NE1A Ethernet IP Communications with Omron CJ2 PLC

Micheal Paradiso

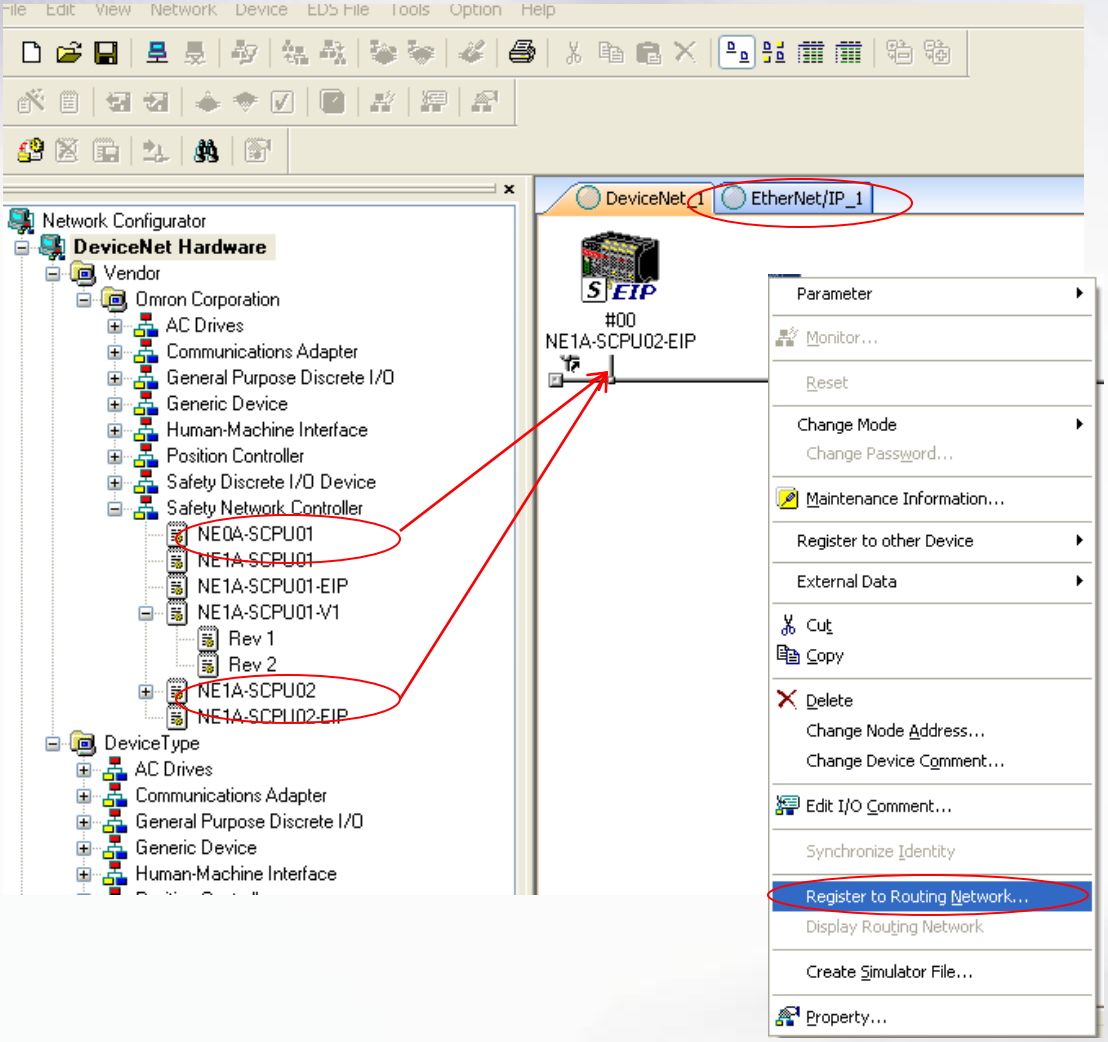
This document will walk you through a step by step setup for communication from a Omron NE1A Safety controller to an Omron CJ2 PLC using Ethernet IP communications.

Network Configuration example code for this presentation is contain in:

NE1A EIP to CJ2.ncf

Creating Needed Networks for NE1A Setup

The first step is to create the needed networks within the Network Configurator software.



- **Open the Network Configurator software** and place a NE1A controller with EIP onto the DeviceNet network. You have two controllers you can use.
- **Right click** on the controller and **select " Register to Routing Network"**
- **Click "yes"** when asked if you want to add new network.
- Once you have done this, a second network will pop up in the network tab.
- This second network will be an Ethernet/IP network that is linked to the controller on the DeviceNet network.
- This is all that is needed to set up the networks.

