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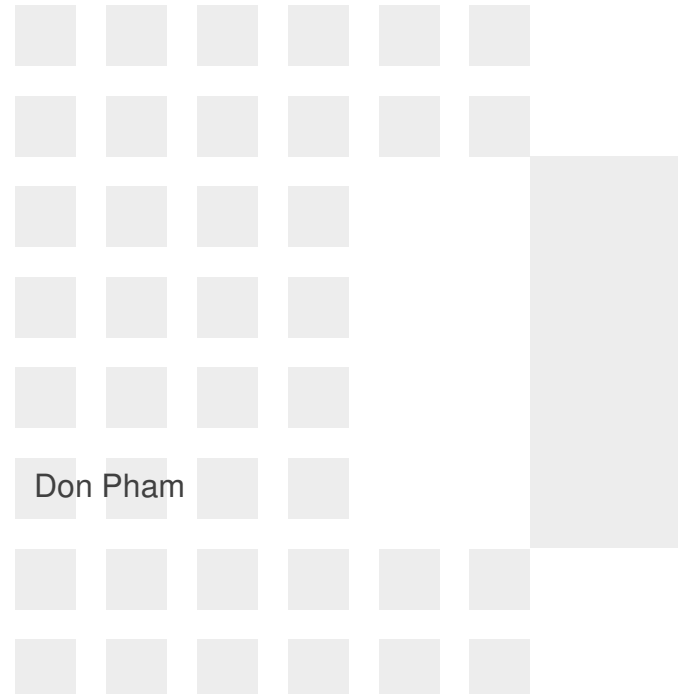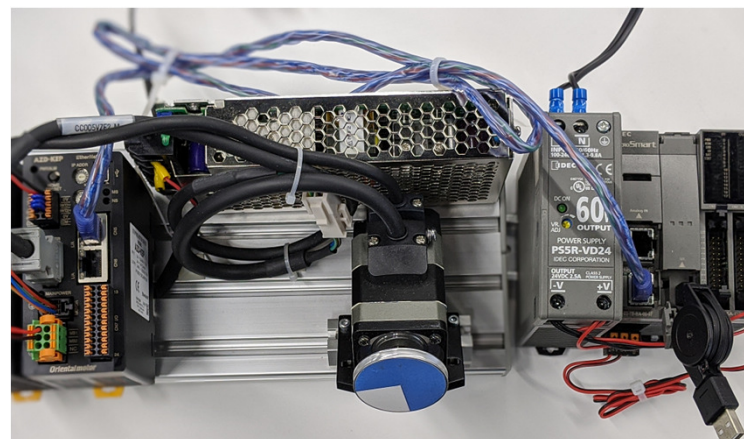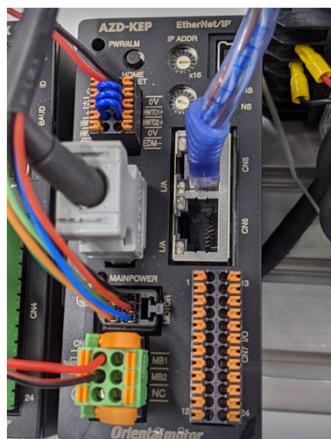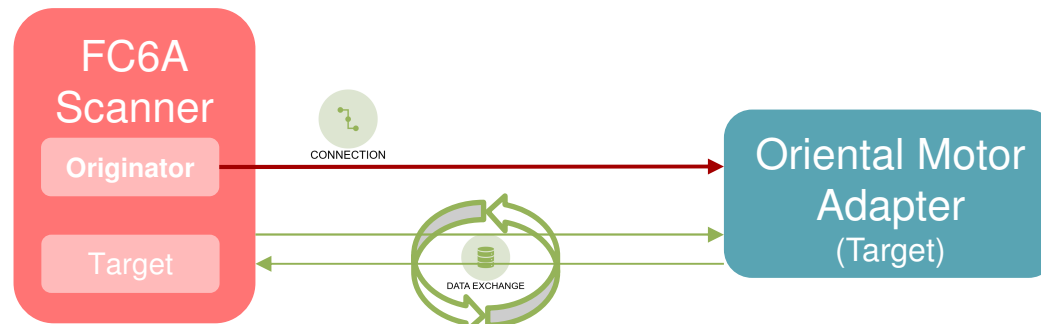*Think Automation and beyond...*

