based on Ethernet network. We can specify the IP address and the device name from I/O Controller via the DCP (Discovery and Configuration Protocol).

Under the slot 6, PNC001, select the I/O Device, ge-gl m104-pn, and click the right button. Select [Properties], see the following picture.

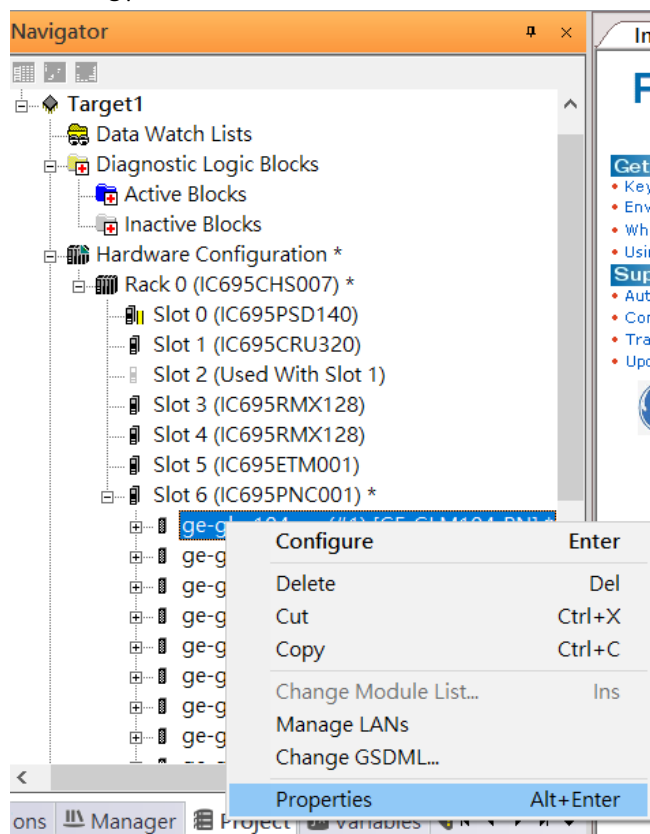


Figure 549

In this table, the I/O Device name can be specified in field [Device Name], and the IP address can be set in field [IP address]. We modify device name to “ge-gl m104-pn-sw-1” and IP address to “192.168.0.21” then we use I/O

Device Discovery Tool to observed an I/O Device and set I/O Device's name to "ge-glm104-pn-sw-1" later.

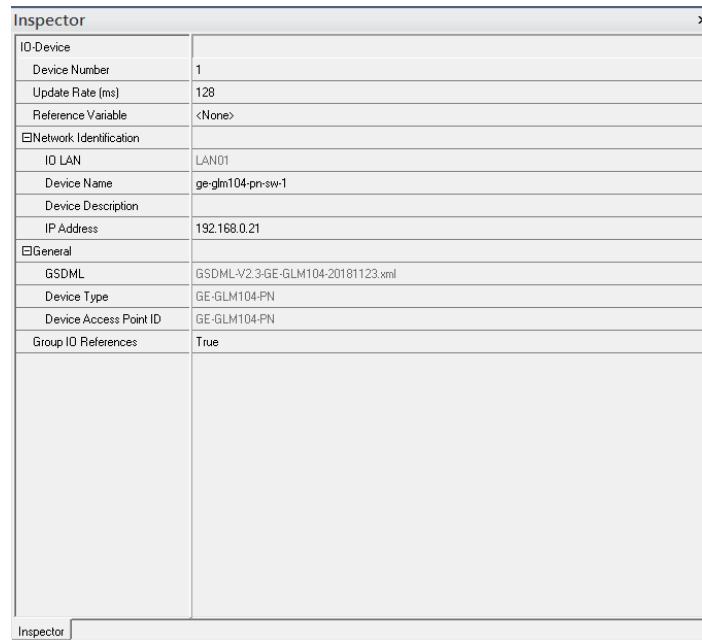


Figure 550

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn2, and click the right button. Select [Properties], see the following picture.

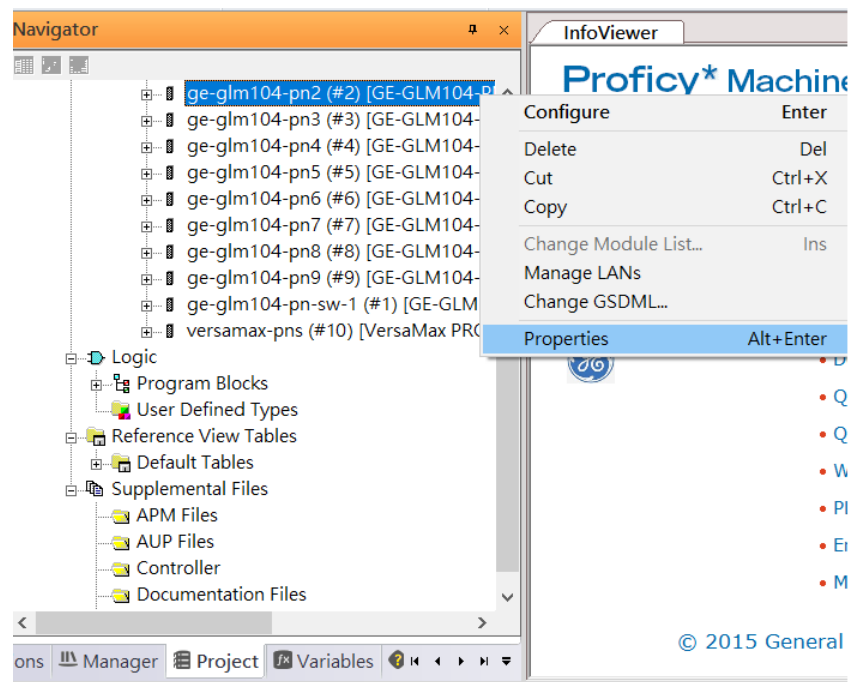


Figure 551

We modify device name to “ge-glm104-pn-sw-2” and IP address to “192.168.0.22” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-2” later.

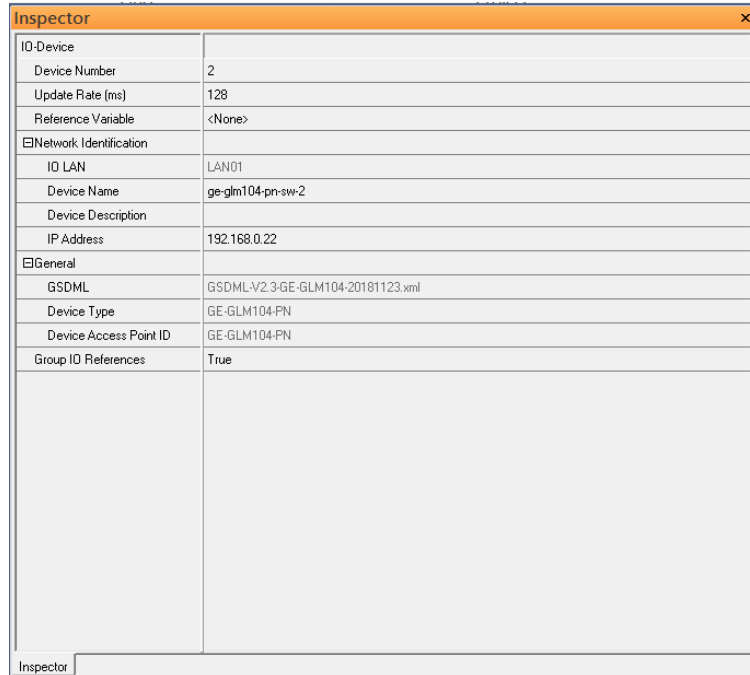


Figure 552

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn3, and click the right button. Select [Properties], see the following picture.

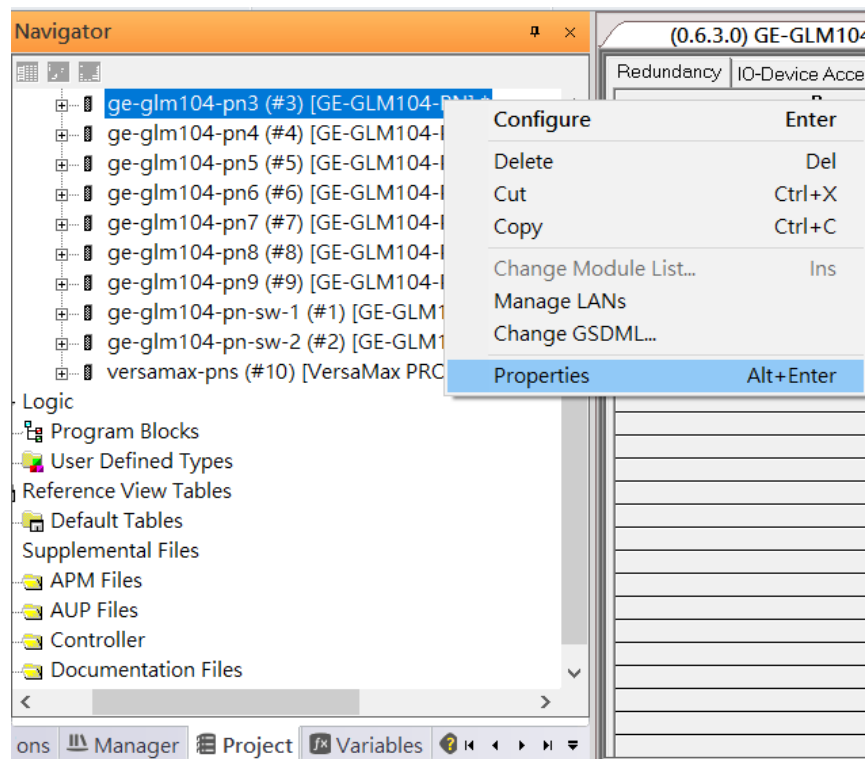


Figure 553

We modify device name to “ge-glm104-pn-sw-3” and IP address to “192.168.0.23” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-3” later.

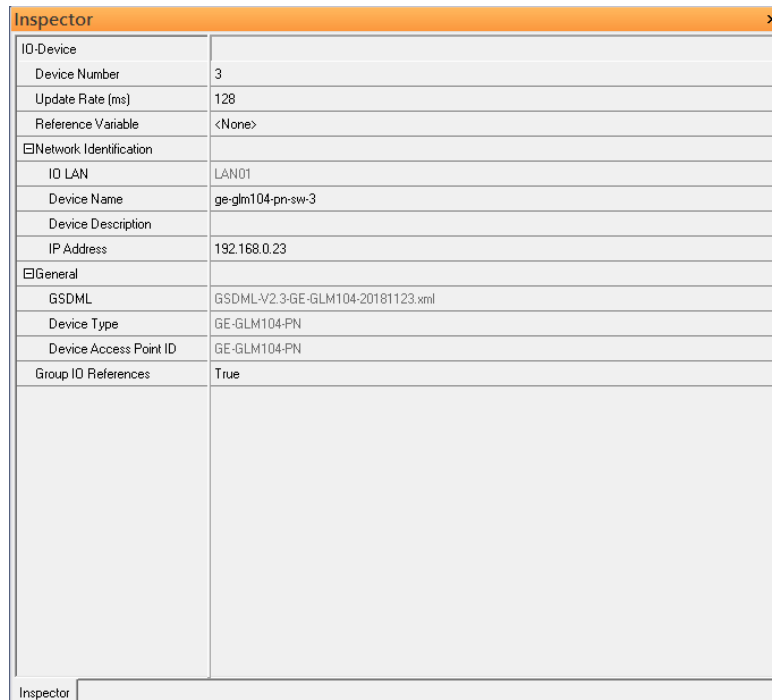


Figure 554

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn4, and click the right button. Select [Properties], see the following picture.

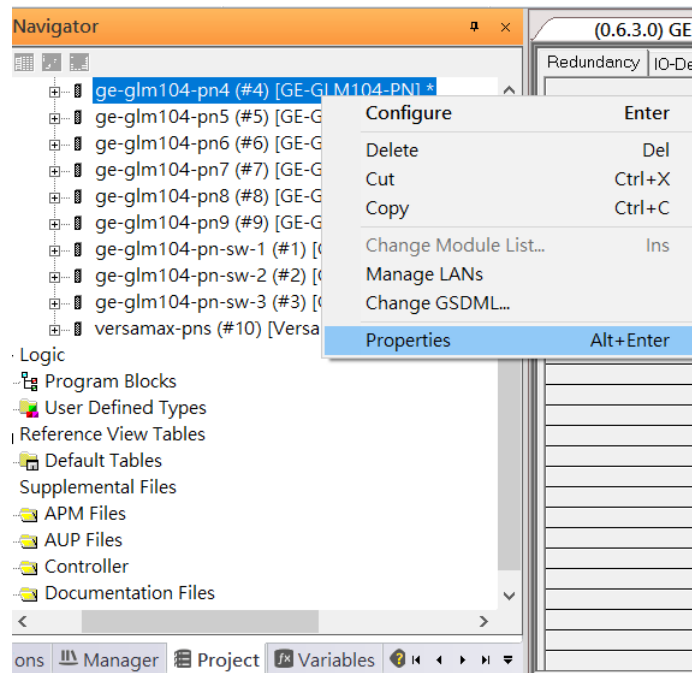


Figure 555

We modify device name to “ge-glm104-pn-sw-4” and IP address to “192.168.0.24” then we use I/O Device DiscoveryTool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-4” later.

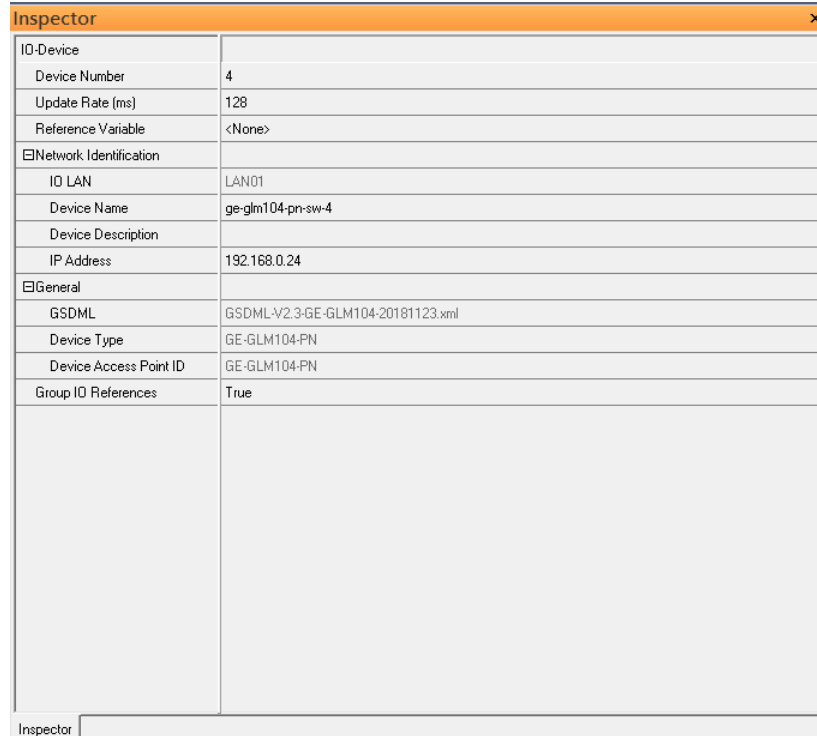


Figure 556

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn5, and click the right button. Select [Properties], see the following picture.

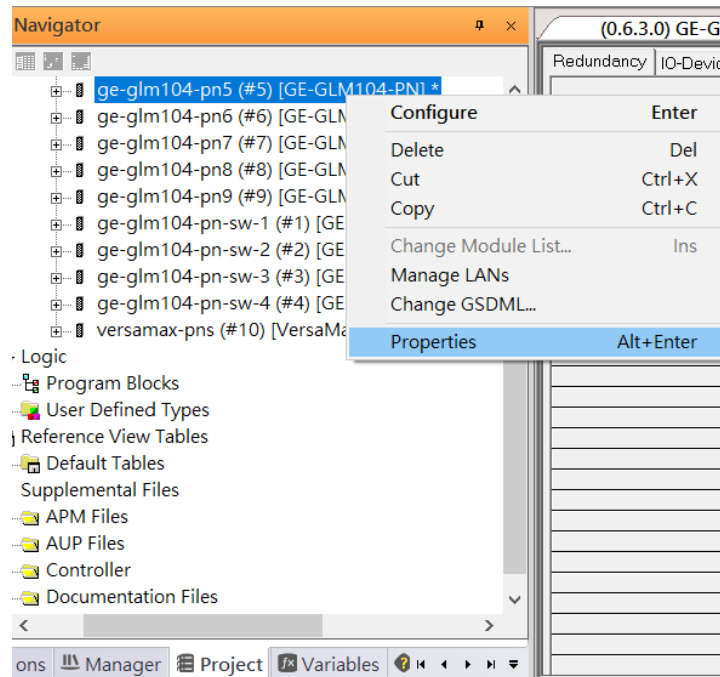


Figure 557

We modify device name to “ge-glm104-pn-sw-5” and IP address to “192.168.0.25” then we use I/O Device DiscoveryTool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-5” later.

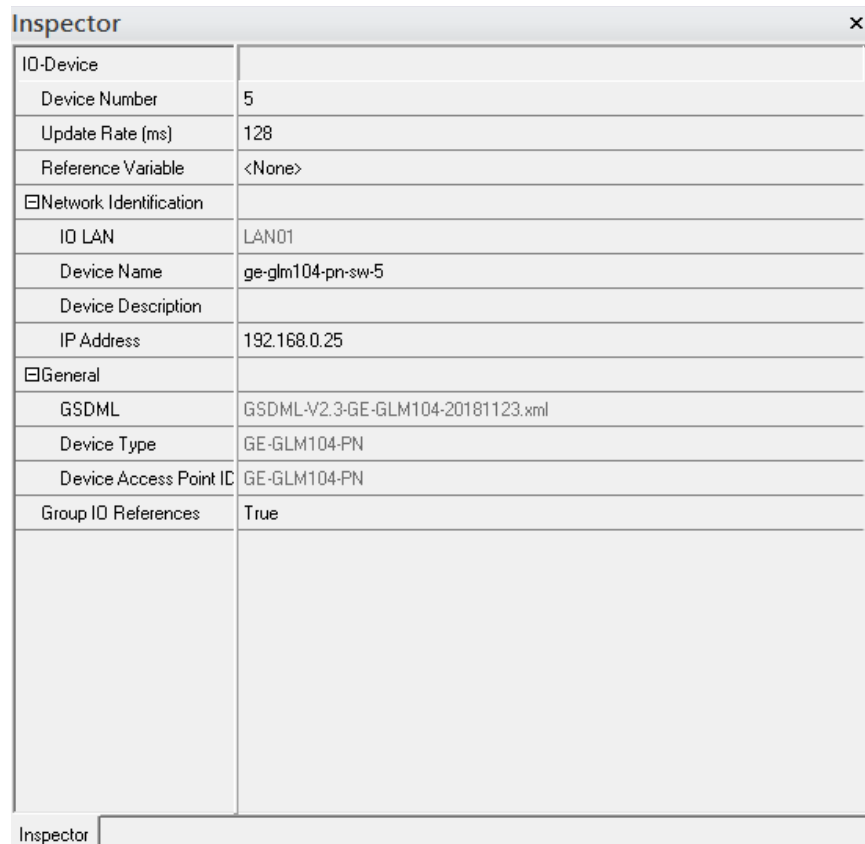


Figure 558

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn6, and click the right button. Select [Properties], see the following picture.

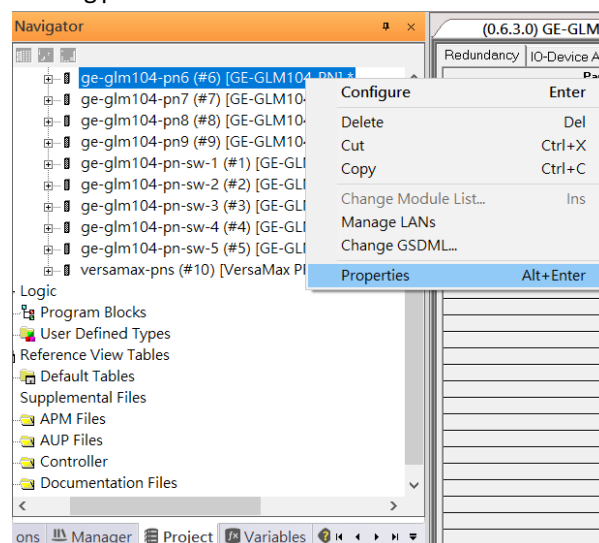


Figure 559

We modify device name to “ge-glm104-pn-sw-6” and IP address to “192.168.0.26” then we use I/O Device DiscoveryTool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-6” later.

The screenshot shows a software window titled "Inspector" with a close button (X) in the top right corner. The window contains a table-like interface for configuring an I/O device. The configuration is organized into sections: "IO-Device", "Network Identification", and "General".

IO-Device	
Device Number	6
Update Rate (ms)	128
Reference Variable	<None>
Network Identification	
IO LAN	LAN01
Device Name	ge-glm104-pn-sw-6
Device Description	
IP Address	192.168.0.26
General	
GSDML	GSDML-V2.3-GE-GLM104-20181123.xml
Device Type	GE-GLM104-PN
Device Access Point ID	GE-GLM104-PN
Group ID References	True

At the bottom left of the window, there is a tab labeled "Inspector".

Figure 560

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn7, and click the right button. Select [Properties], see the following picture.

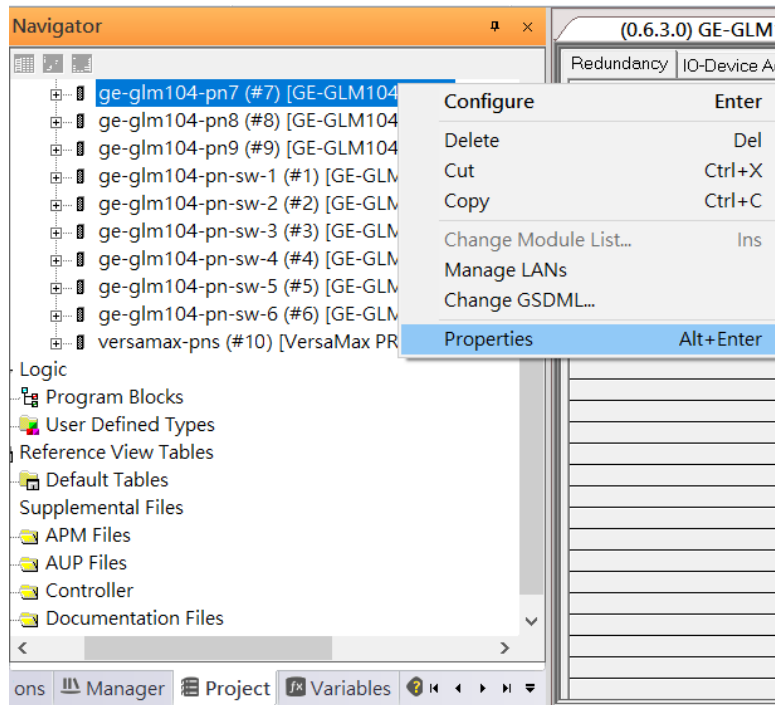


Figure 561

We modify device name to “ge-glm104-pn-sw-7” and IP address to “192.168.0.27” then we use I/O Device DiscoveryTool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-7” later.

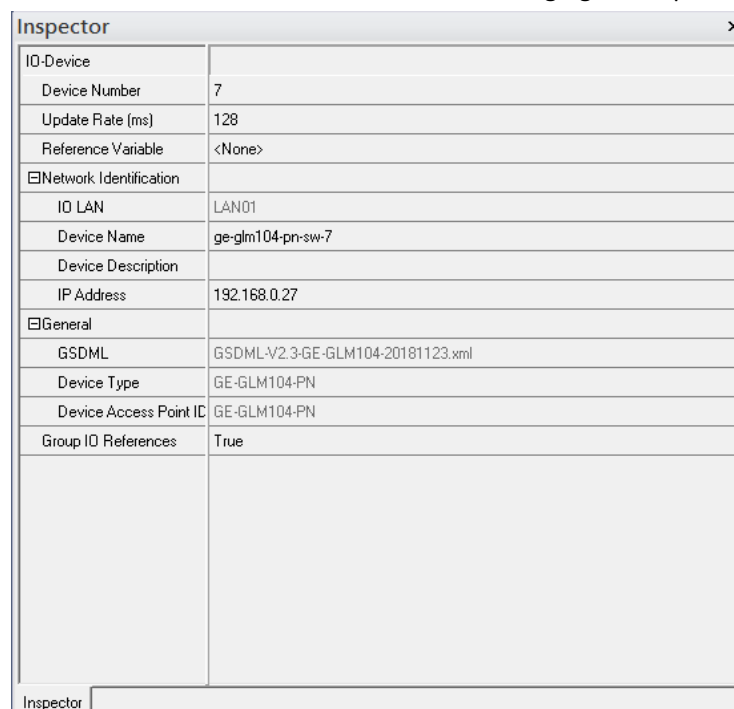


Figure 562

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn8, and click the right button. Select [Properties], see the following picture.

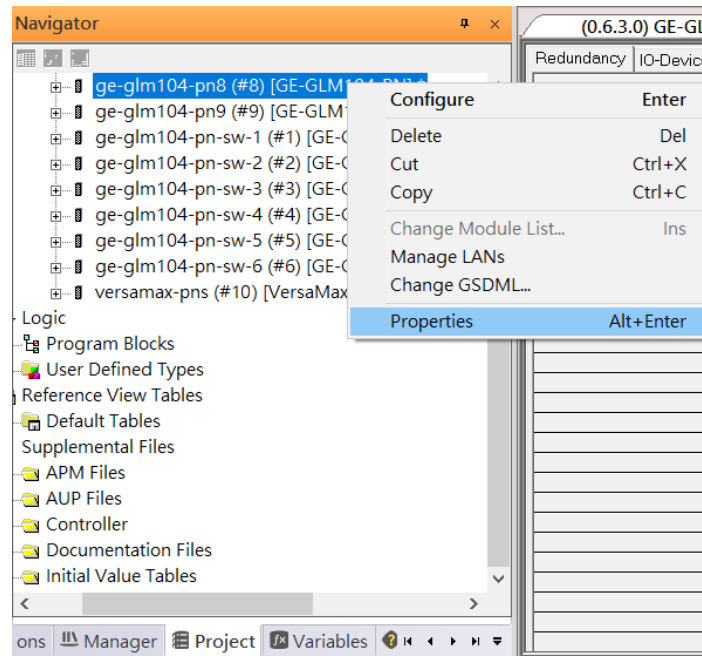


Figure 563

We modify device name to “ge-glm104-pn-sw-8” and IP address to “192.168.0.28” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-8” later.

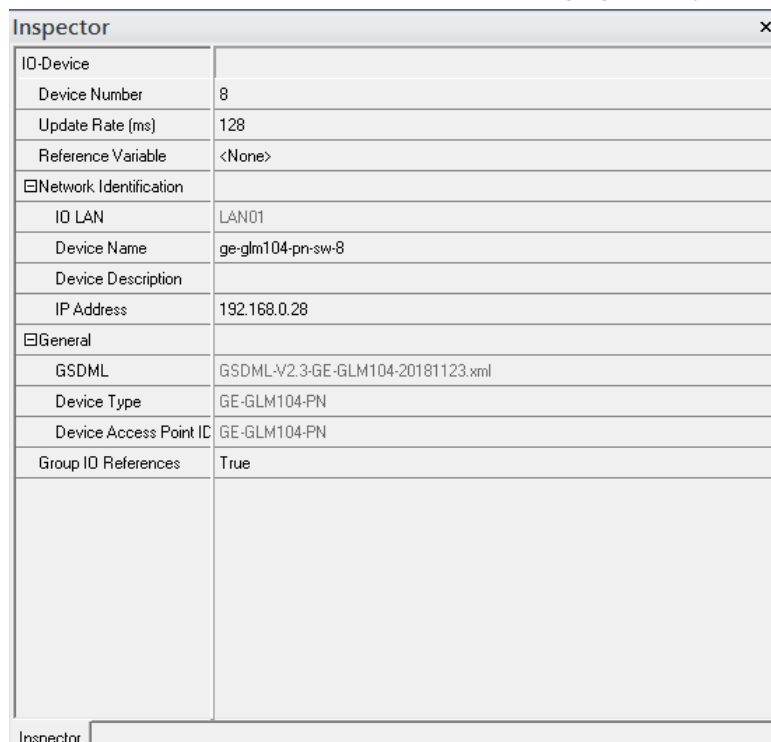


Figure 564

Under the slot 6, PNC001, select the I/O Device, ge-glm104-pn9, and click the right button. Select [Properties], see the following picture.

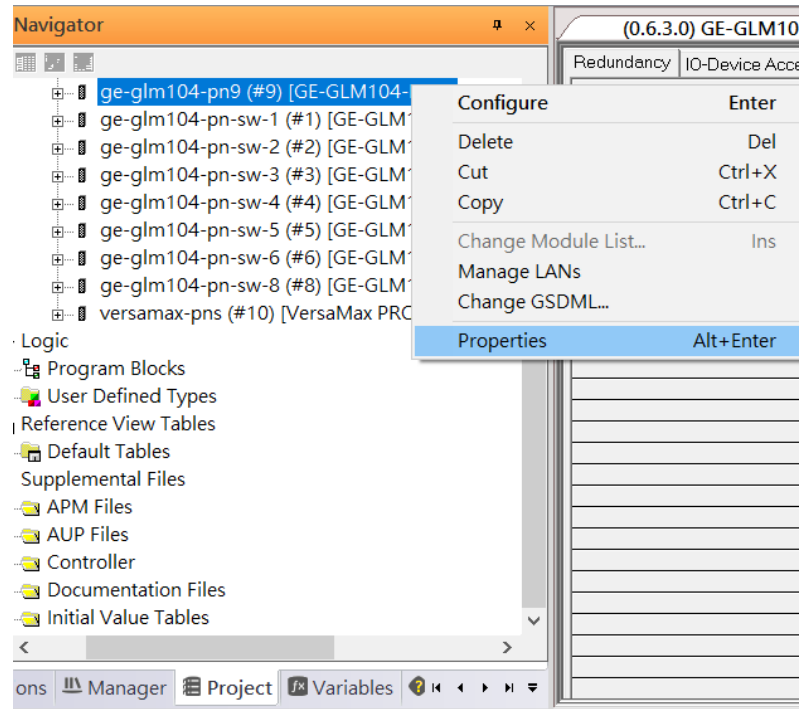


Figure 565

We modify device name to “ge-glm104-pn-sw-9” and IP address to “192.168.0.29” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm104-pn-sw-9” later.

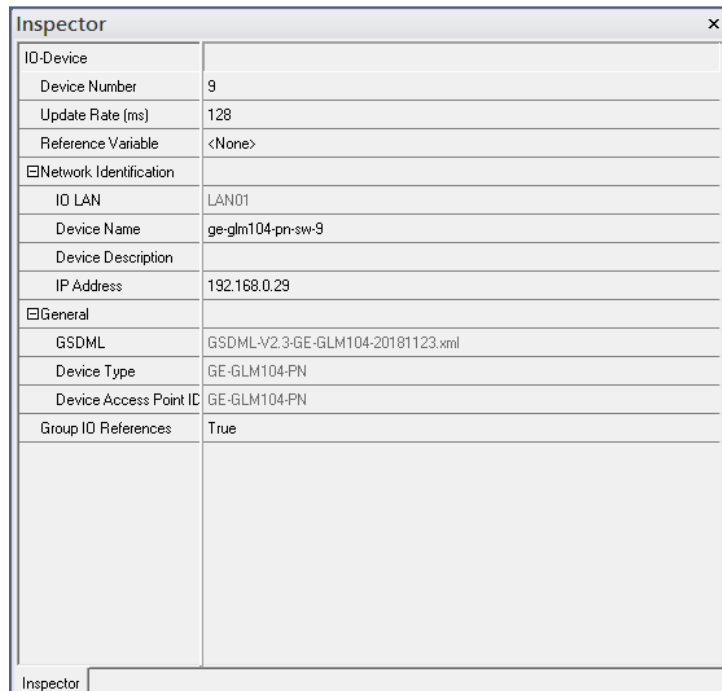


Figure 566

Under the slot 6, PNC001, select the I/O Device, versamax-pns, and click the right button. Select [Properties], see the following picture

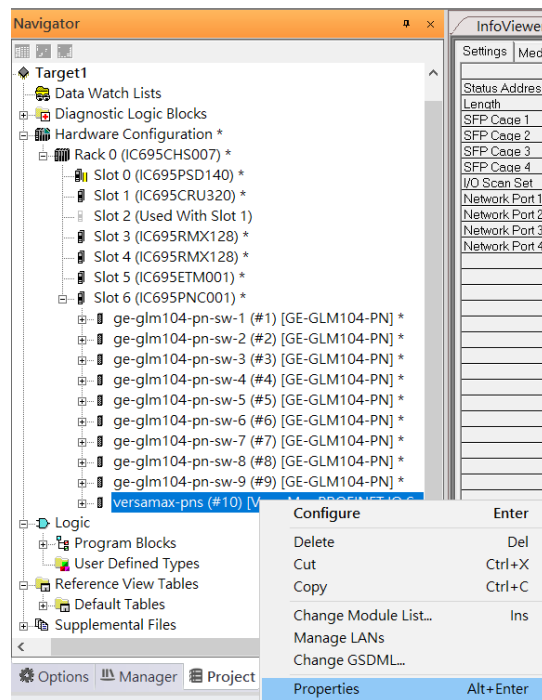


Figure 567

We modify device name to “versamax-pns-pnio-1” and IP address to “192.168.0.55” then we use I/O Device DiscoveryTool to observed an I/O Device and set I/O Device’s name to “versamax-pns-pnio-1” later.

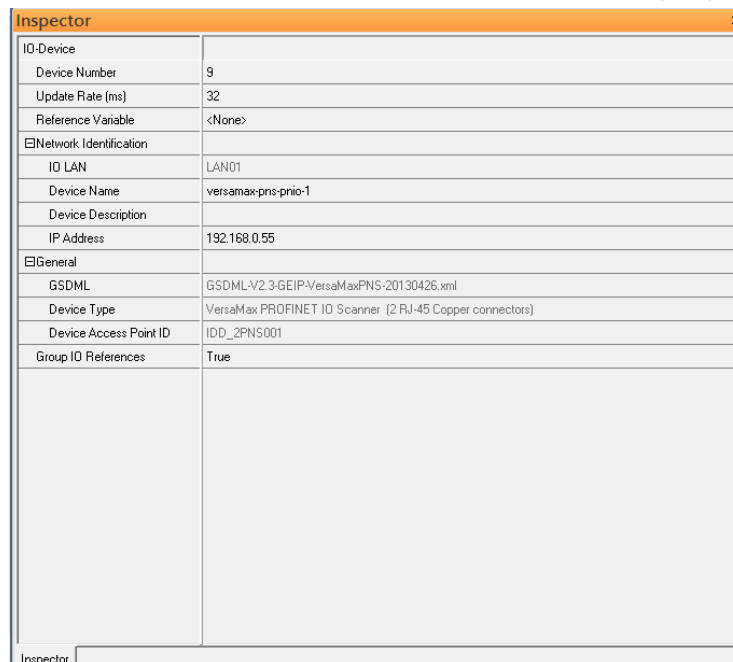


Figure 568

Now all the devices have been changed their device name and IP address like the following picture.

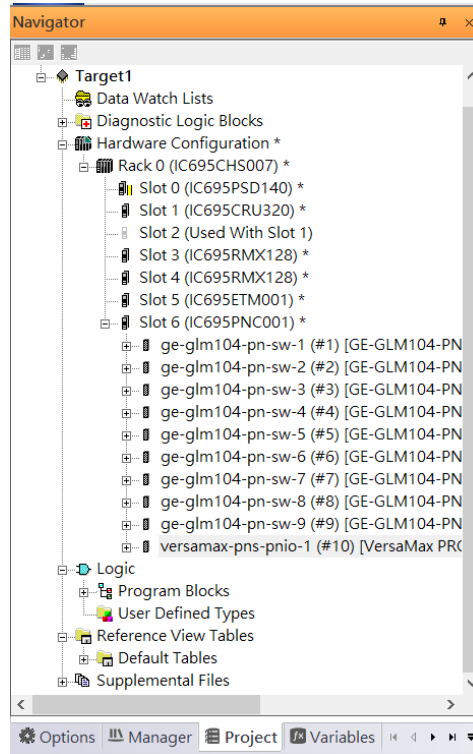


Figure 569

7.2.5 I/O Device Scan

The Proficy Machine Edition also supports the function to scan the connected I/O Devices. First the observed I/O Device shall be connected to the ETM001 on the [Primary] hardware configuration, then using the function [Launch Discovery Tool].

Note: Before we finish downloading the configuration to CRU320, need to unplug the block port according to the hardware topology to avoid loop.

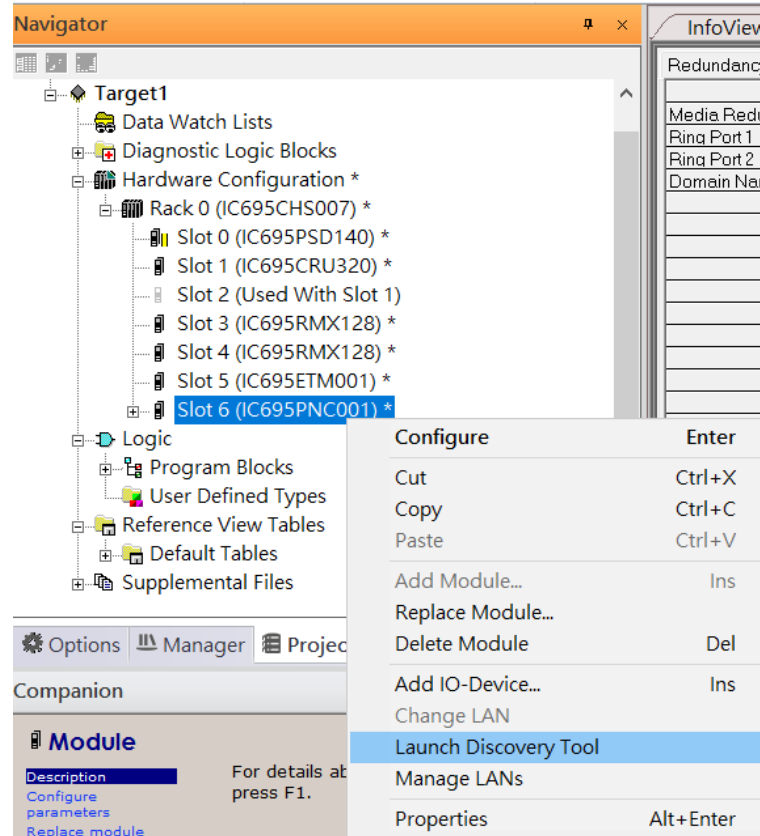


Figure 570

The tool is shown in the following picture, then press [Refresh Device List].

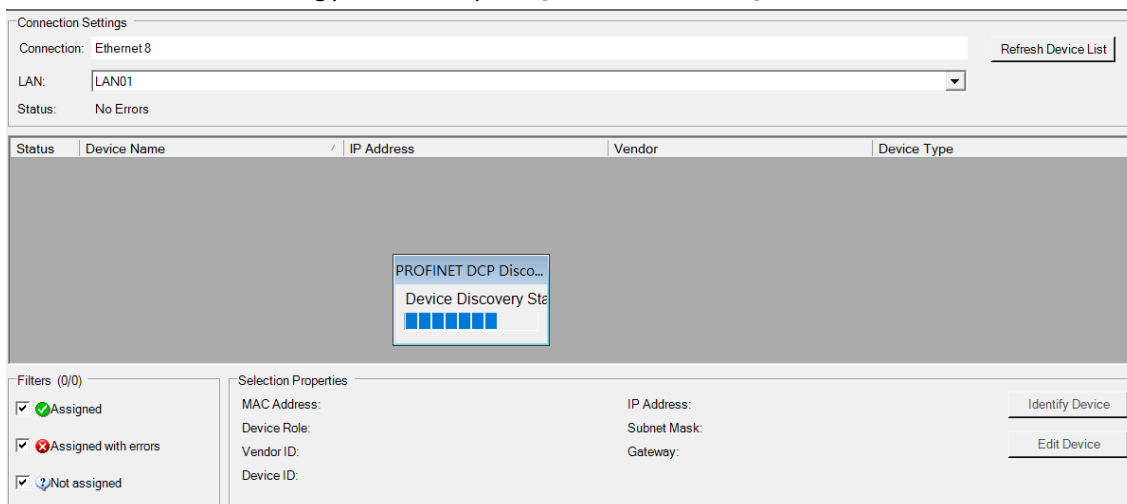


Figure 571

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-1” and click [Set Device Name] button, then set IP Address to “192.168.0.21”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name: GE Intelligent Platforms, Inc. | Vendor ID: 015A
- MAC Address: 00-05-65-72-FB-D0 | Device ID: 0104 | [Identify Device]
- Device Type: GE-GLM104-PN | Device Role: Device
- Device Name: ge-glm104-pn-sw-1 | [Set Device Name]
- IP Address: 192.168.0.21 | Subnet Mask: 255.255.255.0 | Gateway: 0.0.0.0 | [Set IP Information]
- [Reset device to factory settings] | [Reset Device]
- [Exit]

Figure 574

Then set SW-2 device name and IP address

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-2” and click [Set Device Name] button, then set IP Address to “192.168.0.22”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box with the following configuration:

- Vendor Name: GE Intelligent Platforms, Inc. | Vendor ID: 015A
- MAC Address: 00-05-65-73-3C-D6 | Device ID: 0104 | [Identify Device]
- Device Type: GE-GLM104-PN | Device Role: Device
- Device Name: ge-glm104-pn-sw-2 | [Set Device Name]
- IP Address: 192.168.0.22 | Subnet Mask: 255.255.255.0 | Gateway: 0.0.0.0 | [Set IP Information]
- [Reset device to factory settings] | [Reset Device]
- [Exit]

Figure 575

Then set SW-3 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-3” and click [Set Device Name] button, then set IP Address to “192.168.0.23”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

GE-GLM104-PN Properties

Vendor Name: GE Intelligent Platforms, Inc.	Vendor ID: 015A	Identify Device
MAC Address: 00-05-65-73-3D-7E	Device ID: 0104	
Device Type: GE-GLM104-PN	Device Role: Device	

Device Name: Set Device Name

IP Address:
 IP Address:
 Subnet Mask:
 Gateway: Set IP Information

Reset device to factory settings: Reset Device

Exit

Figure 576

Then set SW-4 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-4” and click [Set Device Name] button, then set IP Address to “192.168.0.24”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

GE-GLM104-PN Properties

Vendor Name: GE Intelligent Platforms, Inc.	Vendor ID: 015A	Identify Device
MAC Address: 00-05-65-73-3C-BE	Device ID: 0104	
Device Type: GE-GLM104-PN	Device Role: Device	

Device Name: Set Device Name

IP Address:
 IP Address:
 Subnet Mask:
 Gateway: Set IP Information

Reset device to factory settings: Reset Device

Exit

Figure 577

Then set SW-5 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-5” and click [Set Device Name] button, then set IP Address to “192.168.0.25”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name: GE Intelligent Platforms, Inc. | Vendor ID: 015A
- MAC Address: 00-05-65-73-3C-D6 | Device ID: 0104 | [Identify Device]
- Device Type: GE-GLM104-PN | Device Role: Device
- Device Name: ge-glm104-pn-sw-5 | [Set Device Name]
- IP Address: 192.168.0.25 | Subnet Mask: 255.255.255.0 | Gateway: 0.0.0.0 | [Set IP Information]
- [Reset device to factory settings] | [Reset Device]
- Message box: The IP address information was written to the device successfully. The Device Name was written to the device successfully (ge-glm104-pn changed to ge-glm104-pn-sw-5)
- [Exit]

Figure 578

Then set SW-6 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-6” and click [Set Device Name] button, then set IP Address to “192.168.0.26”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name: GE Intelligent Platforms, Inc. | Vendor ID: 015A
- MAC Address: 00-05-65-73-3C-F6 | Device ID: 0104 | [Identify Device]
- Device Type: GE-GLM104-PN | Device Role: Device
- Device Name: ge-glm104-pn-sw-6 | [Set Device Name]
- IP Address: 192.168.0.26 | Subnet Mask: 255.255.255.0 | Gateway: 0.0.0.0 | [Set IP Information]
- [Reset device to factory settings] | [Reset Device]
- Message box: The IP address information was written to the device successfully. The Device Name was written to the device successfully (ge-glm104-pn changed to ge-glm104-pn-sw-6)
- [Exit]

Figure 579

Then set SW-7 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-7” and click [Set Device Name] button, then set IP Address to “192.168.0.27”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name:** GE Intelligent Platforms, Inc.
- Vendor ID:** 015A
- MAC Address:** 00-05-65-73-3C-5E
- Device ID:** 0104
- Device Type:** GE-GLM104-PN
- Device Role:** Device
- Buttons:** Identify Device, Set Device Name, Set IP Information, Reset Device, Exit.
- Device Name:** ge-glm104-pn-sw-7
- IP Address:** 192.168.0.27
- Subnet Mask:** 255.255.255.0
- Gateway:** 0.0.0.0
- Message Log:** The IP address information was written to the device successfully. The Device Name was written to the device successfully (ge-glm104-pn changed to ge-glm104-pn-sw-7)

Figure 580

Then set SW-8 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-8” and click [Set Device Name] button, then set IP Address to “192.168.0.28”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

The screenshot shows the 'GE-GLM104-PN Properties' dialog box. It contains the following fields and buttons:

- Vendor Name:** GE Intelligent Platforms, Inc.
- Vendor ID:** 015A
- MAC Address:** 00-05-65-73-3C-8E
- Device ID:** 0104
- Device Type:** GE-GLM104-PN
- Device Role:** Device
- Buttons:** Identify Device, Set Device Name, Set IP Information, Reset Device, Exit.
- Device Name:** ge-glm104-pn-sw-8
- IP Address:** 192.168.0.28
- Subnet Mask:** 255.255.255.0
- Gateway:** 0.0.0.0
- Message Log:** The IP address information was written to the device successfully. The Device Name was written to the device successfully (ge-glm104-pn changed to ge-glm104-pn-sw-8)

Figure 581

Then set SW-9 device name and IP address.