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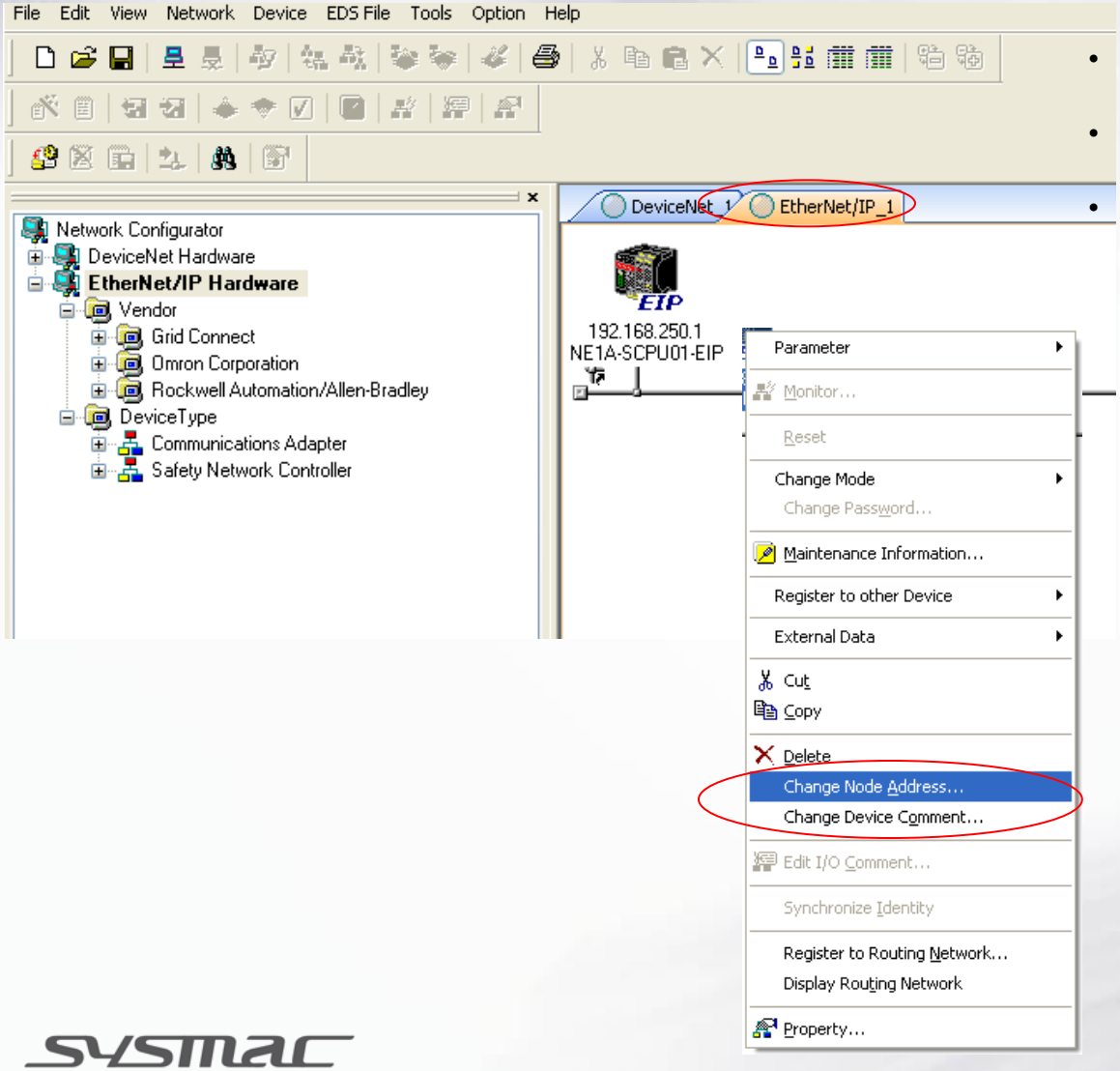
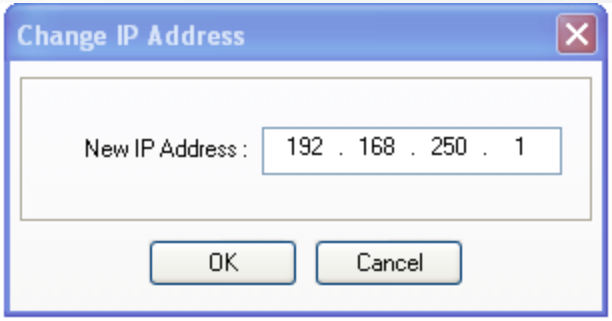
Setting up IP address for NE1A

The default IP address is 192.168.250.1 (assuming you hold down the IP ADDR button when powering up the NE1A,

- **Click on the Ethernet/IP tab** to get to the correct screen.
- **Right click** on the controller and **select " Change Node Address"**
- A box will pop where you can change the IP address.
- Once you have **entered the needed IP address click OK,** the IP address will then be changed in the code.