FC6A Plus EtherNet/IP™

Don Pham

EtherNet/IP™

Example 1: FC6A and Oriental Motor motor driver

- Oriental Motor AZD-KEP motor driver is an Adapter
- FC6A Plus will be configured as a Scanner with Originator function

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Adapter parameters (required for communication)

- In order to configure the FC6A Plus to communicate with the Adapter, we need to find out some Adapter's parameters

- There are two methods of finding this information

  1. Adapter's device user manual

Electronic Key: Vendor ID, Device Type

Communications standards		EtherNet/IP (conforms to CT16)	
Vendor ID		187: Oriental Motor Company	
Device type		43: Generic Device	
Transmission rate		10/100 Mb	
Communication mode		Full duplex	
Cable specifications		Shielded tw straight-th	
Number of occupied bytes	Output (scanner → driver)	40 bytes	
	Input (driver → scanner)	56 bytes	
	Number of connections	2	
	Connection type	Exclusive C	
Implicit	Communication cycle (RPI)	1 to 3,200 r	

■ **Input data format**

Contents of the Input data is as follows. The order of data is in little-endian format.

Assembly Instance	Attribute	Byte	Size (byte)	Description
		0, 1	2	Remote I/O (R-OUT)
100	3			

■ **Output data format**

Descriptions of the Output data are as follows. The order of data is in little-endian format.

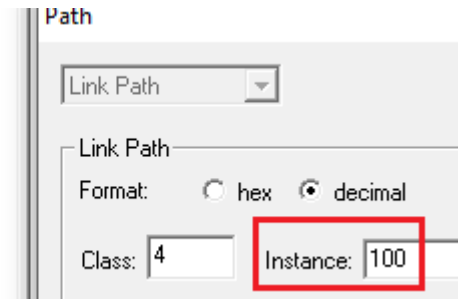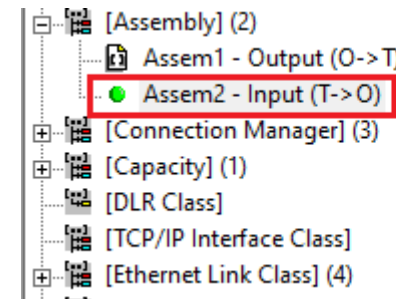| Assembly Instance	Attribute	Byte	Size (byte)	Description
		0, 1	2	Remote I/O (R-IN)
		2, 3	2	Operation data number selection
		4, 5	2	Fixed I/O (IN)
		6, 7	2	Direct data operation operation type
		8 to 11	4	Direct data operation position
		12 to 15	4	Direct data operation operating speed
		16 to 19	4	Direct data operation starting/changing rate
101	3	20 to 23	4	Direct data operation stopping deceleration
		24, 25	2	Direct data operation operating current
		26, 27	2	Direct data operation forwarding destination