Click [Edit Device], set Device Name to “ge-glm104-pn-sw-9” and click [Set Device Name] button, then set IP Address to “192.168.0.29”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

GE-GLM104-PN Properties

Vendor Name: GE Intelligent Platforms, Inc. Vendor ID: 015A
MAC Address: 00-05-65-73-3C-5E Device ID: 0104 Identify Device
Device Type: GE-GLM104-PN Device Role: Device

Device Name
ge-glm104-pn-sw-9 Set Device Name

IP Address
IP Address: 192.168.0.29
Subnet Mask: 255.255.255.0 Set IP Information
Gateway: 0.0.0.0

Reset device to factory settings
Reset Device

Exit

Figure 582

Then set PNIO-1 device name and IP address.

Click [Edit Device], set Device Name to “versamax-pns-pnio-1” and click [Set Device Name] button, then set IP Address to “192.168.0.55”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

IC200PNS001 Properties

Vendor Name: GE Intelligent Platforms, Inc. Vendor ID: 015A
MAC Address: 00-09-91-56-C3-0E Device ID: 0003 Identify Device
Device Type: IC200PNS001 Device Role: Device

Device Name
versamax-pns-pnio-1 Set Device Name

IP Address
IP Address: 192.168.0.55
Subnet Mask: 255.255.255.0 Set IP Information
Gateway: 0.0.0.0

Reset device to factory settings
Reset Device

Exit

Figure 583

After assigning Device Name and IP Address correctly, the Status will be in “Assigned” status.

Connection Settings

Connection: Ethernet 8

Refresh Device List

LAN: LAN01

Status: No Errors

Status	Device Name	IP Address	Vendor	Device Type
✓	ge-glm104-pn-sw-1	192.168. 0. 21	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-2	192.168. 0. 22	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-3	192.168. 0. 23	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-4	192.168. 0. 24	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-5	192.168. 0. 25	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-6	192.168. 0. 6	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-7	192.168. 0. 27	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-8	192.168. 0. 28	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	ge-glm104-pn-sw-9	192.168. 0. 29	GE Intelligent Platforms, Inc.	GE-GLM104-PN
✓	iolan-controller01	192.168. 0. 1	GE Intelligent Platforms, Inc.	IC695PNC001
✓	versamax-pns-pnio-1	192.168. 0. 55	GE Intelligent Platforms, Inc.	IC200PNS001

Filters (11/11)

☒ Assigned
 ☒ Assigned with errors
 ☒ Not assigned

Selection Properties

MAC Address: 00-05-65-72-FB-D0

Device Role: Device

Vendor ID: 015A

Device ID: 0104

IP Address: 192.168.0.21

Subnet Mask: 255.255.255.0

Gateway: 0.0.0.0

Identify Device

Edit Device

Figure 584

7.2.6 MRP Setting

Setting MRP for I/O controller and I/O devices according to the following figure.

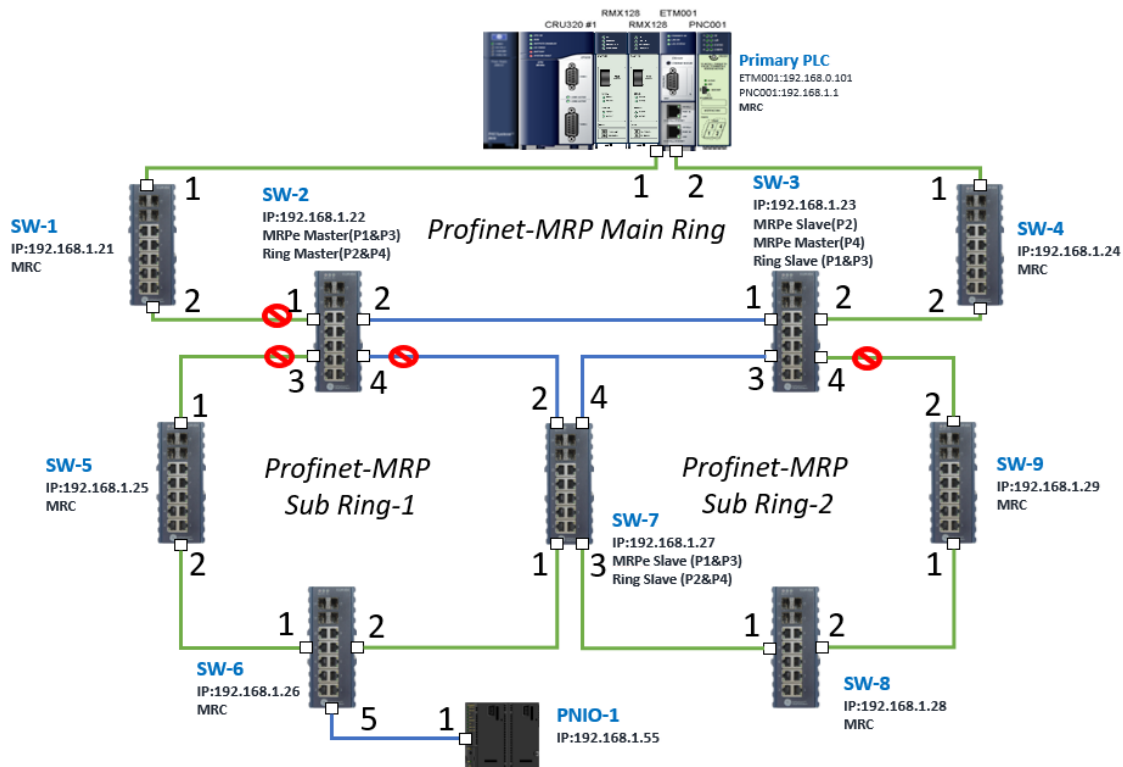


Figure 585

First, configure the MRPe in Profinet MRP Main Ring (green line in the box).

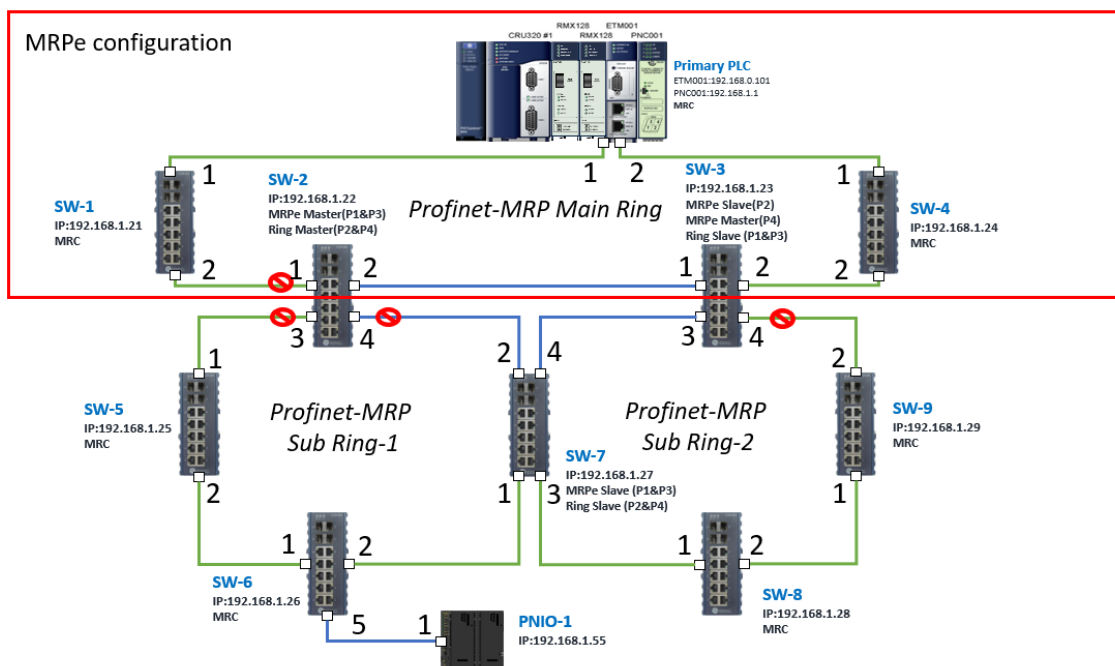


Figure 586

In order to enable MRP function in I/O controller, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

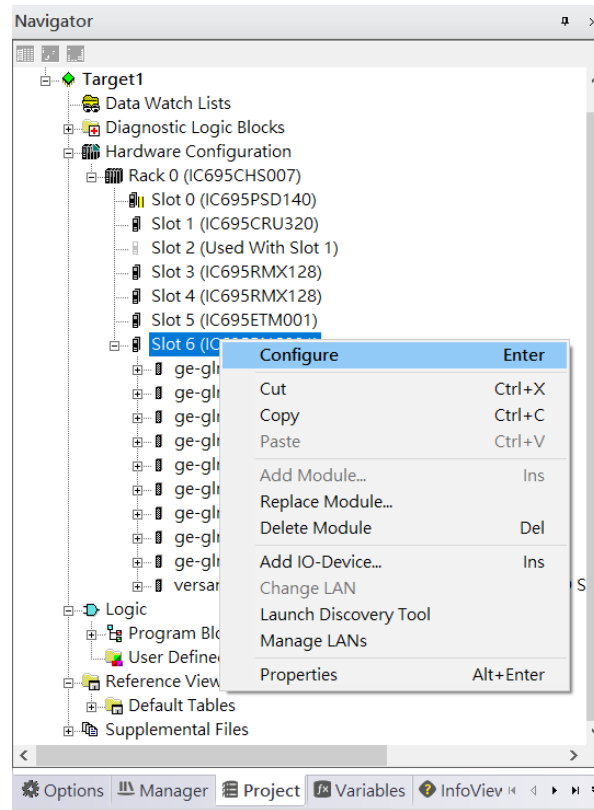


Figure 587

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

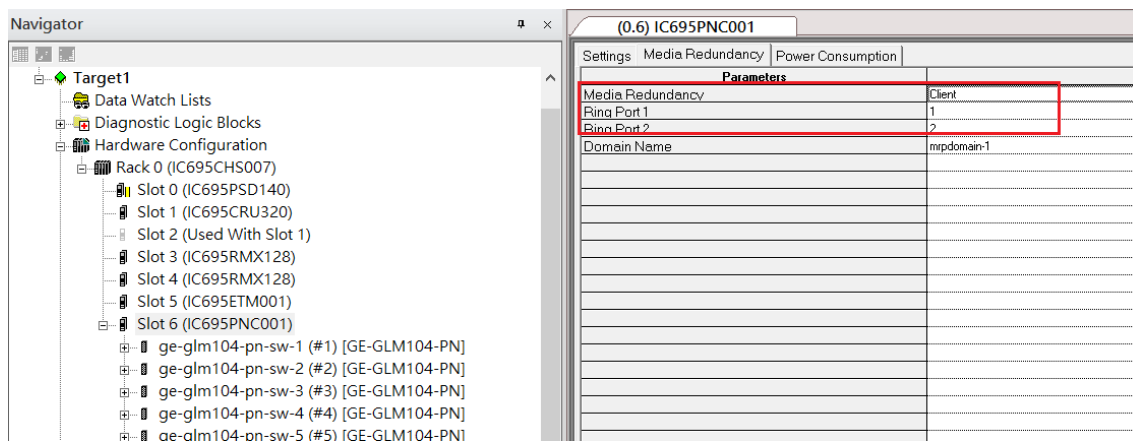


Figure 588

In order to enable MRP function in SW1, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

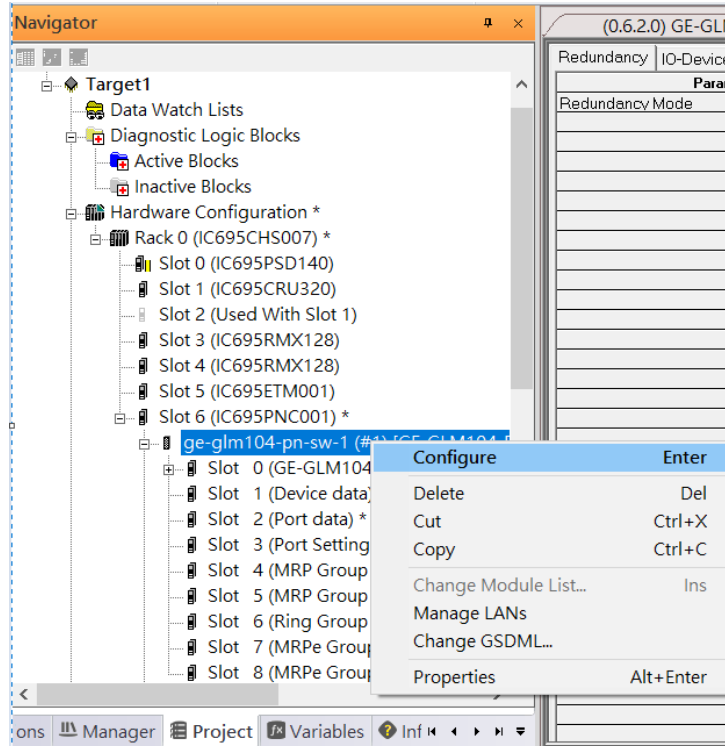


Figure 589

Enable MRP function by changing the value of “Media Redundancy” to manager and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

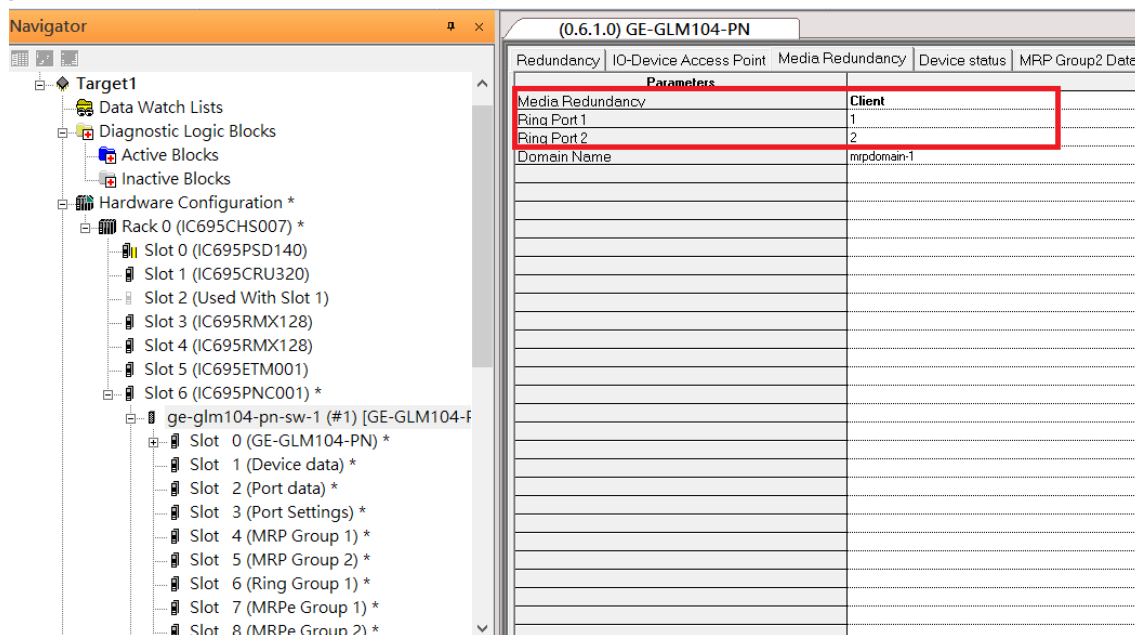


Figure 590

To enable MRPe functions in SW2, click the right button and choose [Configure].

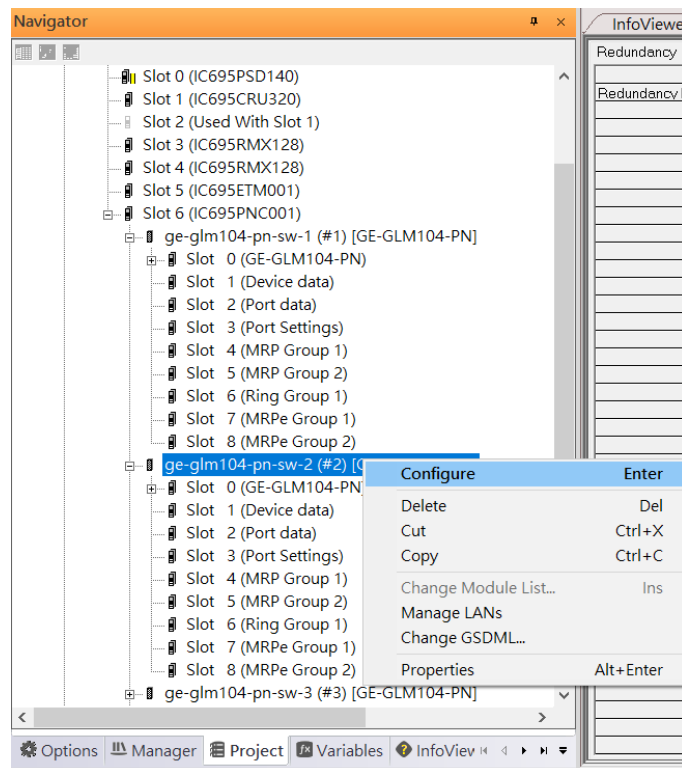


Figure 591

Enable MRPe function by changing the value of “MRPe Group1 Data” to Master and select [MRPe Port] to “Port 1”.

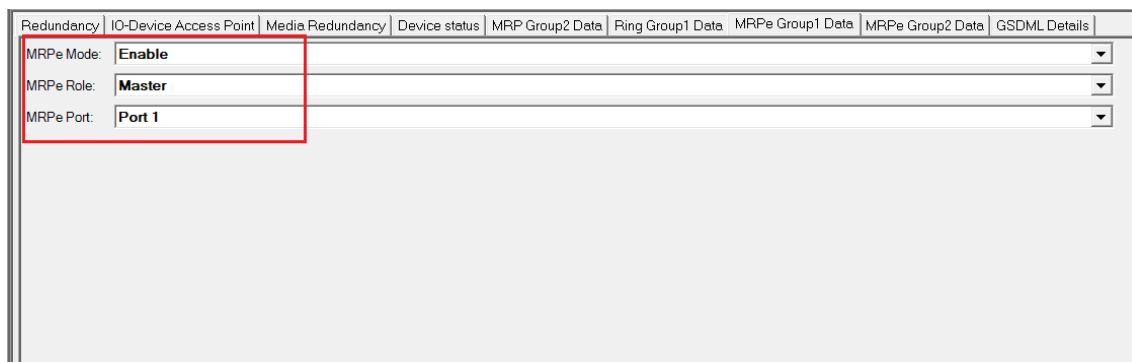


Figure 592

To enable MRPe functions in SW3, click the right button and choose [Configure].

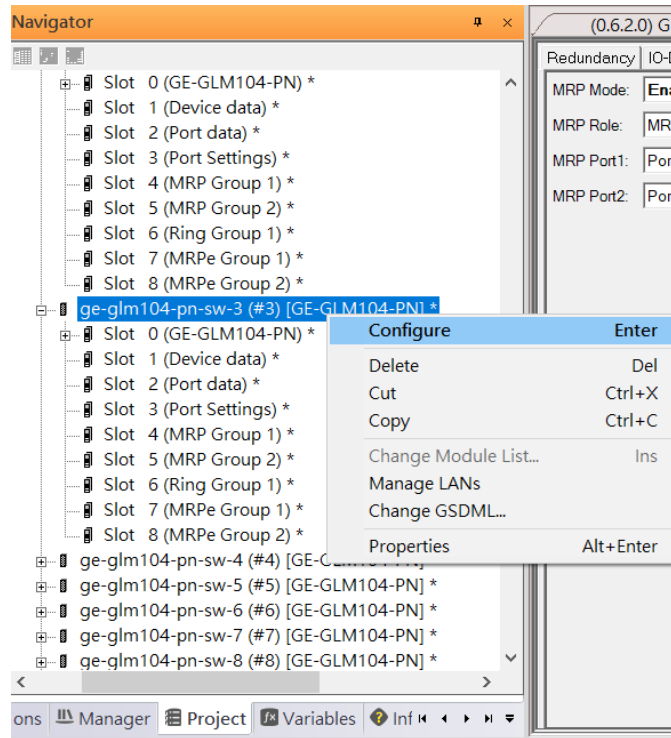


Figure 593

Enable MRPe function by changing the value of “MRPe Group1 Data” to Slave and select [MRPe Port] to “Port 2”.

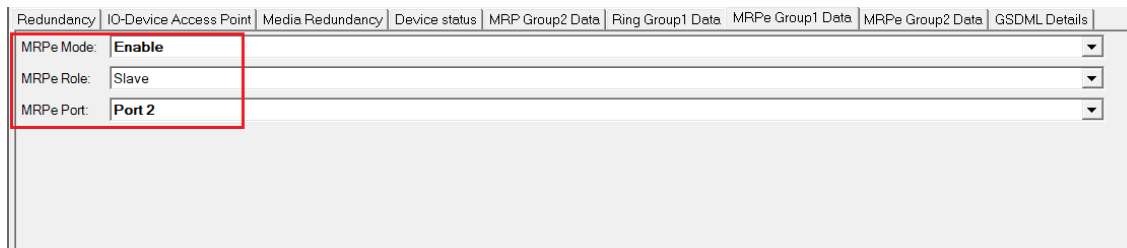


Figure 594

To enable MRP function in SW4, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

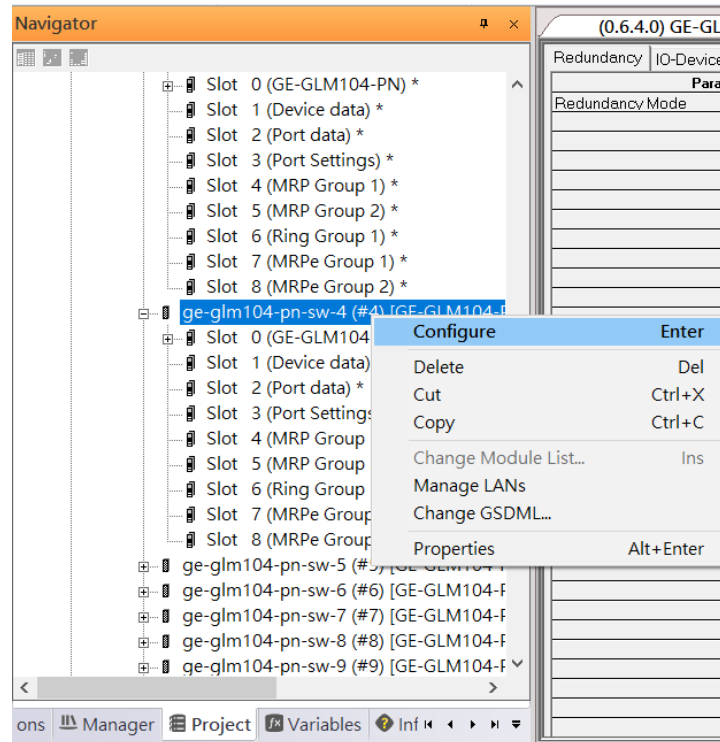


Figure 595

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

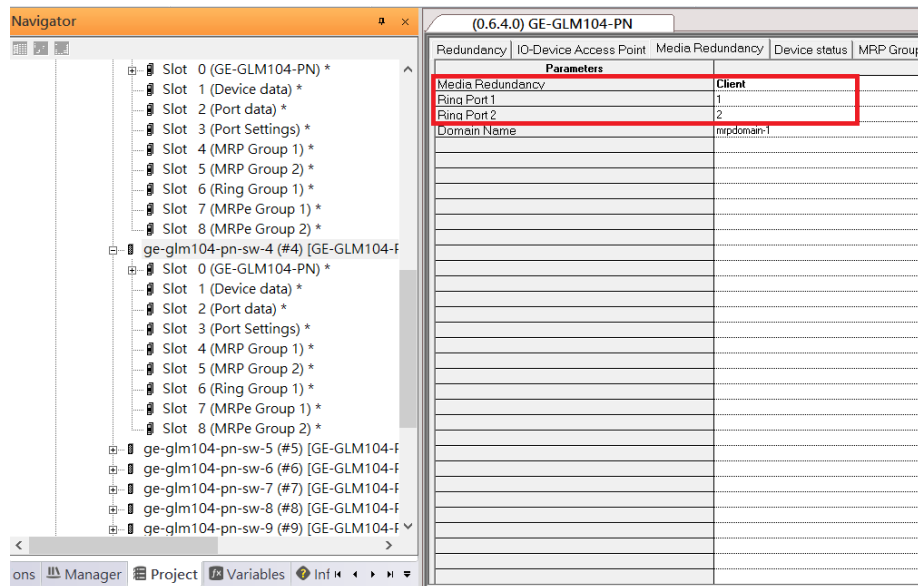


Figure 596

Then configure the Ring in Profinet Main Ring (blue line in the box).

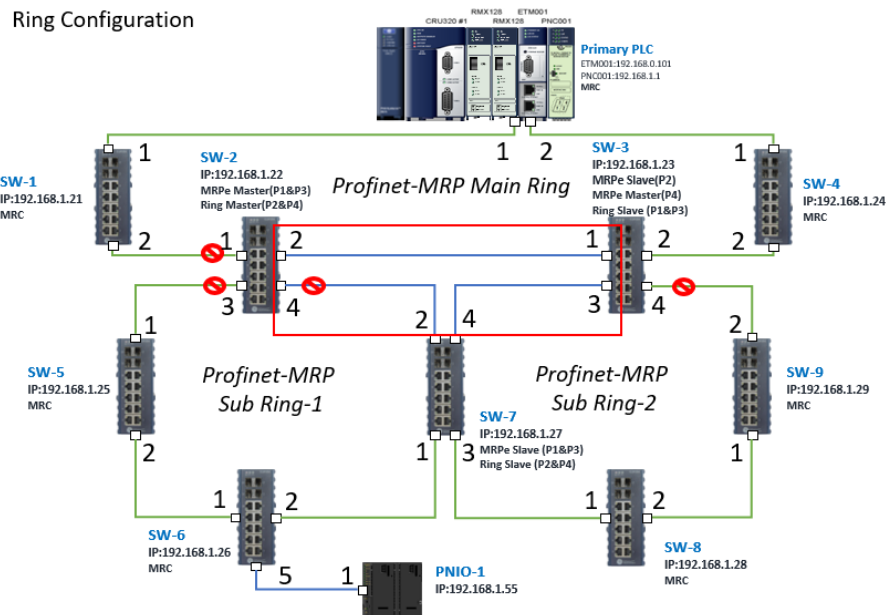


Figure 597

To enable Ring function in SW2, click the right button and choose[Configure].

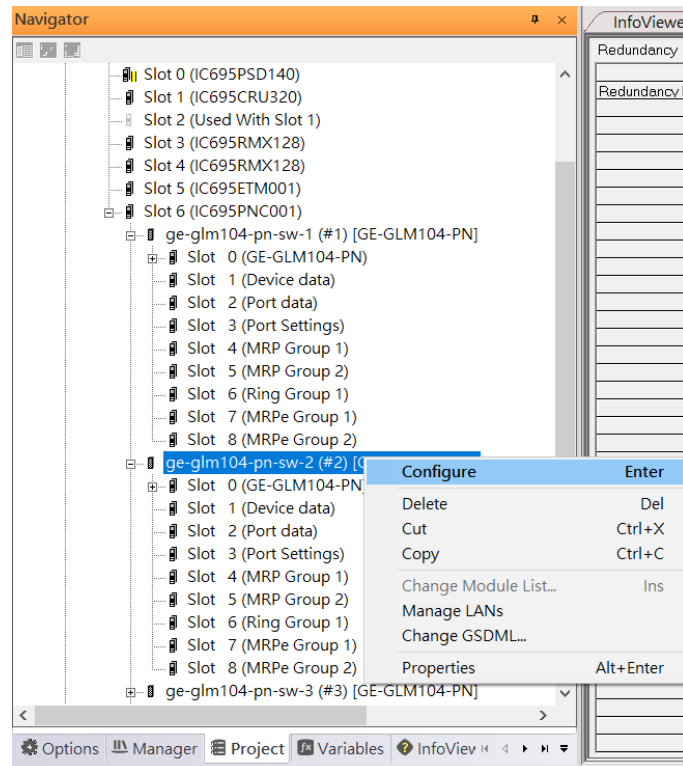


Figure 598

Enable Ring function by changing the value of “Ring Group1 Data” to master and select [Ring Group Port 1]to “Port 2”, [Ring Group Port 2] to “Port 4”.

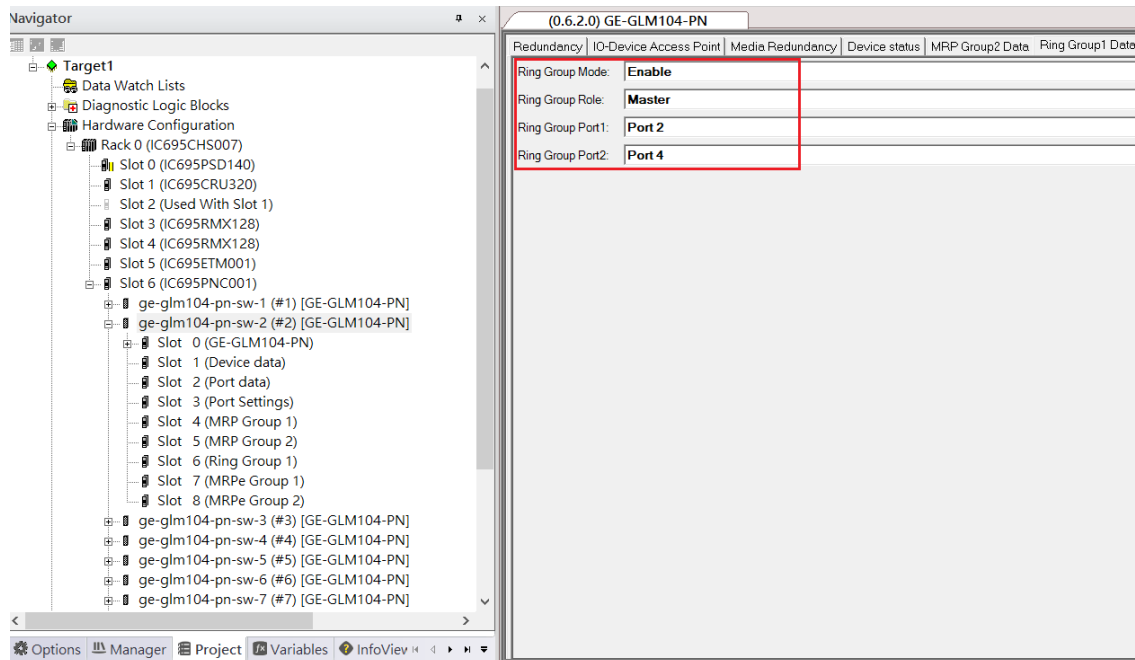


Figure 599

To enable Ring function in SW3, click the right button and choose [Configure].

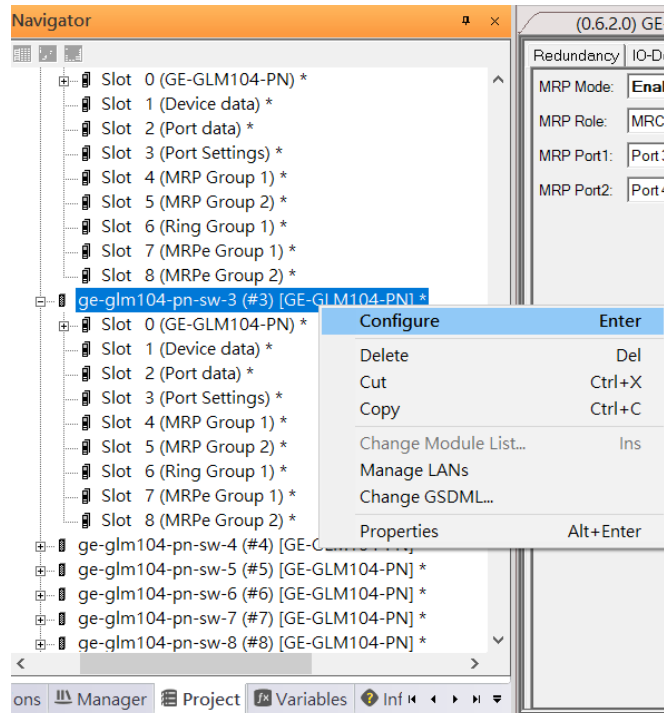


Figure 600

Enable Ring function by changing the value of “Ring Group1 Data” to slave and select [Ring Group Port 1]to “1”, [Ring Group Port 2] to “3”.

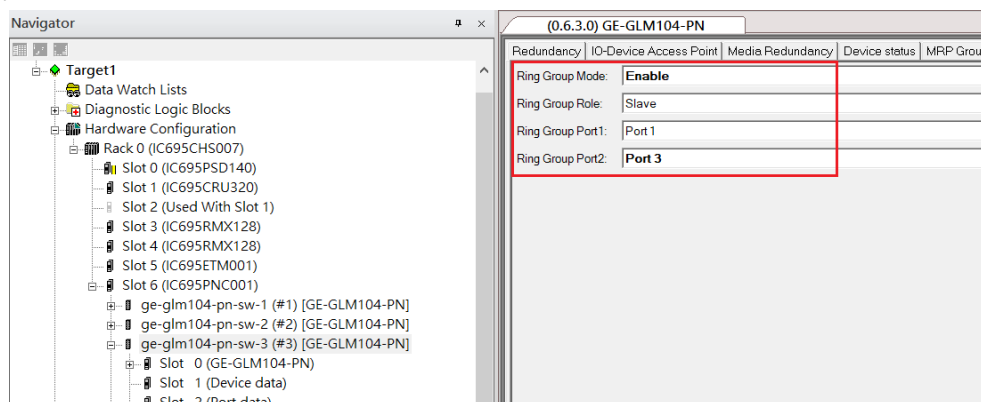


Figure 601

To enable Ring function in SW7, click the right button and choose [Configure].

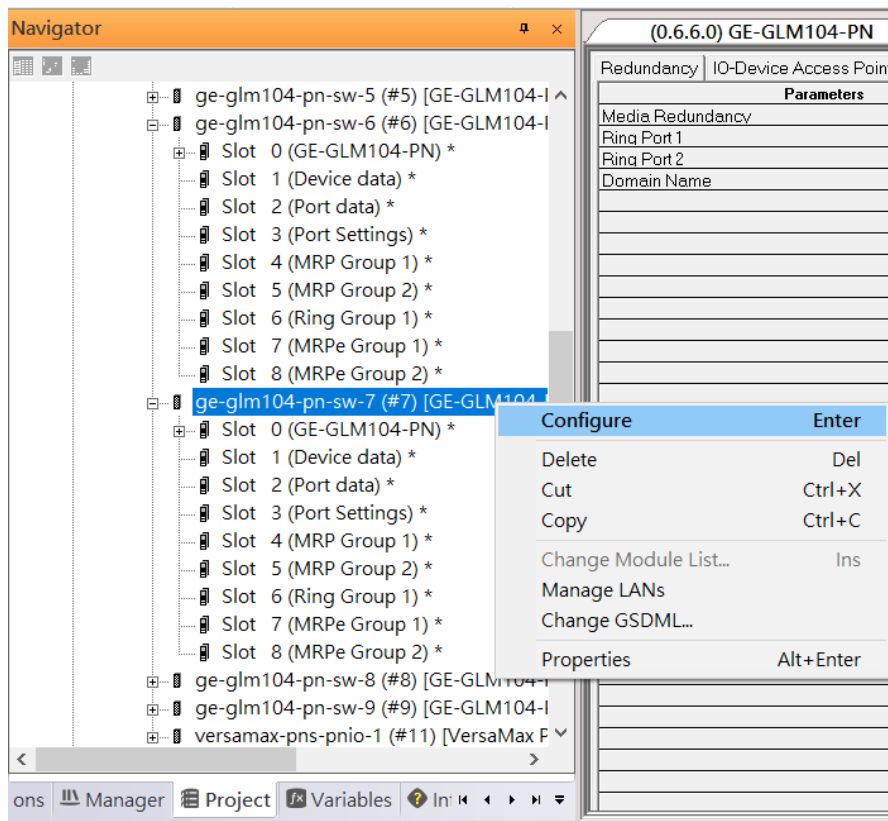


Figure 602

Enable Ring function by changing the value of “Ring Group1 Data” to slave and select [Ring Group Port 1]to “Port 2”, [Ring Group Port 2] to “Port 4”.

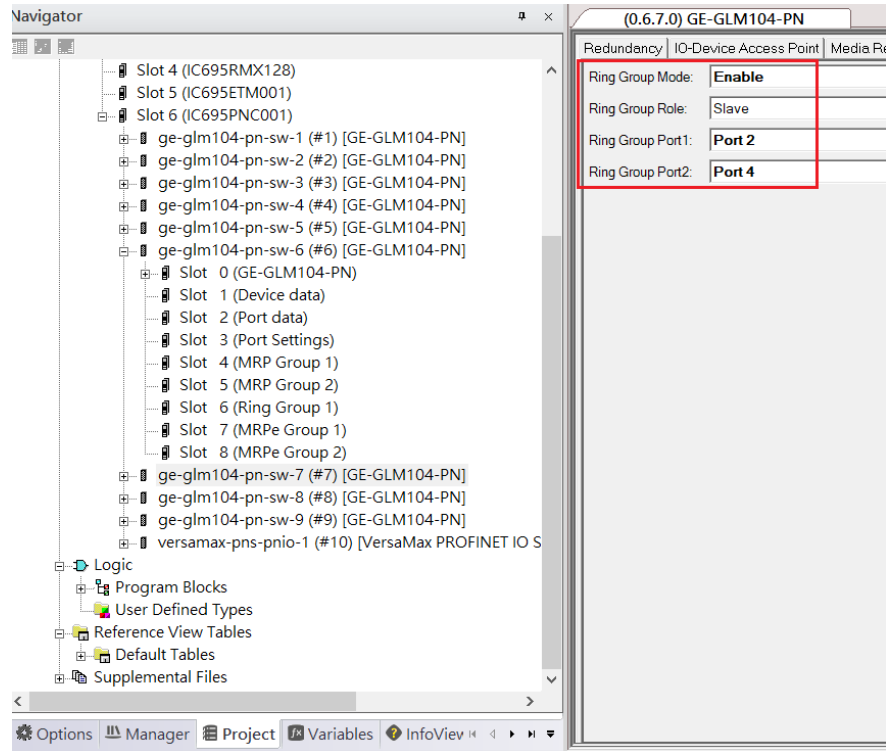


Figure 603

Then configure the MRPe in Profinet MRP Sub Ring-1 (green line in the box).

MRPe configuration

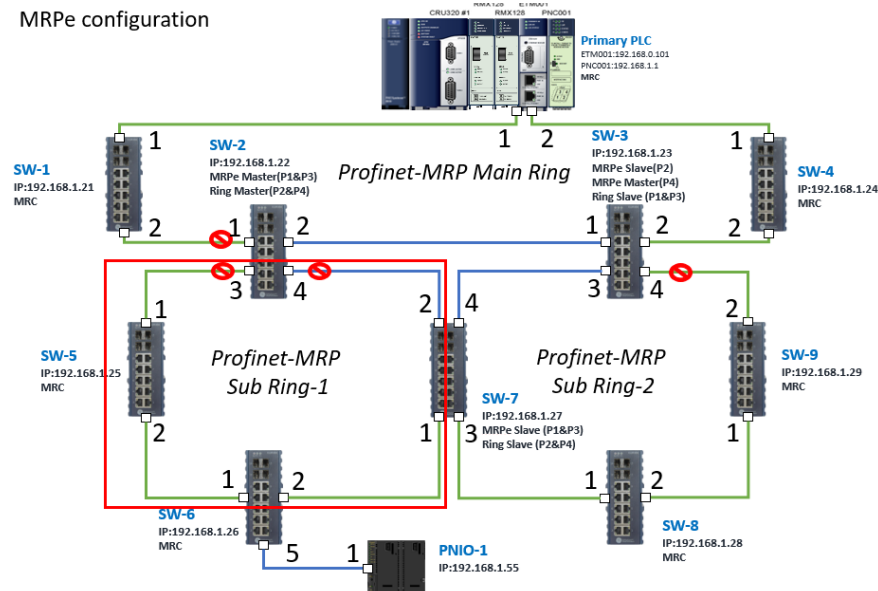


Figure 604

To enable Ring functions in SW2, click the right button and choose [Configure].

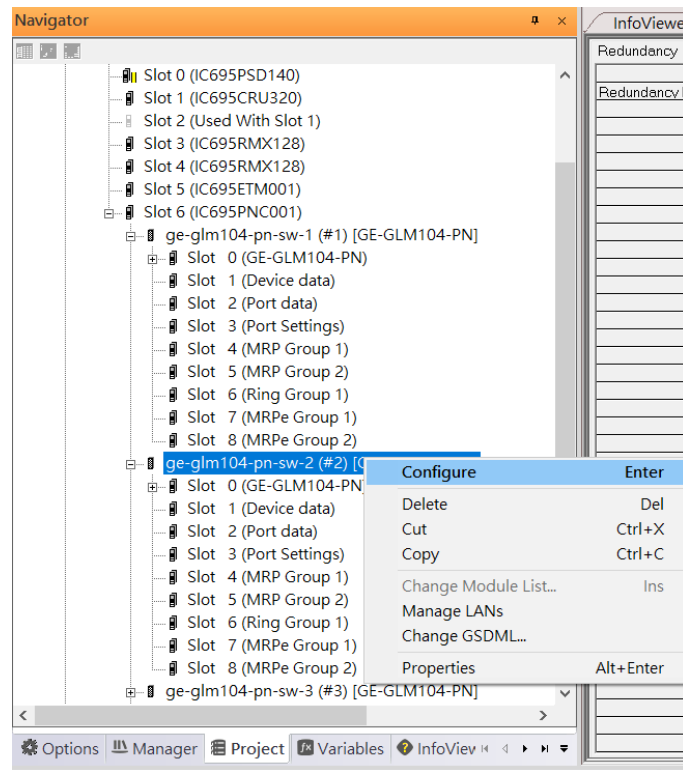


Figure 605

Enable MRPe function by changing the value of “MRPe Group2 Data” to Master and select [MRPe Port] to “Port 3”.

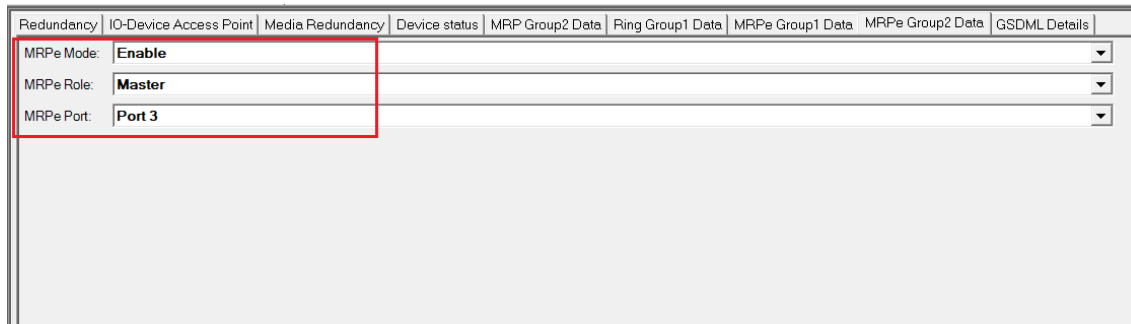


Figure 606

To enable MRP function in SW5, click the right button and choose [Configure].
It will show “Media Redundancy” on the right window.