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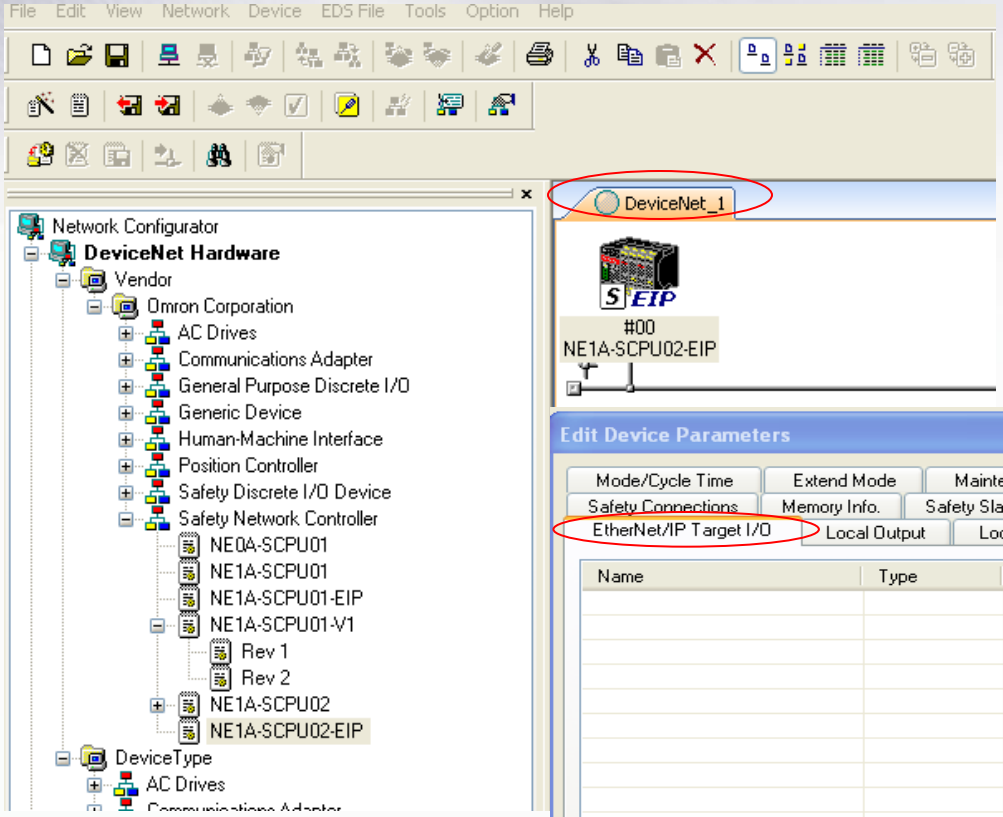
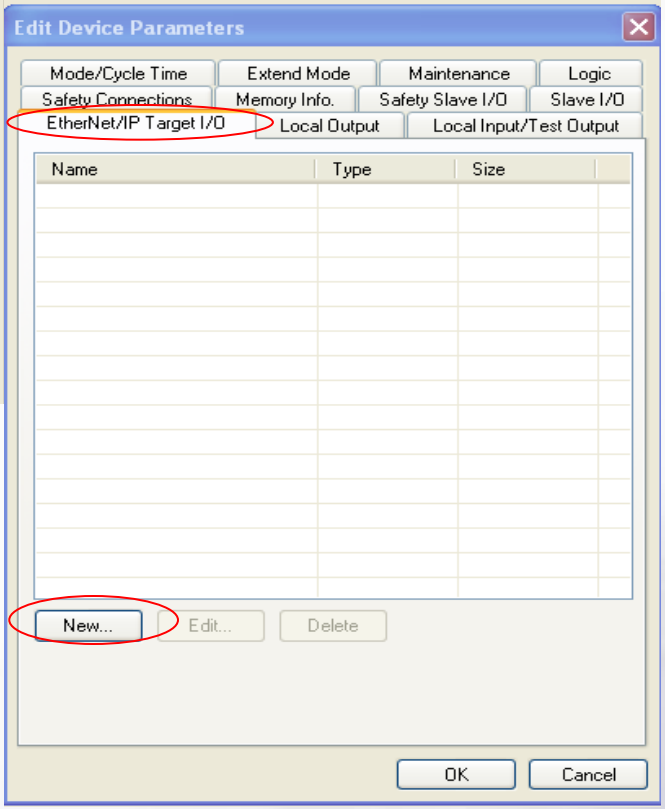
Setting up EIP I/O in NE1A

For this step you will need to be on the DeviceNet network.





- **Ensure you are on the DeviceNet network tab**.
- **Double click on the controller** and a box will appear. **Select the Ethernet/IP Target I/O tab**.
- **Select the new tab** in this box.
- A second box will appear, this is the box where you will configure the I/O you would like to put on the EIP Network.