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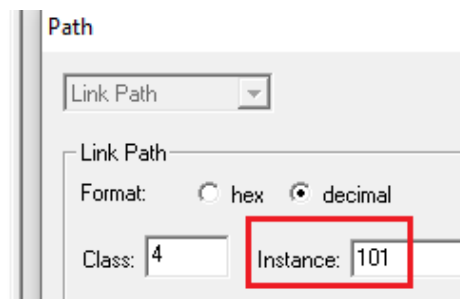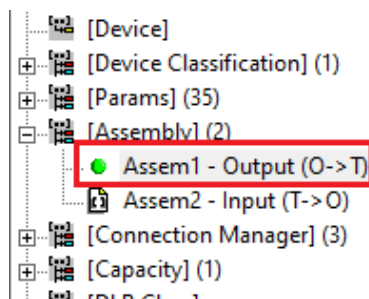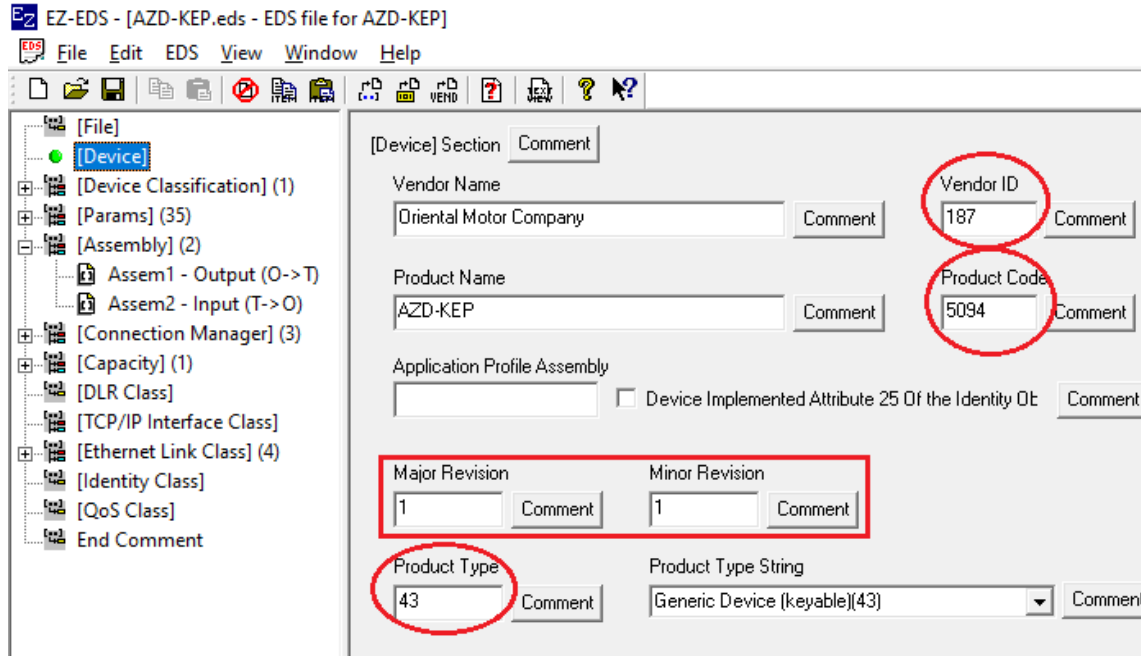
EtherNet/IP™

Adapter parameters (required for communication)

- **There are two methods of finding this information**
  2. Electronic Data Sheet (EDS) File
     - Most EtherNet/IP Adapters provide an EDS file, so users don't have to manually look up and enter this information in the Scanner settings
     - However, WindLDR currently does not support EDS file import
     - EDS file import will be supported in later WindLDR version
     - For now, users can use the free EDS extractor tool to extract
     - EDS extractor tool
       - https://www.odva.org/subscriptions-services/software/ez-eds-download/

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EDS extractor tool

EtherNet/IP™

Example 1: FC6A and Oriental Motor motor driver

- Step 1: Click Ethernet Port 2

- Step 2: Check EtherNet/IP Settings and click Configure

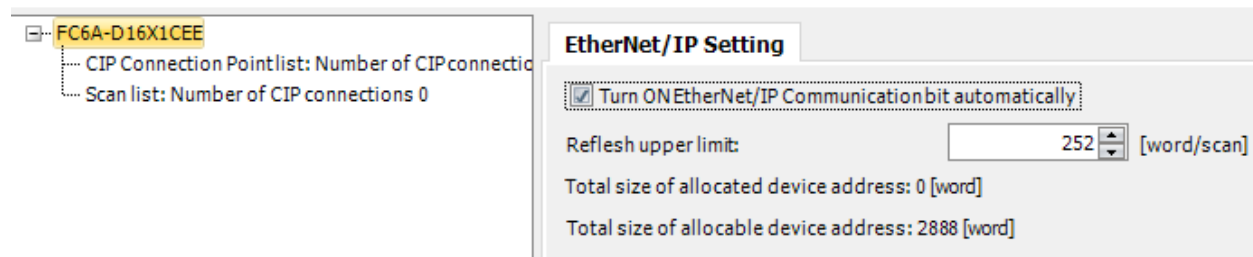**EtherNet/IP Settings**

☑ Enable EtherNet/IP   [Configure]