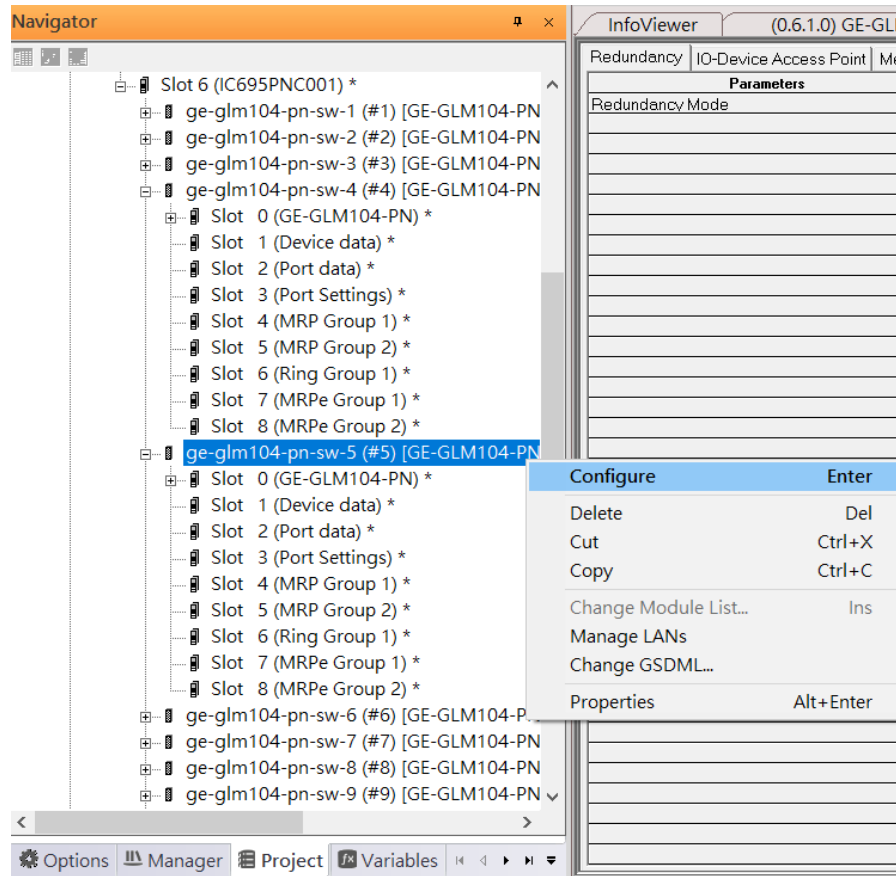


Figure 607

Enable MRP function by changing the value of “Media Redundancy” to manager and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

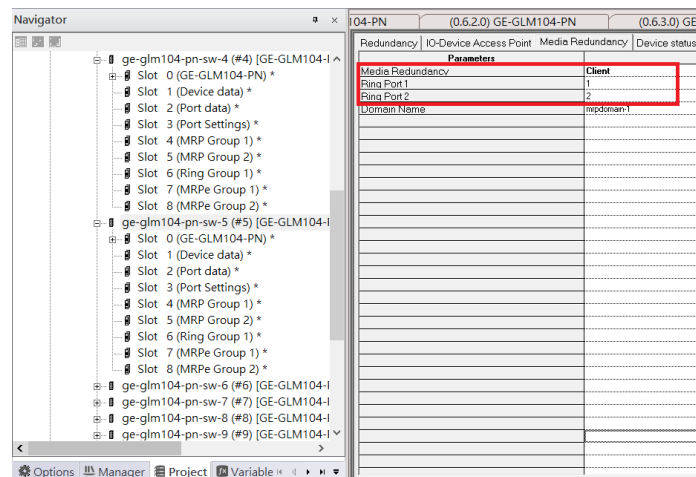


Figure 608

To enable MRP function in SW6, click the right button and choose [Configure].

It will show “Media Redundancy” on the right window.

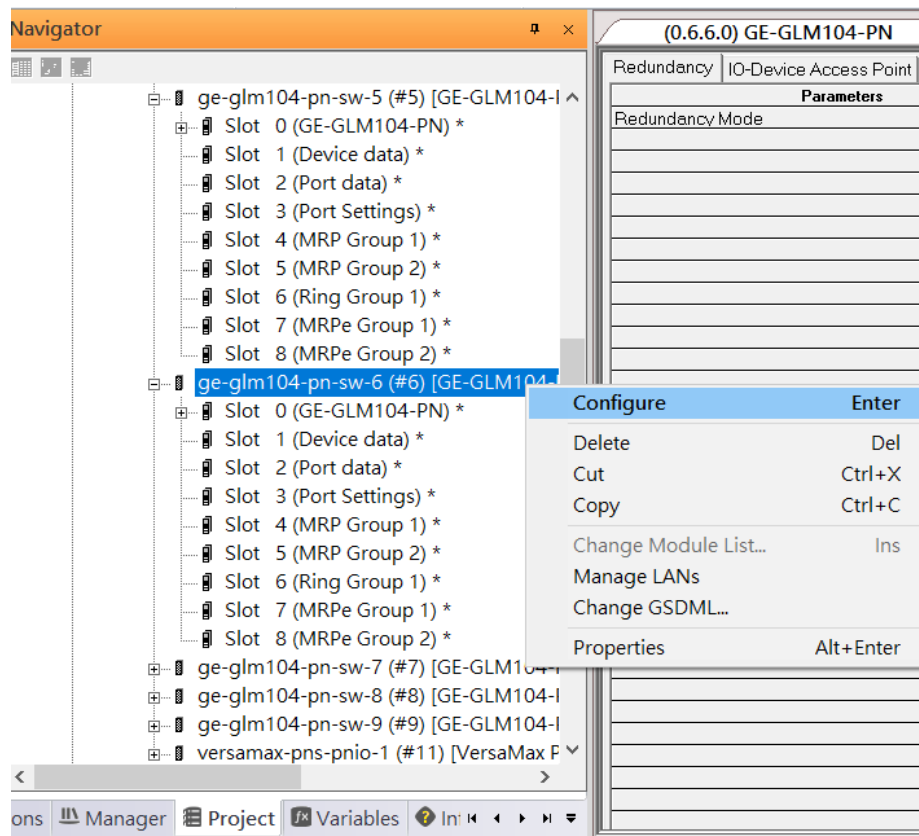


Figure 609

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1]to “1”, [Ring Port 2] to “2”.

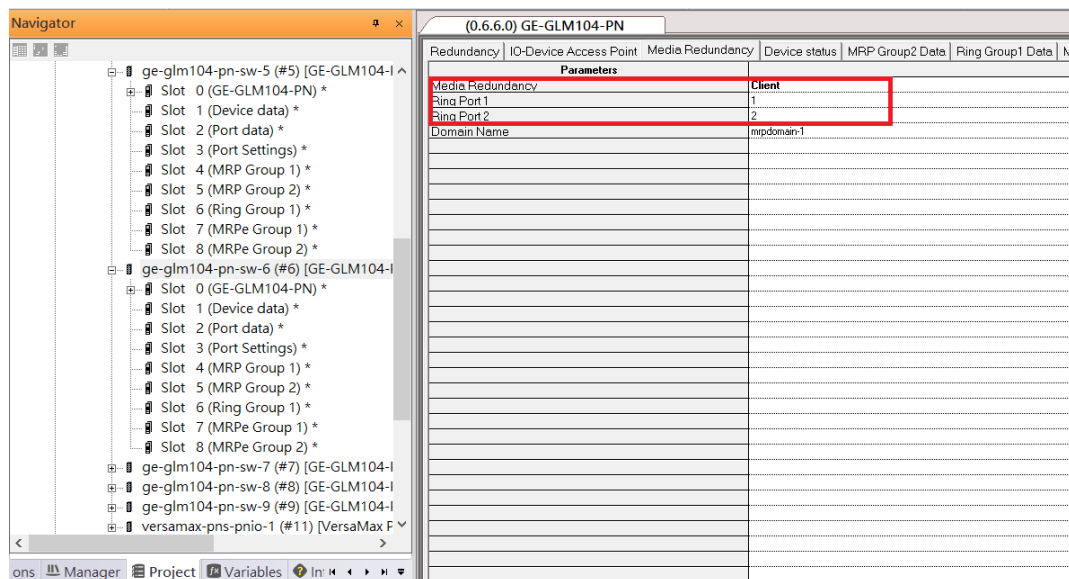


Figure 610

To enable Ring&MRPe functions in SW7, click the right button and choose[Configure].

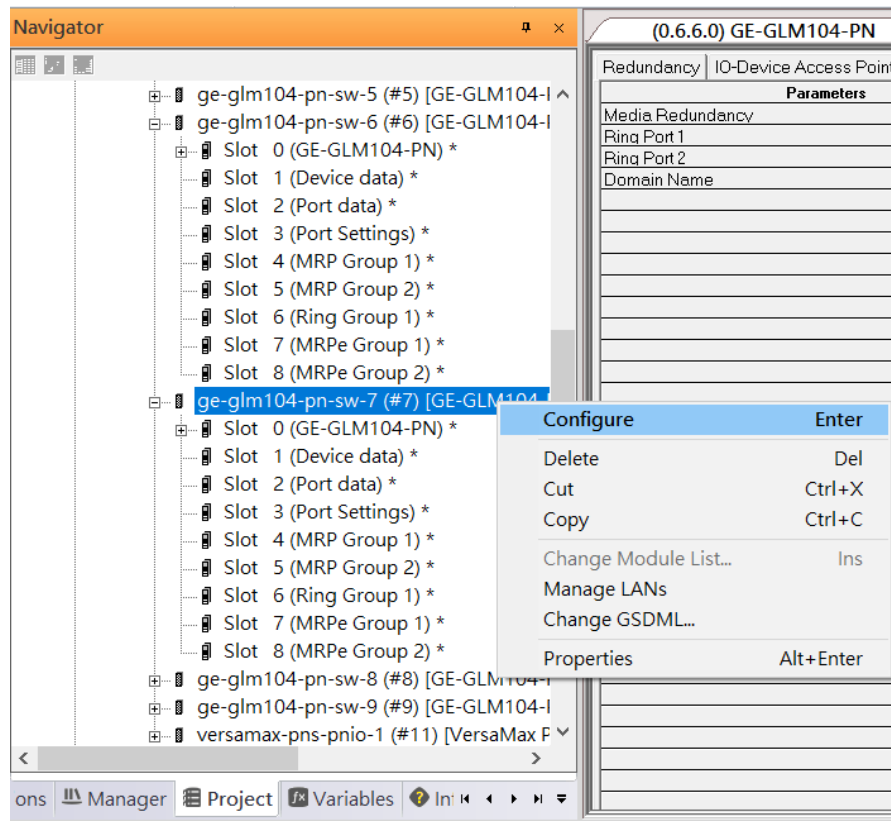


Figure 611

Enable MRPe function by changing the value of “MRPe Group1 Data” to Slave and select [MRPe Port]to “Port 1”

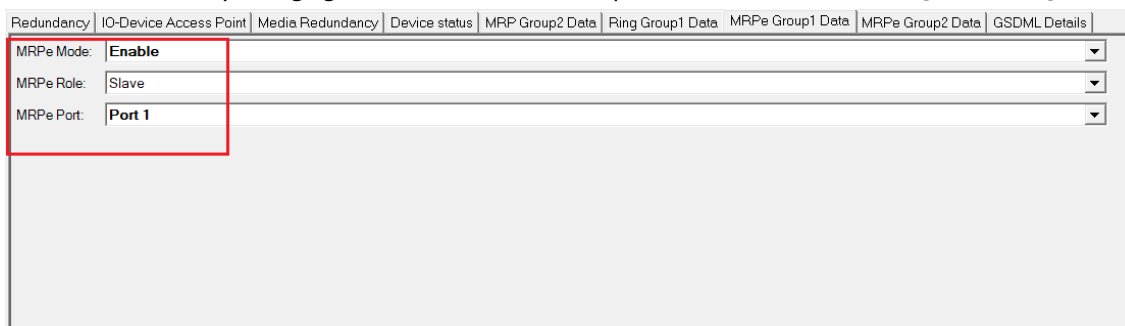


Figure 612

Then configure the MRPe in Profinet MRP Sub Ring-2 (green line in the box).

MRPe configuration

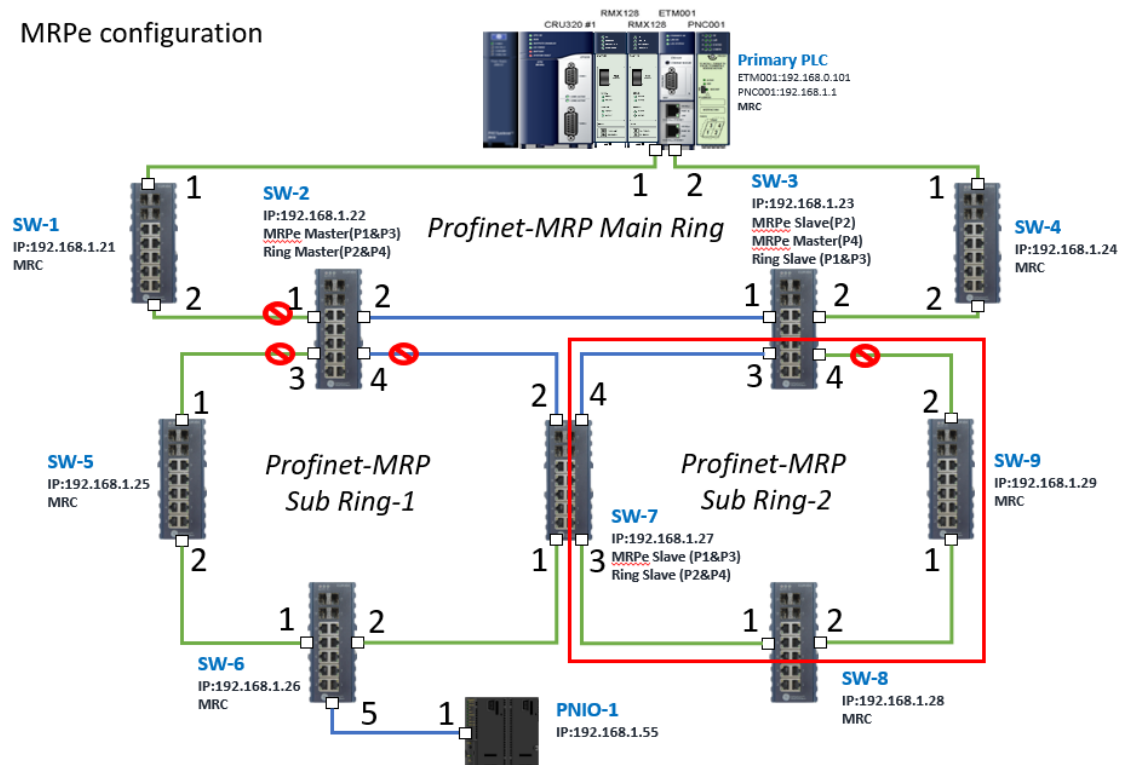


Figure 613

To enable Ring&MRPe functions in SW7, click the right button and choose [Configure].

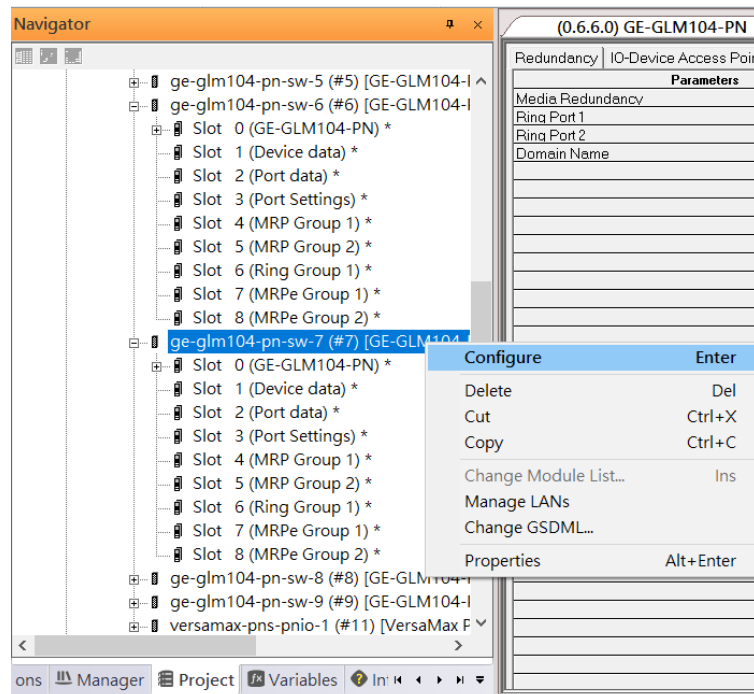


Figure 614

Enable MRPe function by changing the value of “MRPe Group2 Data” to Slave and select [MRPe Port] to “Port 3”

Redundancy	IO-Device Access Point	Media Redundancy	Device status	MRP Group2 Data	Ring Group1 Data	MRPe Group1 Data	MRPe Group2 Data	GSDML Details
MRPe Mode:	Enable							
MRPe Role:	Slave							
MRPe Port:	Port 3							

Figure 615

To enable MRP function in SW8, click the right button and choose [Configure].

It will show “Media Redundancy” on the right window.

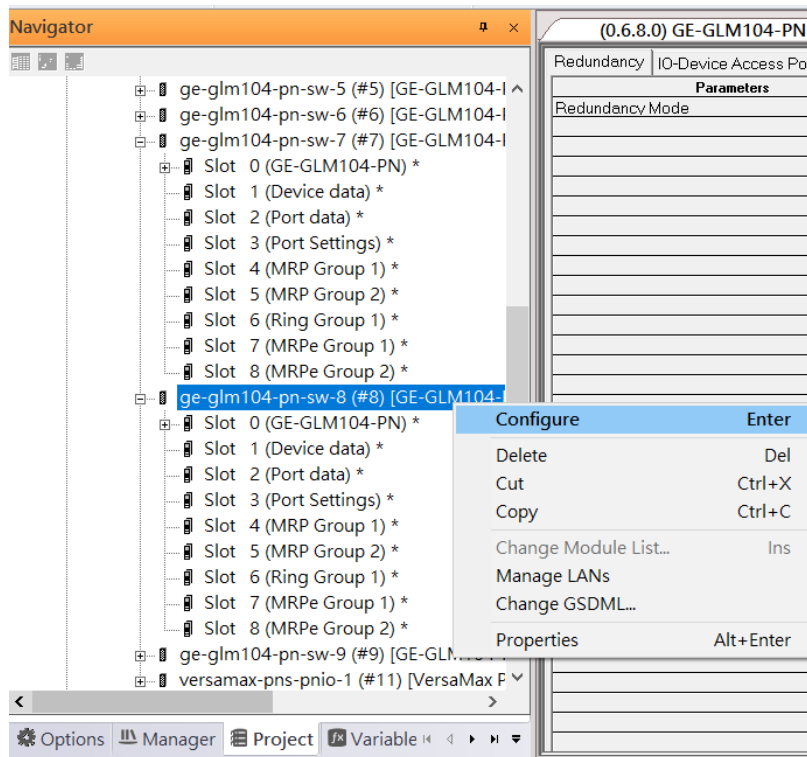


Figure 616

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1] to “1”, [Ring Port 2] to “2”.

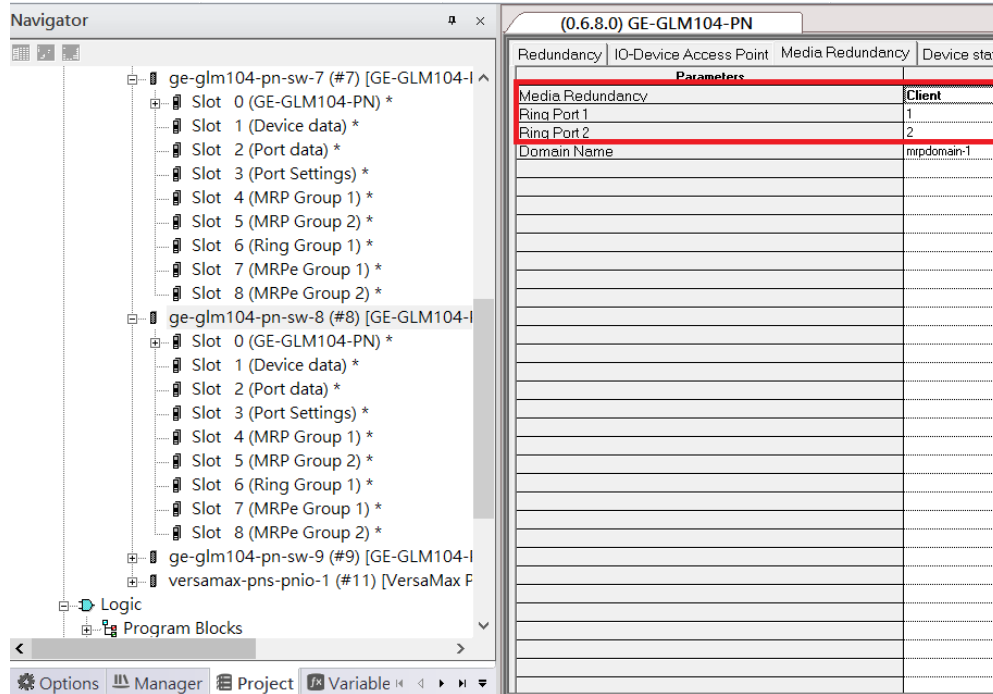


Figure 617

To enable MRP function in SW9, click the right button and choose [Configure]. It will show “Media Redundancy” on the right window.

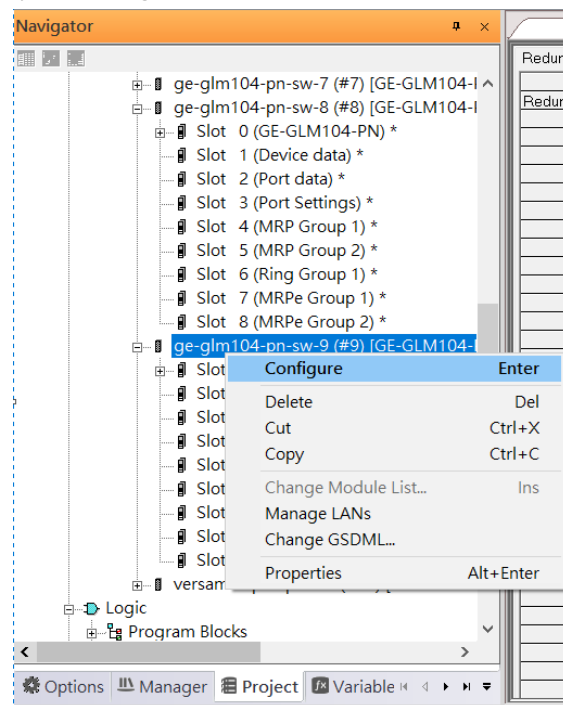


Figure 618

Enable MRP function by changing the value of “Media Redundancy” to client and select [Ring Port 1]to “1”, [Ring Port 2]to “2”.

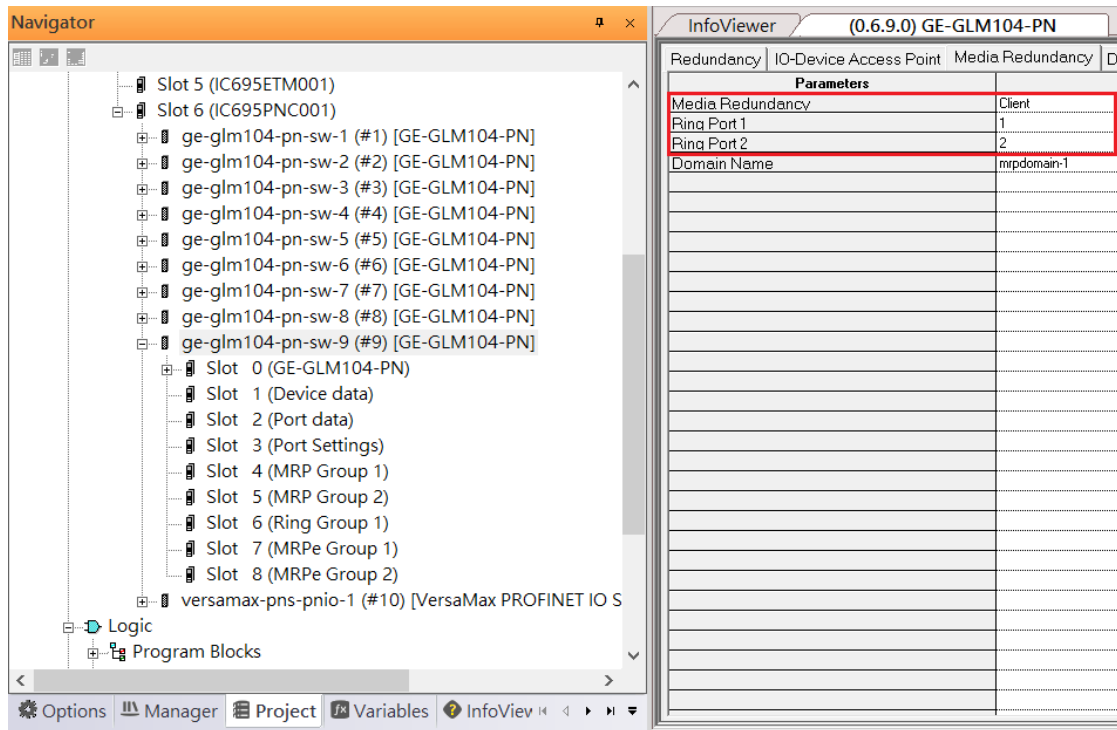


Figure 619

To enable MRPe functions in SW3, click the right button and choose [Configure].

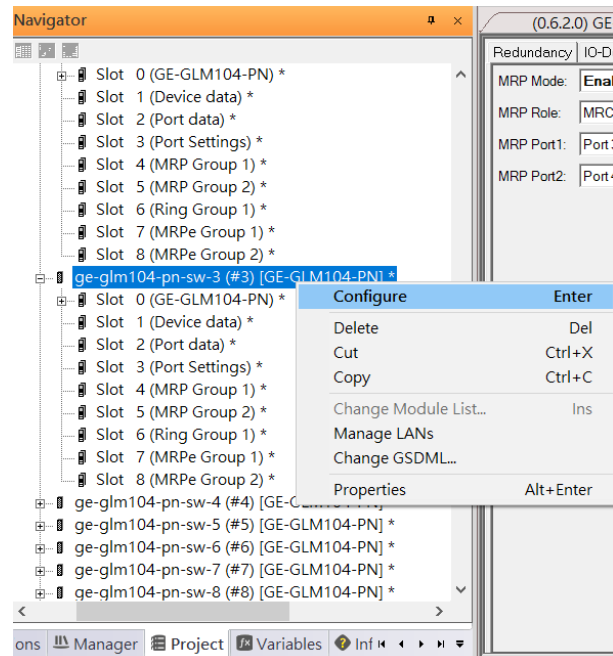


Figure 620

Enable MRPe function by changing the value of “MRPe Group2 Data” to Master & select [MRPe Port] to “Port 4”.

Redundancy	IO-Device Access Point	Media Redundancy	Device status	MRP Group2 Data	Ring Group1 Data	MRPe Group1 Data	MRPe Group2 Data	GSDML Details
MRPe Mode:	Enable							
MRPe Role:	Master							
MRPe Port:	Port 4							

Figure 621

7.2.7 Network Setting

To establish the communication to the I/O Controller from Proficy Machine Edition, the interface of I/O Controller shall be specified.

It should be noted that there is only 1 I/O Controller (Primary or Secondary) is able to communicate with Proficy Machine Edition. Therefore, there are 3 rules of communication are defined.

I/O Controller Communication Rule

Rule	Description
1	The communicated I/O Controller shall be specified. Click primary or secondary hardware configuration, click the right button, and select [Set as Selected HWC]
2	During the communication, the cable shall be connected to the ETM001 in specified hardware (Primary or Secondary)
3	Specify the interface and IP address for communicated I/O Controller

For rule 3, click [Target 1] and Select [Property]

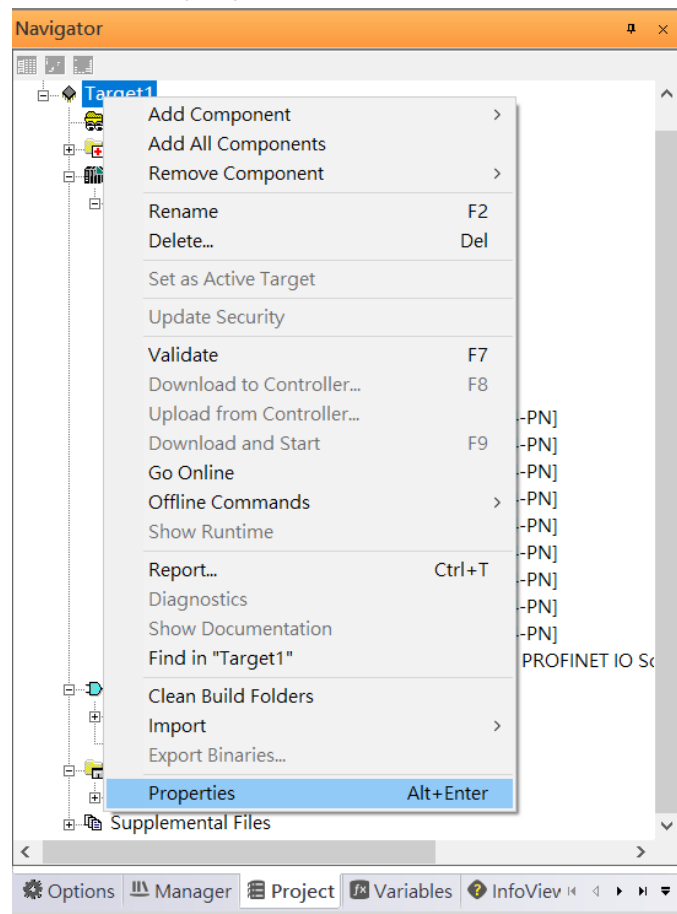
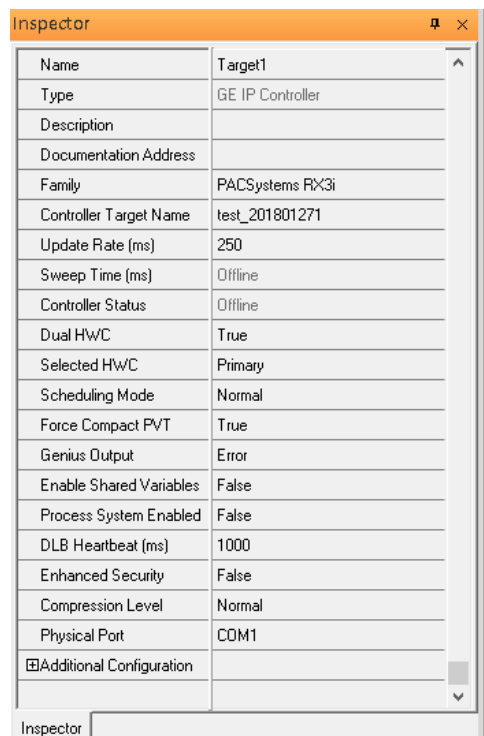


Figure 622

Then the configuration table is shown.

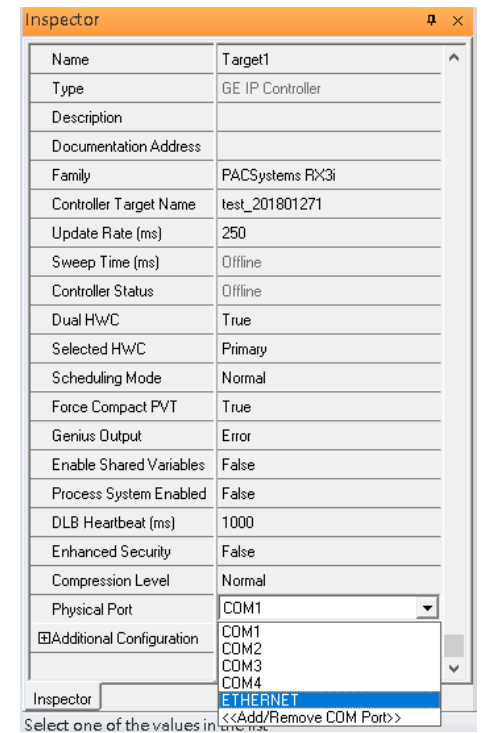


The 'Inspector' window displays the following configuration parameters for 'Target1':

Parameter	Value
Name	Target1
Type	GE IP Controller
Description	
Documentation Address	
Family	PACSystems RxC3i
Controller Target Name	test_201801271
Update Rate (ms)	250
Sweep Time (ms)	Offline
Controller Status	Offline
Dual HwC	True
Selected HwC	Primary
Scheduling Mode	Normal
Force Compact PVT	True
Genius Output	Error
Enable Shared Variables	False
Process System Enabled	False
DLB Heartbeat (ms)	1000
Enhanced Security	False
Compression Level	Normal
Physical Port	COM1
Additional Configuration	

Figure 623

Select [Physical Port] to [Ethernet]



The 'Inspector' window shows the 'Physical Port' dropdown menu open, displaying the following options:

- COM1
- COM2
- COM3
- COM4
- ETHERNET
- <<Add/Remove COM Port>>

The 'ETHERNET' option is highlighted in blue. Below the dropdown, a text prompt reads: 'Select one of the values in the list'.

Figure 624

Also, the IP address of communicated I/O Controller shall be set. Here the [Primary] setting is shown.
Note, the specified IP address is set as the IP address on ETM001.

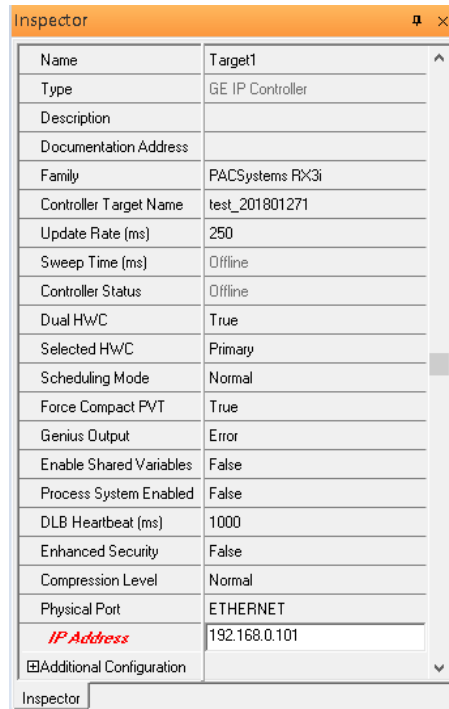


Figure 625

7.2.8 PC Network

The IP address of PC with Proficy Machine Edition shall be set in the same network area.

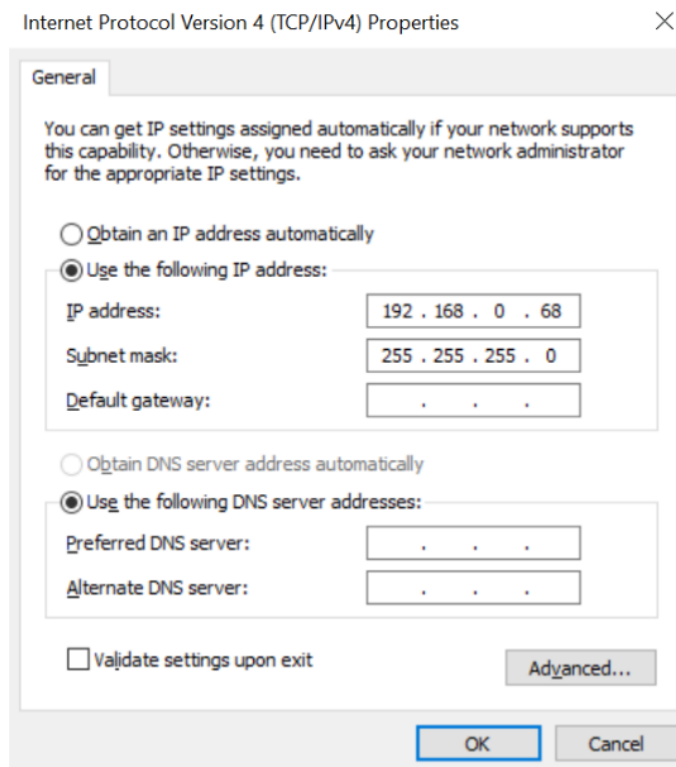


Figure 626

7.2.9 Temporary IP

However, if the IP address of ETM001 is lost or forgotten, the IP address can be changed by the function [Set Temporary IP Address] according to the MAC address of ETM001. In the following figure, the MAC address is referenced to the ETM001, and the IP address can be defined by user.

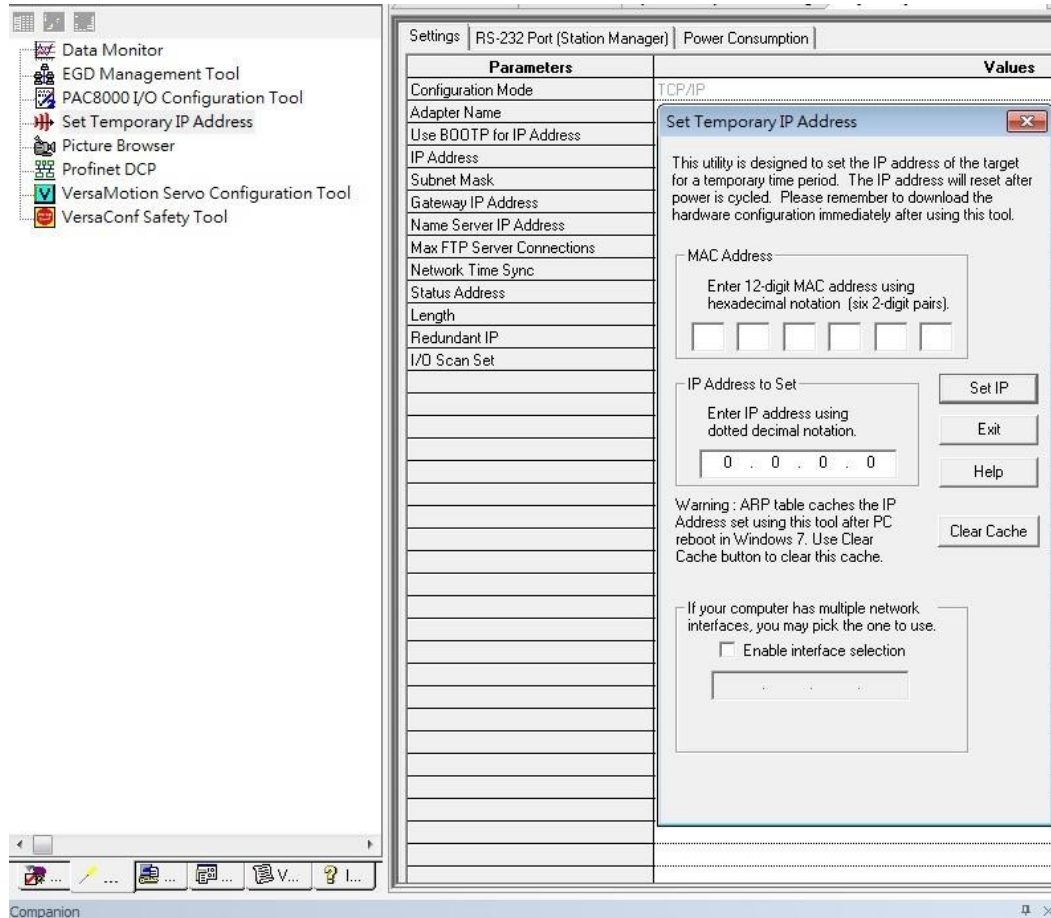


Figure 627

7.3 Implementation

To download the configuration to hardware, the following steps shall be applied.

First, press the [Connect] icon.

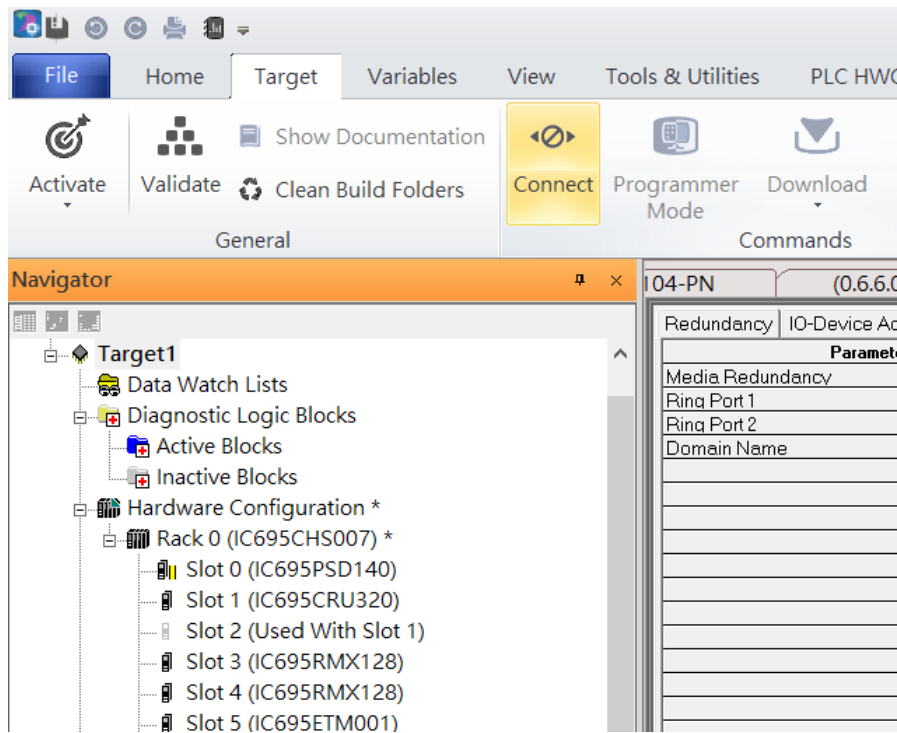


Figure 628

Then press the icon [Programmer Mode]

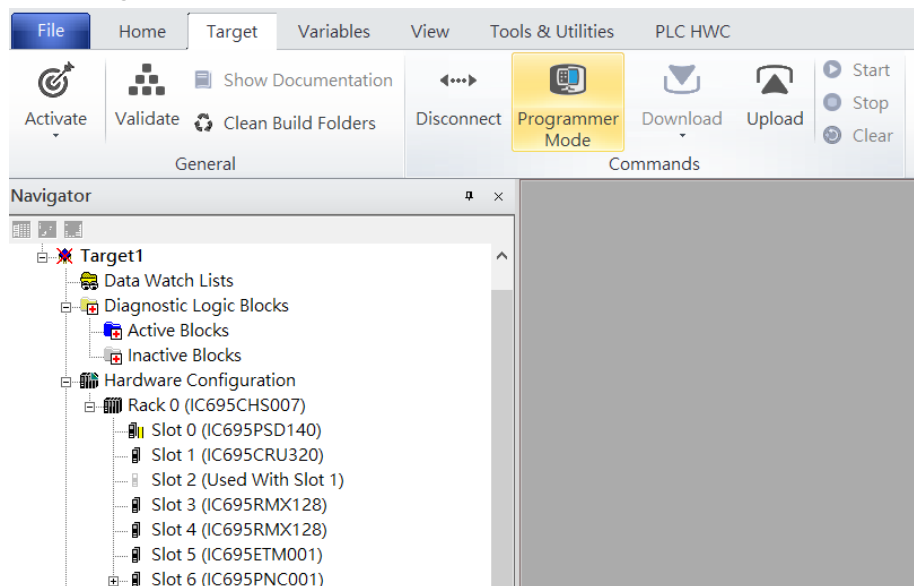


Figure 629

Then press icon [Download] and select “Download”

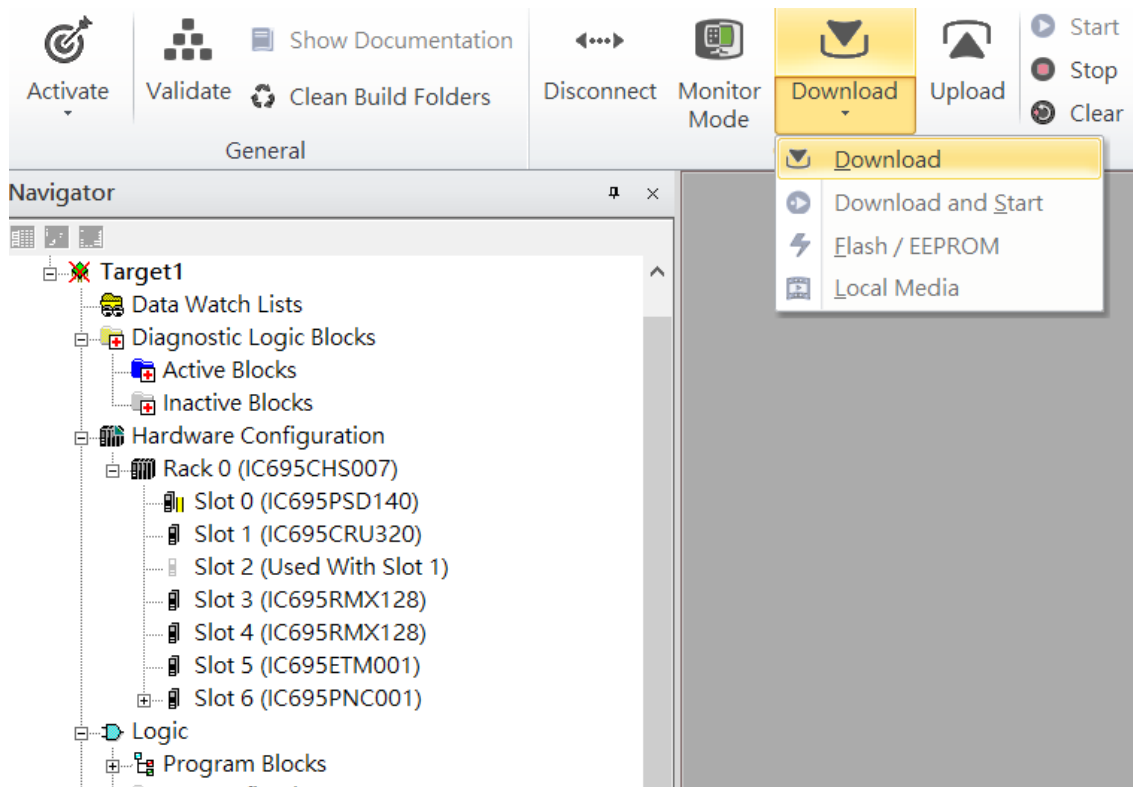


Figure 630

Then the dialogue is appeared to make sure the initialization procedure, select [OK]

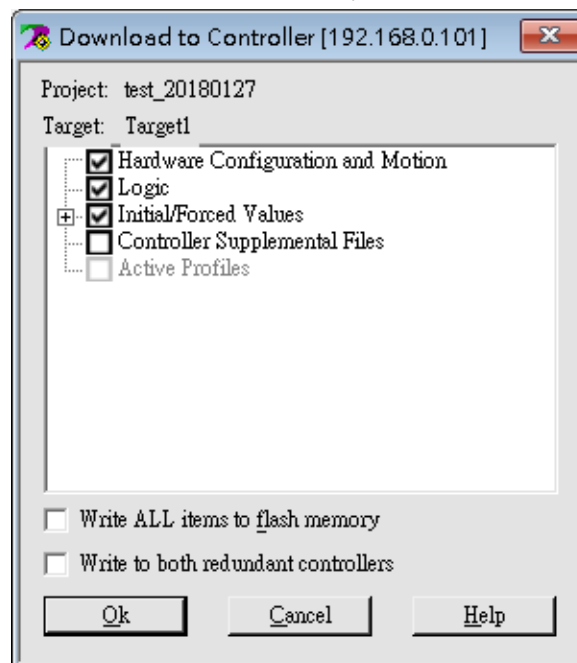
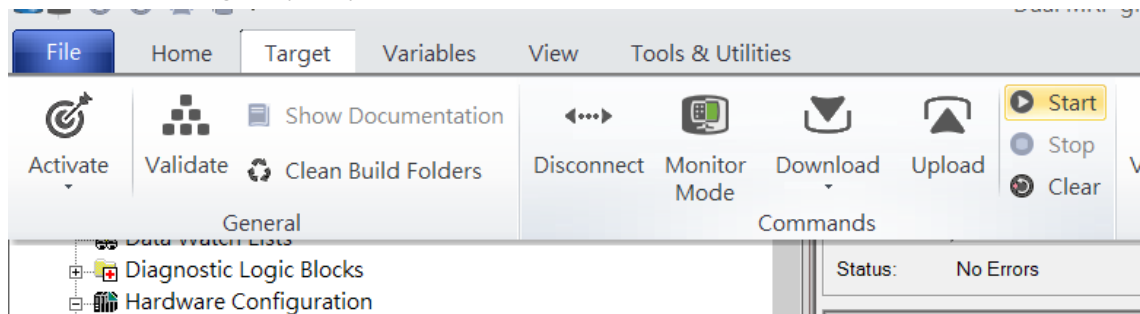


Figure 631

After download completely, press icon [Start] to active PLC.