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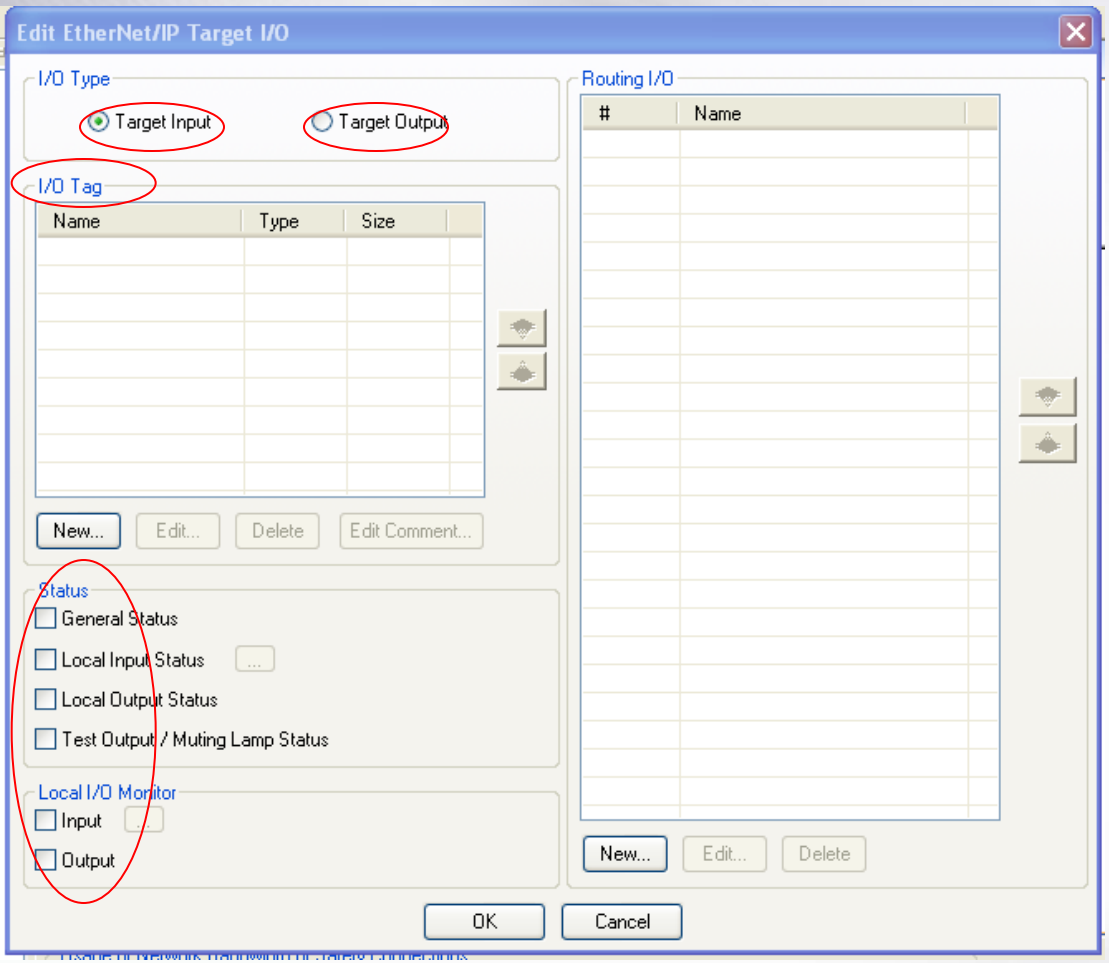
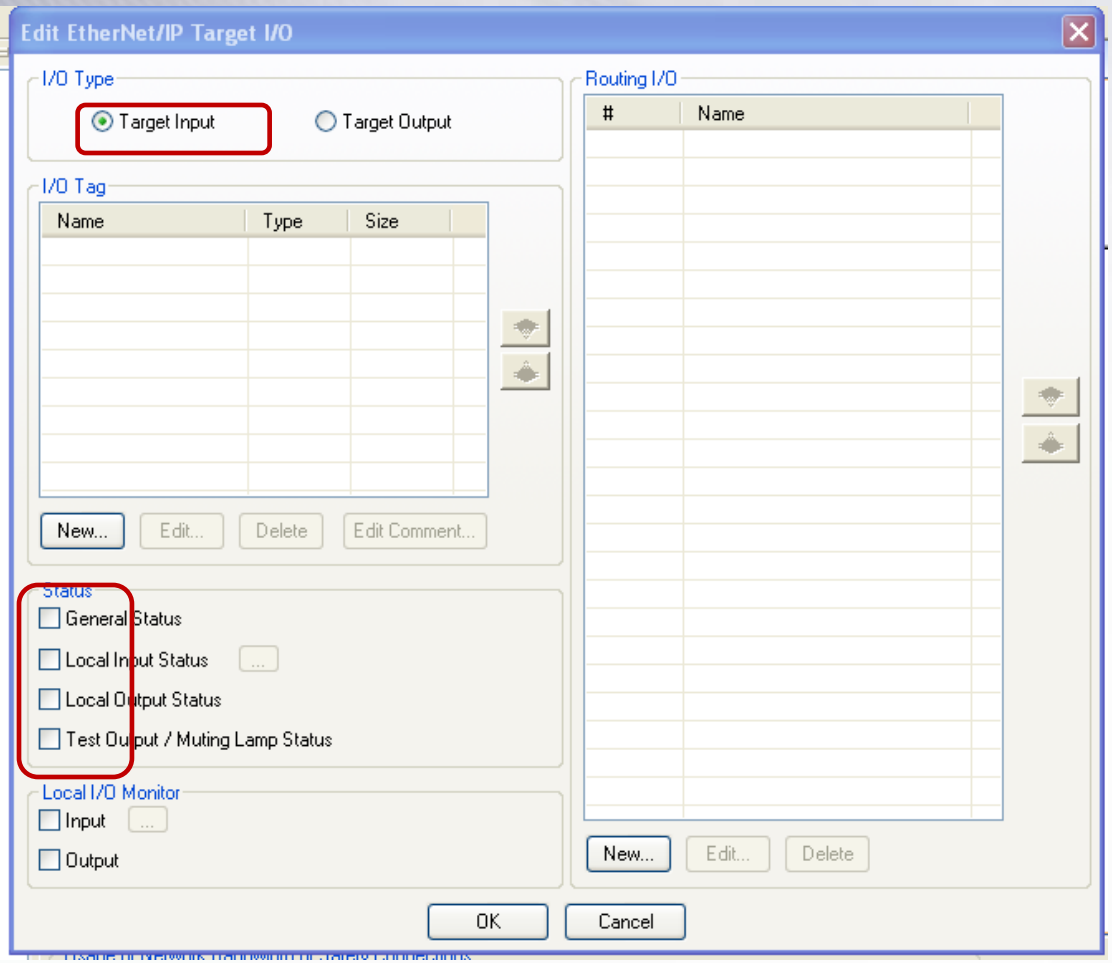
Setting up EIP I/O in NE1A cont.

This slide will explain in detail the function of this box.

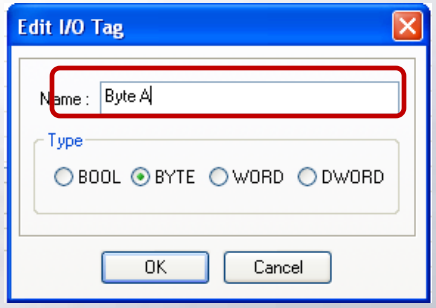


- The I/O Type field is used to set up polling information out of the NE1A or writing info to the communication bits in the logic.
- Target Input is used as a read from the NE1A communication bits (outputs from the NE1A)
- Target Outputs is used to do write to the NE1A communication bits (inputs to the NE1A)
- I/O Tag field is used to set up the I/O type and name
- The Status and Local I/O Monitor field are preconfigured I/O points that can be checked and will give you access to these bits on the EIP network.
- The next slide will explain how to set up each of these fields.