- Check the *Turn ON EtherNet/IP*…box if you want the FC6A to automatically enable EtherNet/IP communication

EtherNet/IP setting

FC6A-D16X1CEE
  CIP Connection Point list: Number of CIP connectio
  Scan list: Number of CIP connections 0

EtherNet/IP Setting

☑ Turn ON EtherNet/IP Communication bit automatically

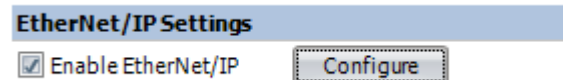Reflesh upper limit: 252 [word/scan]

Total size of allocated device address: 0 [word]

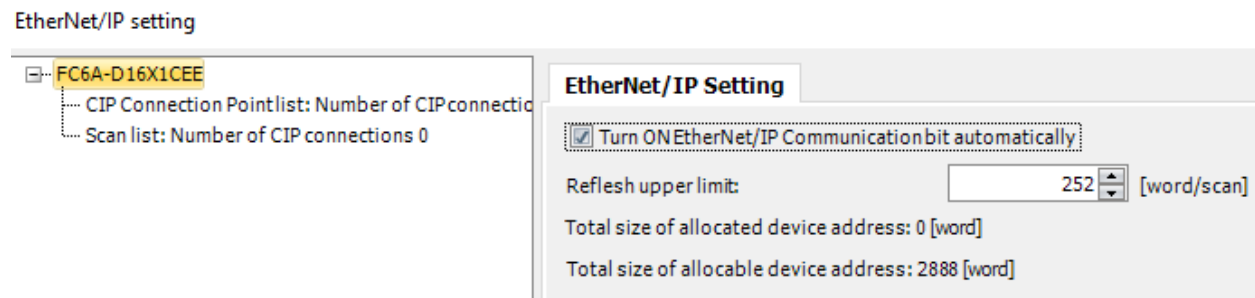Total size of allocable device address: 2888 [word]

- **M8460: EtherNet/IP Communication Bit**
  This special internal relay permits or prohibits EtherNet/IP communication.
  OFF: Prohibit EtherNet/IP communication
  ON: Permit EtherNet/IP communication

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EtherNet/IP™

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Example 1: FC6A and Oriental Motor motor driver

- Step 1: Click Ethernet Port 2

- Step 2: Check EtherNet/IP Settings and click Configure

**EtherNet/IP Settings**
☑ Enable EtherNet/IP   [Configure]

- Check the *Turn ON EtherNet/IP*…box if you want the FC6A to automatically enable EtherNet/IP communication

EtherNet/IP setting

⊟ FC6A-D16X1CEE
　　⋯ CIP Connection Point list: Number of CIP connectio
　　⋯ Scan list: Number of CIP connections 0

EtherNet/IP Setting

☑ Turn ON EtherNet/IP Communication bit automatically

Reflesh upper limit:　　　252 [word/scan]

Total size of allocated device address: 0 [word]

Total size of allocable device address: 2888 [word]

- **M8460: EtherNet/IP Communication Bit**
This special internal relay permits or prohibits EtherNet/IP communication.
OFF: Prohibit EtherNet/IP communication
ON: Permit EtherNet/IP communication