Note: After downloading completely, switch CRU320 to “Run I/O Enable”



Then the dialogue is appeared, please select [OK]

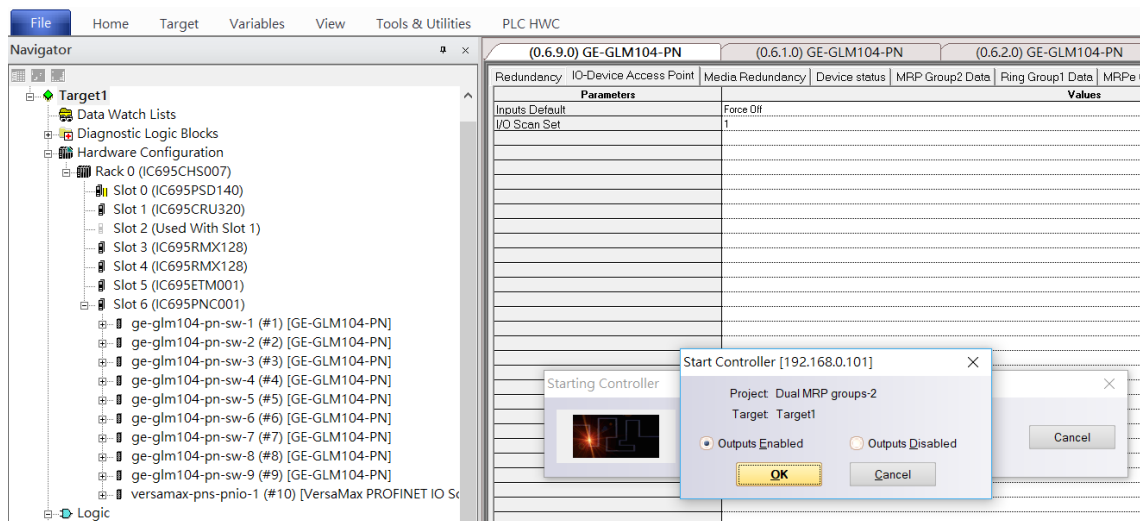


Figure 632

If PLC has started successfully, a message “The Controller was successfully started”.

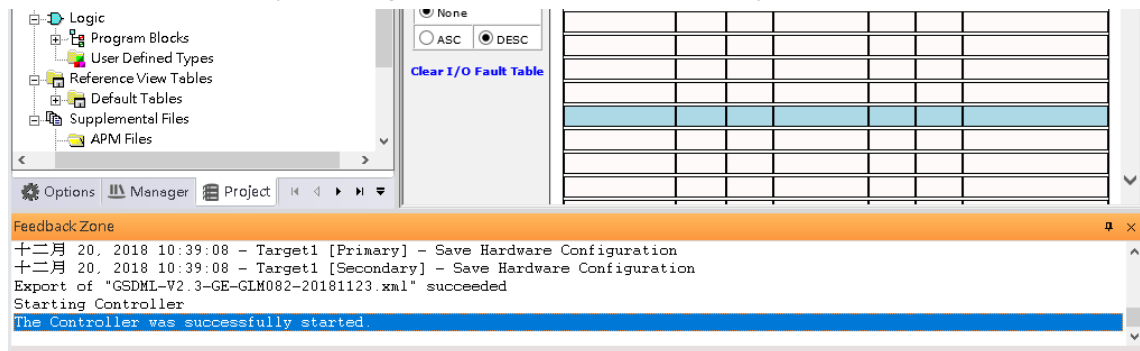


Figure 633

Chapter 8 PROFINET System Redundancy

8.1 Network Topology

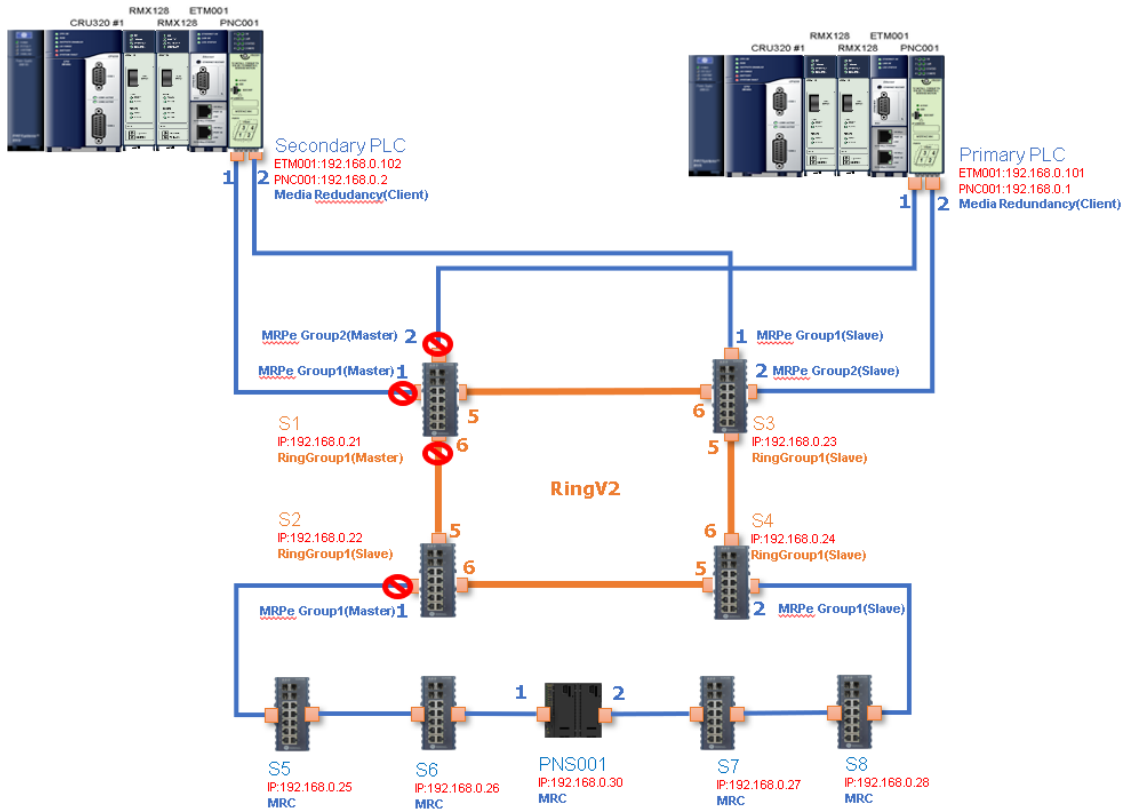


Figure 634

8.2 Hardware Configuration

On the 2 CRU320s, the I/O data can be set to “STOP”, “RUN OUTPUT DISABLE” or “RUN I/O Enable” states by a switch imbedded on CRU320. During the configuration, the switches on both 2 CRU320s must be set to “STOP”

8.2.1 Project Open

To start the software Proficy Machine Edition, please follow the steps below:

- (1) Click [Start] -> [Proficy] -> [Proficy Machine Edition] -> [Proficy Machine Edition]. See the following picture.

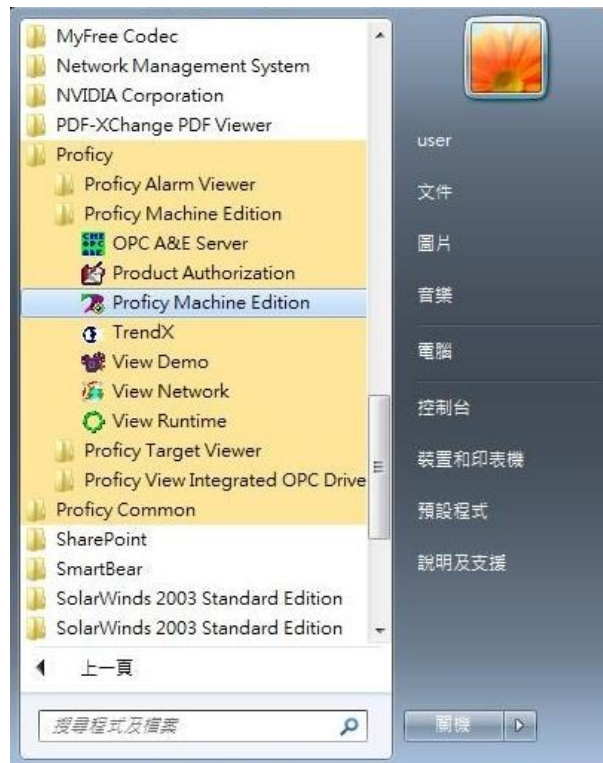


Figure 635

- (2) Select the empty project and click [OK].



Figure 636

- (3) Set the project name and click[OK]

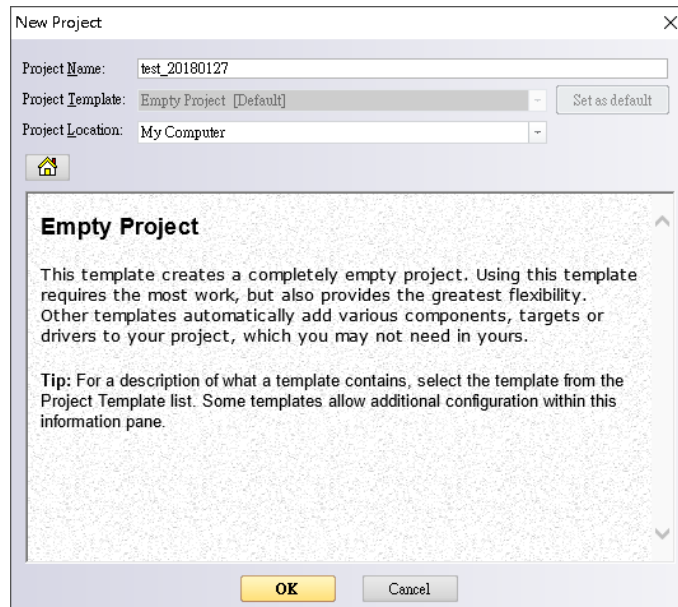


Figure 637

8.2.2 I/O Controller Setting

Next step is to add a target for this project.

Click right button on project name “test_20150127” and select [Add Target] -> [GE Intelligent Platforms Controller] -> [PACSystems RX3i].

The PACSystems RX3i is the I/O Controller to be tested. See the following picture.

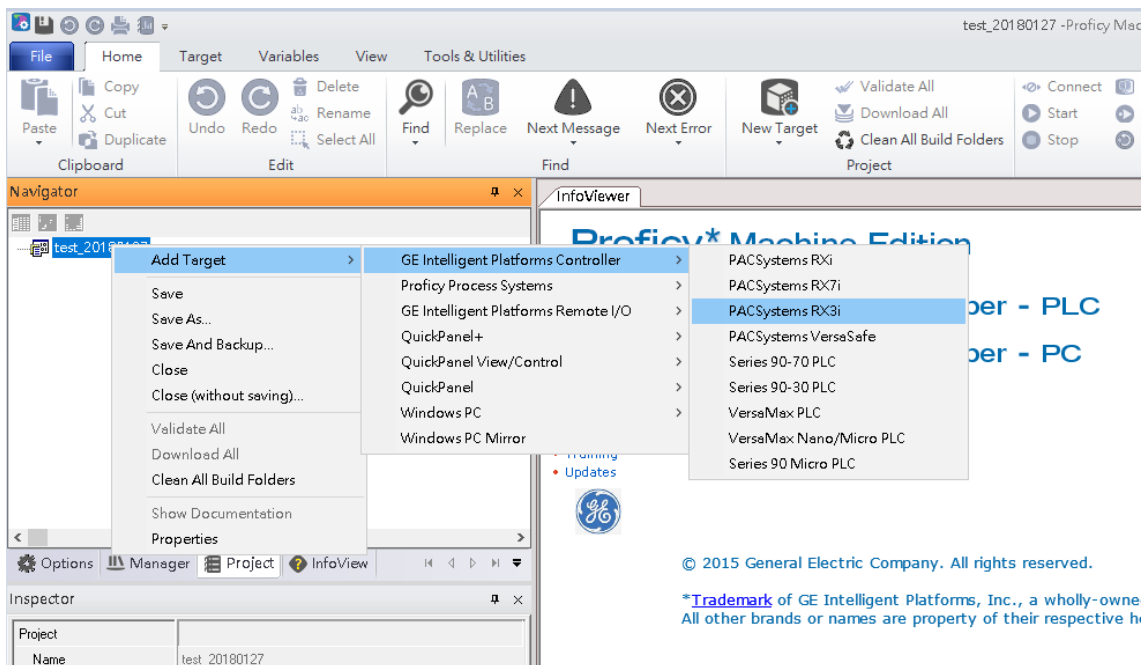


Figure 638

Originally the I/O Controller is described as the rack with 12 slots, each slot can be regarded as the chassis for device installations such as power card, communication module, or bus controller.

However, there are only 7 chassis can be used in the I/O Controller CRU320. Thus, replace the rack for 7 slots.

Click right button on “Rack 0 (IC695CHS012)” and select [Replace Rack...]

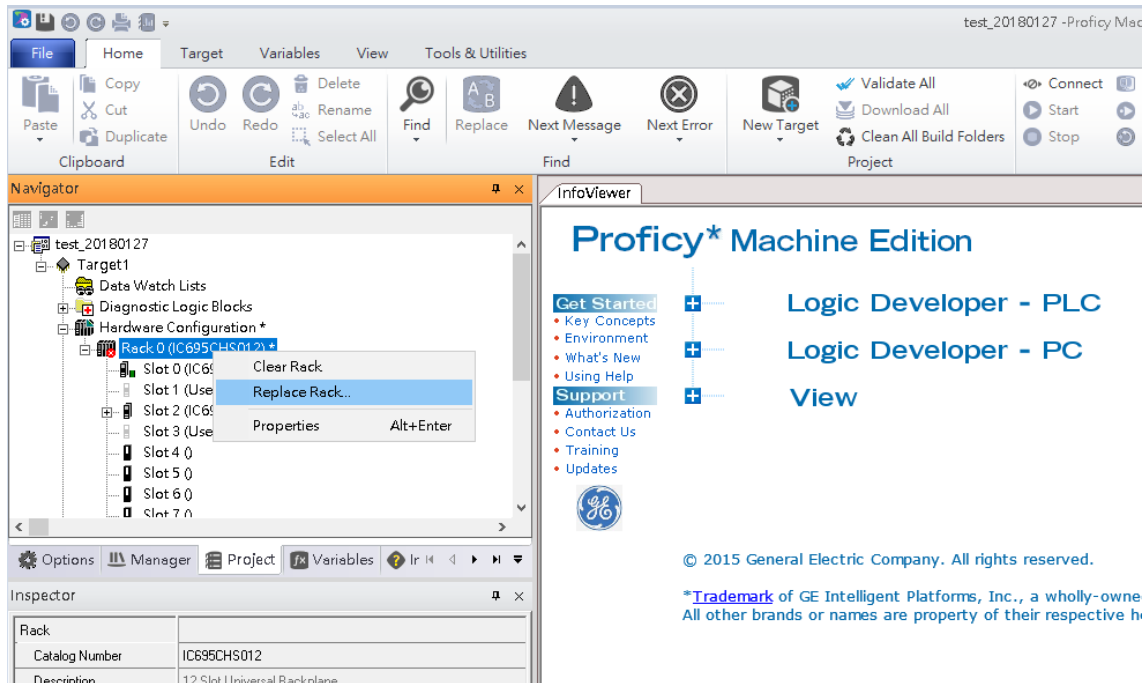


Figure 639

Select “IC695CHS007” and click [OK]

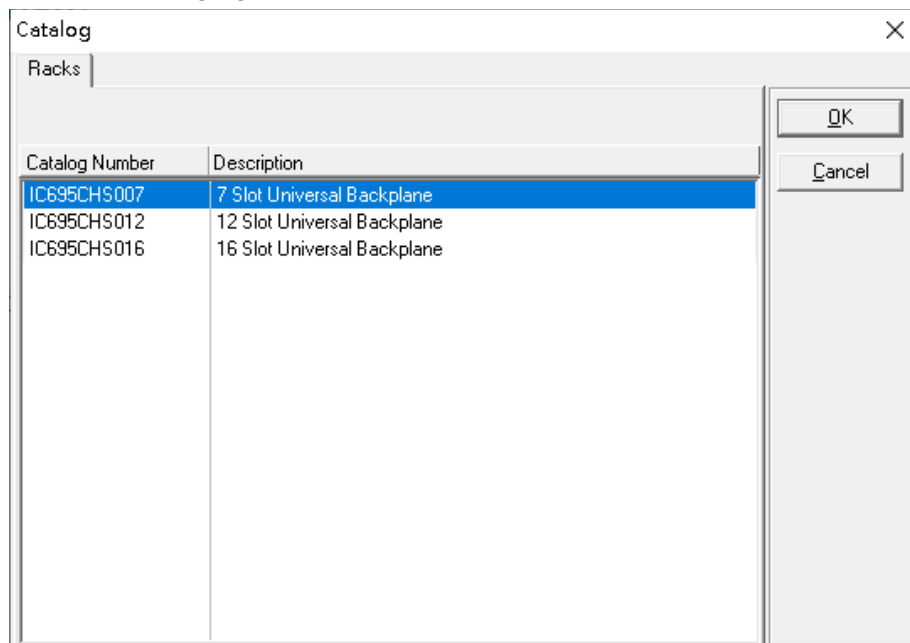


Figure 640

After the rack and the number of slots is defined, select the corresponding devices into the slots according to the I/O Controller. The following picture is the current installation for each device on the I/O Controller



Figure 641

From left to right, the installed devices on the I/O Controller are

Devices on I/O Controller

Device Type	Device Name	Chassis index
Power Card	PSD140	0
Central Processing Unit	CRU320	1 ~ 2
Communication Module	RMX128	3
Communication Module	RMX128	4
Communication Module	ETM001	5
Bus Controller	PNC001	6

Now, add the module into the slots by the current devices on the I/O Controller, the chassis index is corresponding to the slot index.

First, replace the power card. Click slot 0 and click the right button, select [Replace Module ...], and specify the installed power card, PSD140, then click [OK]

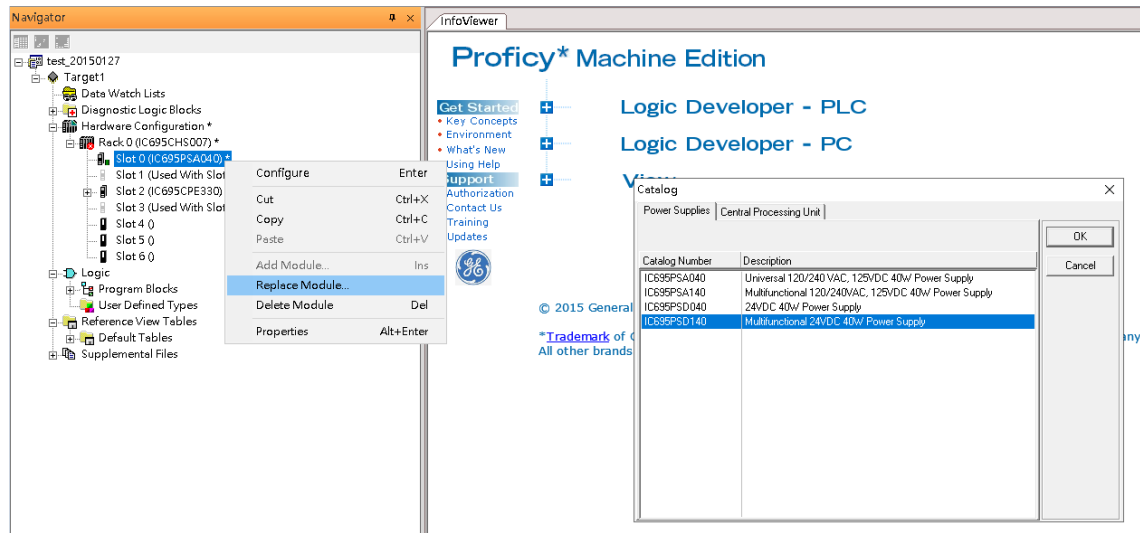


Figure 642

Slot 0 is replaced by current power card, PSD140

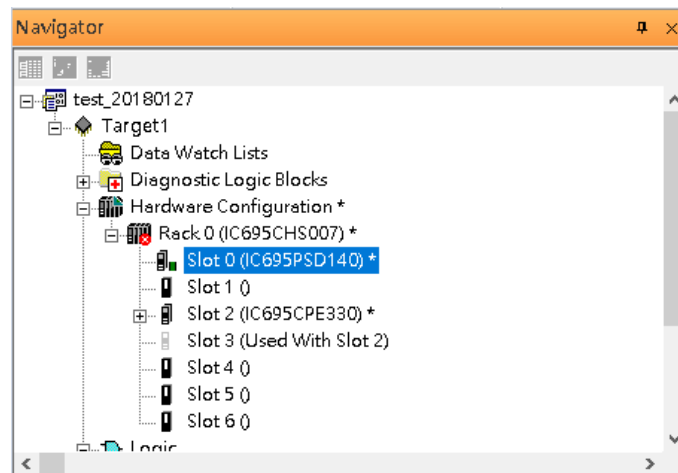


Figure 643

For slot 1 and 2, 2 chassis (1 and 2) is occupied by the Central Processing Unit, CRU320. To integrate slot 1 and 2, pull the slot 2 to slot 1

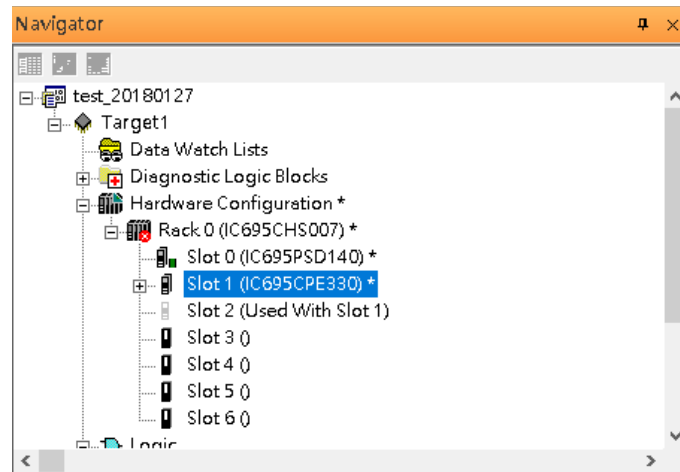


Figure 644

Now the slot 2 is cleaned.

To select the Central Processing Unit, click slot 1 and click the right button, select [Replace Module ...] to choose CRU320

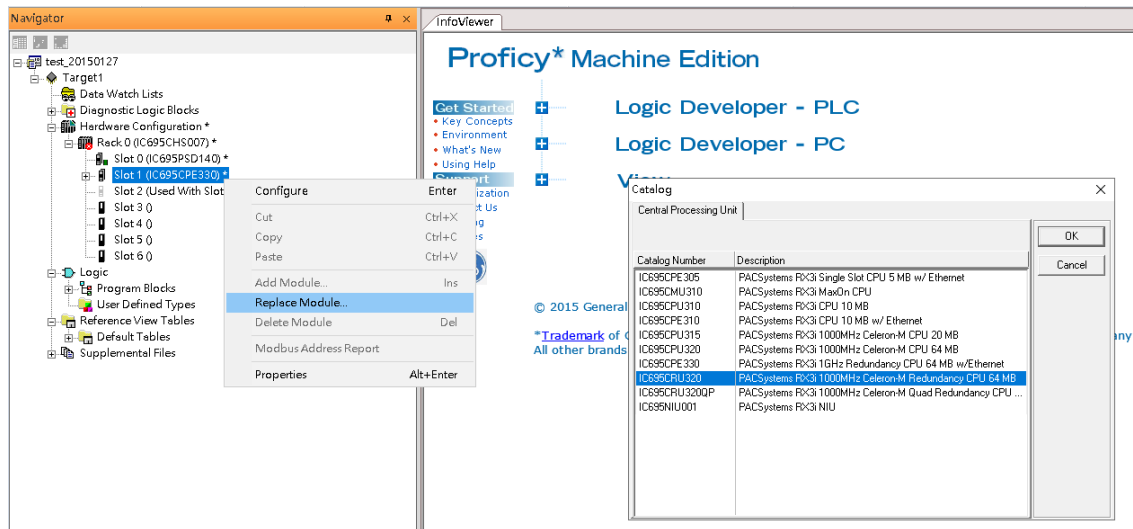


Figure 645

Now the CRU320 is specified.

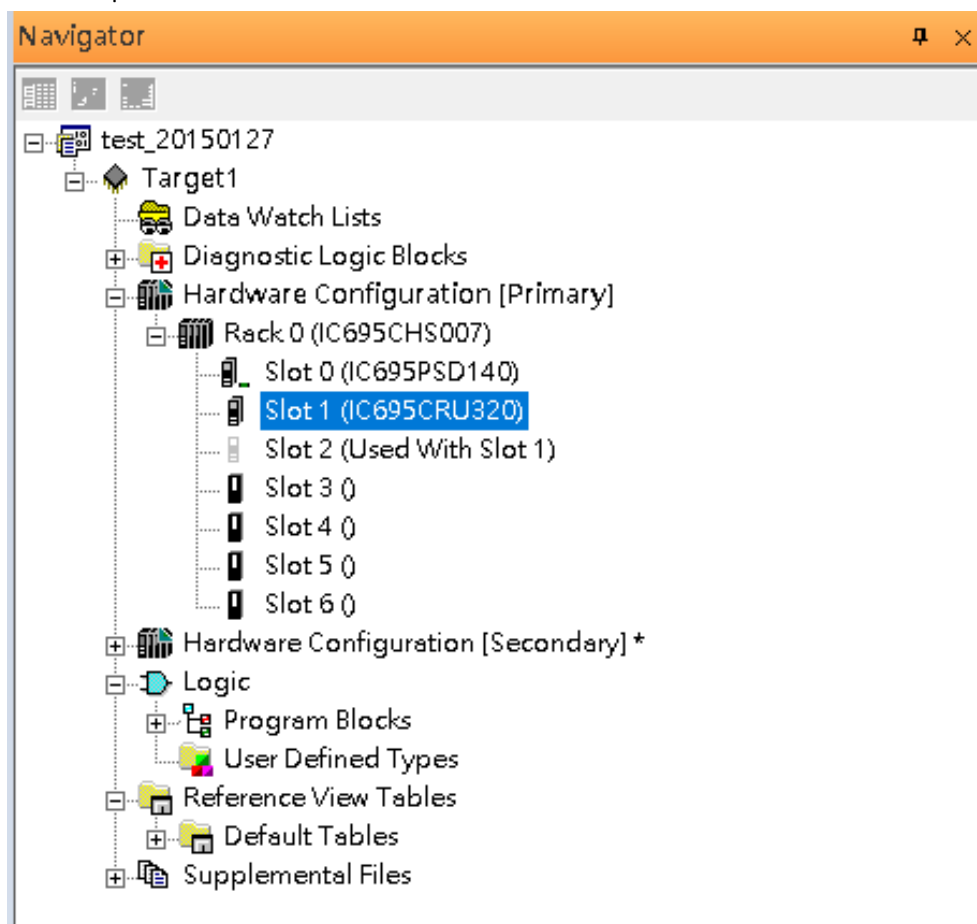


Figure 646

Note, for redundancy, the current hardware configuration is defined as [Primary]: Hardware Configuration [Primary]. Therefore, the secondary hardware is created as well.

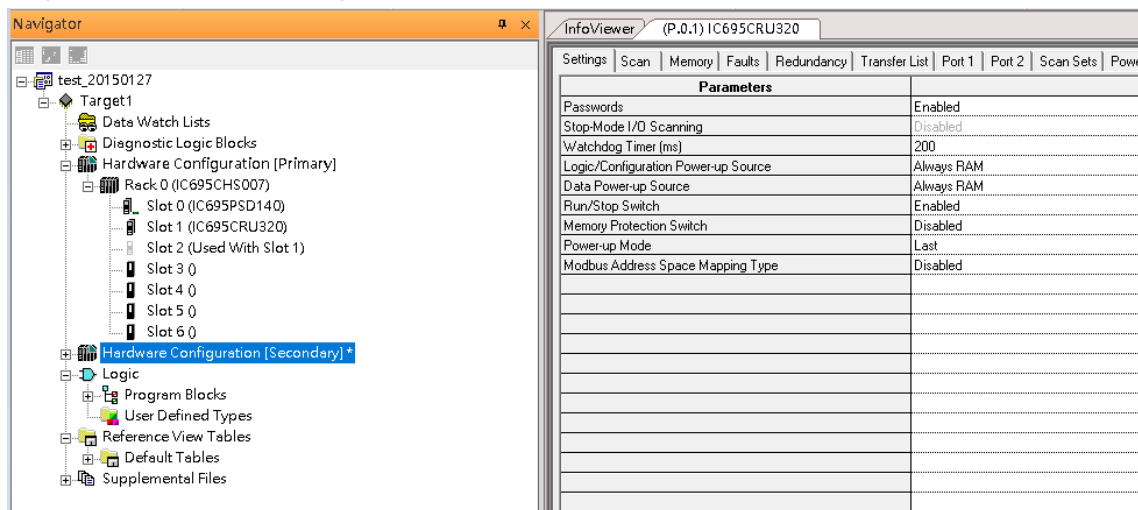


Figure 647

Next is to add RMX128 module for slot 3.

Click the right button on slot 3, select [Add Module ...]

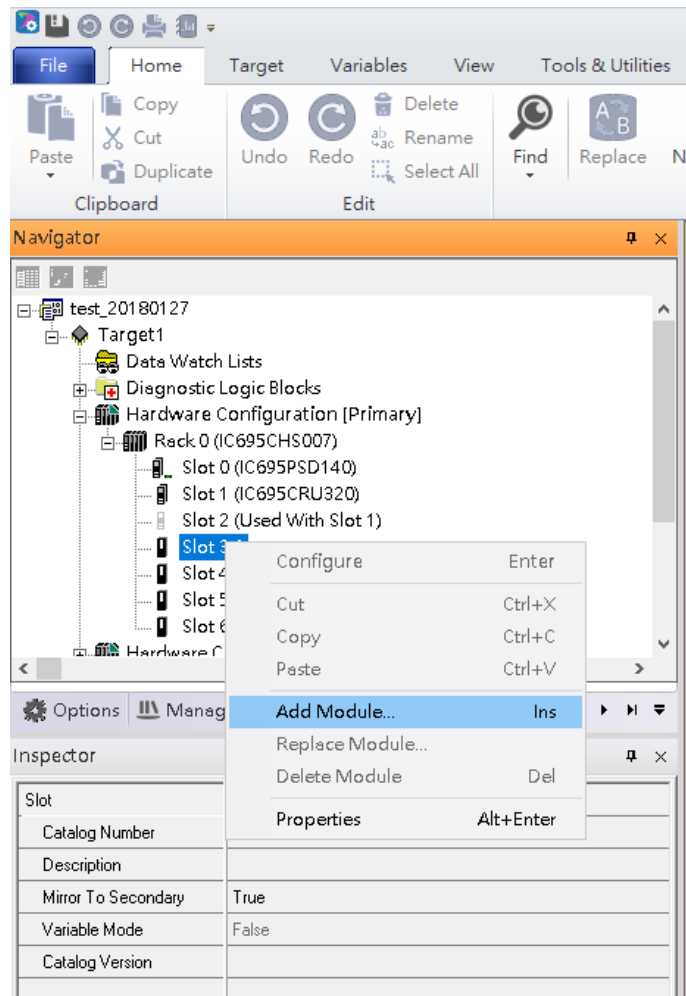


Figure 648

According to the current installation on the I/O Controller, the RMX128 shall be select.
Select [Communications] -> [IC695RMX128] and click [OK]

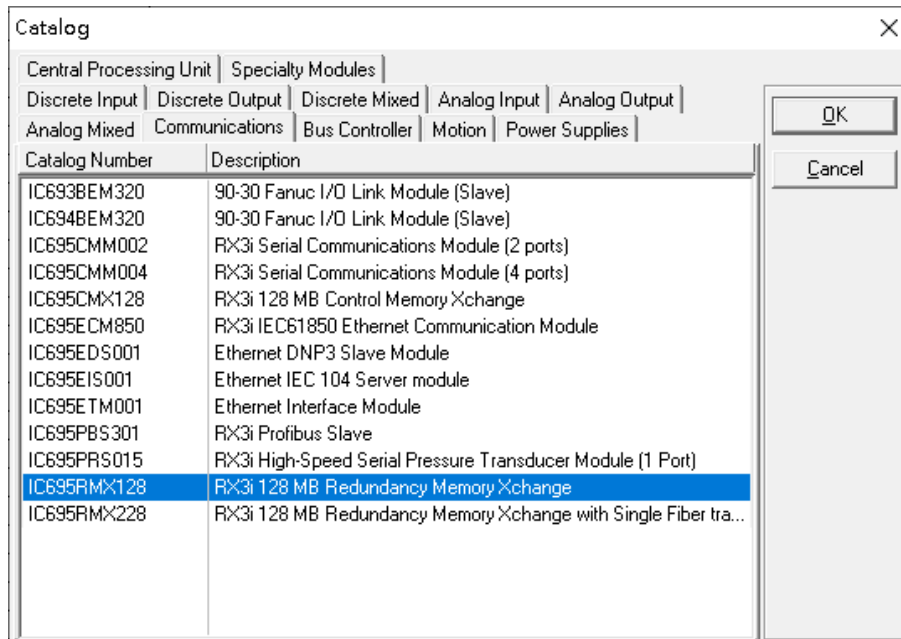


Figure 649

Now the RMX128 is ready on slot 3.

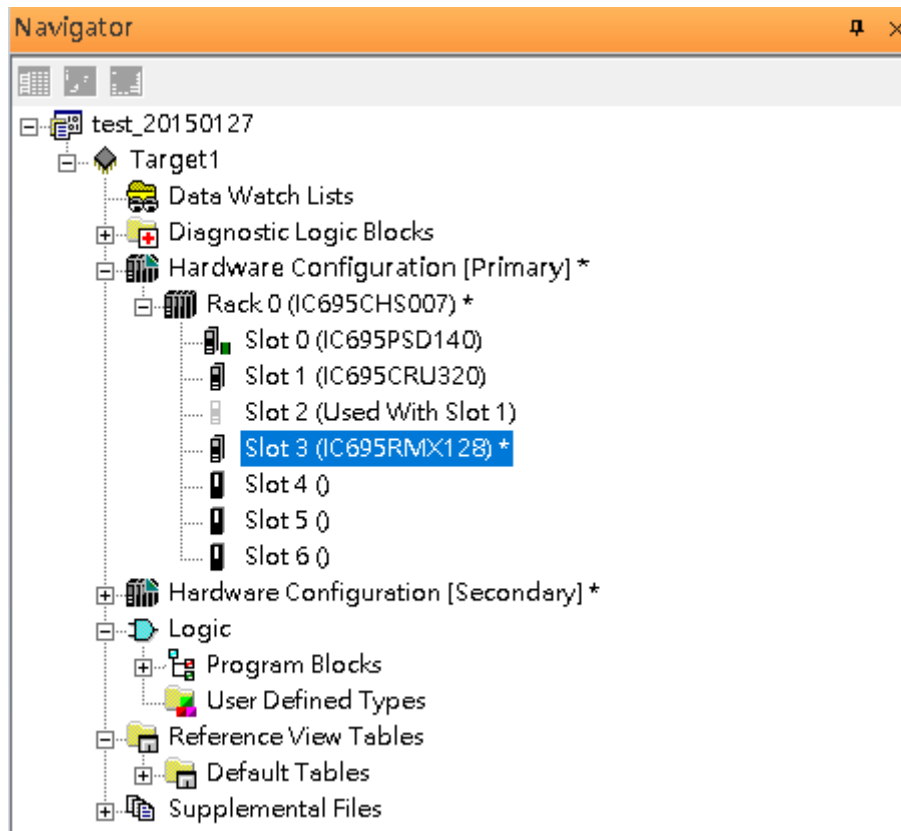


Figure 650

Continuously, select RMX128 for slot 4.

Click the right button on slot 4, select [Add Module ...], select [Communications] -> [IC695RMX128] and click [OK]

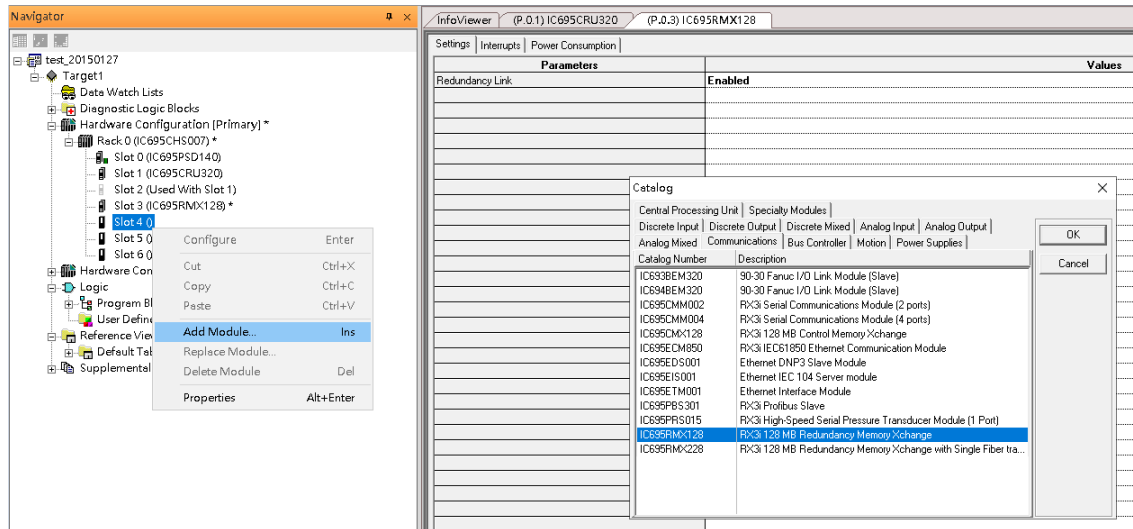


Figure 651

Continuously, select ETM001 for slot 5.

Click the right button on slot 5, select [Add Module ...], select [Communications] -> [IC695ETM001] and click [OK]

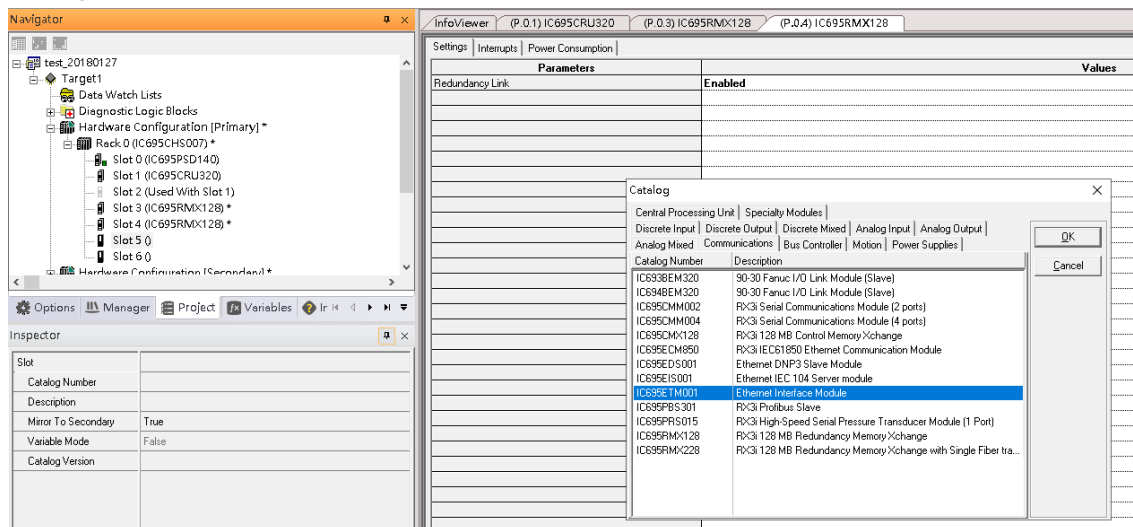


Figure 652

It should be noted that the ETM001 is the management device for Proficy Machine Edition. The communication interface is Ethernet network. The IP address and Subnet Mask shall be specified.

In the following picture, the IP address 192.168.0.101 and mask 255.255.255.0 is specified on ETM001.