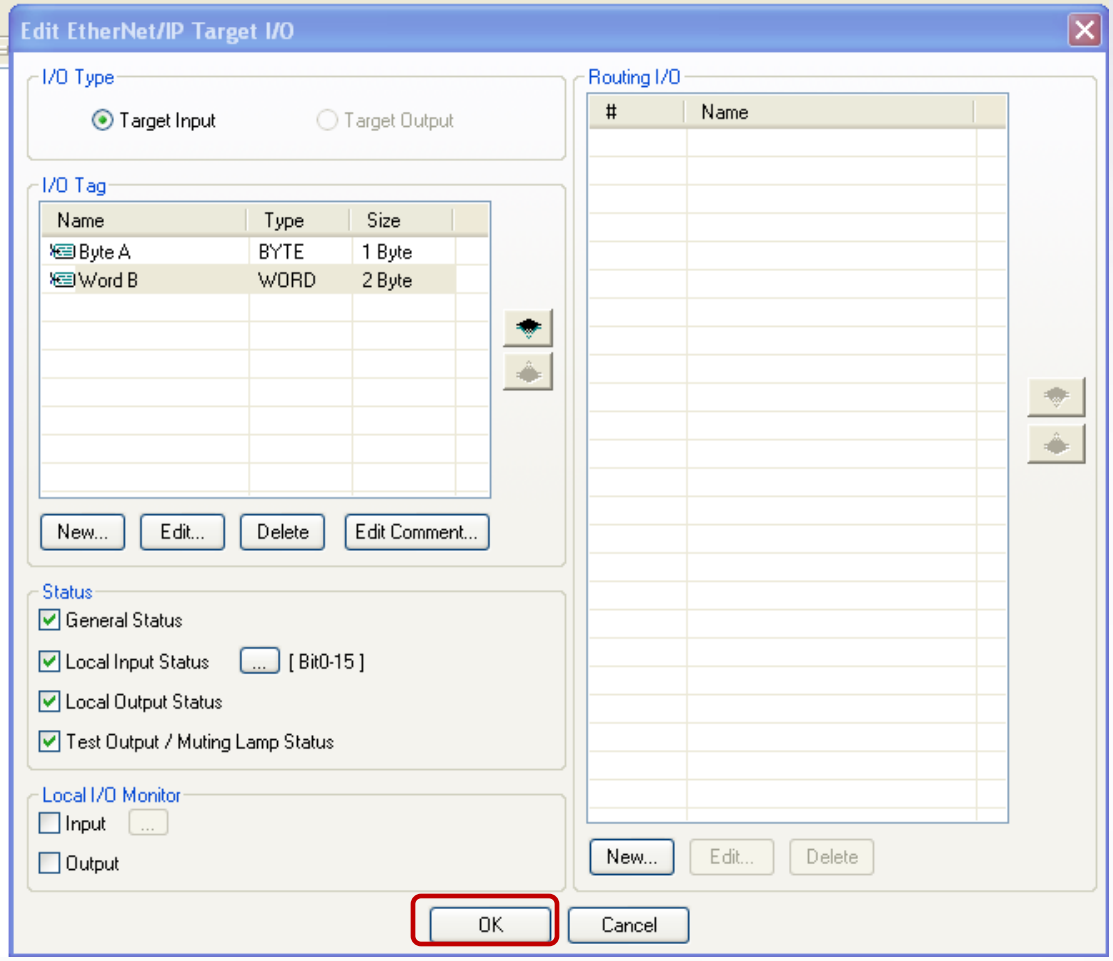
Setting up EIP I/O in NE1A cont.



- For this example we will do a read from the NE1A
- **Check "Target Input" and then "New" in the I/O tag field.**
- A box will pop up, this box will set up the Tag name and data type. **Type "Byte A" for the tag** name and **check the checkbox for "BYTE"**
- This will set up a tag name with 8 Standard communication output bits
- **Repeat the last step but check "WORD" for data type and call it "Word B"** (the tag name can be anything you want but for this example use these names.)
- **Also check the four boxes in the Status field**.
- It should look like this when you are done and click OK.



Setting up EIP I/O in NE1A cont.