EtherNet/IP™

Example 1: FC6A and Oriental Motor motor driver
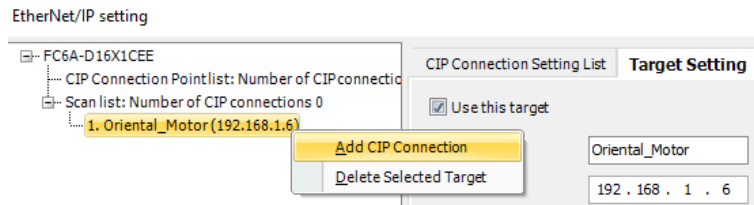
- **Step 3: Right mouse click Scan list..→ Add Target**
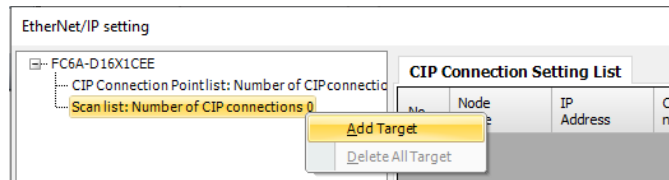
- **Step 4: Under Target Setting tab, enter the Node name, IP Address and Electronic Key of the motor**
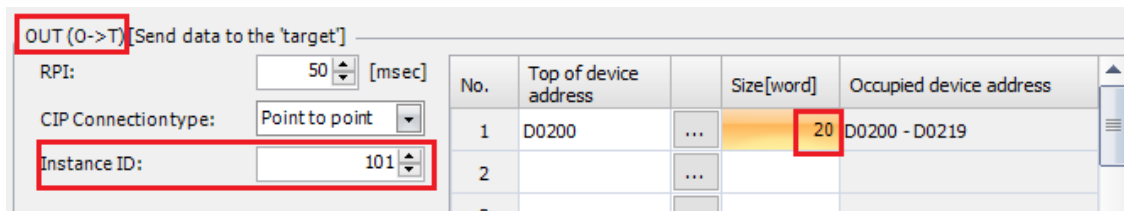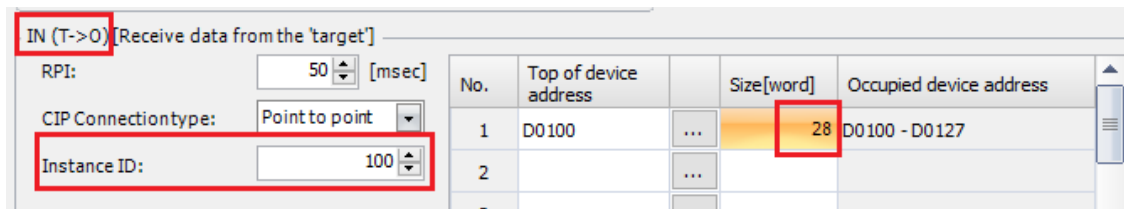
EtherNet/IP™
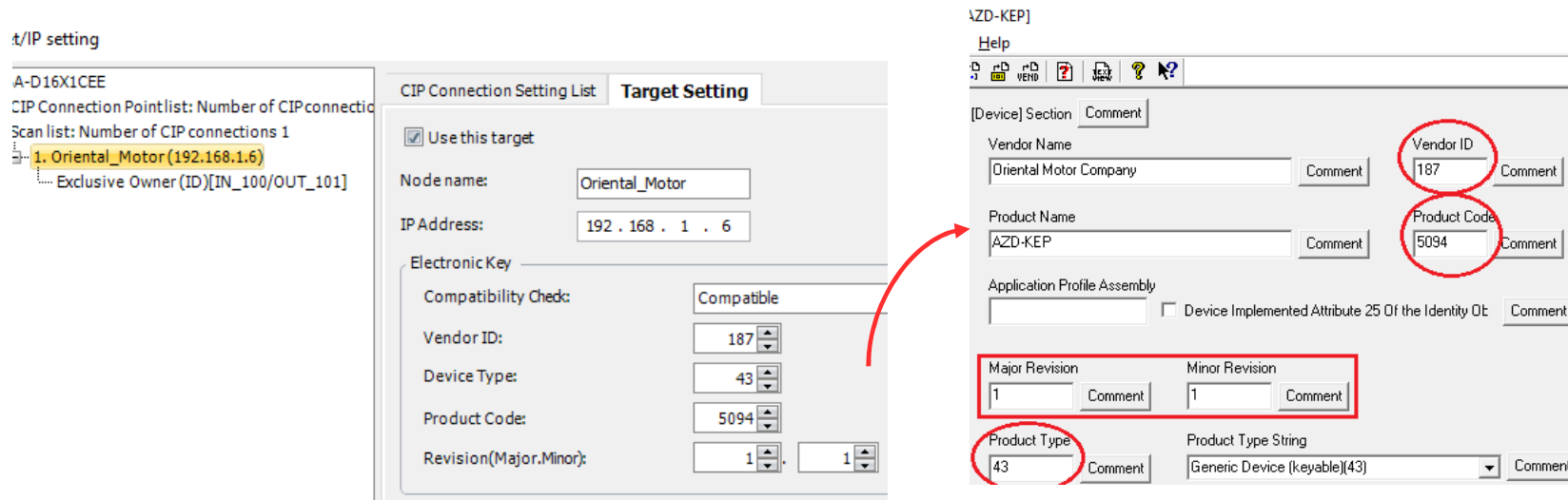
Example 1: FC6A and Oriental Motor motor driver