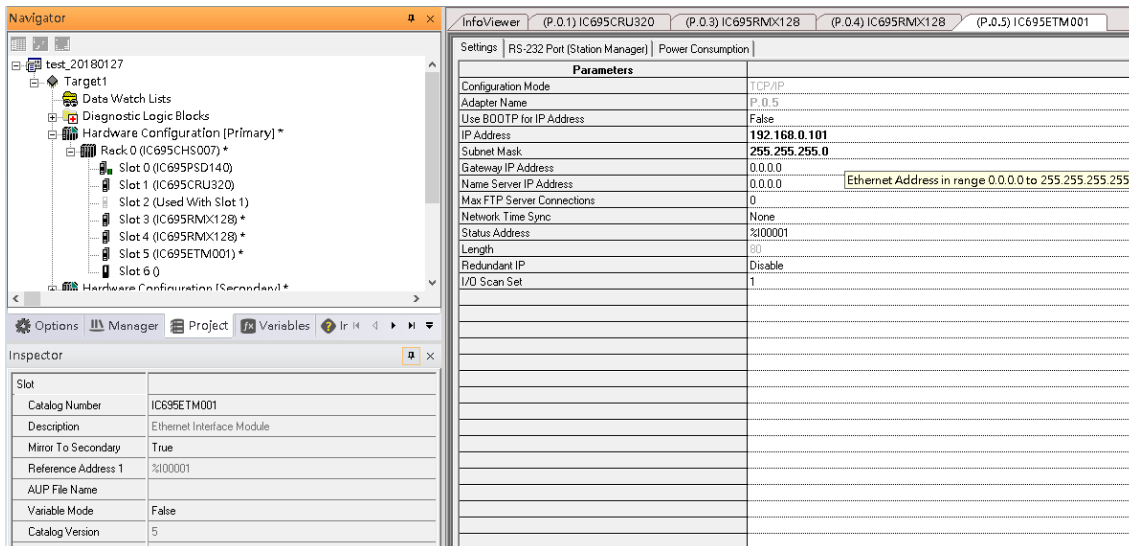


Figure 653

Continuously, select PNC001 for slot 6.

Click slot 6 and click the right button, select [Add Module ...], specify the installed Bus Controller, PNC001 and click [OK]

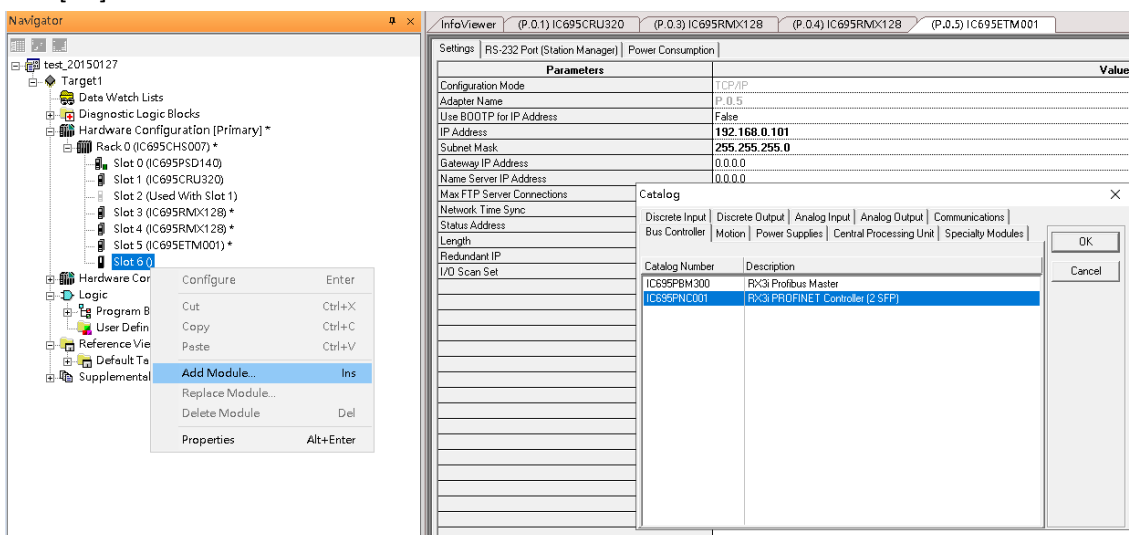


Figure 654

Now all the devices on the I/O Controller are ready on the slots on the rack, the following picture is the current status, and we shall save it.

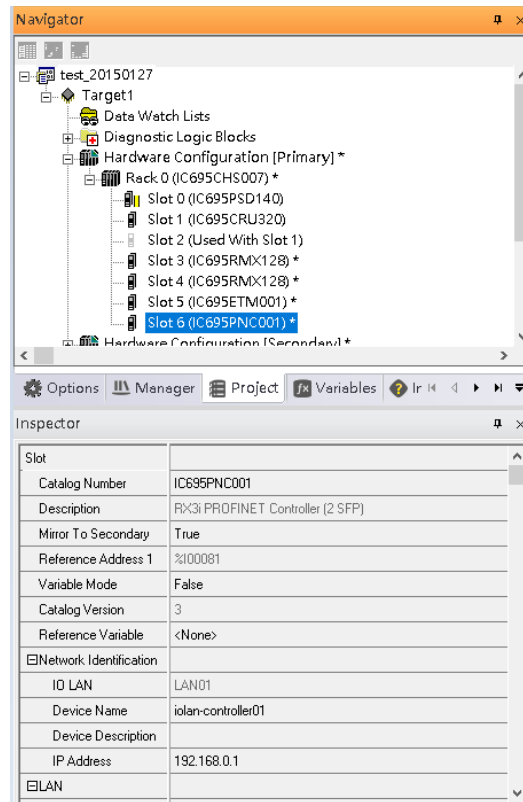


Figure 655

8.2.3 I/O Device Setting

This section introduces the I/O Device integration. To configure the I/O Device, the GSDML file is necessary. Now we create another interface to load the GSDML file by using [Toolchest].

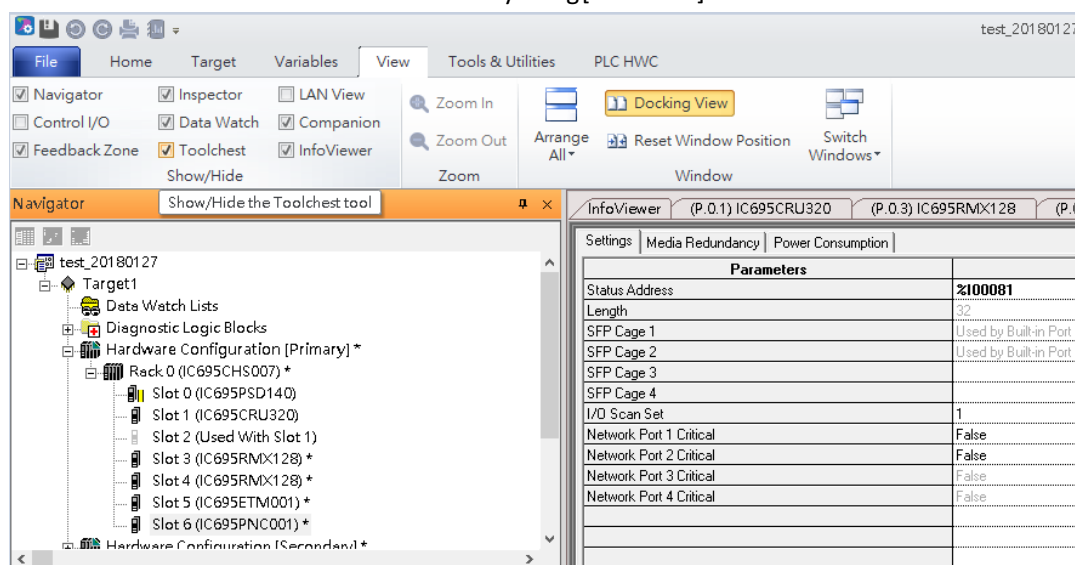


Figure 656

As shown in the following picture, a new interface is created on the right-hand side.

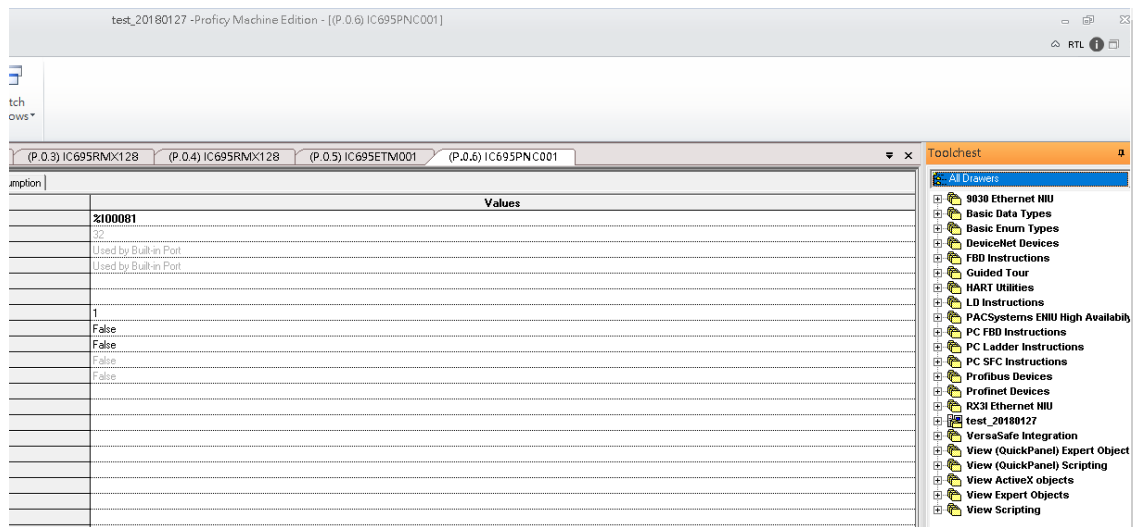


Figure 657

Select Profinet Devices.

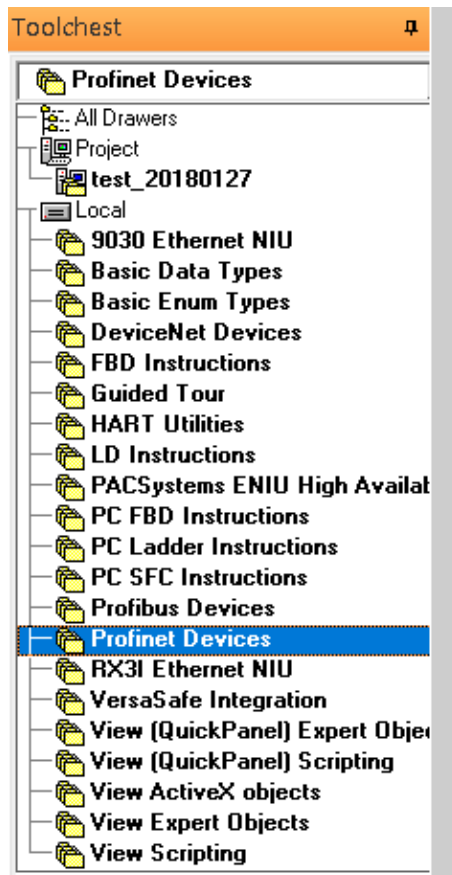


Figure 658

Click right button, select [Assistants] -> [Import GSDML File ...]

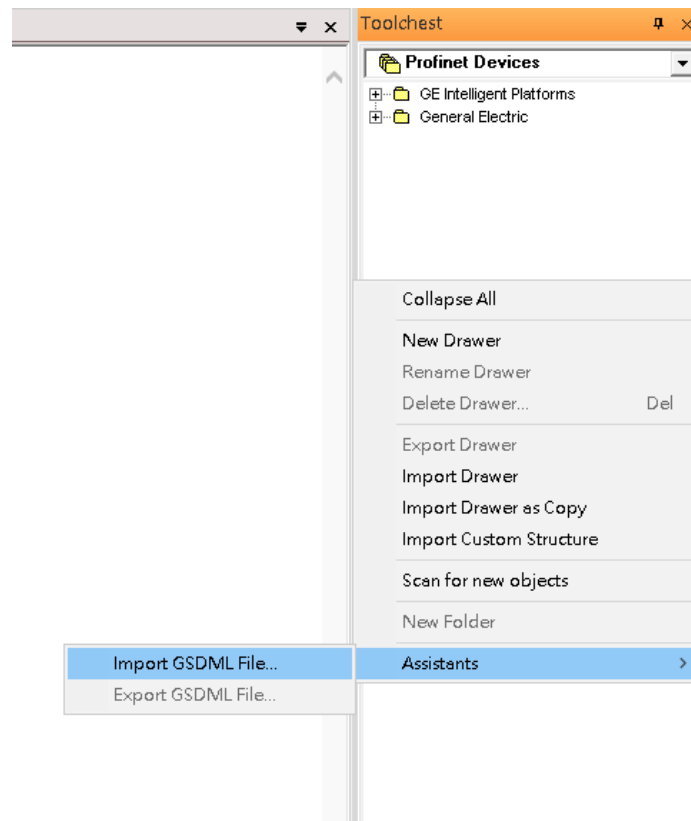


Figure 659

Select the GSDML File.

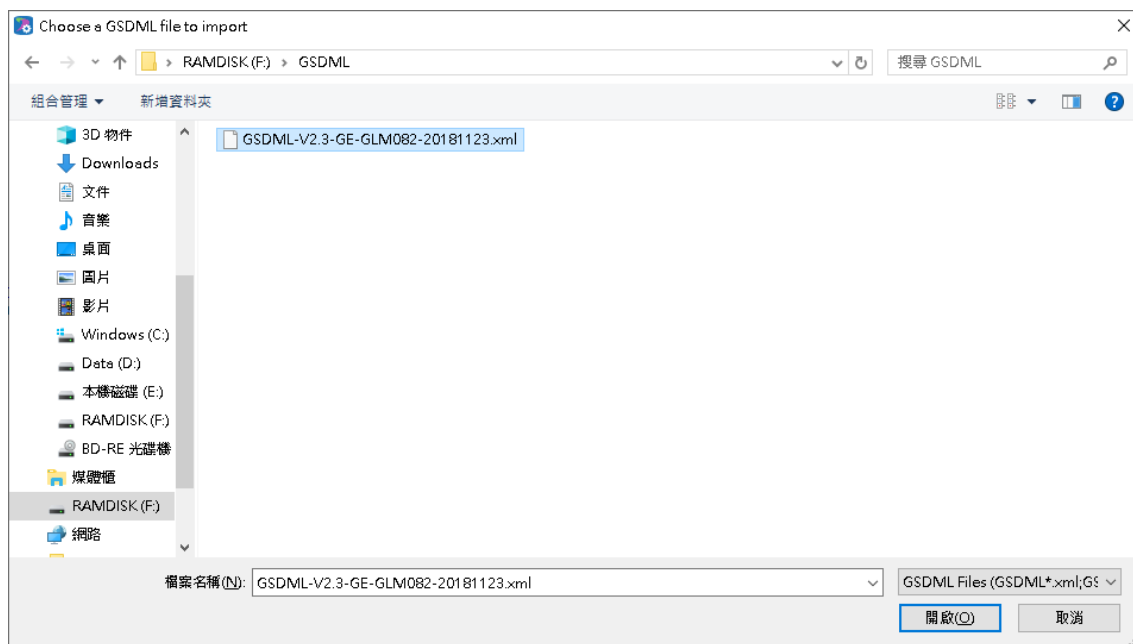


Figure 660

Then the corresponding I/O Device of GSDML File is added in the [Toolchest].

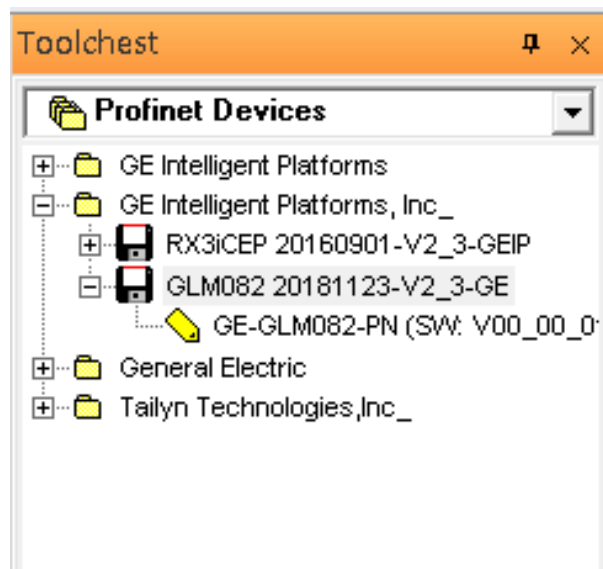


Figure 661

The I/O Device is connected to the Bus Controller on the I/O Controller. Click the slot 6 and click the right button to add the I/O Device on the PNC001

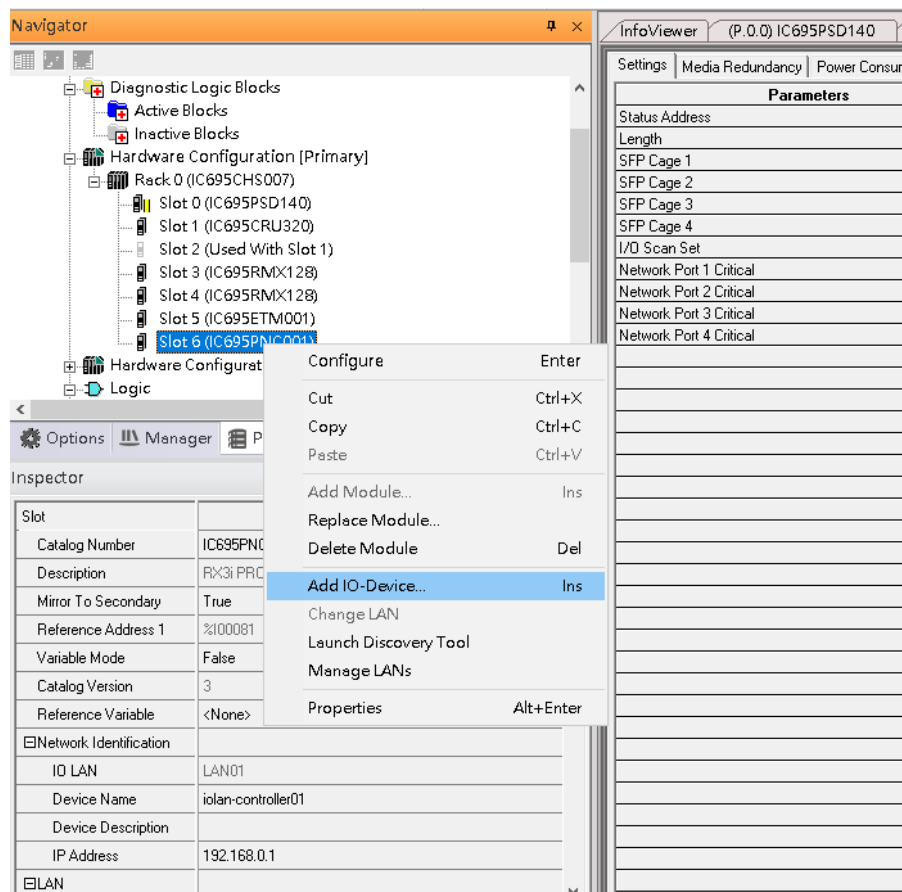


Figure 662

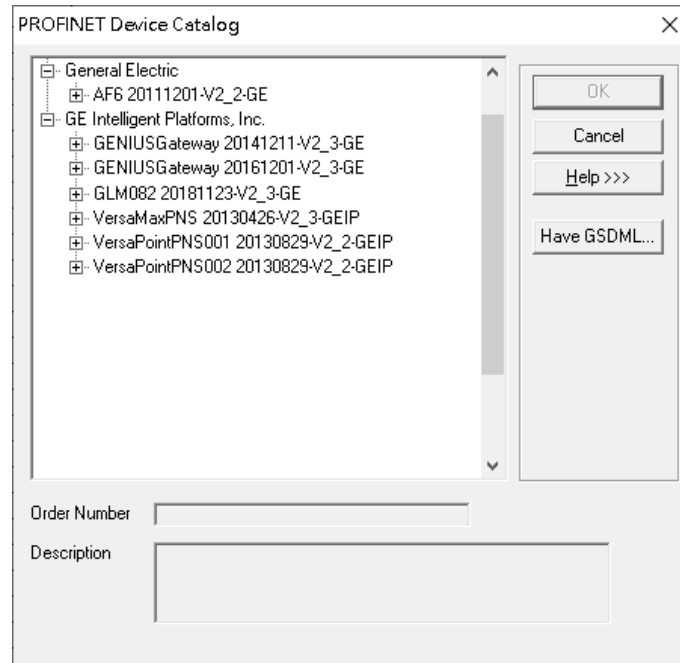


Figure 663

Select the specified I/O Service, [GE Intelligent Platforms, Inc.] -> [GLM082 20181123-V2_3-GE] -> [GE-GLM082-PN] and click [OK]

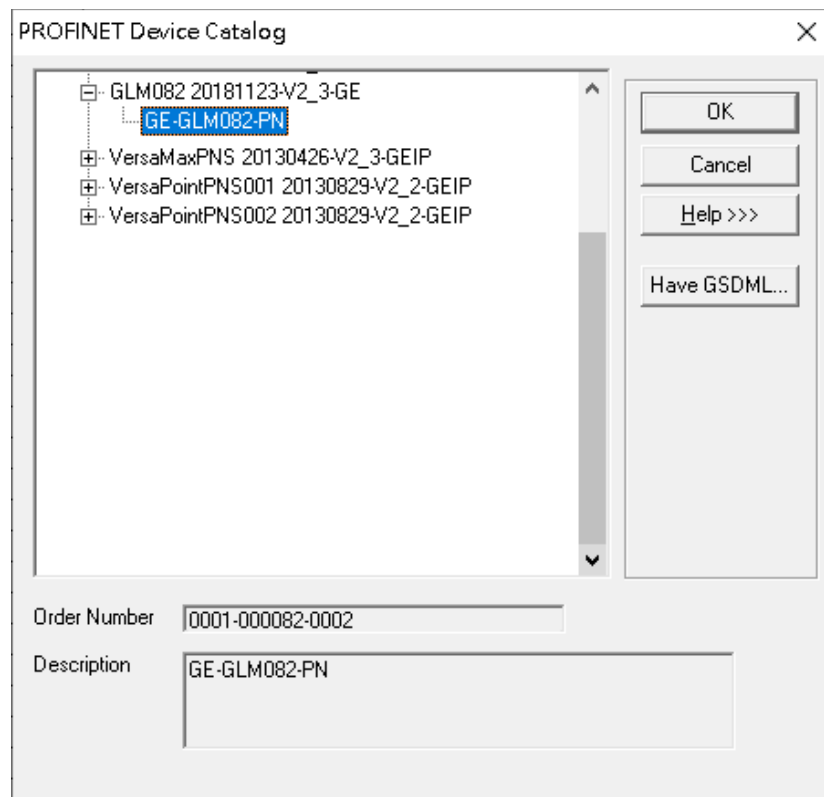


Figure 664

Now the I/O device GLM082 is ready and is a subslot on PNC001.

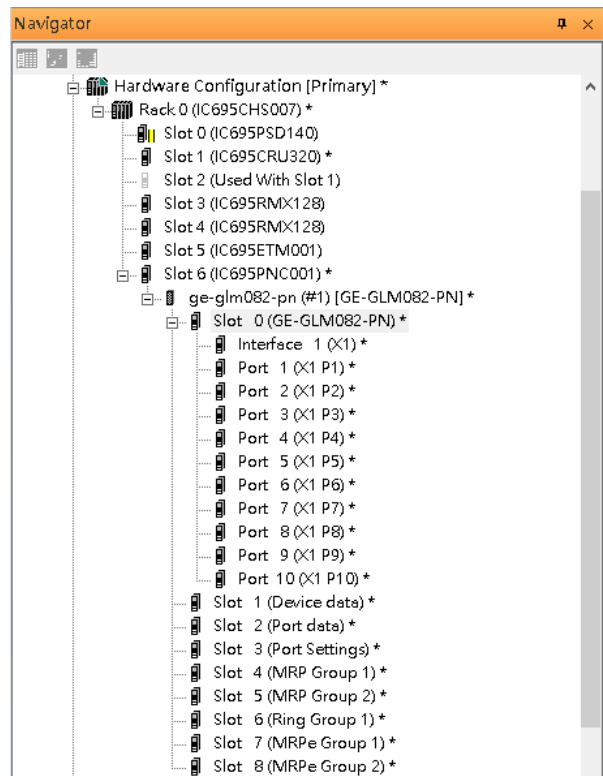


Figure 665

8.2.4 DCP Set Command

To configure the setting or monitor the status on the I/O Device, the communication interface is also based on Ethernet network. We can specify the IP address and the device name from I/O Controller via the DCP (Discovery and Configuration Protocol).

Under the slot 6, PNC001, select the I/O Device, GLM082, and click the right button.

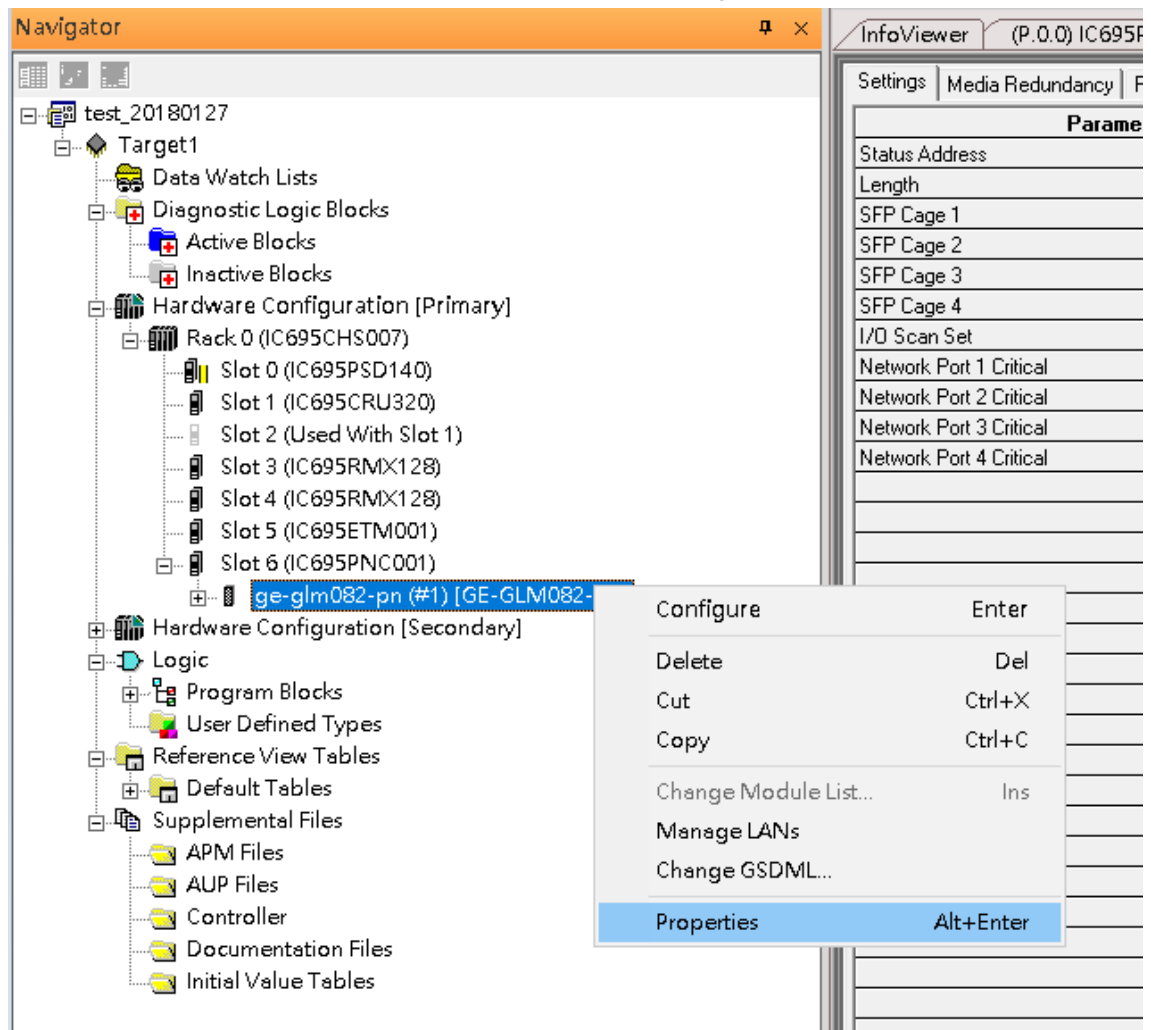


Figure 666

Select [Properties], see the following picture.

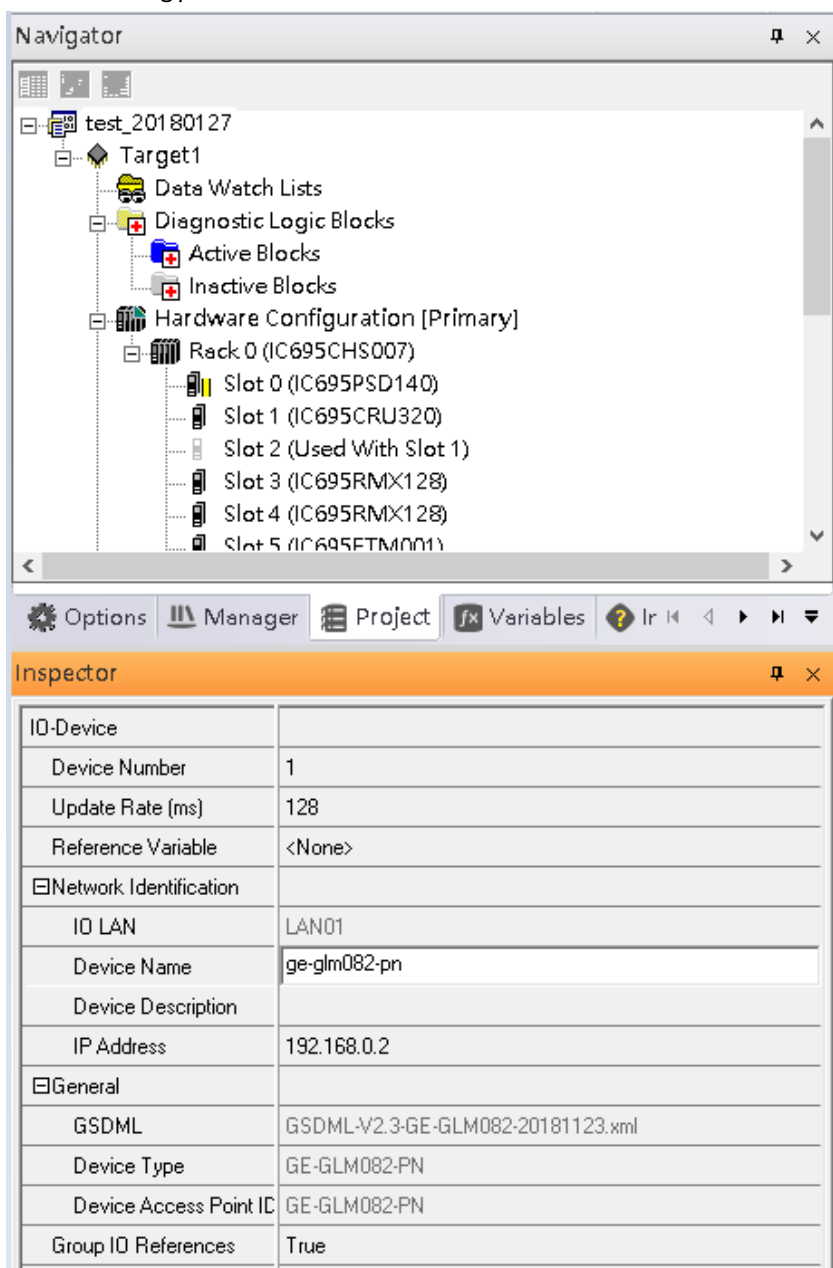


Figure 667

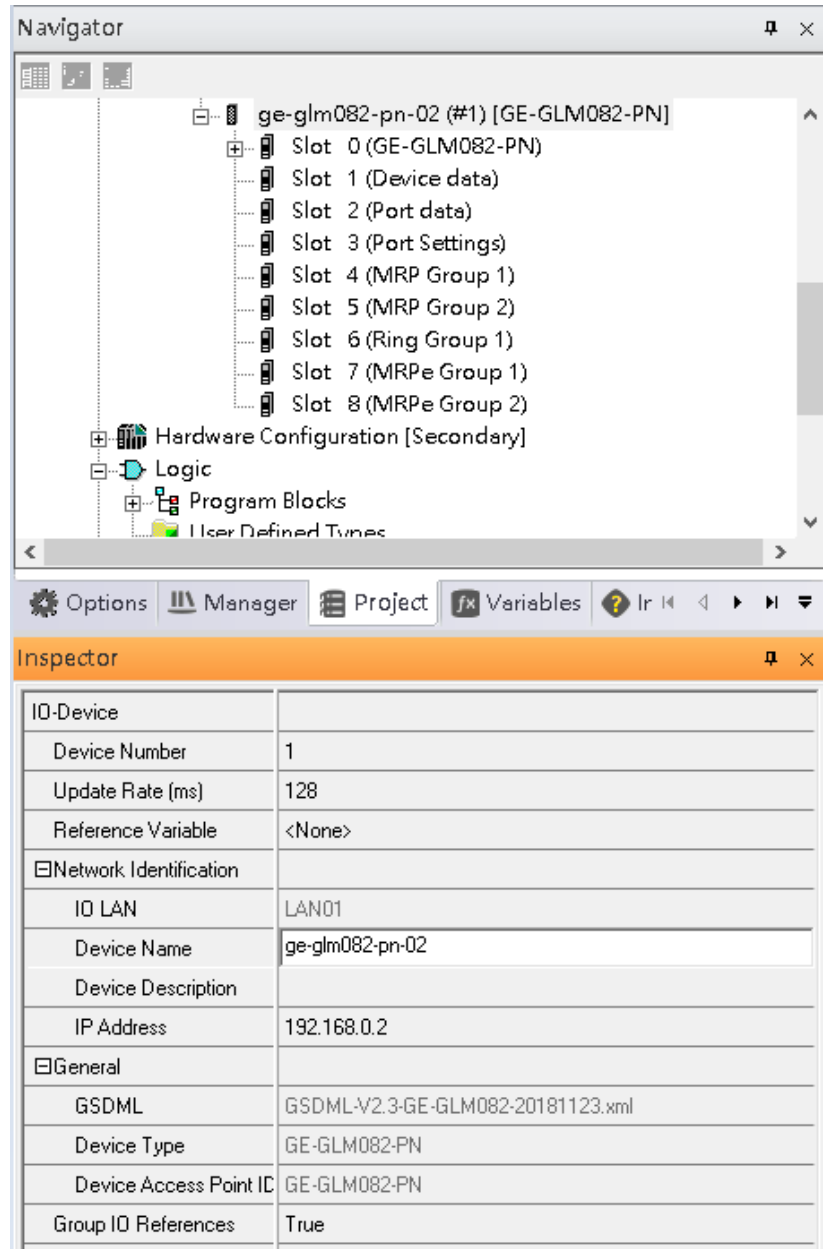


Figure 668

In this table, the I/O Device name can be specified in field [Device Name], and the IP address can be set in field [IP address]. We modify device name to “ge-glm082-pn-02” then we use I/O Device Discovery Tool to observed an I/O Device and set I/O Device’s name to “ge-glm082-pn-02” later.

It should be noted that, both the [Properties] of I/O Device shall be synchronized between [Primary] and [Secondary] hardware configuration. The DCP setting will be effective when all the configurations are downloaded to the hardware from [Primary] hardware configuration.

8.2.5 I/O Device Scan

The Proficy Machine Edition also supports the function to scan the connected I/O Devices. First the observed I/O Device shall be connected to the ETM001 on the [Primary] hardware configuration, then using the function [Launch Discovery Tool]

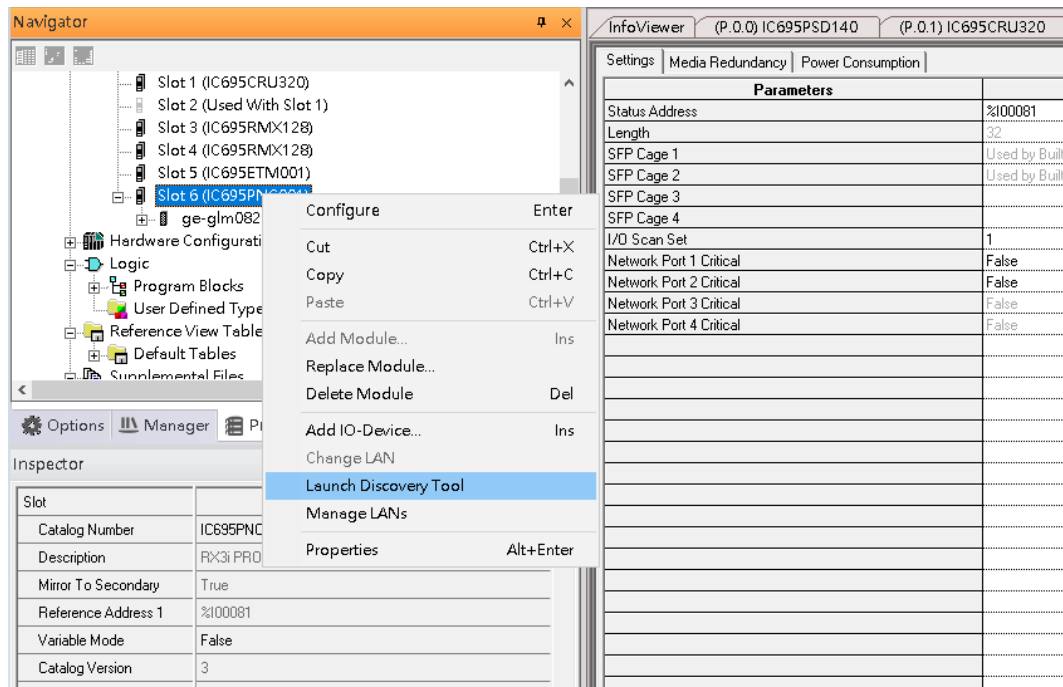


Figure 669

The tool is shown in the following picture, then press [Refresh Device List].

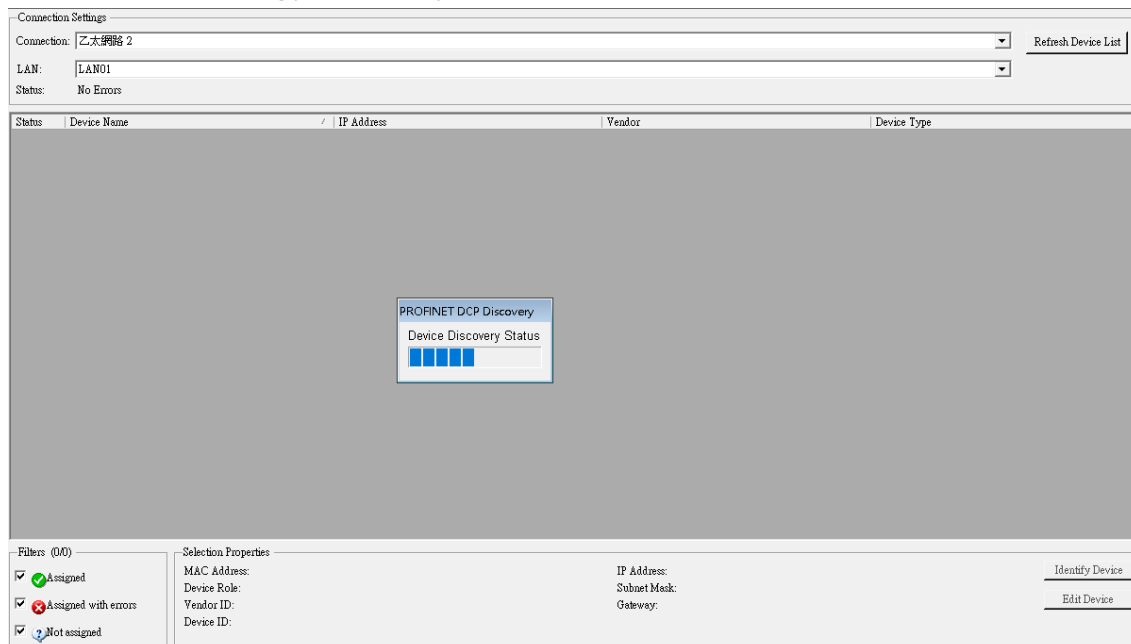


Figure 670

Then the connected I/O Device is listed in the following table.

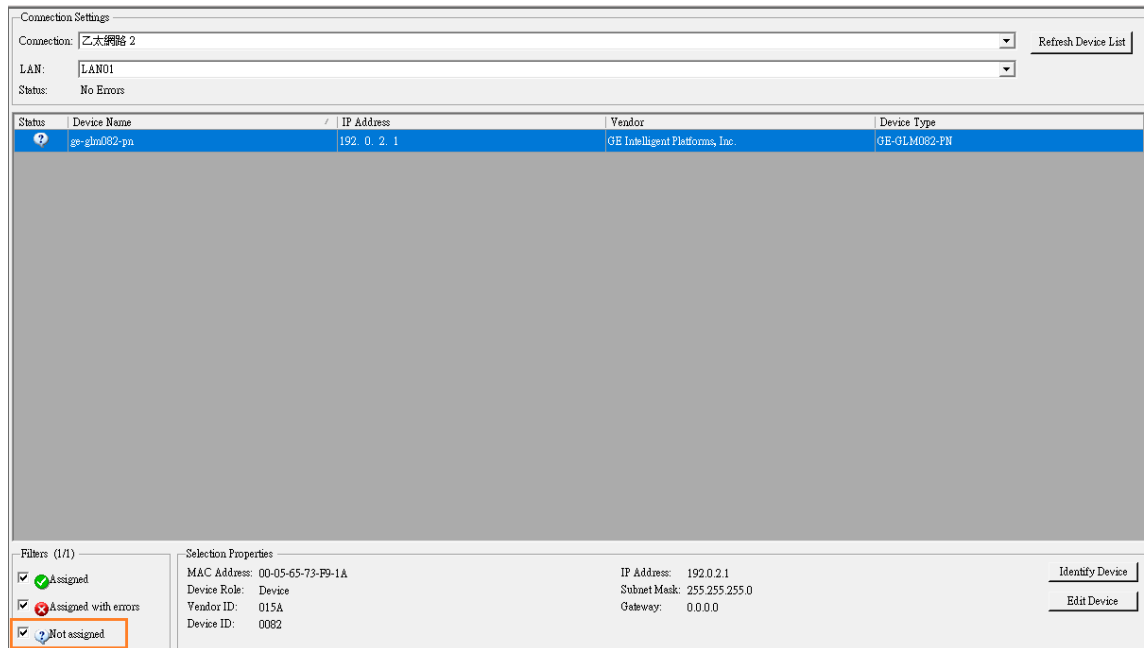


Figure 671

There is an I/O Device named “ge-glm082-pn” whose status is in “Not assigned”. We need to change its device name to [ge-glm082-pn-02] and IP address to [192.168.0.2] as previous configuration in Figure 37.

Click [Edit Device], set Device Name to “ge-glm082-pn-02” and click [Set Device Name] button, then set IP Address to “192.168.0.2”, Subnet Mask to “255.255.255.0” and click [Set IP Information] button.

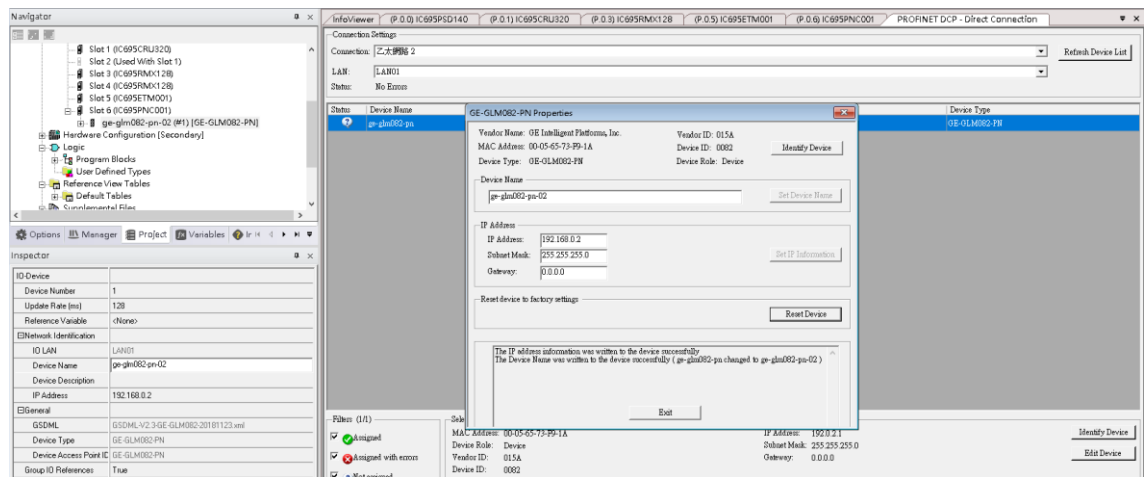


Figure 672

After assigning Device Name and IP Address correctly, the Status will be in “Assigned” status.