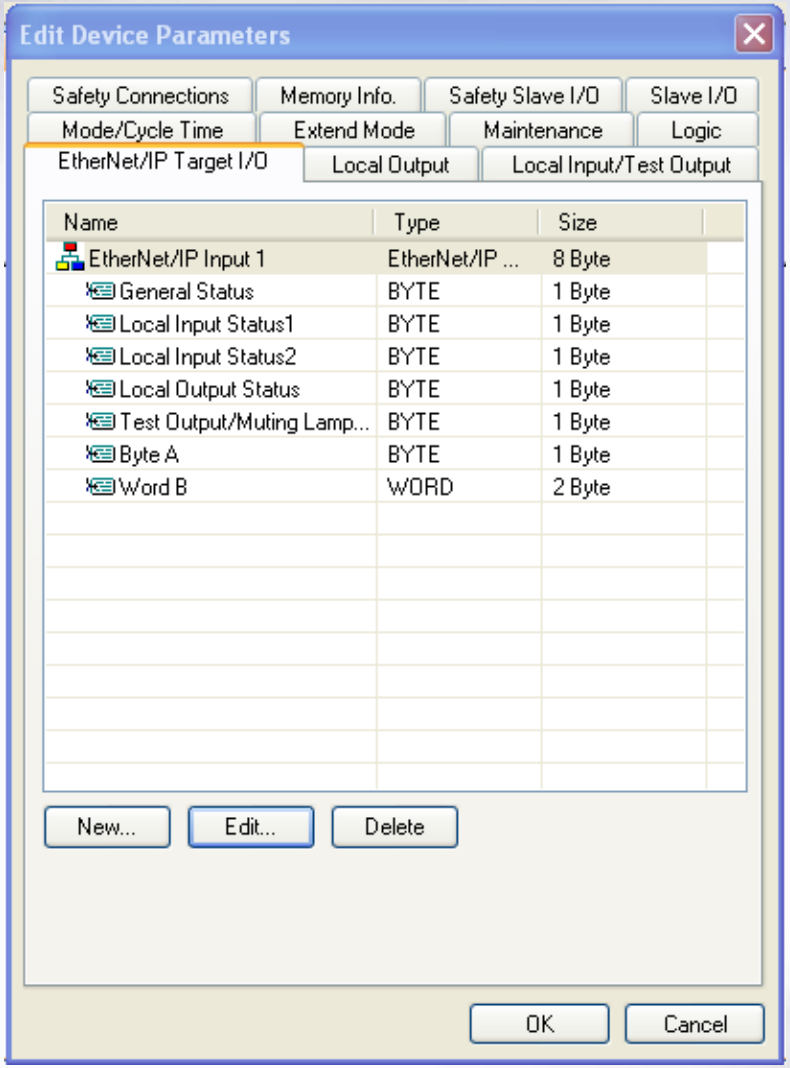


- Your Screen should look like this now
- Click **OK** complete this step

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	General Status (1 byte)							
1	Local Input Status 1 (1 byte)							
2	Local Input Status 2 (1 byte)							
3	Local Output Status (1 byte)							
4	Test Output/Muting Lamp Status (1 byte)							
5	Byte A (1 byte)							
6	Word B (2 bytes)							
7								

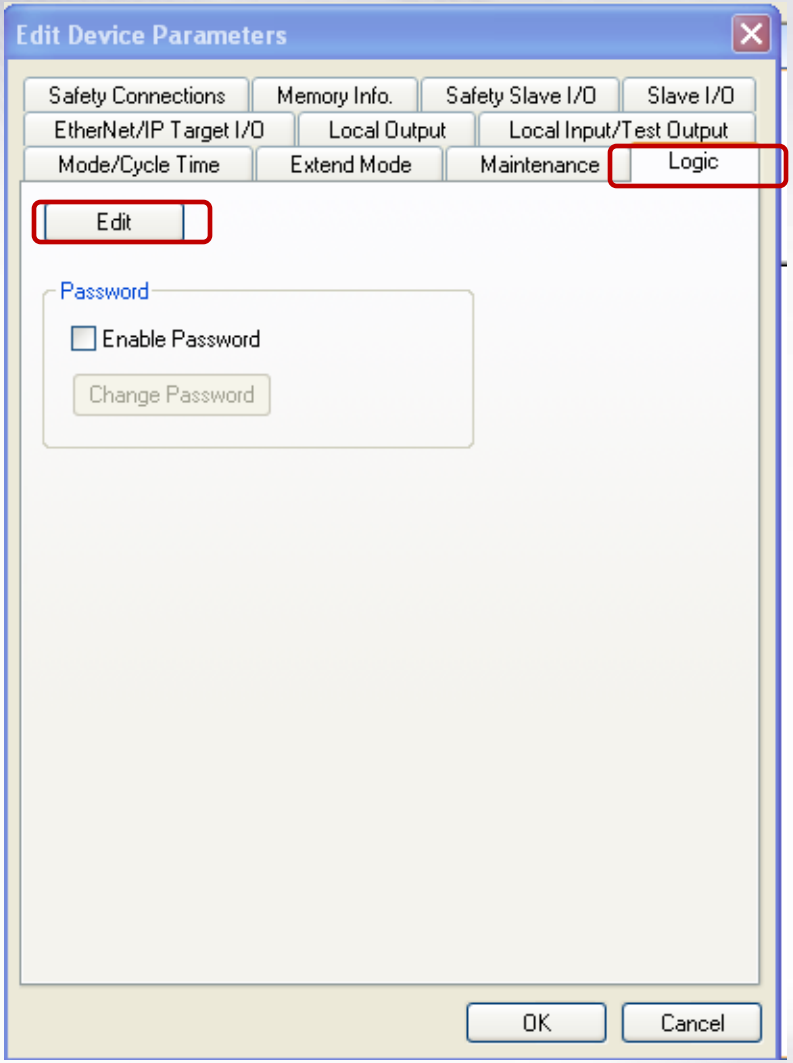
- Data format for the configuration you just setup will look like this.

Setting up EIP I/O in NE1A cont.



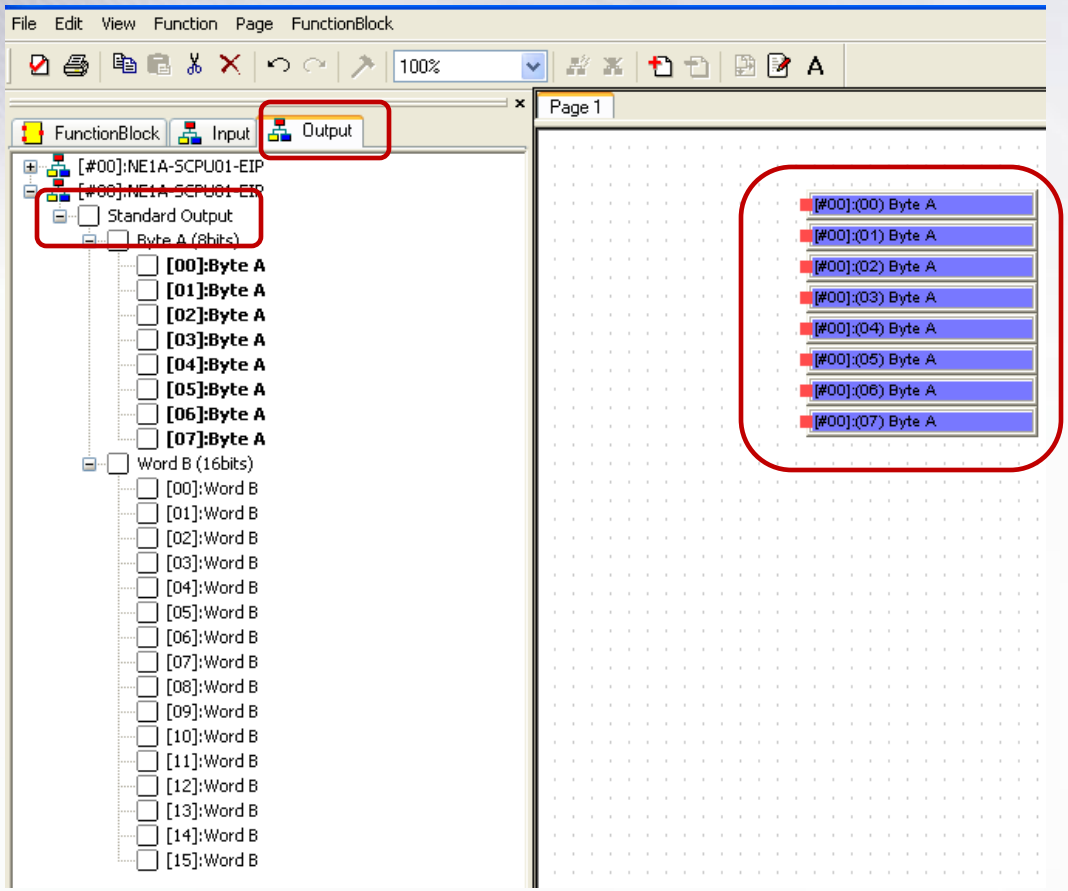
- The tab for EtherNet/IP Target I/O should look like this now.