- Step 5: Right mouse click and select Add CIP Connection

- Step 6: In the CIP Connection Settings, fill in the Adapter parameters
  - IN Instance ID = 100, Size = 28 Words
  - OUT Instance ID = 101, Size = 20 Words

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Adapter Settings

EtherNet/IP™

Example 1: FC6A and Oriental Motor motor driver

■ **Step 7: Configure the rest of the settings**

CIP Connection name
See pg 440 Manual for more details

Timeout
Sets the timeout

Configuration Instance ID
Some vendors use this parameter, and some don't

RPI
Requested package interval 10 to 10,000ms

CIP Connection type
Point-to-Point-receives data from target on a one-to-one basis
Multicast-multiple originators receive data from one target

Trigger of send
Cyclic-transmit data at the set RPI
COS-transmit data at the set RPI or when a value changes

Control Register
Sets the data registers that will be used by the CIP connection
See pg 441 Manual

Top of the device address
Users define data registers in the FC6A

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EtherNet/IP™

Example 2: FC6A and AB ControlLogix5555

- AB ControlLogix is a Scanner with Originator function
- FC6A Plus will be configured as a Scanner with **Target** function
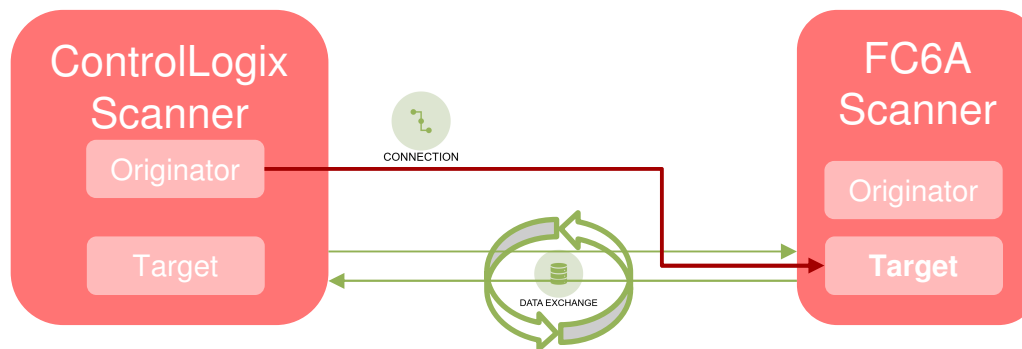
EtherNet/IP™

Example 2: FC6A and AB ControlLogix5555

■ WindLDR Configuration

- Step 1: Click Ethernet Port 2
- Step 2: Check EtherNet/IP Settings and click Configure

EtherNet/IP Settings
☑ Enable EtherNet/IP   [Configure]
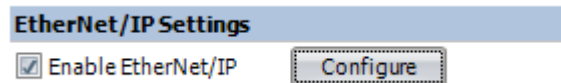
- Step 3: Right mouse click CIP Connection…→ Add CIP Connection Point Setting

EtherNet/IP setting

⊟ FC6A-D16X1CEE
   ⌐ CIP Connection Pointlist: Number of CIP connectio
   ⊟ Scan list: Number of CIP connections 1
     ⊟ 1. Oriental_Motor (192.168.1.6)
       ⌐ Exclusive Owner (ID)[IN_100/OUT_101]