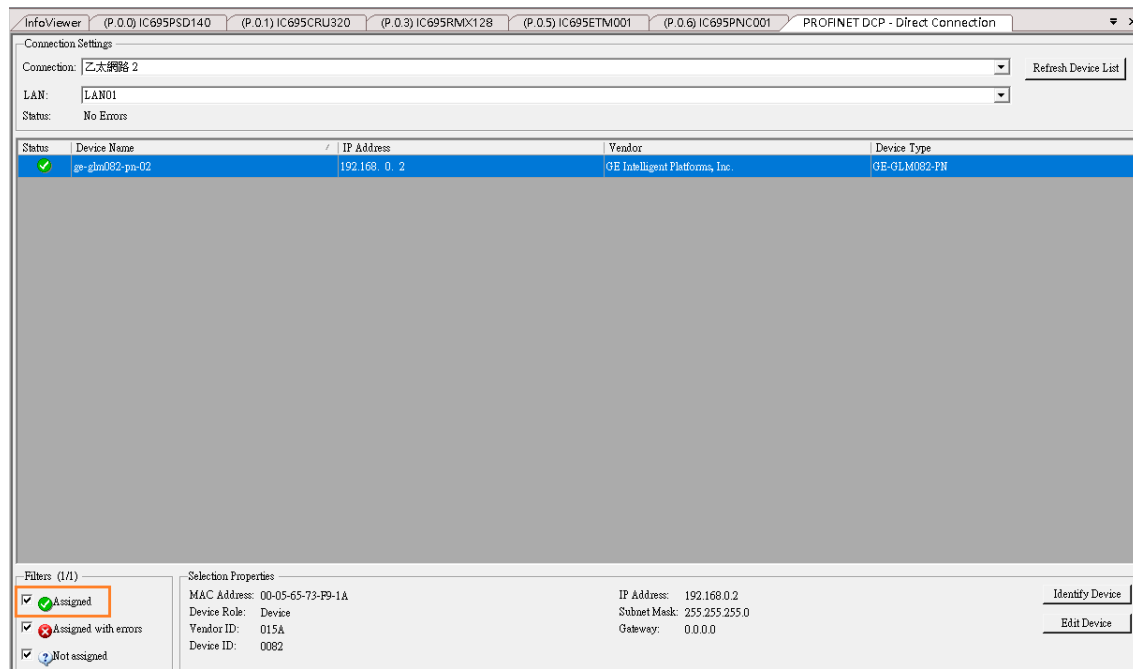


Figure 673

8.2.6 MRP Setting

This example will show how to use RingV2 and MRPe to setup the network topology which can support system redundancy and media redundancy.

In this network topology shown in Figure 674, switch port 5,6 of Switch S1, S2, S3 and S4 use RingV2 to protect the link in the ring. Switch S1 runs as RingV2 Master role, Switch S2, S3 and S4 runs as RingV2 Slave role. In normal state, Master will block one of its ring ports for preventing broadcast storm in the ring. If anyone link between these 4 switches is failure, Master will set this blocked port to forward state, so the traffic will resume soon.

Switch port 2 of Switch S1 and S3 connect to Primary PLC by using MRPe to protect the links. In this link, Primary PLC runs as MRC, MRPe Group2(Master) will manage port 2 of Switch S1. MRPe Group2(Master) will set port2 of Switch S1 to blocked in Normal state. If MRPe Group2(Master) detects link-failure, it will set port2 of Switch S1 to forwarded.

Switch port 1 of Switch S1 and S3 connect to Secondary PLC by using MRPe to protect the links. MRPe Group1(Master) will manage port 1 of Switch S1. MRPe Group1(Master) will set port1 of Switch S1 to blocked in Normal state. If MRPe Group1(Master) detects link-failure, it will set port1 of Switch S1 to forwarded.

Switch port 1 of Switch S2 and Switch port 2 of Switch S4 connect to 5 MRC Devices by using MRPe to protect the links. MRPe Group1(Master) will manage port 1 of Switch S2. MRPe Group1(Master) will set port1 of Switch S2 to blocked in Normal state. If MRPe Group1(Master) detects link-failure, it will set port1 of Switch S2 to forwarded.

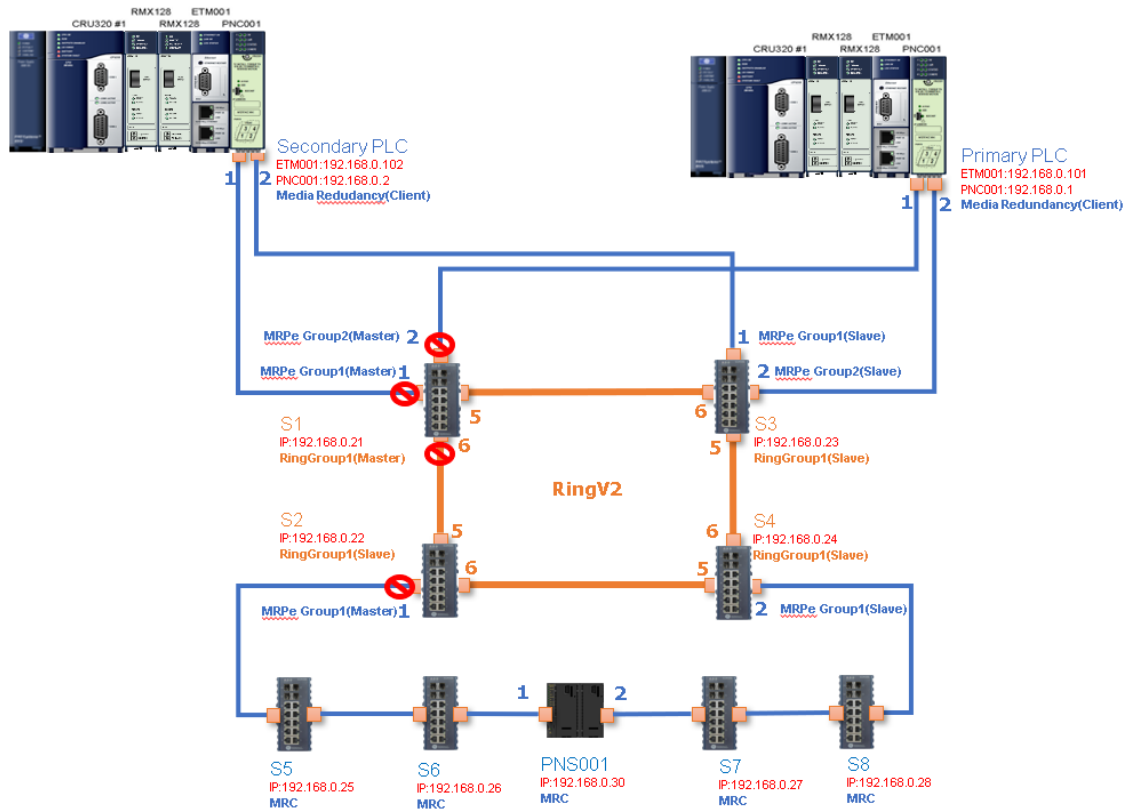


Figure 674

Follow the procedures to complete the configuration of the network.

Step1: Create Proficy project and add needed modules.

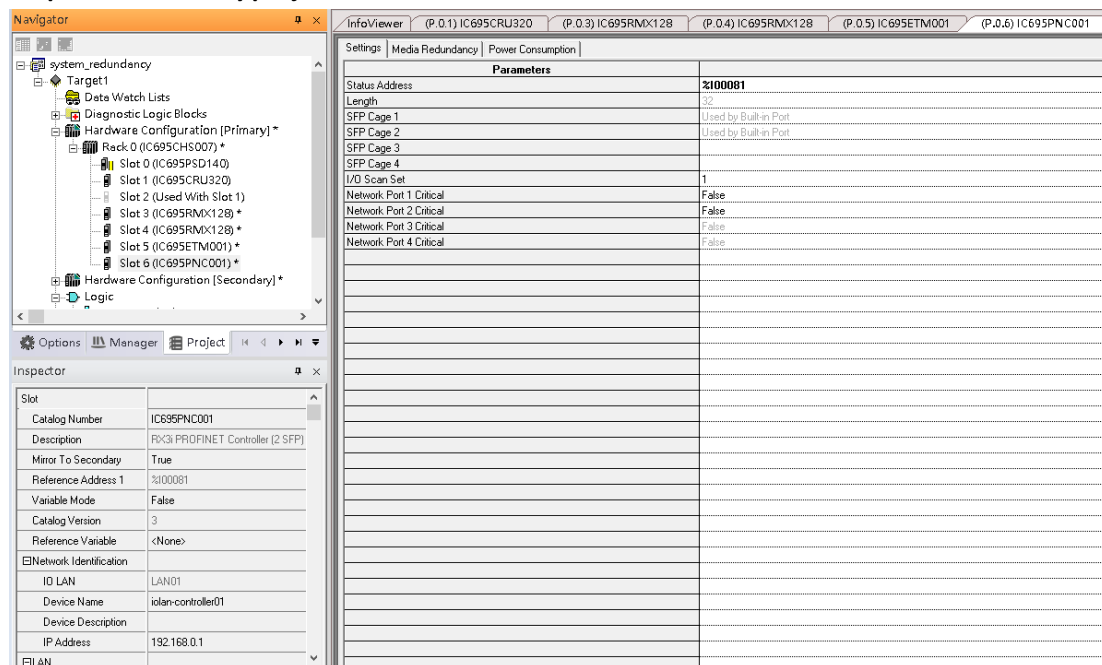


Figure 675

Step2: Config PNC001 to run as MRC

The screenshot shows the InfoViewer interface with the 'Media Redundancy' tab selected. The left pane shows the hardware configuration tree, with 'Slot 6 (IC695PNC001)' highlighted. The right pane displays the 'Parameters' table for the Media Redundancy configuration.

Parameters	Client
Media Redundancy	
Ring Port 1	1
Ring Port 2	2
Domain Name	mpdomain-1

The Inspector pane on the left shows the details for Slot 6:

Slot	
Catalog Number	IC695PNC001
Description	RX3i PROFINET Controller (2 SFP)
Mirror To Secondary	True
Reference Address 1	%I00081
Variable Mode	False
Catalog Version	3
Reference Variable	<None>
Network Identification	
IO LAN	LAN01
Device Name	iolan-controller01
Device Description	
IP Address	192.168.0.1

Figure 676

Step3: Add Switch S1

The screenshot shows the InfoViewer interface with the 'Media Redundancy' tab selected. The left pane shows the hardware configuration tree, with 'Slot 6 (IC695PNC001)' highlighted. The right pane displays the 'Parameters' table for the Media Redundancy configuration.

Parameters	Client
Status Address	%I00081
Length	32
SFP Cage 1	Used by Built-in Port
SFP Cage 2	Used by Built-in Port
SFP Cage 3	
SFP Cage 4	
I/O Scan Set	
Network Port 1 Critical	
Network Port 2 Critical	
Network Port 3 Critical	
Network Port 4 Critical	

The Inspector pane on the left shows the details for Slot 6:

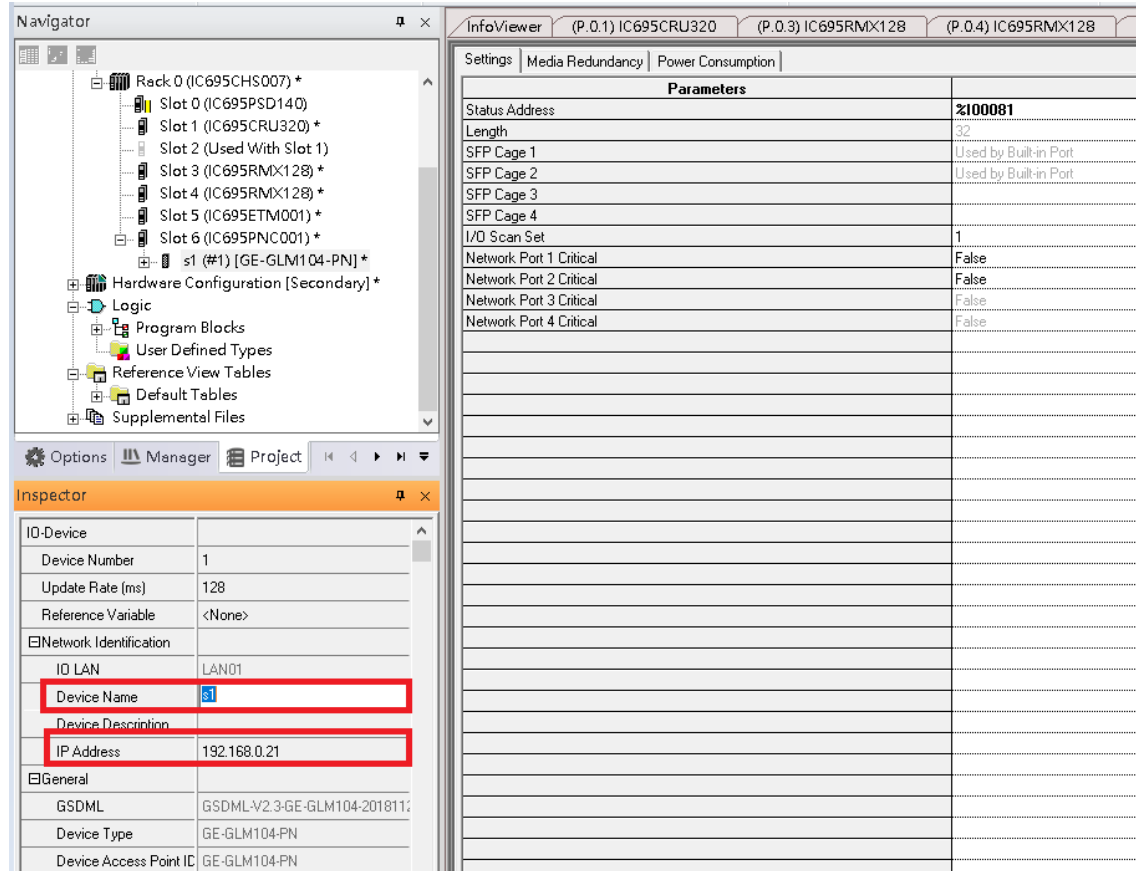
Slot	
Catalog Number	IC695PNC001
Description	RX3i PROFINET Controller (2 SFP)
Mirror To Secondary	True
Reference Address 1	%I00081
Variable Mode	False
Catalog Version	3
Reference Variable	<None>
Network Identification	
IO LAN	LAN01
Device Name	iolan-controller01

A context menu is open over the 'Add IO-Device...' option. The 'PROFINET Device Catalog' dialog is also open, showing a list of devices. The 'GE-GLM104-PN' device is selected.

The 'PROFINET Device Catalog' dialog shows the following details:

Order Number	0001-000104-0004
Description	GE-GLM104-PN

Figure 677

Step3: Set Switch S1 device name and ip address**Figure 678****Step4: Config Switch S1 to run RingV2 and MRPe.**

Set Switch S1 to run RingV2 Master Role:

In [Ring Group1 Date], set

- Ring Group Mode: Enable
- Ring Group Role: Master
- Ring Group Port1: Port5
- Ring Group Port2: Port6

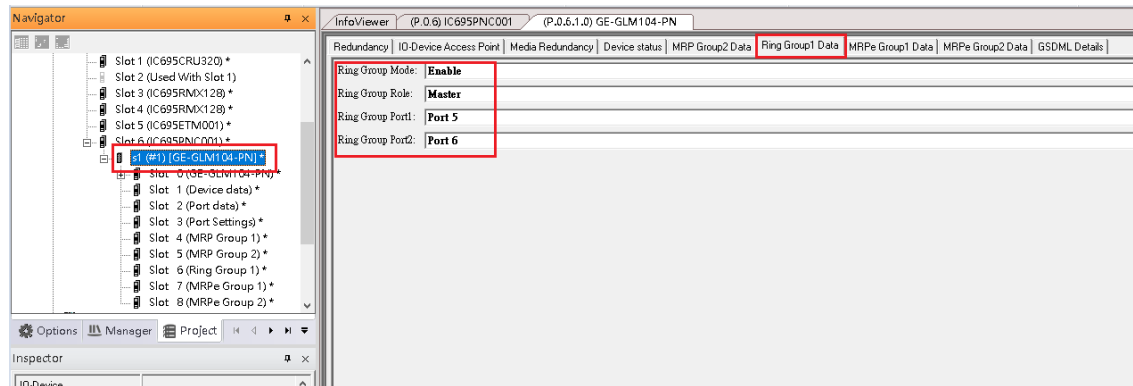


Figure 679

Step5: Set Switch S1 port1 and port2 to run MRPe Master

In [MRPe Group1 Date], set

- MRPe Mode: Enable
- MRPe Role: Master
- MRPe port: Port1

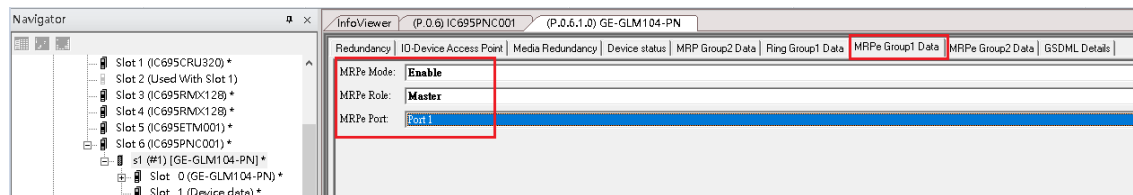


Figure 680

In [MRPe Group2 Date], set

- MRPe Mode: Enable
- MRPe Role: Master
- MRPe port: Port2

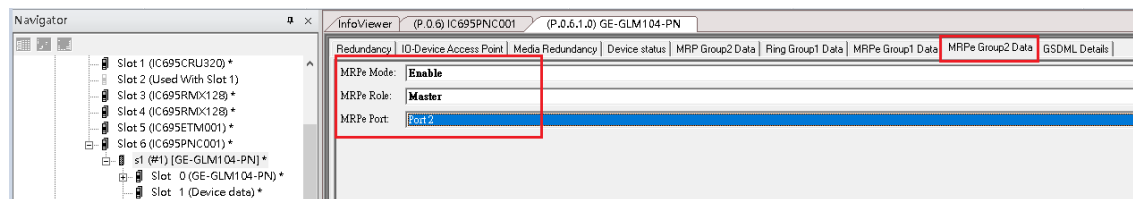
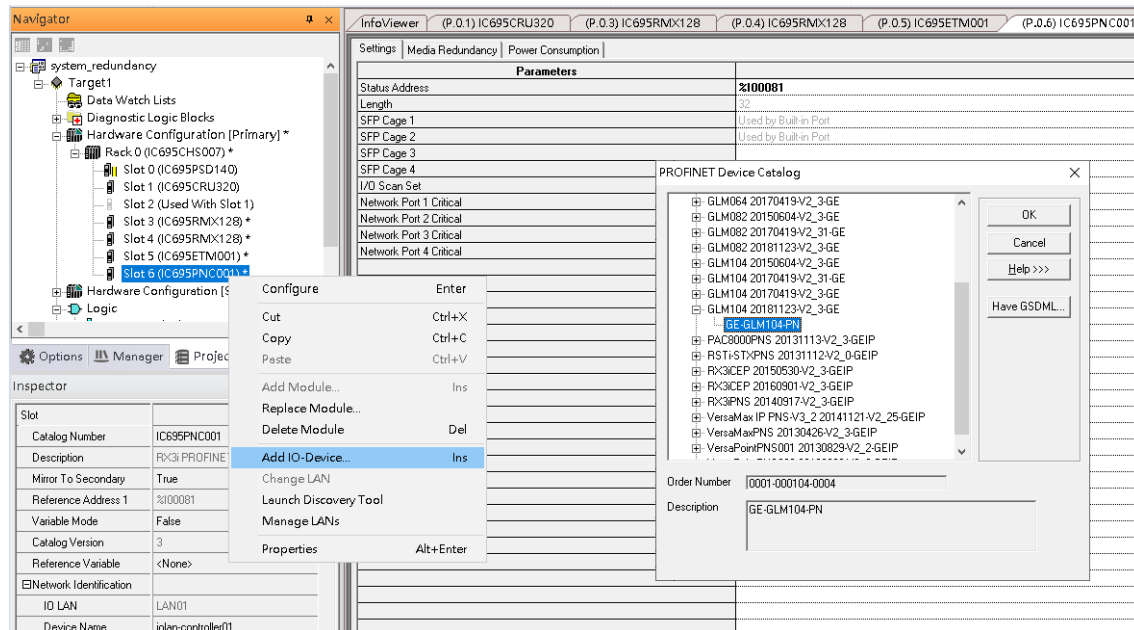
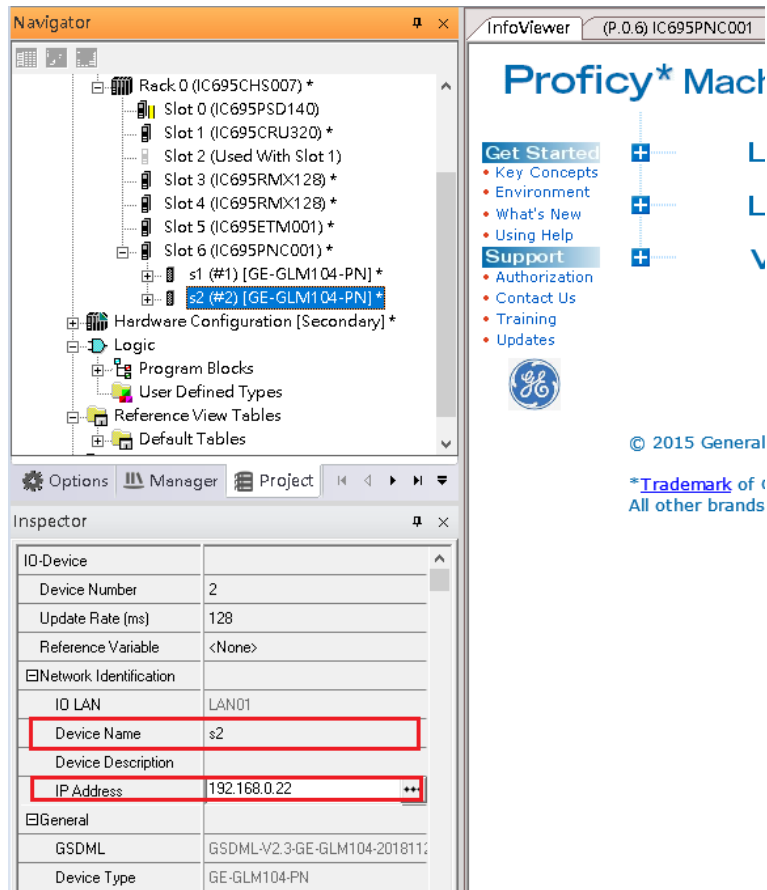


Figure 681

Step6: Add Switch S2**Figure 682****Step7: Set Switch S2 device name and ip address****Figure 683**

Step8: Config Switch S2 to run RingV2 and MRPe.

Set Switch S2 to run RingV2 Slave Role

In [Ring Group1 Date], set

- Ring Group Mode: Enable
- Ring Group Role: Slave
- Ring Group Port1: Port5
- Ring Group Port2: Port6

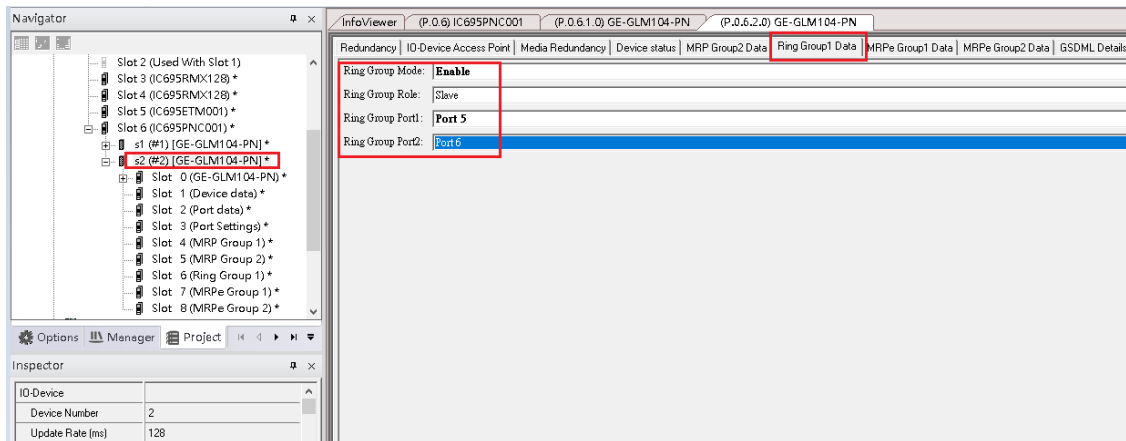


Figure 684

Step9: Set Switch S2 port1 to run MRPe Master

In [MRPe Group1 Date], set

- MRPe Mode: Enable
- MRPe Role: Master
- MRPe port: Port1

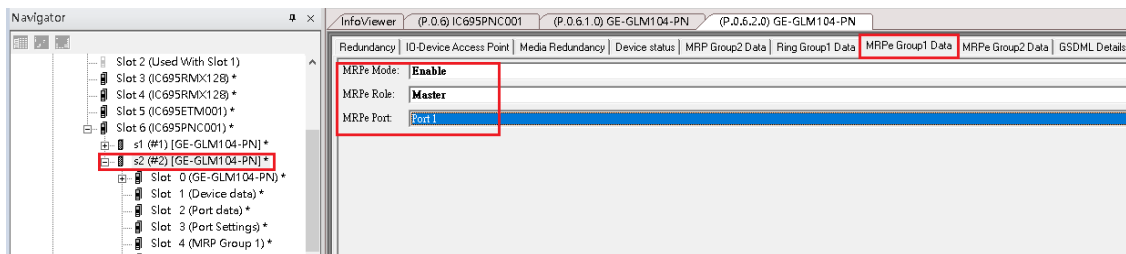
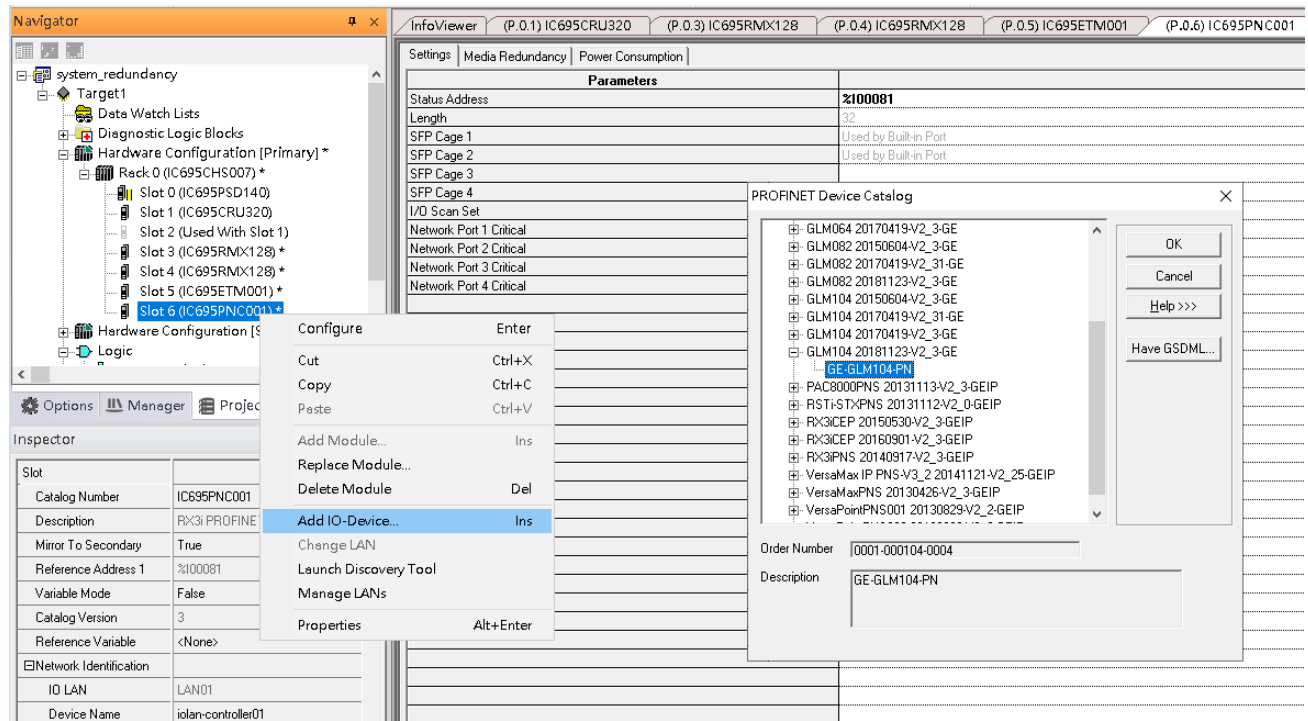


Figure 685

Step10: 10 Add Switch S3**Figure 686**

Step11: Set Switch S3 device name and ip address

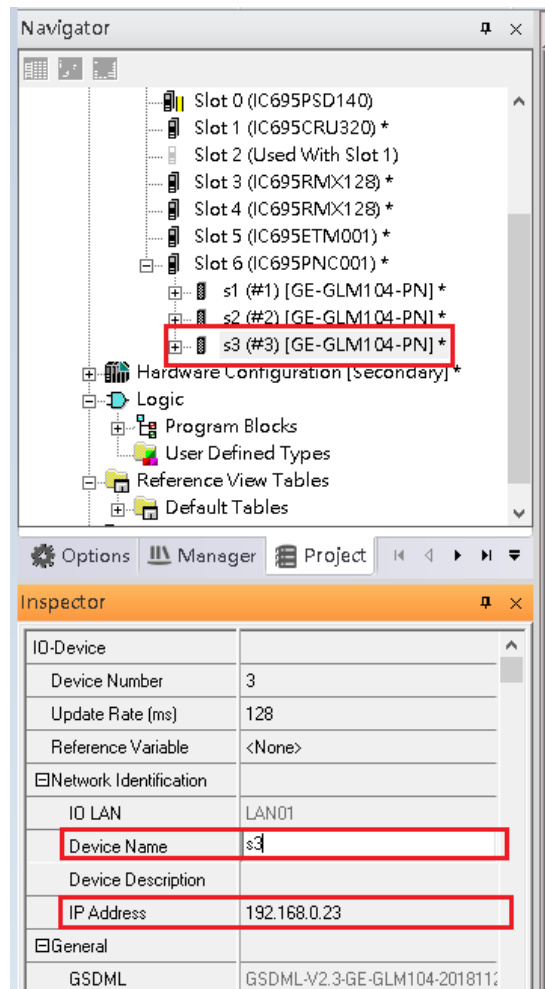


Figure 687

Step12: Config Switch S3 to run RingV2 and MRPe.

Set Switch S3 to run RingV2 Slave Role:

In [Ring Group1 Date], set

- Ring Group Mode: Enable
- Ring Group Role: Slave
- Ring Group Port1: Port5
- Ring Group Port2: Port6

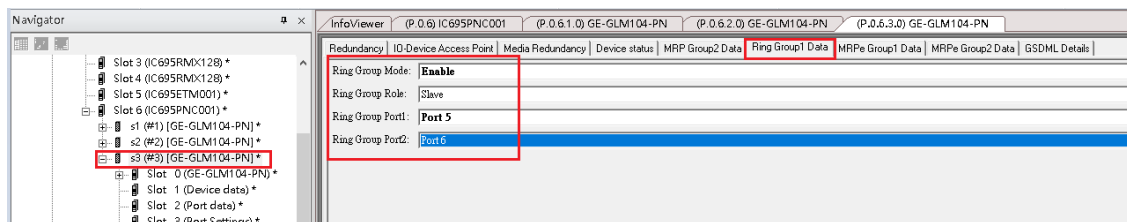


Figure 688

Step13: Set Switch S3 port1 and port2 to run MRPe Slave

In [MRPe Group1 Date], set

- MRPe Mode: Enable
- MRPe Role: Slave
- MRPe port: Port1

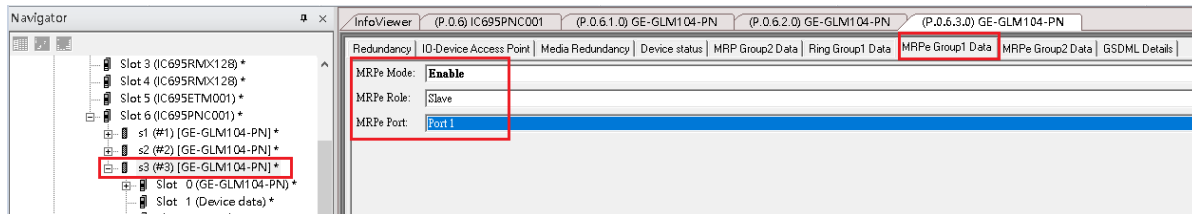


Figure 689

In [MRPe Group2 Date], set

- MRPe Mode: Enable
- MRPe Role: Master
- MRPe port: Port2

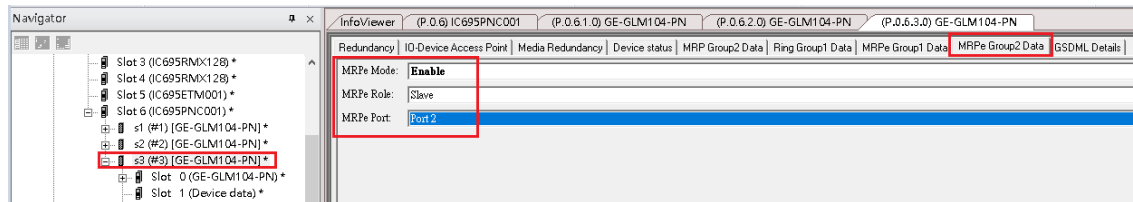


Figure 690

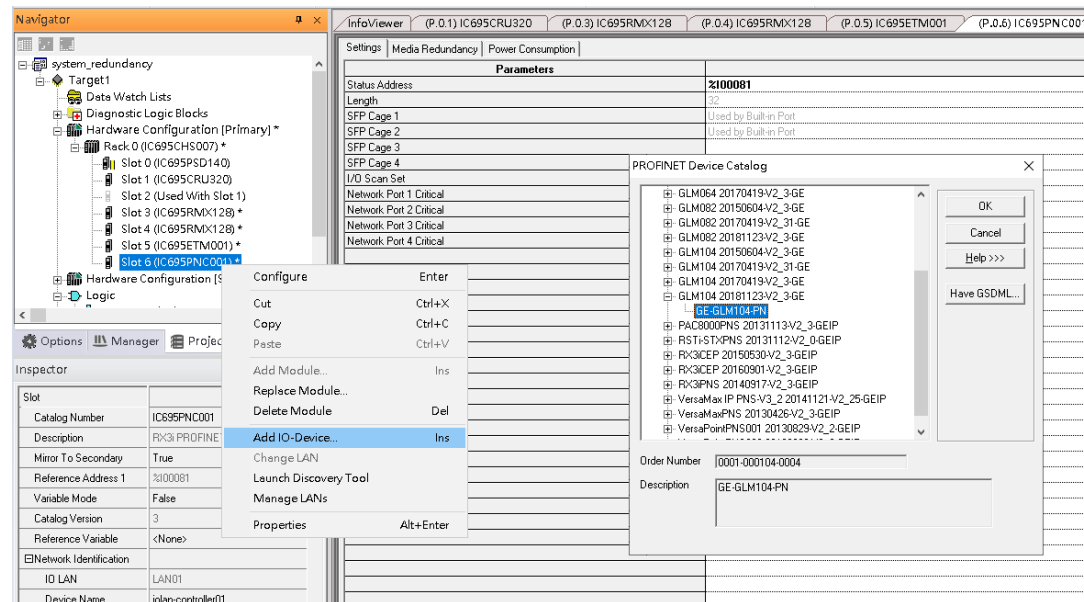
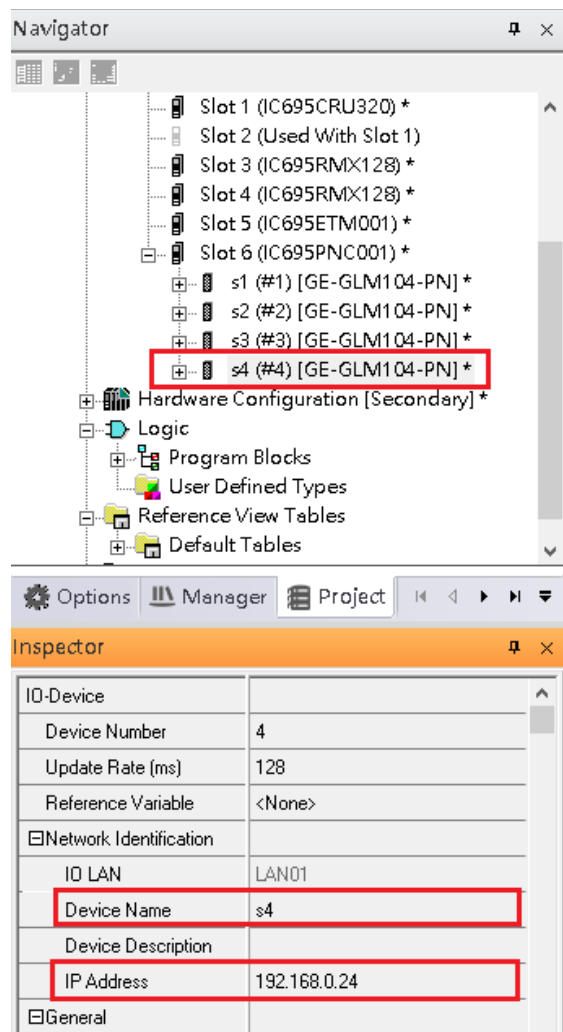
Step14: Add Switch S4

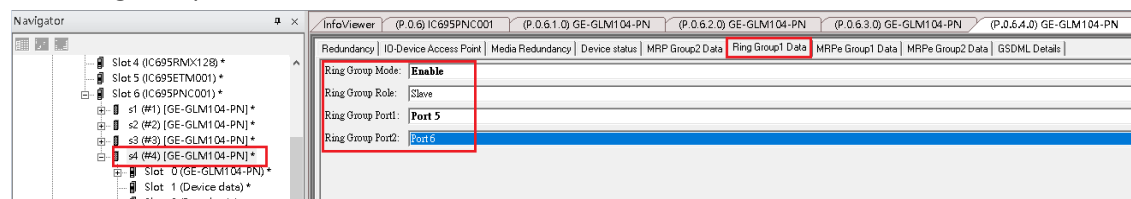
Figure 691

Step15: Set Switch S4 device name and ip address**Figure 692****Step16: Config Switch S4 to run RingV2 and MRPe.**

Set Switch S4 to run RingV2 Slave Role

In [Ring Group1 Date], set

- Ring Group Mode: Enable
- Ring Group Role: Slave
- Ring Group Port1: Port5
- Ring Group Port2: Port6

**Figure 693**

Step17: Set Switch S4 port2 to run MRPe Slave

In [MRPe Group1 Date], set

- MRPe Mode: Enable
- MRPe Role: Slave
- MRPe port: Port2

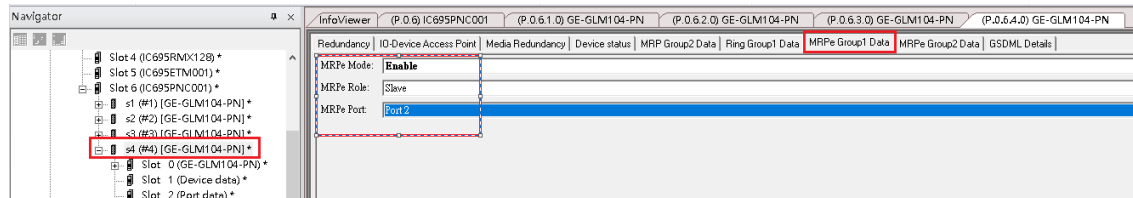


Figure 694

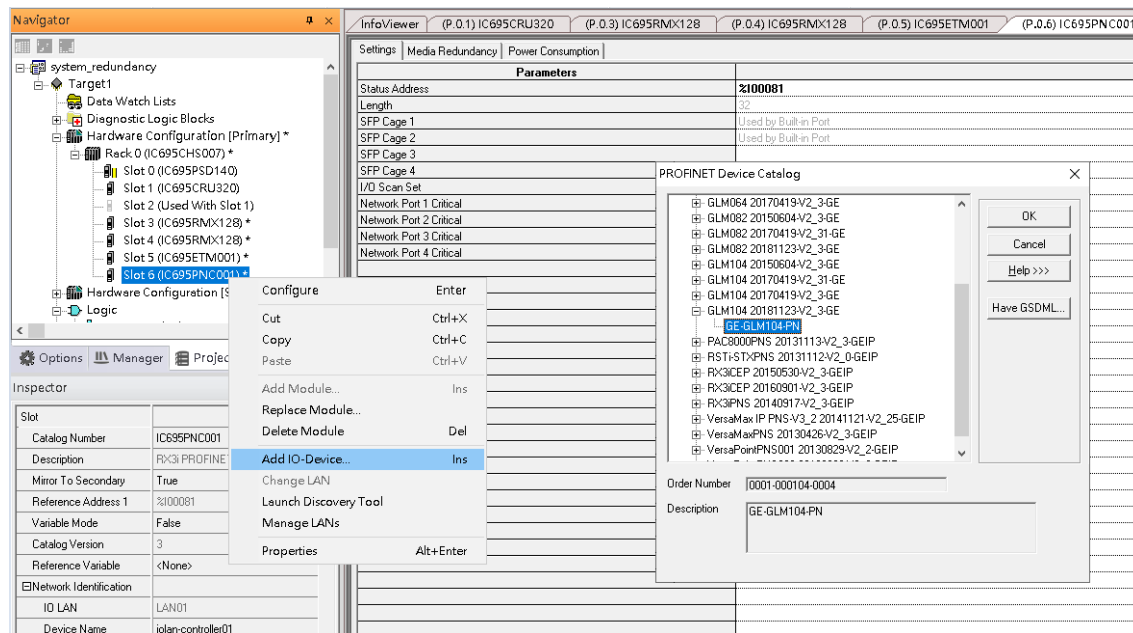
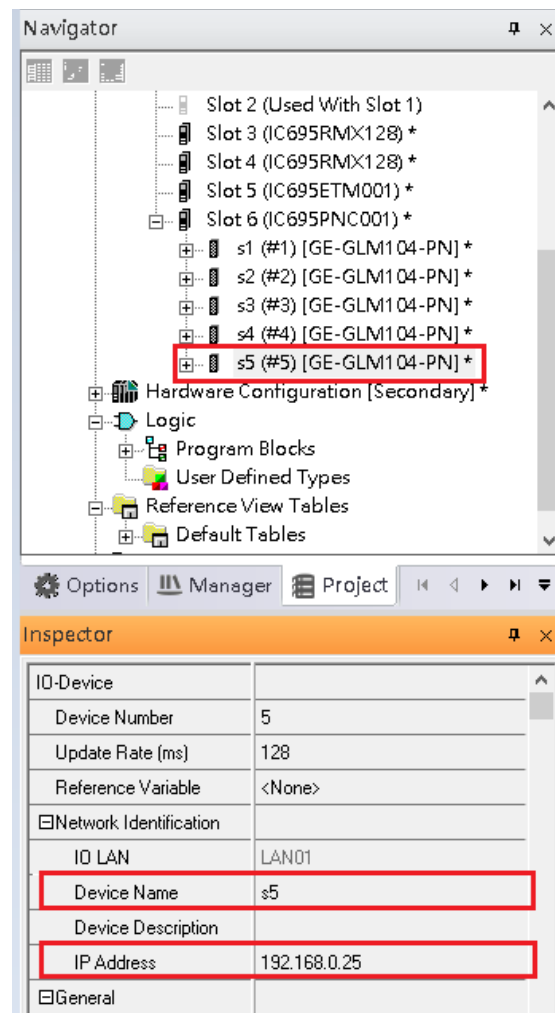
Step18: Add Switch S5

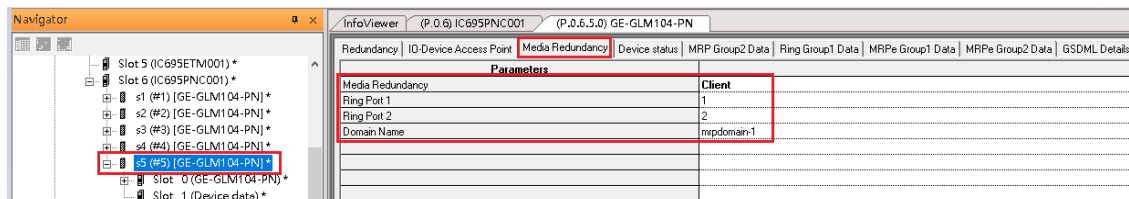
Figure 695

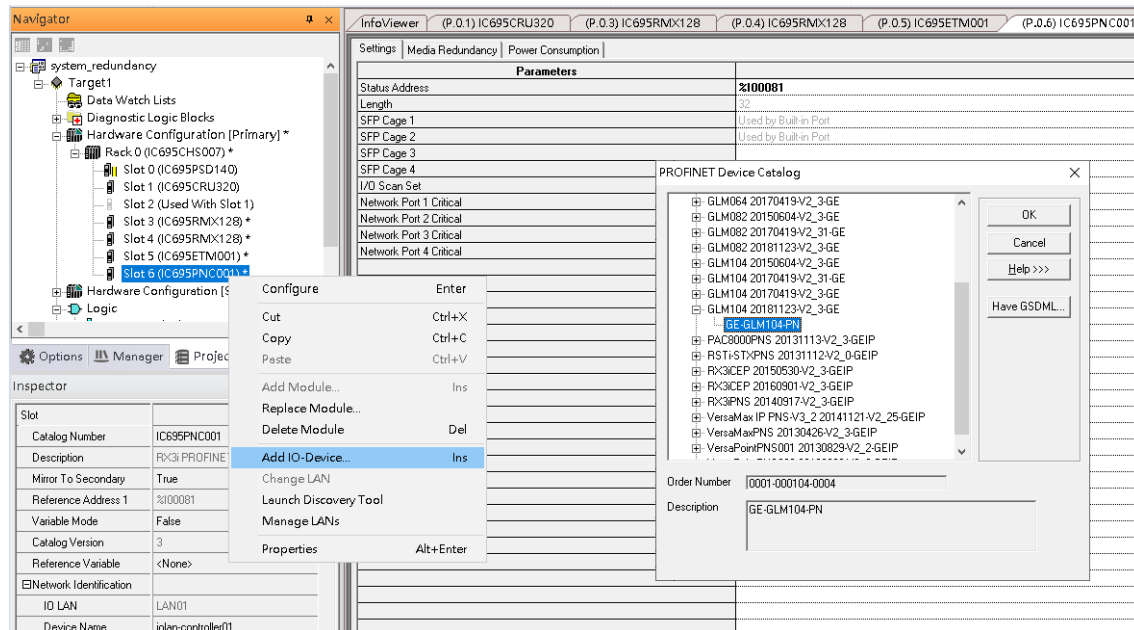
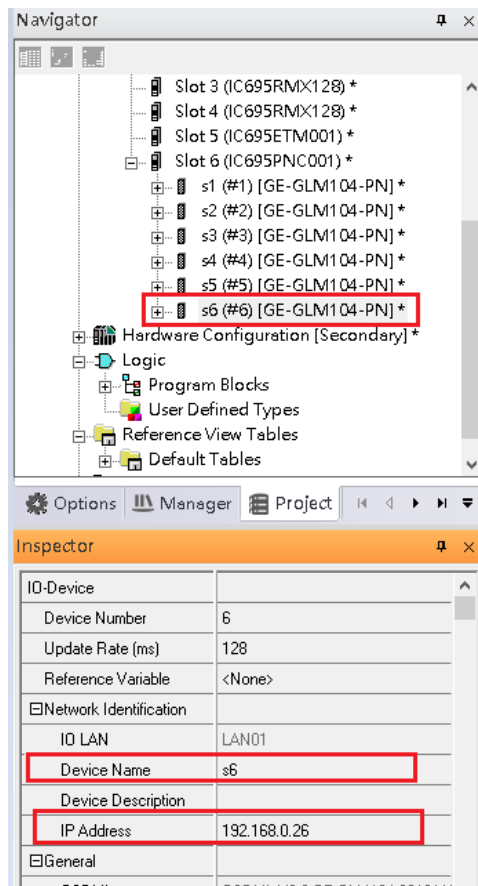
Step19: Set Switch S5 device name and ip address**Figure 696****Step20: Config Switch S5 to run MRC.**

Set Switch S5 to run MRC

In [Media Redundancy], set

- Media Redundancy: Client
- Ring Port 1: 1
- Ring Port 2: 2
- Domain Name: mrpdomain-1

**Figure 697**

Step21: Add Switch S6**Figure 698****Step21: Set Switch S6 device name and ip address****Figure 699**

Step23: Config Switch S6 to run MRC.