Setting up EIP I/O in NE1A cont.



- Now let's check the I/O in the logic that you have just set up. Click on the **Logic tab** and then the **Edit** button
- **Click on the Output tab** and expand the **Standard Output** tab.
- You will now have 24 new output tags you can use in the code as standard output bits.
- The I/O is now set up for the NE1A EIP communications.
- This is all that is needed for EIP communications, the next step will be to do a download to the NE1A. If you have other settings or programming you need to do, do this before you do a download and move on to the next step.

Setting up EIP I/O in NE1A cont.



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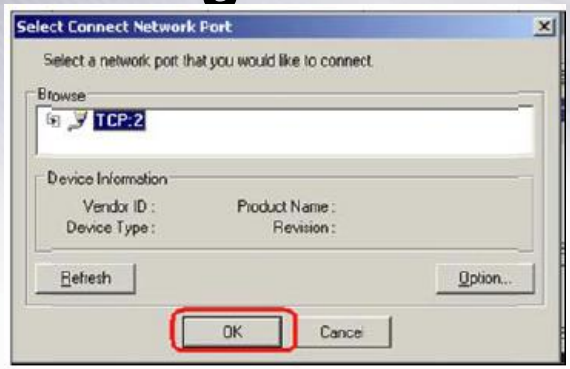
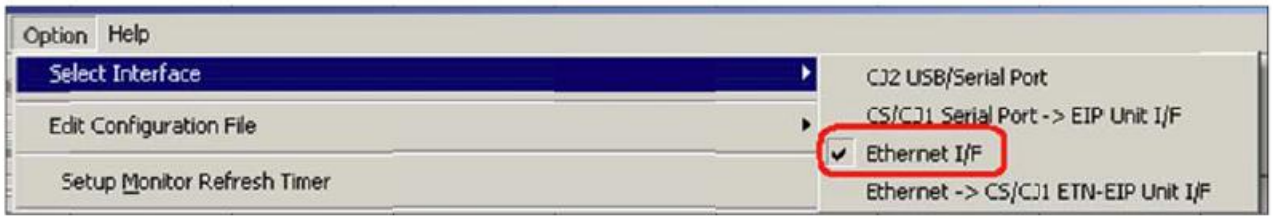
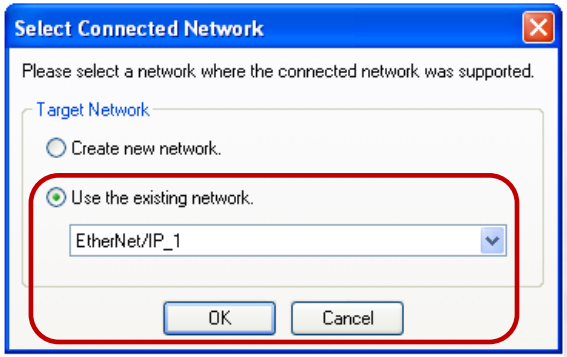
Testing EIP connection & Setup in NE1A