CIP Connection Point List

	Type
Add CIP Connection Point Setting	
Delete All CIP Connection Point Setting	

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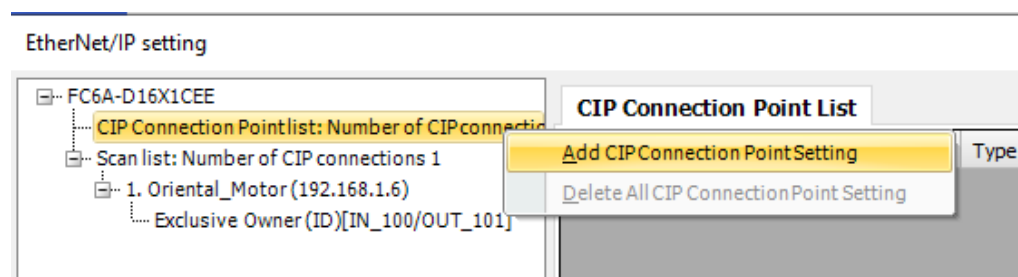
Example 2: FC6A and AB ControlLogix5555

- **WindLDR Configuration**
  - Step 4: FC6A sends values in D0-D1 to ControLogix
    - Instance ID = 100 (Default. Can be set with other value)
    - CIP Tag: Optional
    - Type: IN (T → O)
    - Top of device address: D0, Size 2

CIP Connection Point Setting

Instance ID:	100	Available Instance ID (100 to 197, 240 to 255 and 768 to 1279)
☐ CIP Tag:		
Type:	IN (T->O) ▼	Send data to the 'Originator'.

Device Allocation:	No.	Top of device address		Size[word]	Occupied device address
	1	D0000	...	2	D0000 - D0001
	2		...		

  - Step 5: Repeat step 3 to add another connection point

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EtherNet/IP™

Example 2: FC6A and AB ControlLogix5555

■ WindLDR Configuration

- Step 6: FC6A receives data from ControLogix and stores in D400-D409

  - Instance ID = 101 (Needs to be different from other connection point)

  - CIP Tag: Optional

  - Type: OUT (O → T)

  - ●

CIP Connection Point Setting

| Instance ID: | 101 | Available Instance ID (100 to 197, 240 to 255 and 768 to 1279) |

CIP Tag: [ ]

| Type: | OUT (O->T) | Receive data from the 'Originator'. |

Device Allocation:

No.	Top of device address		Size[word]	Occupied device address
1	D0400	...	10	D0400 - D0409
2		...		

EtherNet/IP™

Example 2: FC6A and AB ControlLogix5555

■ RSLogix5000 Configuration

- – Step 1: Select "1756-ENBT/A eip"
- – Step 2: Select "Add New Module" from context menu
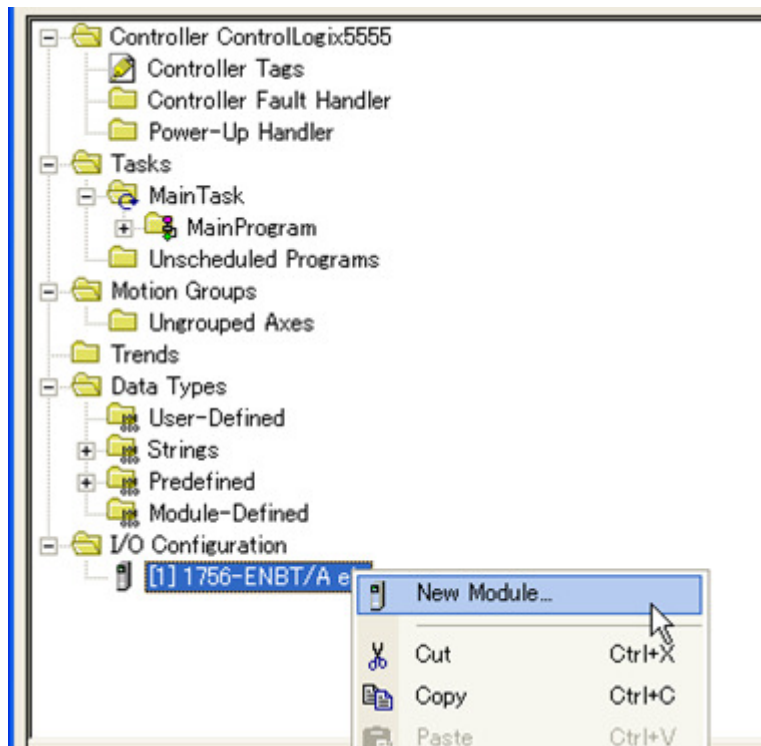
EtherNet/IP™