Set Switch S6 to run MRC

In [Media Redundancy], set

- Media Redundancy: Client
- Ring Port 1: 1
- Ring Port 2: 2
- Domain Name: mrpdomain-1

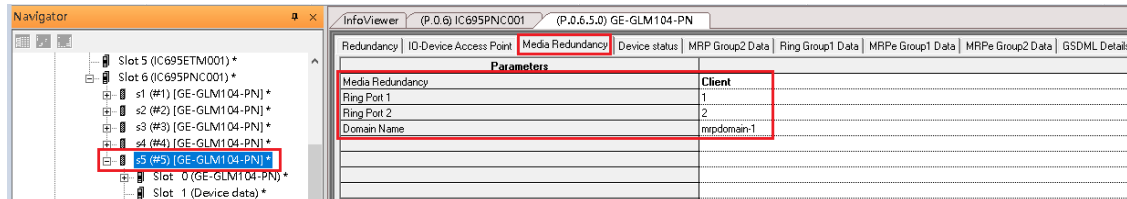


Figure 700

Step24: Add Switch S7

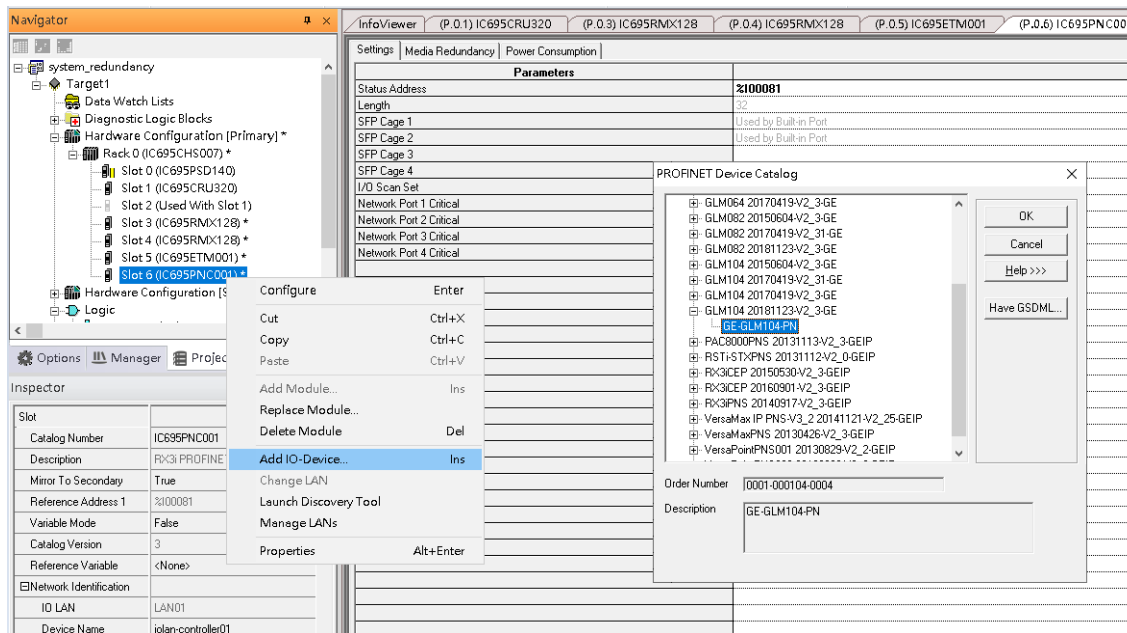
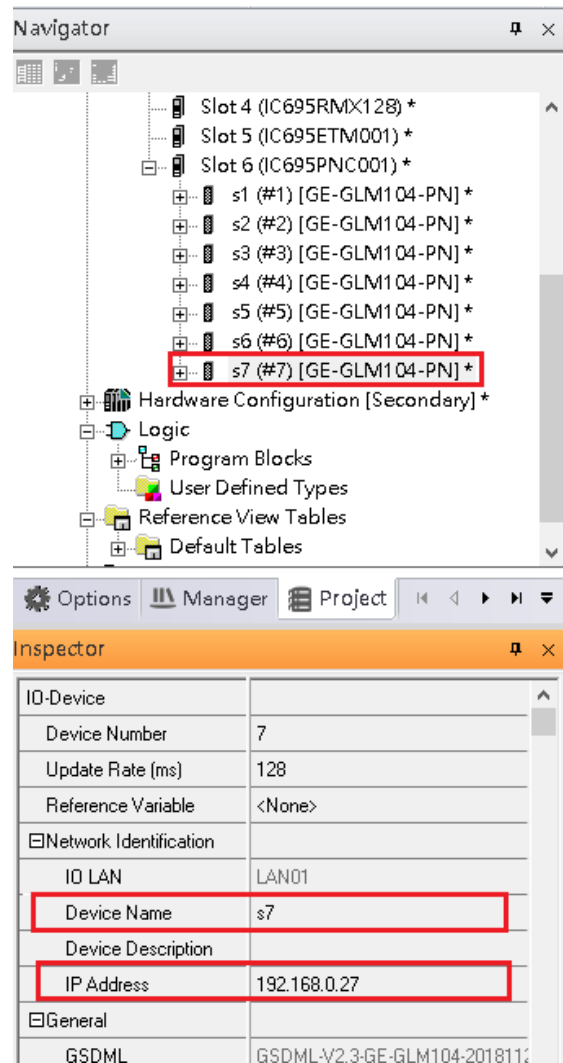


Figure 701

Step25: Set Switch S7 device name and ip address**Figure 702****Step26: Config Switch S7 to run MRC.**

Set Switch S7 to run MRC

In [Media Redundancy], set

- Media Redundancy: Client
- Ring Port 1: 1
- Ring Port 2: 2
- Domain Name: mrpdomain-1

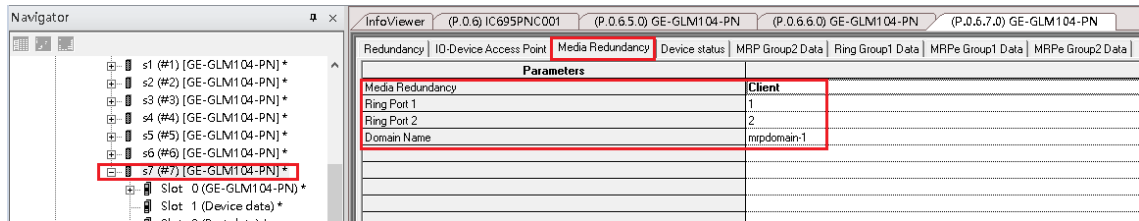


Figure 703

Step27: Add Switch S8

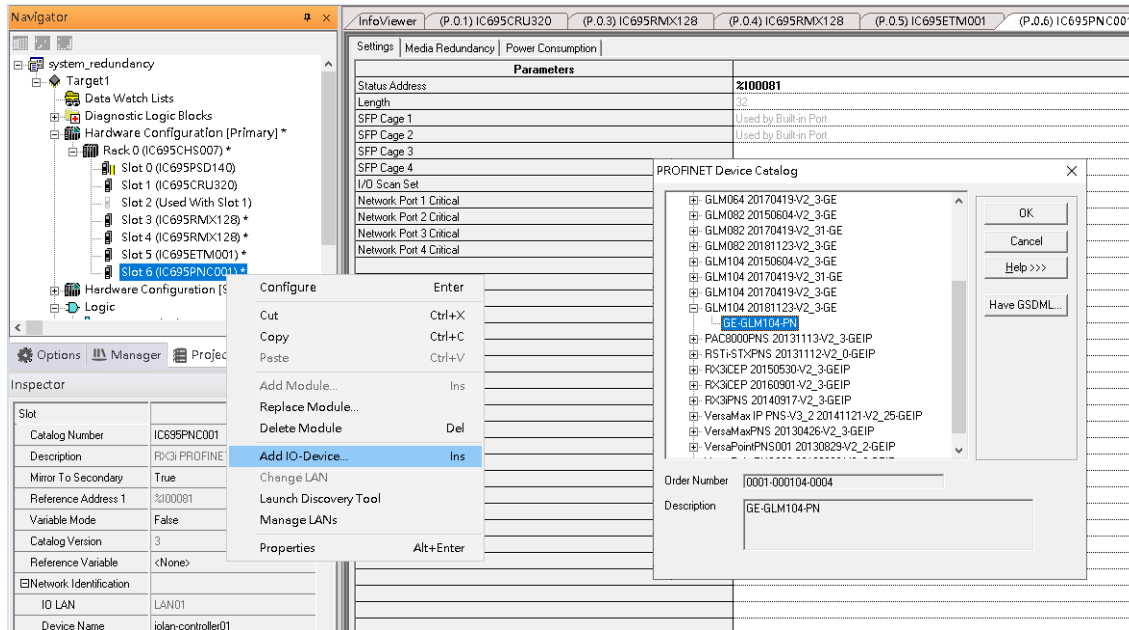
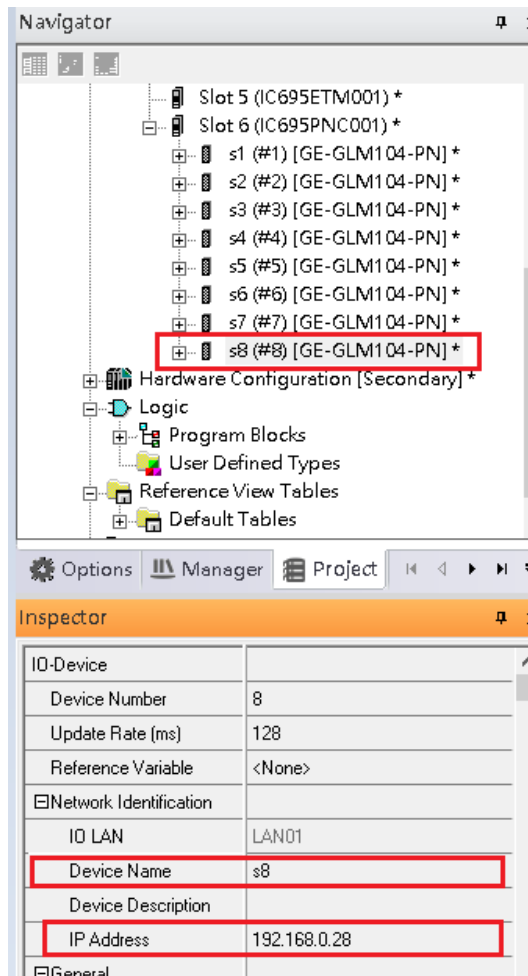


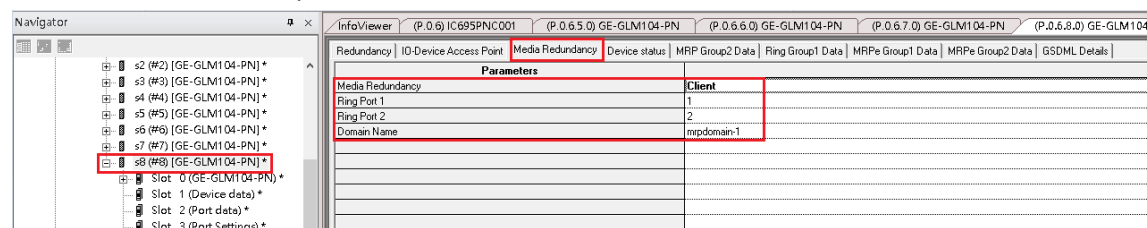
Figure 704

Step28: Set Switch S8 device name and ip address**Figure 705****Step29: Config Switch S8 to run MRC.**

Set Switch S8 to run MRC

In [Media Redundancy], set

- Media Redundancy: Client
- Ring Port 1: 1
- Ring Port 2: 2
- Domain Name: mrpdomain-1

**Figure 706**

Step30: Add IO-Device PNS001

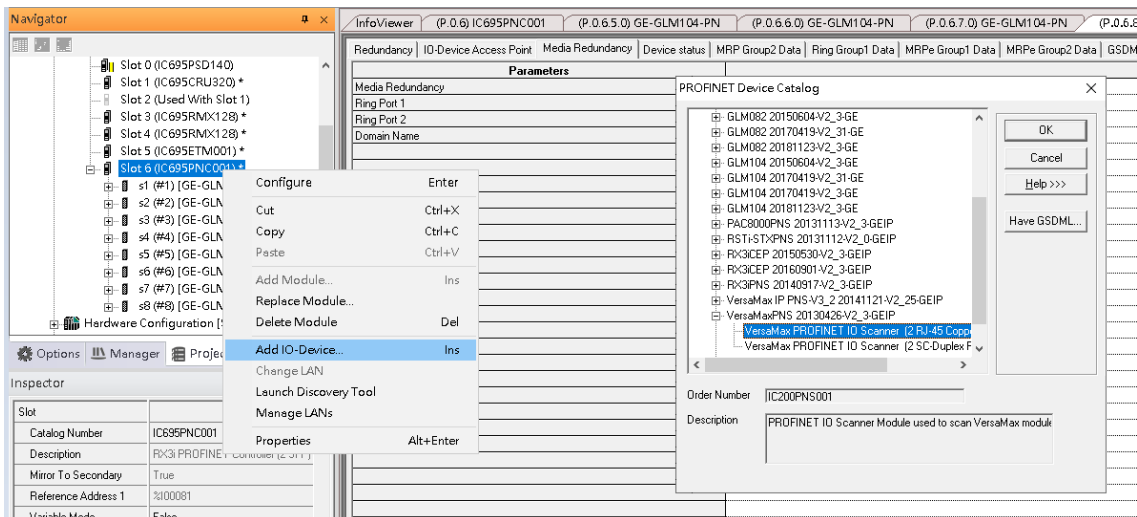


Figure 707

Step31: Set Switch PNS001 device name and ip address

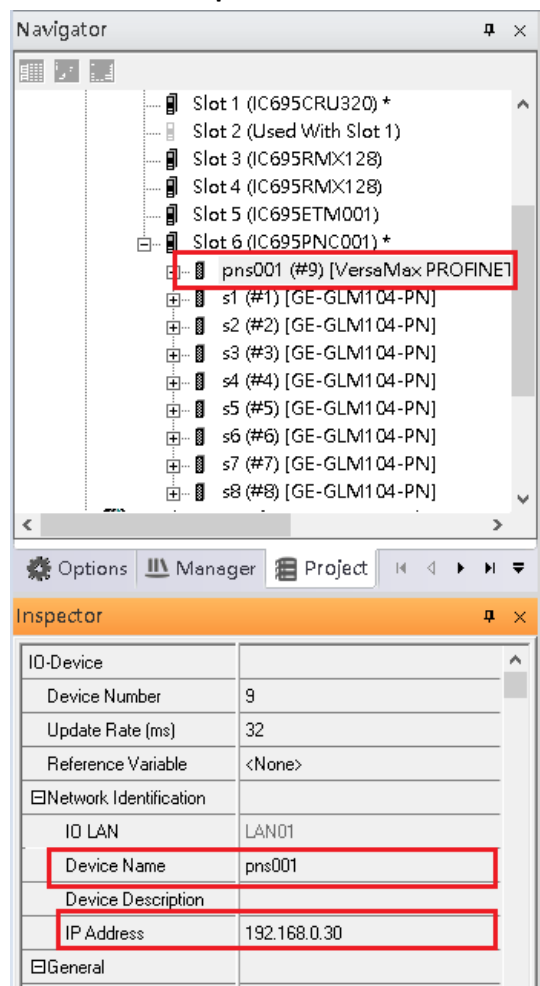


Figure 708

Step32: Config Switch PNS001 to run MRC.

Set Switch PNS001 to run MRC

In [Media Redundancy], set

Media Redundancy: Client

Ring Port 1: 1

Ring Port 2: 2

Domain Name: mrpdomain-1

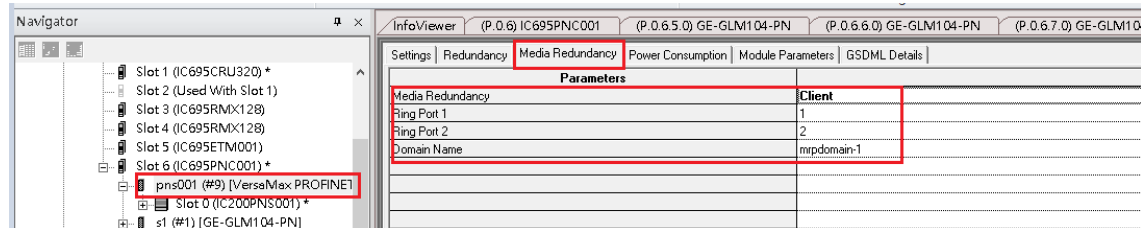


Figure 709

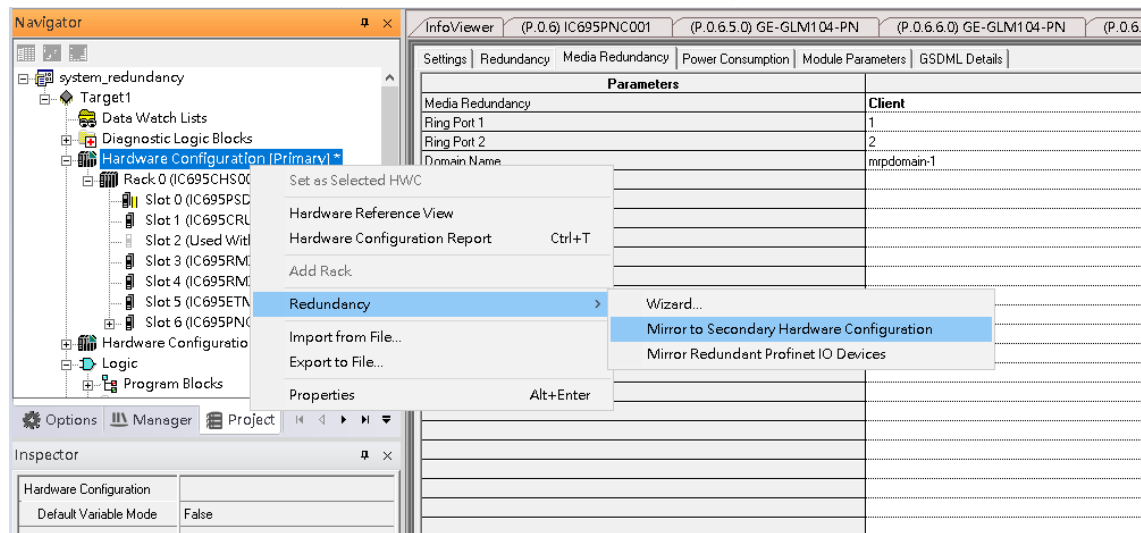
Step33: Mirror configuration to Secondary PLC

Figure 710

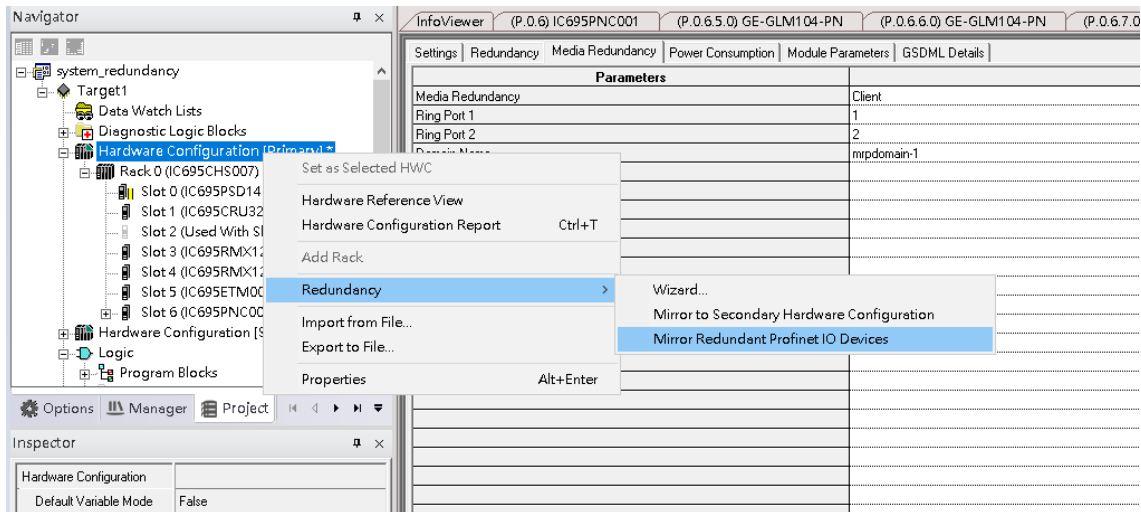


Figure 711

Step34: Set ETM001 IP Address of Secondary PLC to 192.168.0.102

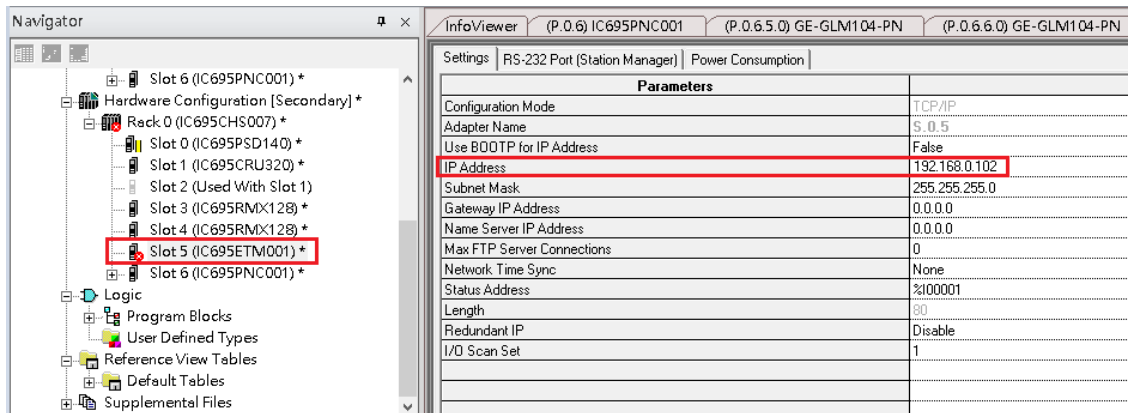
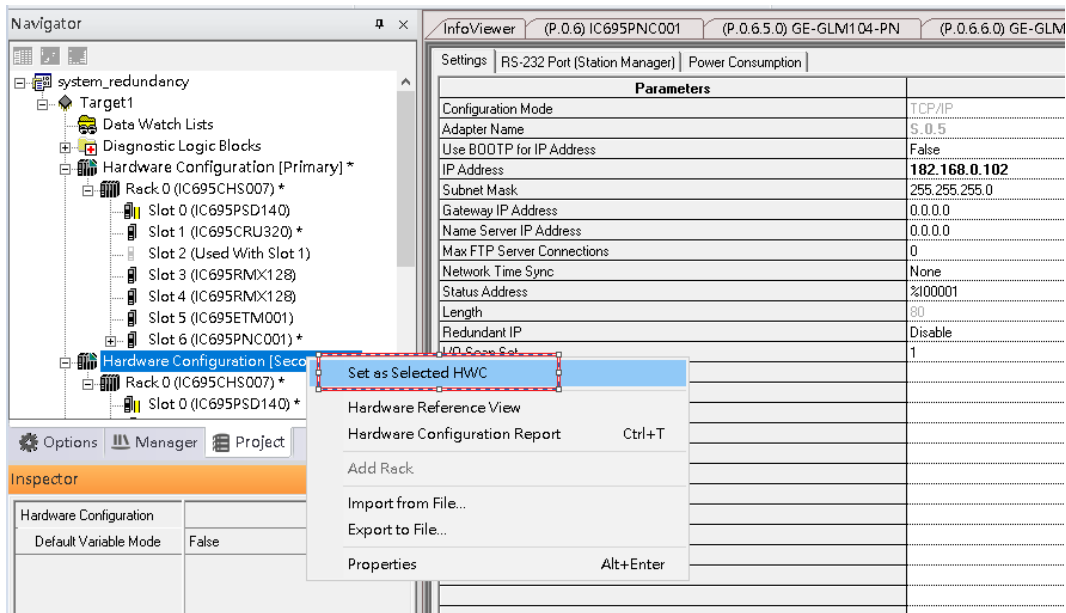
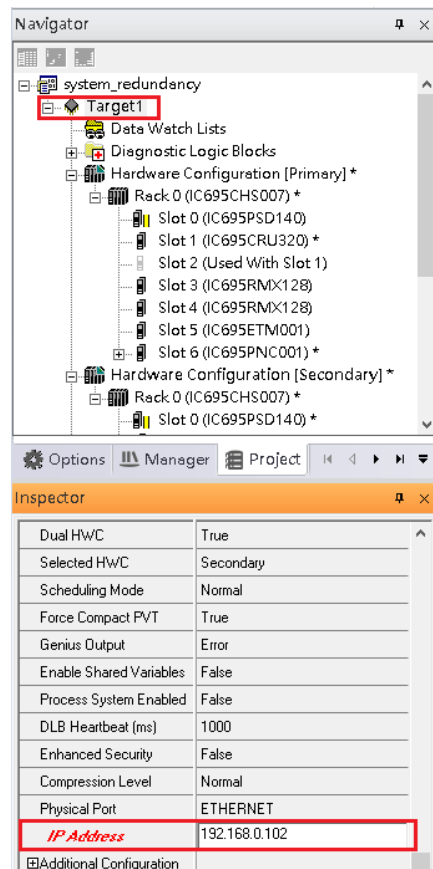


Figure 712

Step35: Set Secondary PLC as HWC**Figure 713**

Double click [Target1], and set IP Address to 192.168.0.102

**Figure 714**

Before use Profinet DCP or Download configuration to PLC, make sure to remove following ethernet cable for preventing **broadcast storm** in the network.

1. Port1 of Switch S3
2. Port2 of Switch S3
3. Port6 of Switch S3
4. Port2 of Switch S4

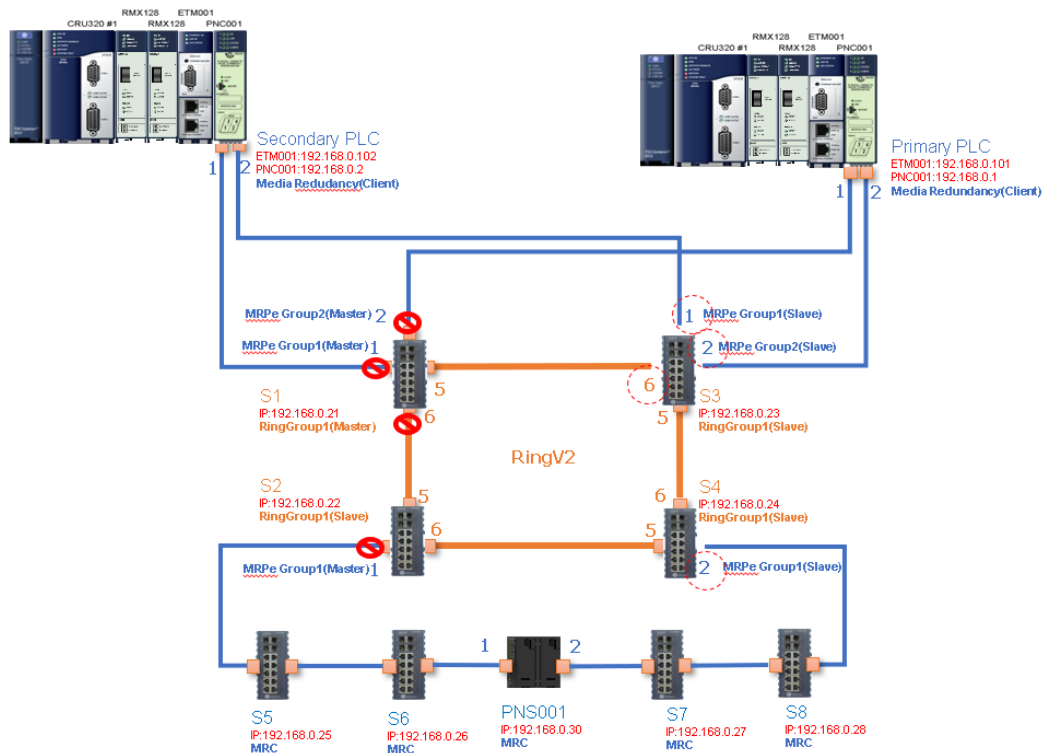


Figure 715

Use Profinet DCP to find out all the devices which connecting to the network. If the Device Name or IP Address is not the same as configuration, please set them to correct Device Name and IP Address.

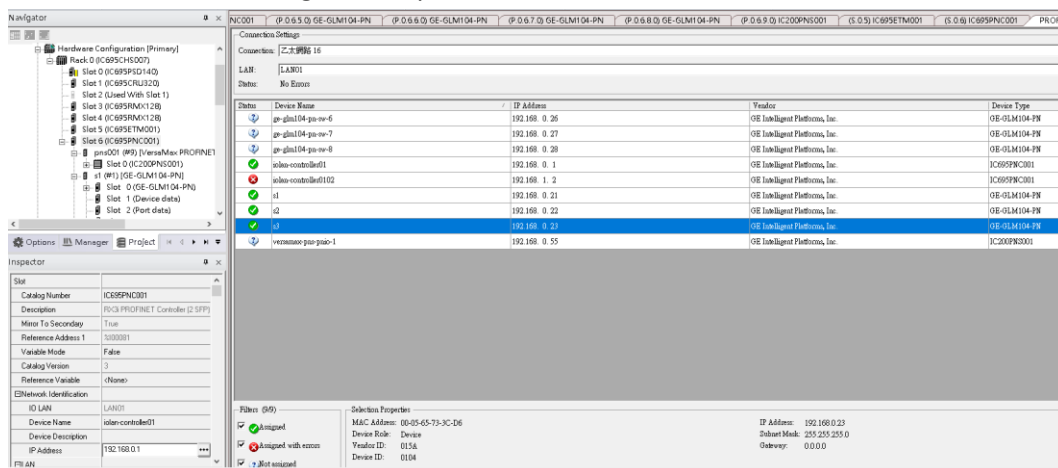


Figure 716

After correct setting, all the devices when into “Assigned” state.

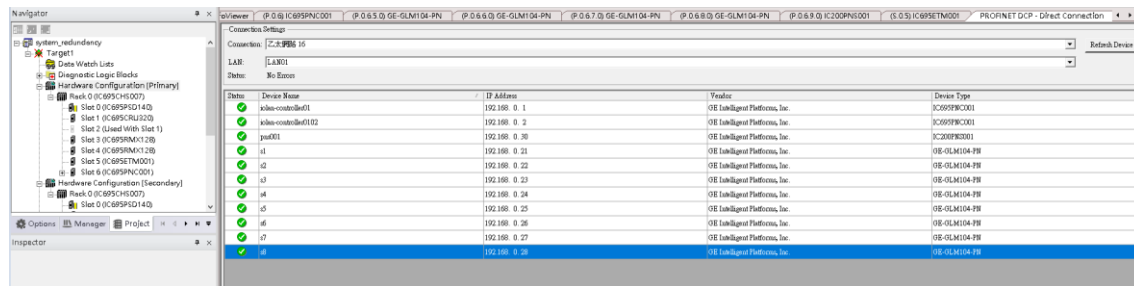


Figure 717

Step36: Download and Start for Primary PLC

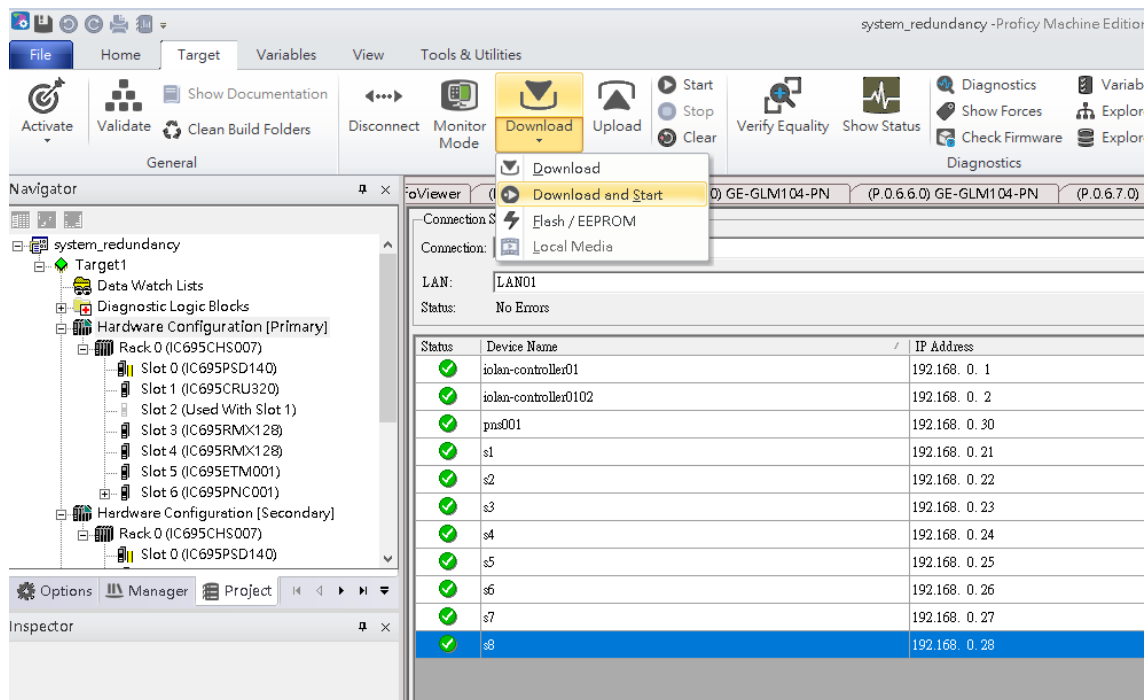
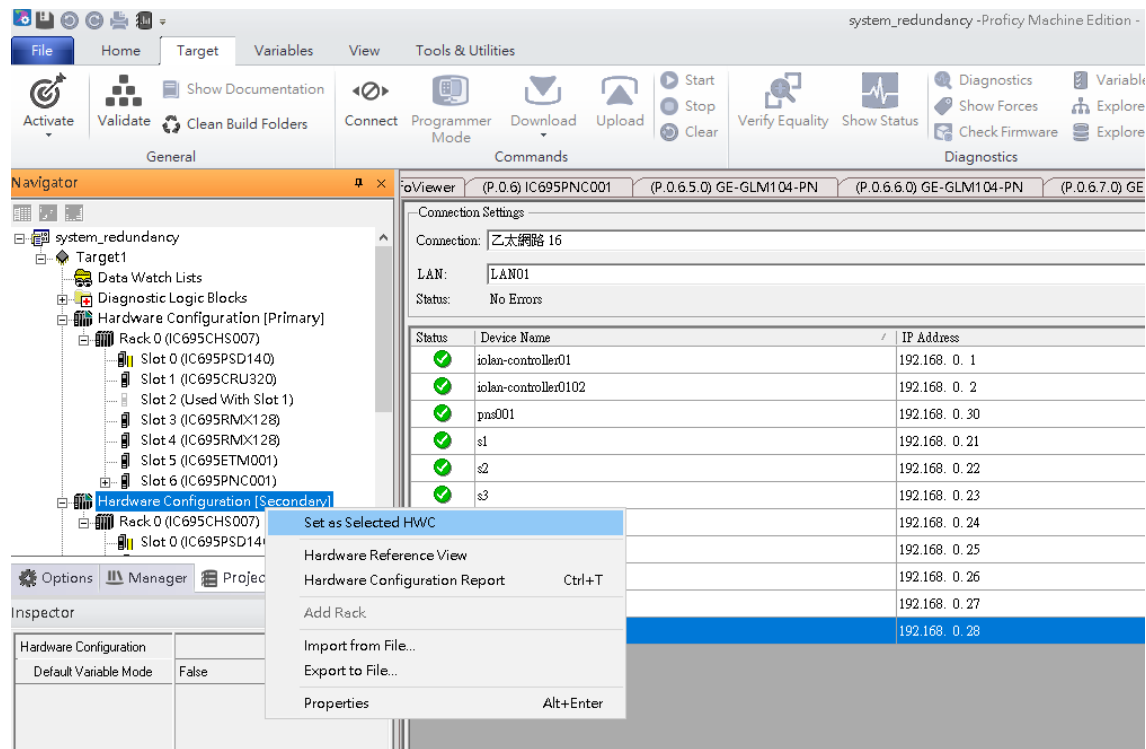
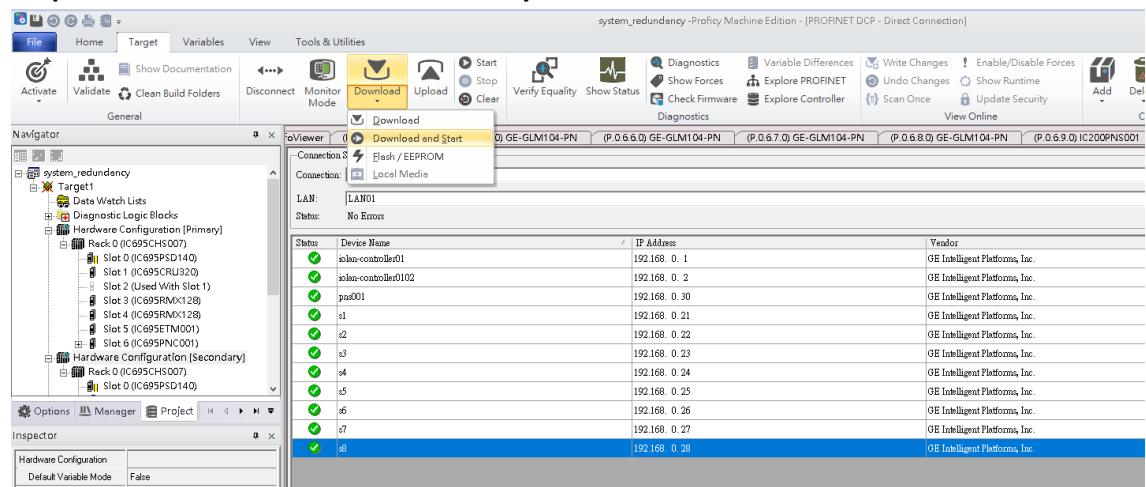


Figure 718

Step37: Set Secondary PLC to HWC**Figure 719****Step38: Download and Start for Secondary PLC****Figure 720**

8.2.7 Network Setting

To establish the communication to the I/O Controller from Proficy Machine Edition, the interface of I/O Controller shall be specified.

It should be noted that there is only 1 I/O Controller (Primary or Secondary) is able to communicate with Proficy Machine Edition. Therefore, there are 3 rules of communication are defined.

I/O Controller Communication Rule

Rule	Description
1	The communicated I/O Controller shall be specified. Click primary or secondary hardware configuration, click the right button, and select [Set as Selected HWC]
2	During the communication, the cable shall be connected to the ETM001 in specified hardware (Primary or Secondary)
3	Specify the interface and IP address for communicated I/O Controller

For rule 3, click [Target 1] and Select [Property]

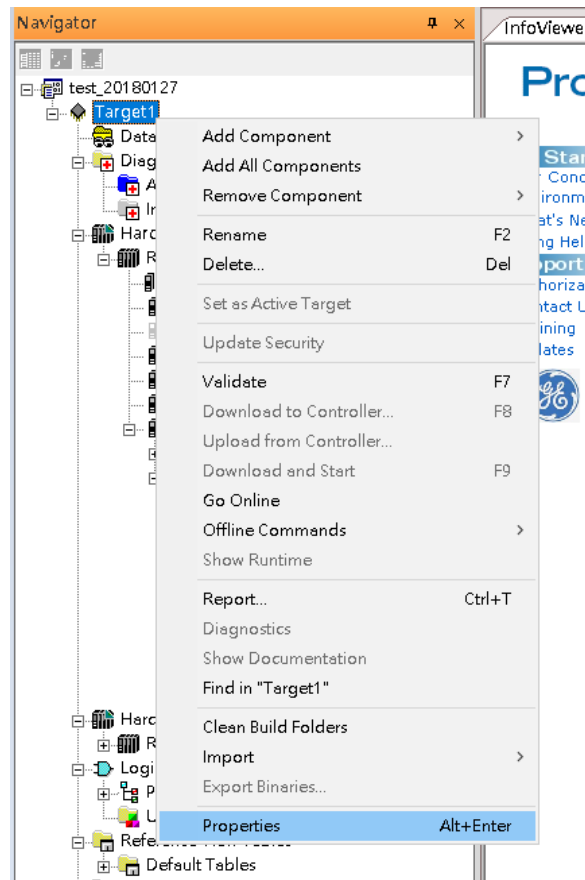
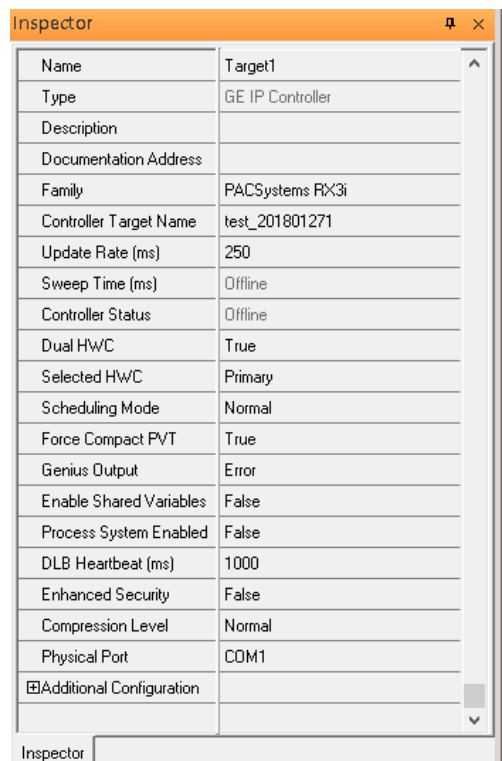


Figure 721

Then the configuration table is shown.