Example 2: FC6A and AB ControlLogix5555

■ RSLogix5000 Configuration

– Step 3: Select "Generic Ethernet Module" from module list
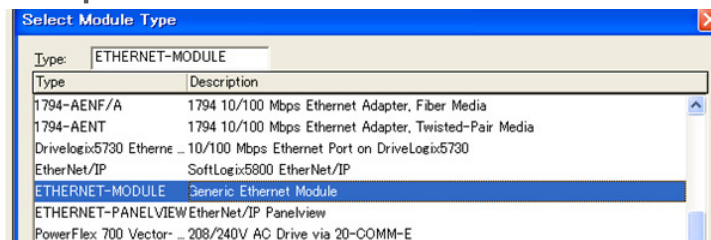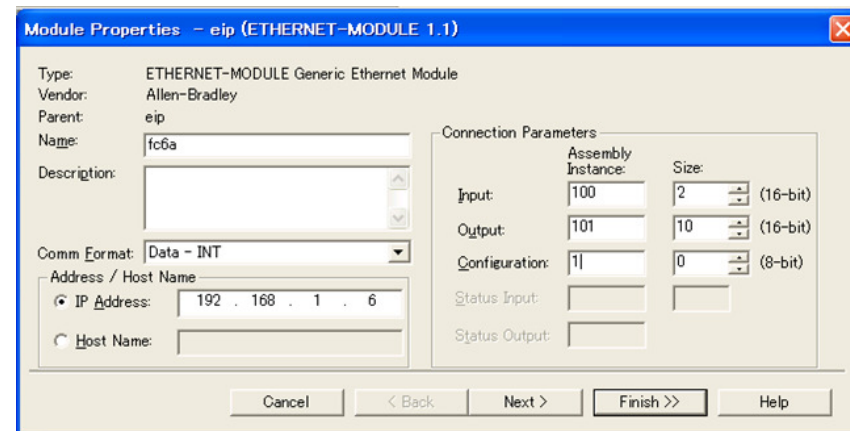

– Step 4: Configure properties of FC6A Plus
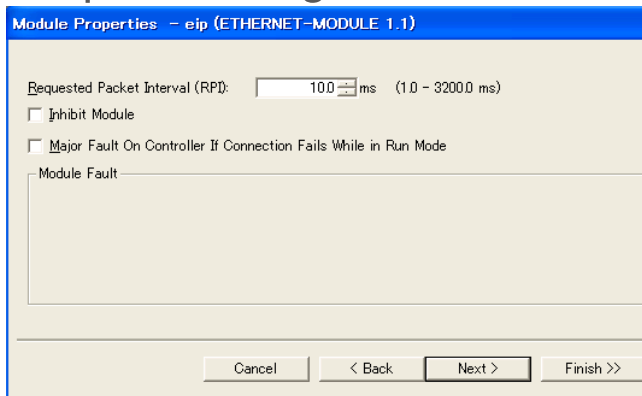
Name	Any name
IP Address	FC6A PLUS IP Address
Input (T → O)	Assembly Instance = 100 Size = 2
Output (O → T)	Assembly Instance = 101 Size = 10
Configuration	Assembly Instance = 1 Size = 0

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Example 2: FC6A and AB ControlLogix5555

■ **RSLogix5000 Configuration**

- Step 5: Configure RPI and click "Finish >>"

Module Properties – eip (ETHERNET-MODULE 1.1)

Requested Packet Interval (RPI): 10.0 ms (1.0 – 3200.0 ms)

☐ Inhibit Module

☐ Major Fault On Controller If Connection Fails While in Run Mode

Module Fault

Cancel | < Back | Next > | Finish >>

Notes: We didn't configure the Vendor ID, Device Type, and Product Type because some Scanners do not require this information. But other Scanners do require this information.

The FC6A information can be found on page 451 of the manual.

■ **Instance Attributes (Instance ID: 1)**

ID	Access	Name	Data Type	Description	Attribute Value
1	Get	Vendor ID	UINT	Vendor identification number	159
2	Get	Device Type	UINT	General device type	14 (Programmable Logic Controller)
3	Get	Product Code	UINT	Product identification code	2000

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