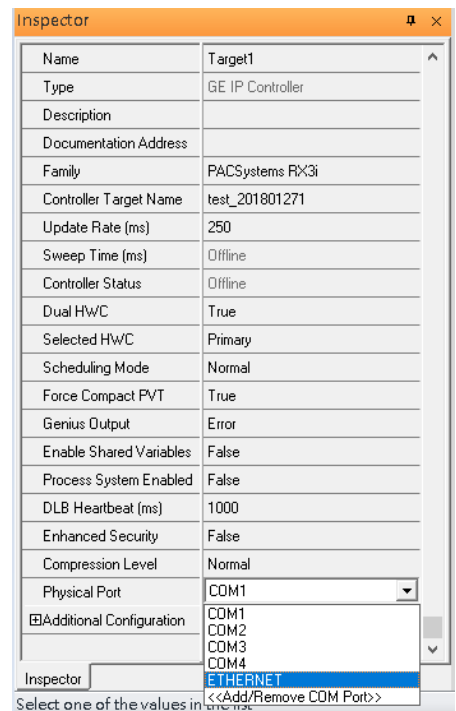


The Inspector window displays a configuration table for 'Target1'. The table lists various parameters and their current values. The 'Physical Port' is currently set to 'COM1'. The 'Additional Configuration' section is expanded, showing a list of available ports: COM1, COM2, COM3, COM4, and ETHERNET. The 'ETHERNET' option is highlighted in blue.

Name	Value
Name	Target1
Type	GE IP Controller
Description	
Documentation Address	
Family	PACSystems RX3i
Controller Target Name	test_201801271
Update Rate (ms)	250
Sweep Time (ms)	Offline
Controller Status	Offline
Dual HWC	True
Selected HWC	Primary
Scheduling Mode	Normal
Force Compact PVT	True
Genius Output	Error
Enable Shared Variables	False
Process System Enabled	False
DLB Heartbeat (ms)	1000
Enhanced Security	False
Compression Level	Normal
Physical Port	COM1
Additional Configuration	COM1 COM2 COM3 COM4 ETHERNET <<Add/Remove COM Port>>

Figure 722

Select [Physical Port] to [Ethernet]



The Inspector window displays the same configuration table as Figure 722. The 'Physical Port' dropdown menu is open, showing a list of available ports: COM1, COM2, COM3, COM4, and ETHERNET. The 'ETHERNET' option is highlighted in blue. The 'Additional Configuration' section is also expanded, showing the same list of ports.

Name	Value
Name	Target1
Type	GE IP Controller
Description	
Documentation Address	
Family	PACSystems RX3i
Controller Target Name	test_201801271
Update Rate (ms)	250
Sweep Time (ms)	Offline
Controller Status	Offline
Dual HWC	True
Selected HWC	Primary
Scheduling Mode	Normal
Force Compact PVT	True
Genius Output	Error
Enable Shared Variables	False
Process System Enabled	False
DLB Heartbeat (ms)	1000
Enhanced Security	False
Compression Level	Normal
Physical Port	COM1
Additional Configuration	COM1 COM2 COM3 COM4 ETHERNET <<Add/Remove COM Port>>

Figure 723

Also, the IP address of communicated I/O Controller shall be set. Here the [Primary] setting is shown. Note, the specified IP address is set as the IP address on ETM001.

Name	Target1
Type	GE IP Controller
Description	
Documentation Address	
Family	PACSystems RX3i
Controller Target Name	test_201801271
Update Rate (ms)	250
Sweep Time (ms)	Offline
Controller Status	Offline
Dual HwC	True
Selected HwC	Primary
Scheduling Mode	Normal
Force Compact PVT	True
Genius Output	Error
Enable Shared Variables	False
Process System Enabled	False
DLB Heartbeat (ms)	1000
Enhanced Security	False
Compression Level	Normal
Physical Port	ETHERNET
IP Address	192.168.0.101
Additional Configuration	

Figure 724

8.2.8 PC Network

The IP address of PC with Proficy Machine Edition shall be set in the same network area.

Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address: 192 . 168 . 0 . 68

Subnet mask: 255 . 255 . 255 . 0

Default gateway:

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

Preferred DNS server:

Alternate DNS server:

☐ Validate settings upon exit

Advanced...

OK Cancel

Figure 725

8.2.9 Temporary IP

However, if the IP address of ETM001 is lost or forgotten, the IP address can be changed by the function [Set Temporary IP Address] according to the MAC address of ETM001. In the following figure, the MAC address is referenced to the ETM001, and the IP address can be defined by user.

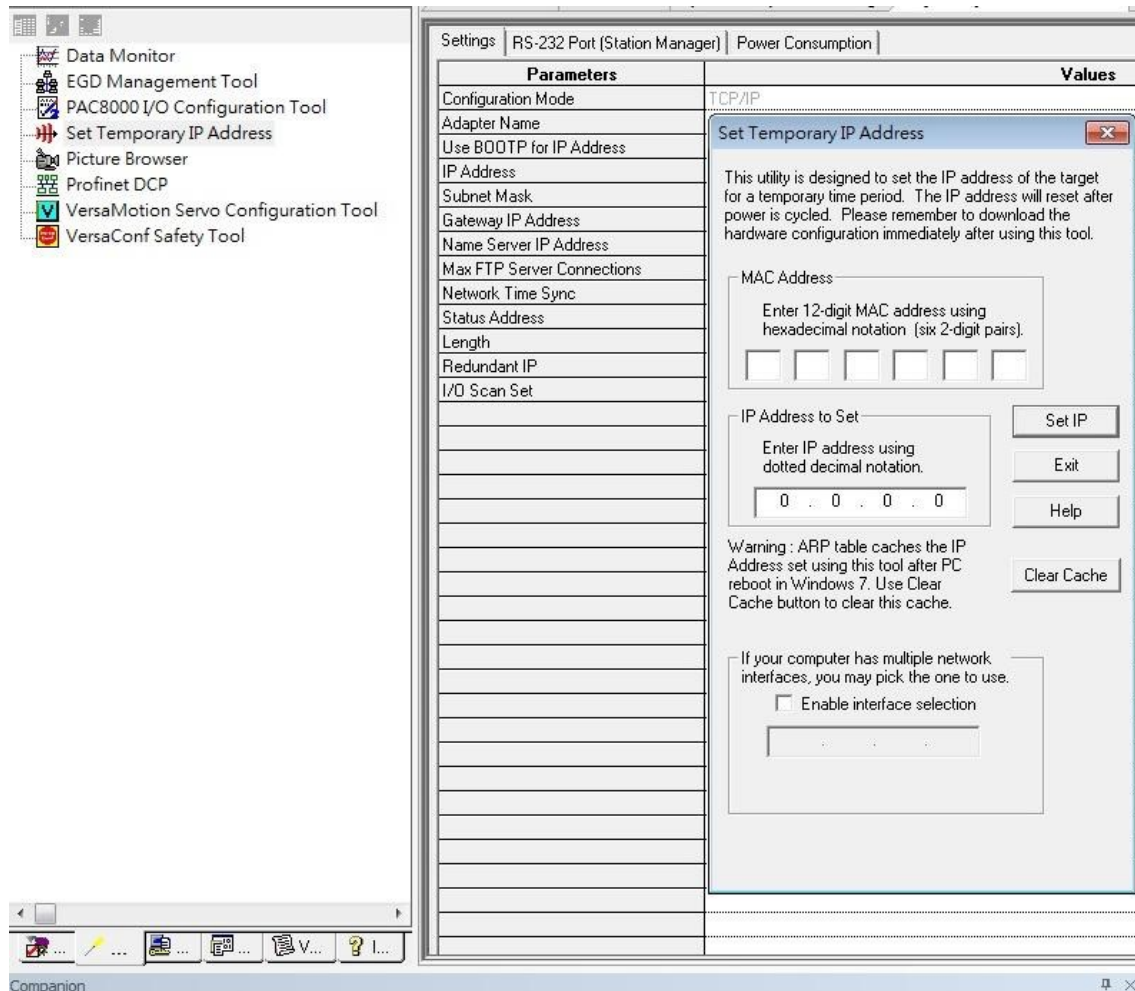


Figure 726

8.3 Implementation

To download the configuration to hardware, the following steps shall be applied.

First, press the [Connect] icon

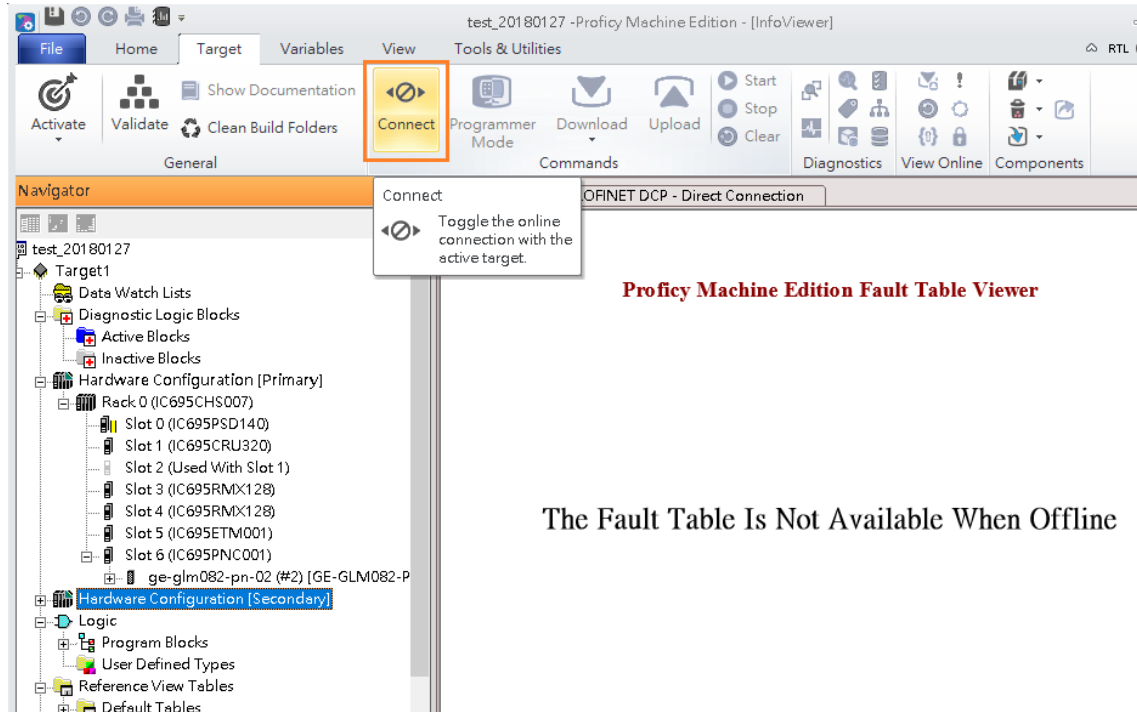


Figure 727

Then press the icon [Programmer Mode]

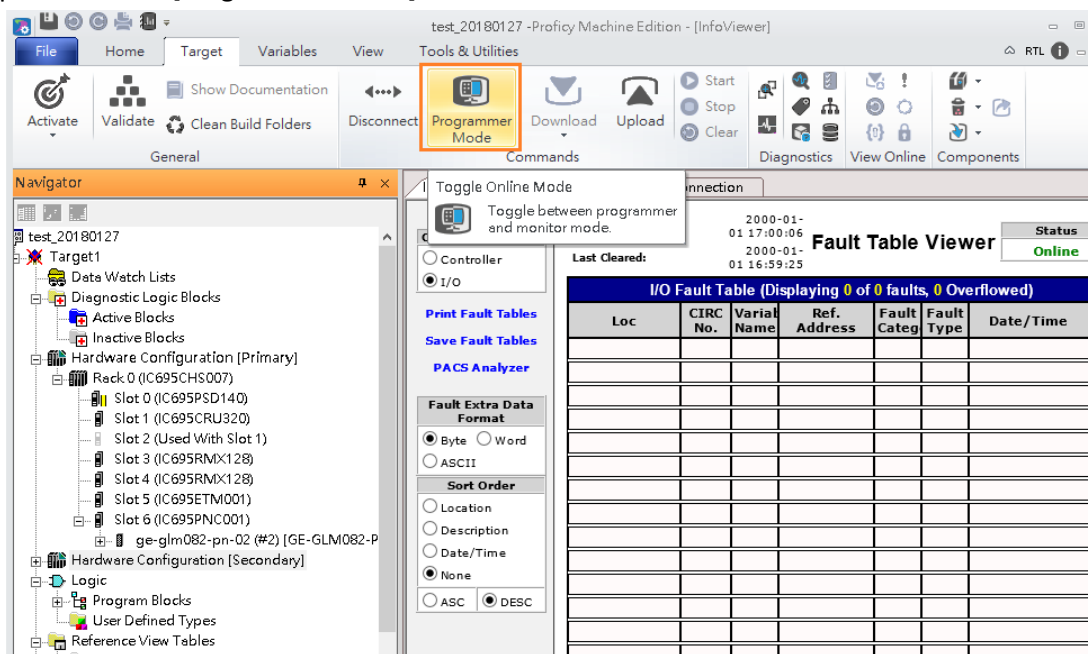


Figure 728

Then press icon [Download] and select “Download”

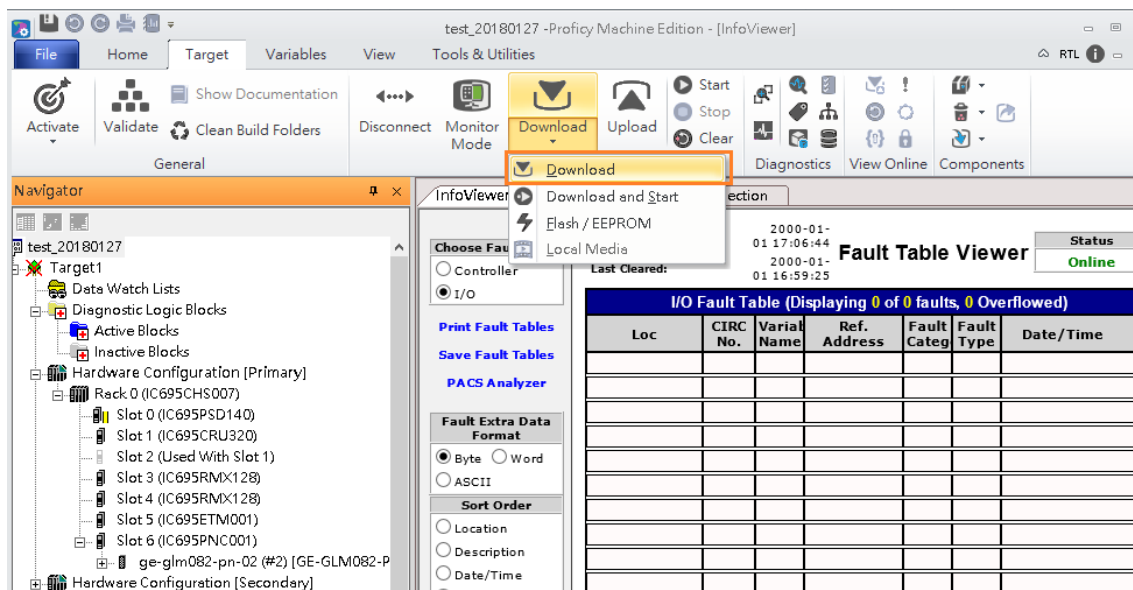


Figure 729

Then the dialogue is appeared to make sure the initialization procedure, select [OK]

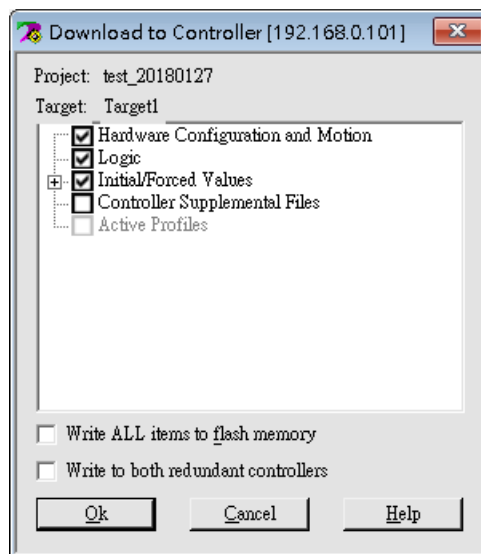


Figure 730

After download completely, press icon [Start] to active PLC.

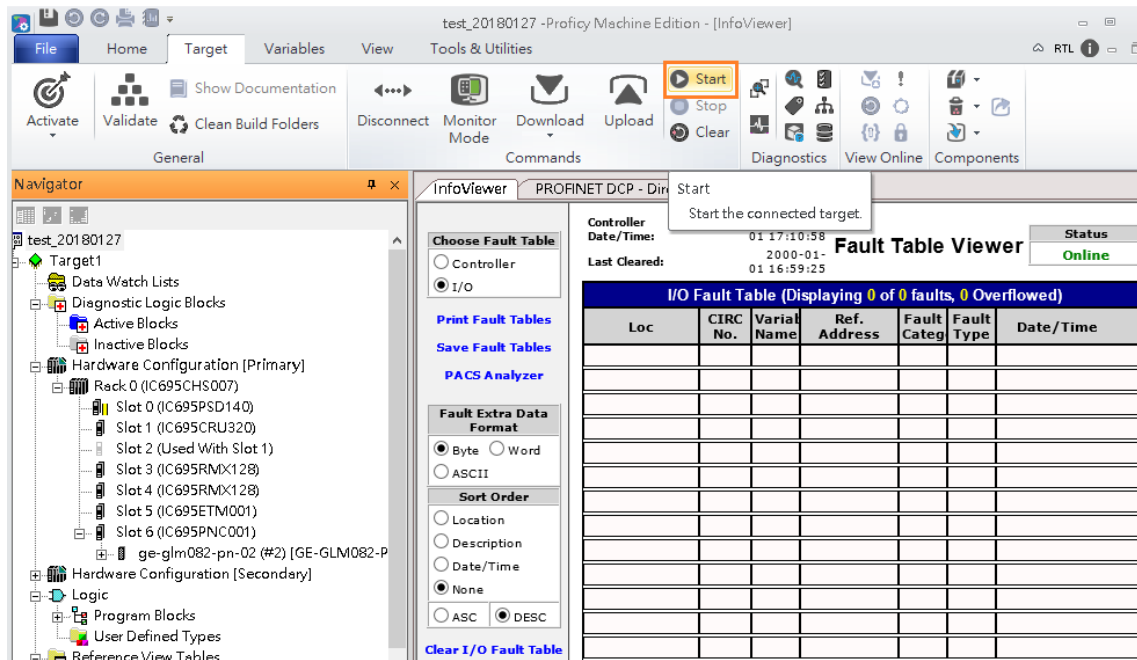


Figure 731

Then the dialogue is appeared, please select [OK]

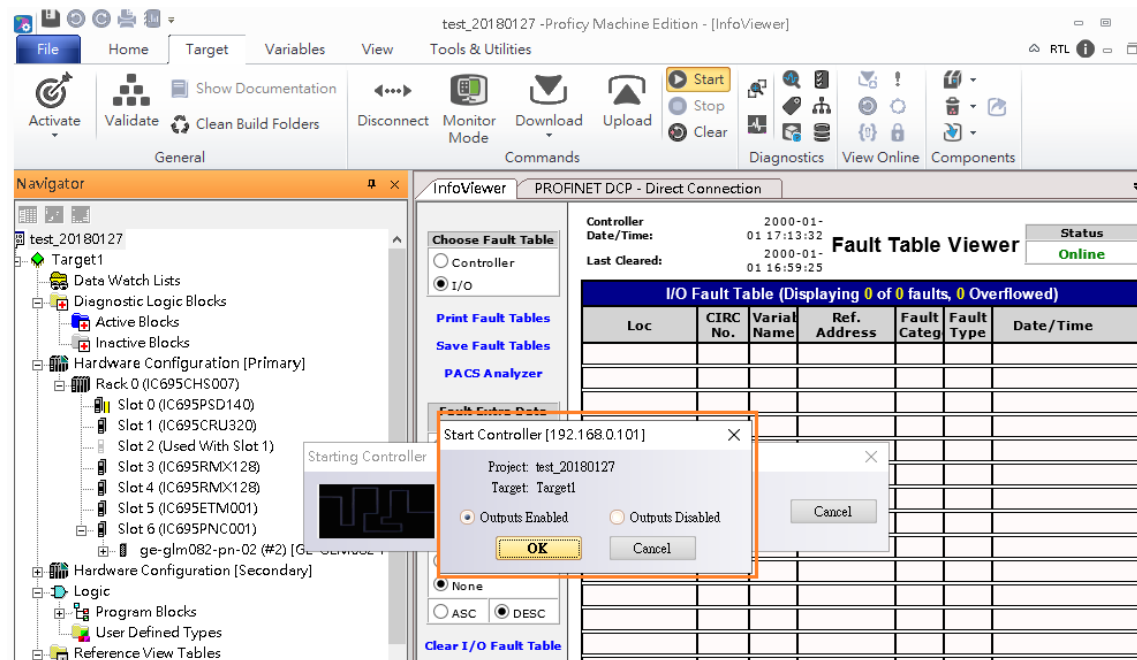


Figure 732

If PLC has started successfully, a message “The Controller was successfully started”.

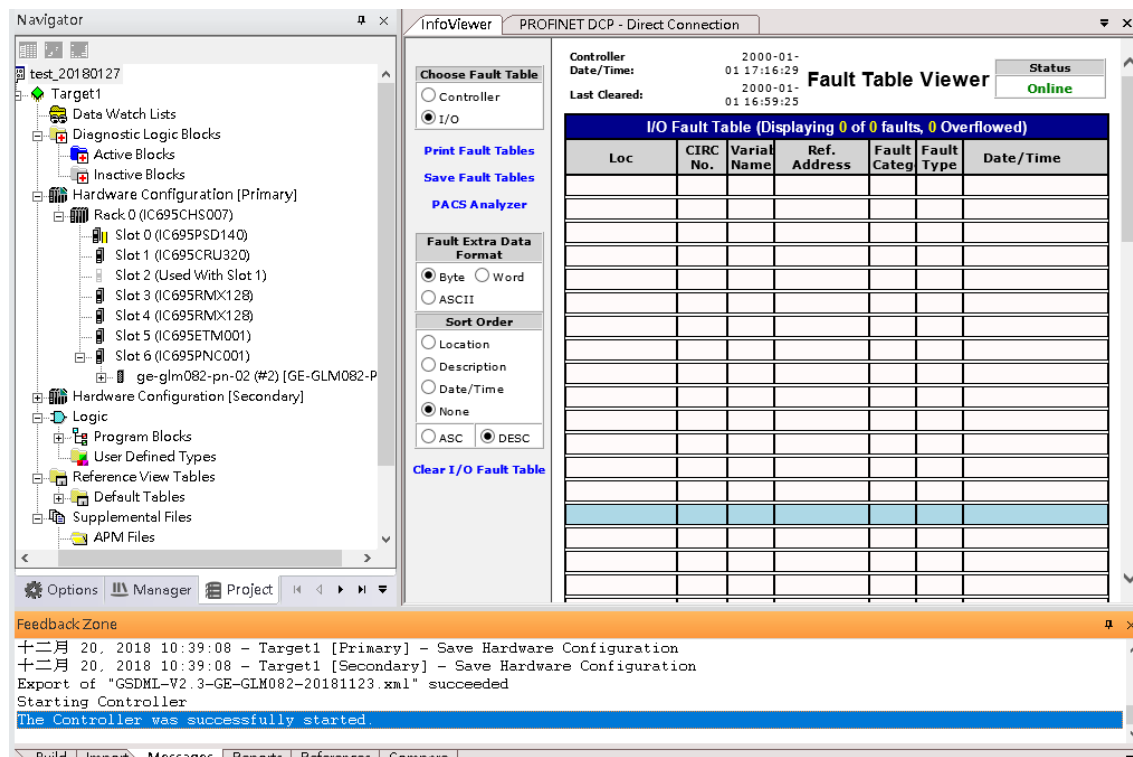


Figure 733

After [Primary] PLC starts running, please use the same download steps to active [Secondary].
Press icon [Disconnect] to disconnect from Primary PLC.

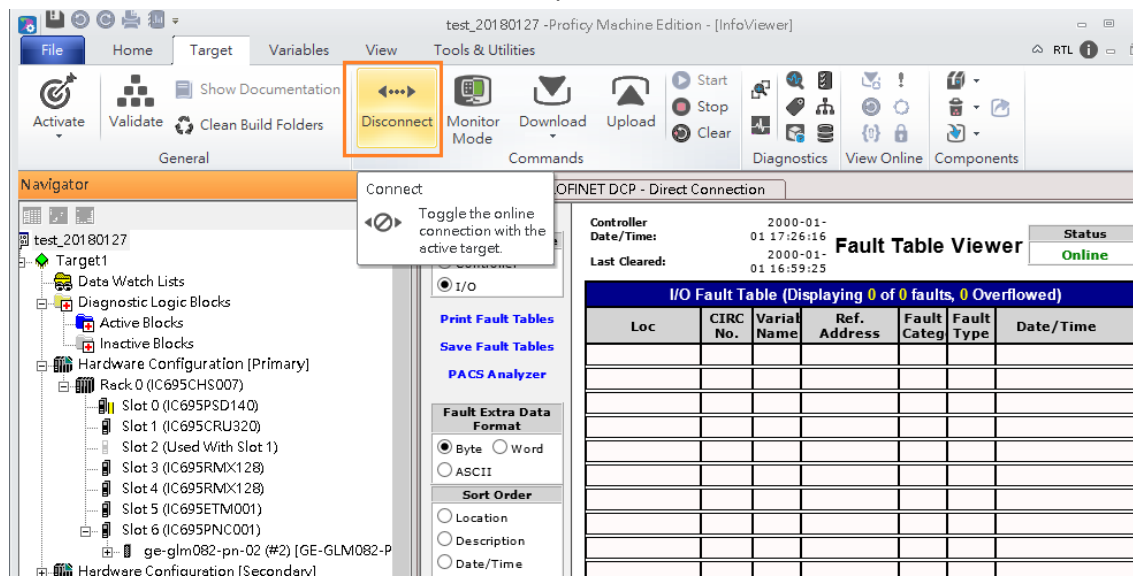


Figure 734

Click the right button on “[Hardware Configuration [Secondary]]” and select [Set as selected HWC]

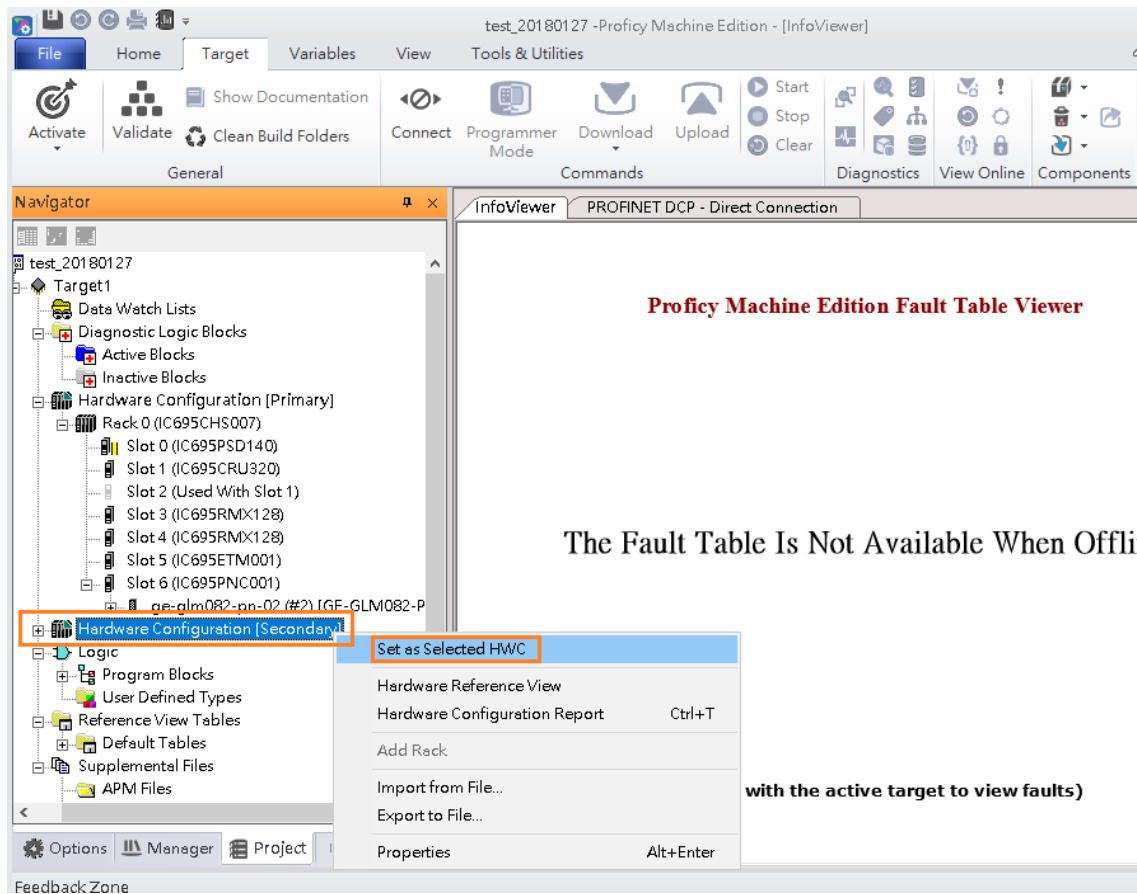


Figure 735

Press the [Connect] icon

Then press the icon [Programmer Mode]

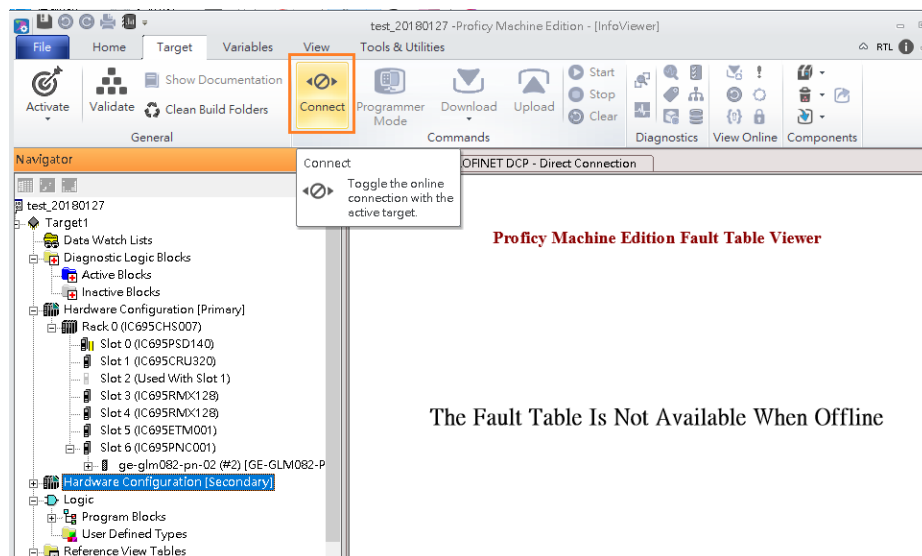


Figure 736

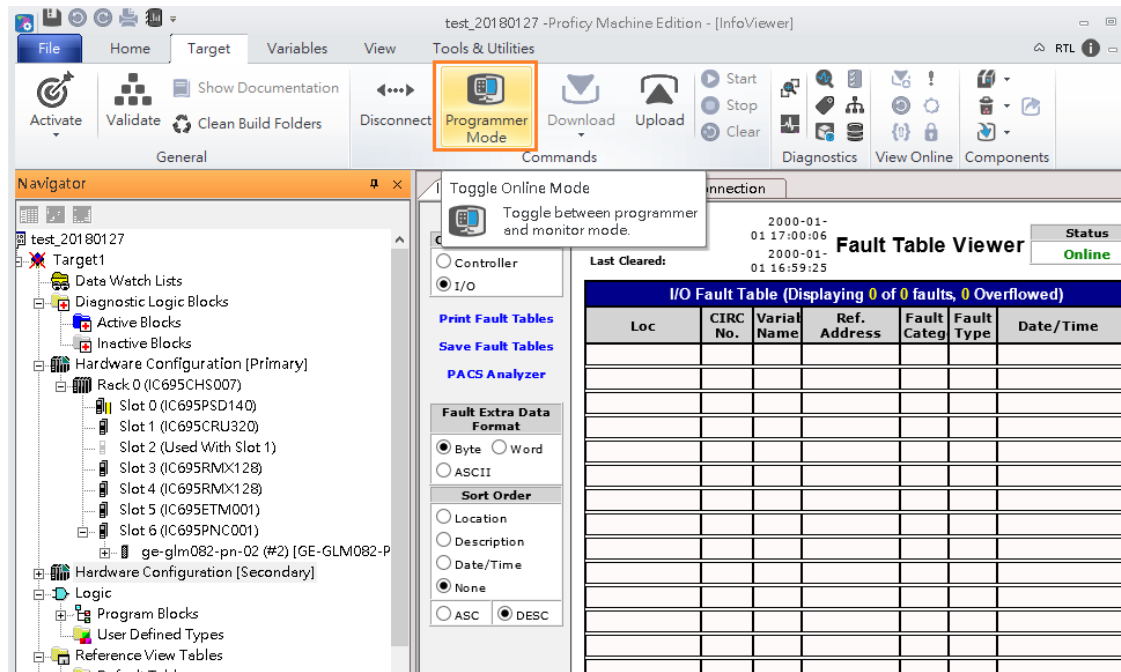


Figure 737

Then press icon [Download] and select “Download”

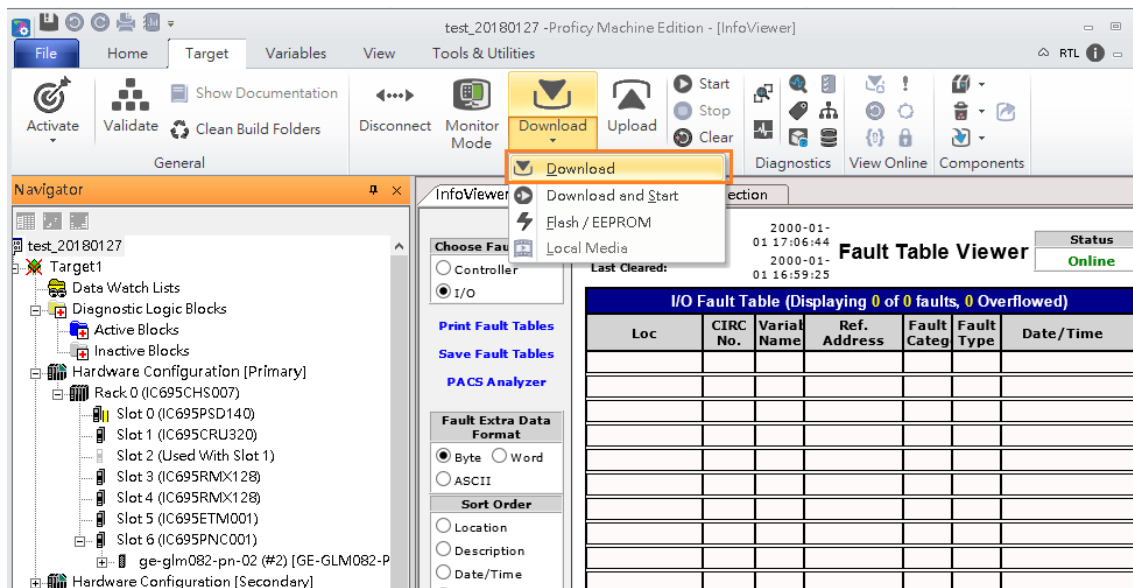


Figure 738

Then the dialogue is appeared to make sure the initialization procedure, select [OK]

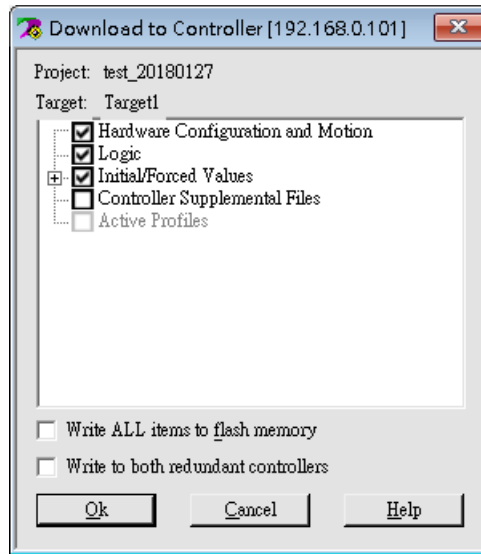


Figure 739

After download completely, press icon [Start] to active PLC.

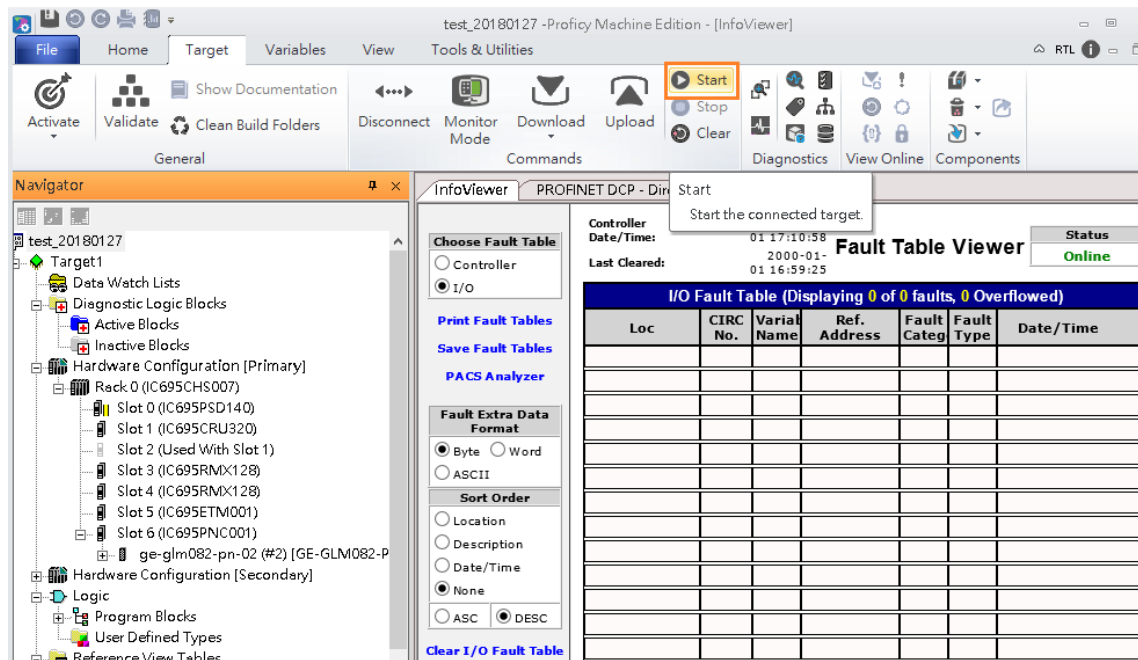


Figure 740

Then the dialogue is appeared, please select [OK]

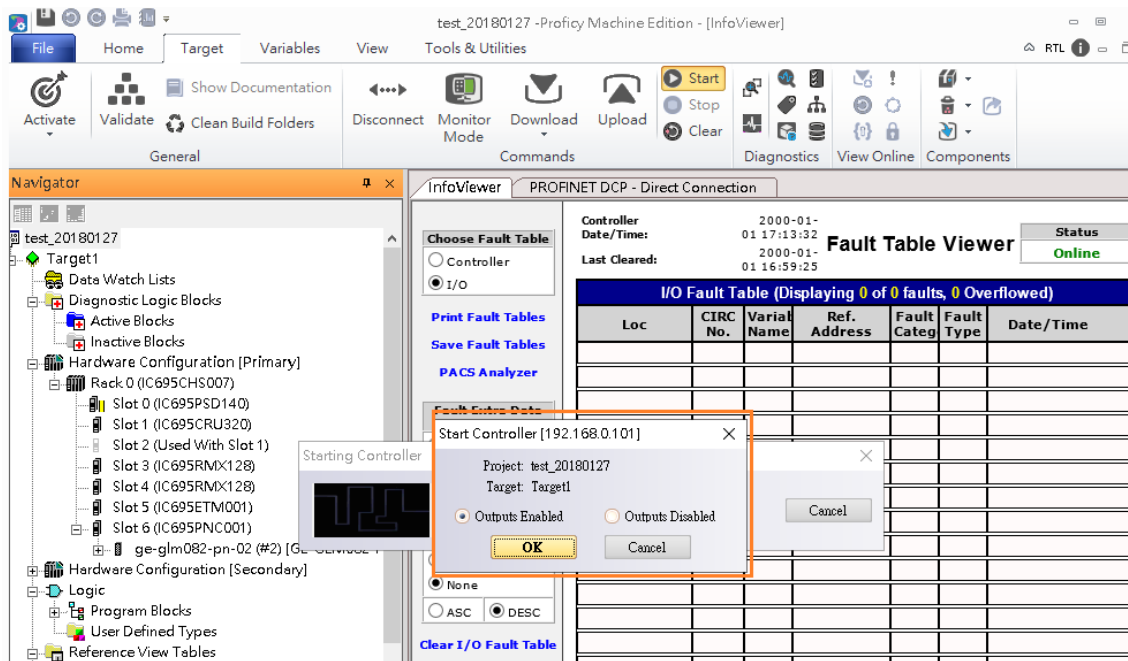


Figure 741

If PLC has started successfully, a message “The Controller was successfully started”.

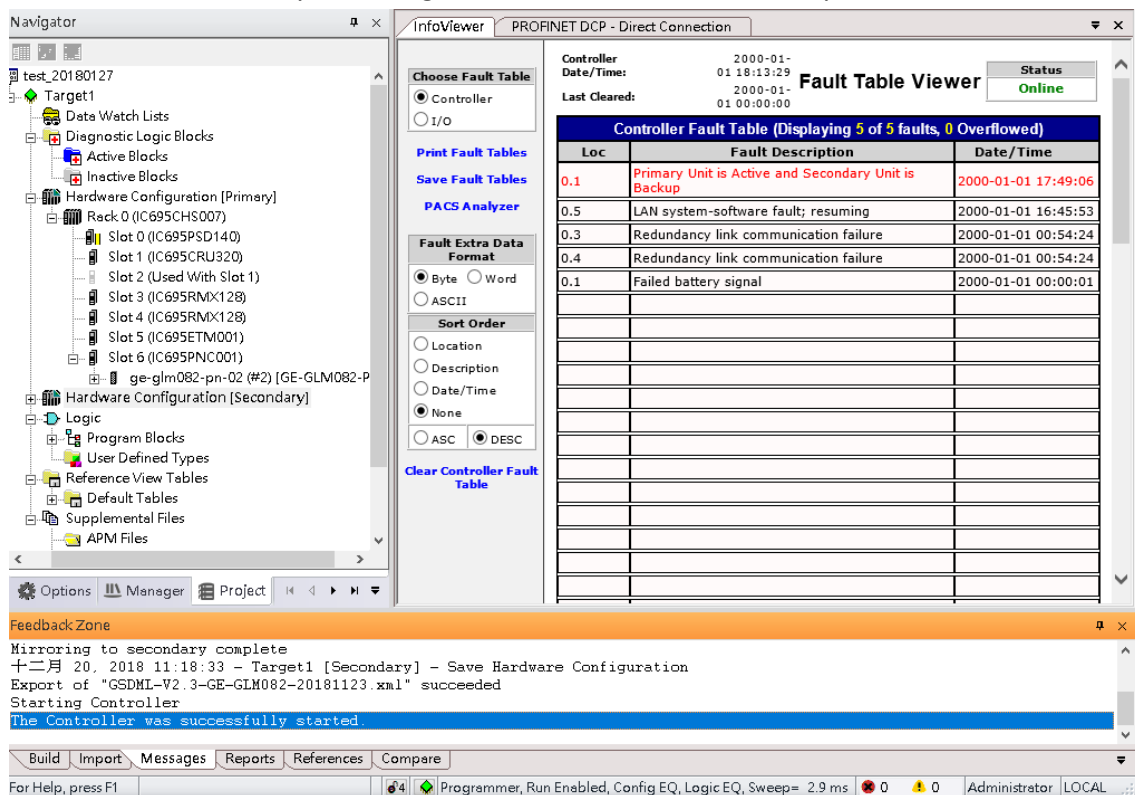


Figure 742

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