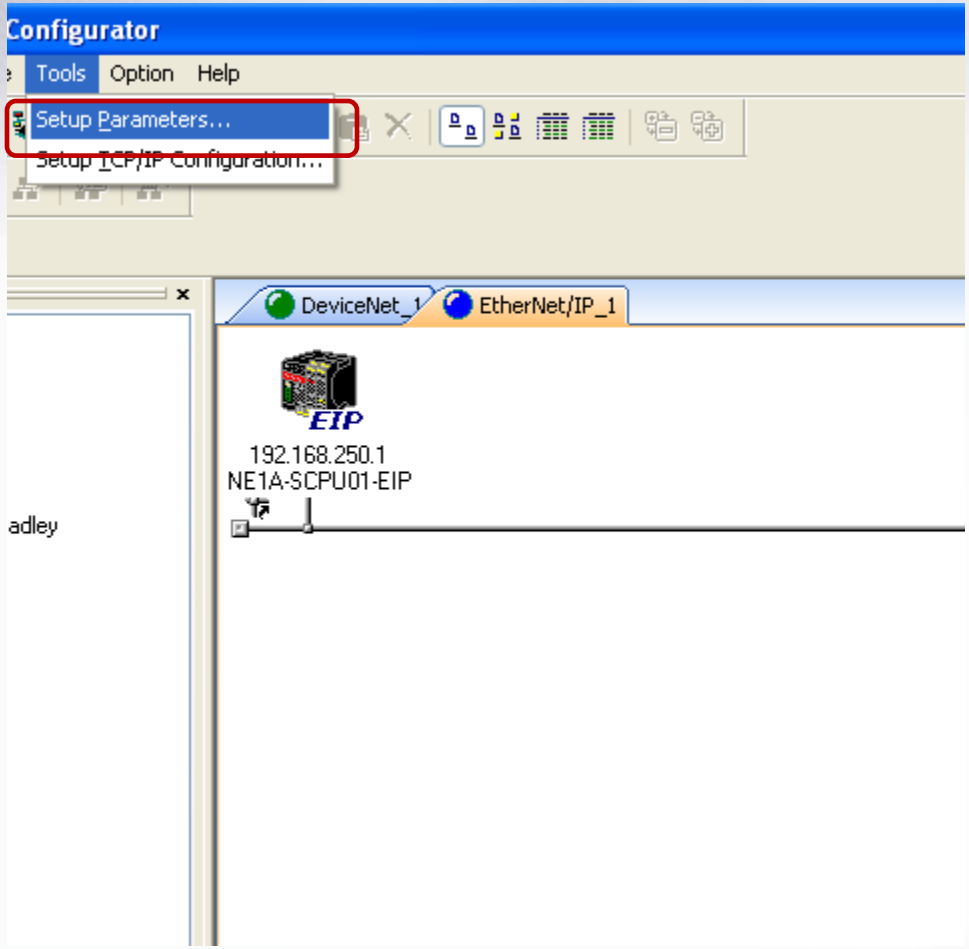




- **This step should only be done after you have done a download of the NE1A code and the controller is in Execute mode**.
- For this step you will need to change the controller connection type to Ethernet I/F and have a connection from your PC to the EIP Network.
- Set up your PC's IP address to the same sub net as the controller and **select Ethernet I/F** for the interface.
- Once you have the interface setup, **go online with the controller**
- Use the existing network when asked and say OK.

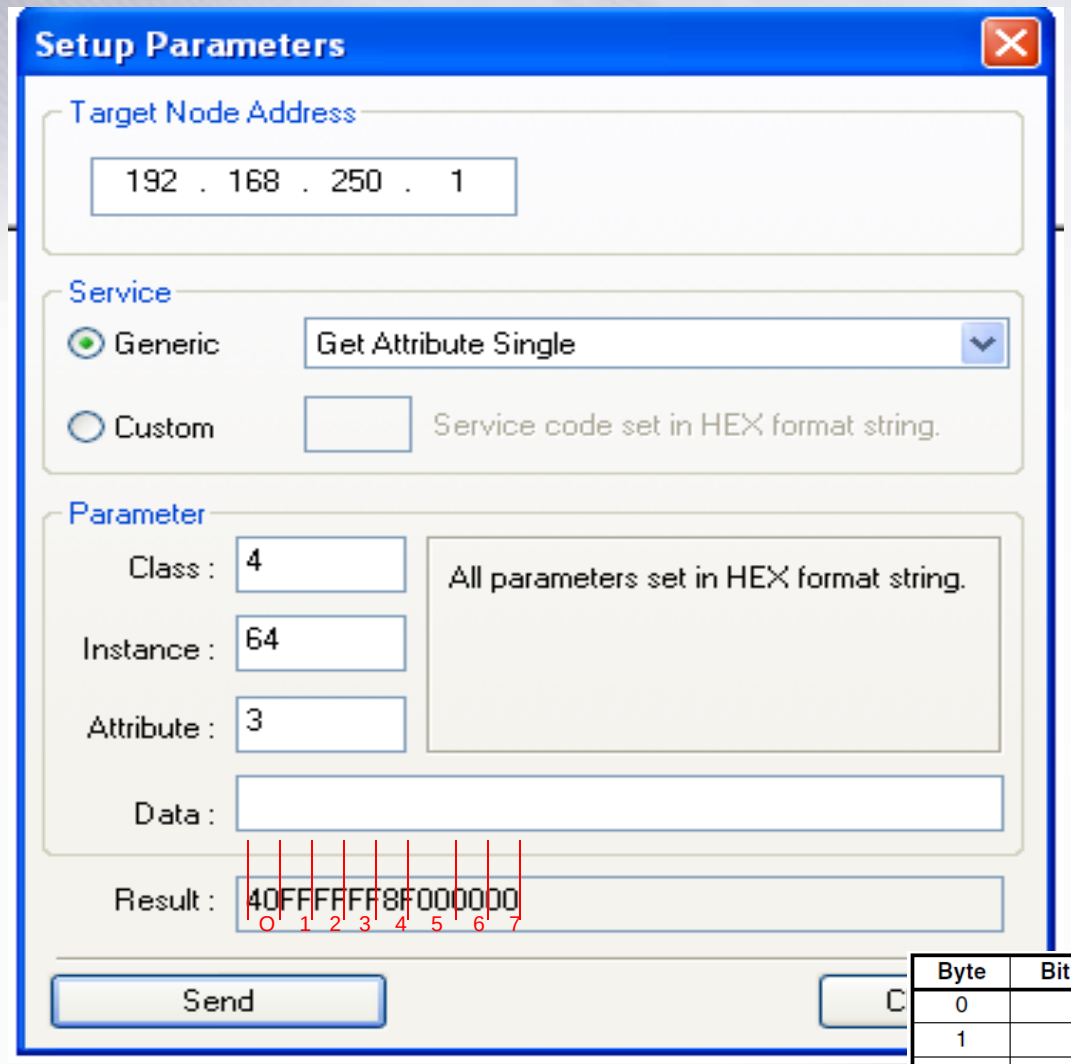


Testing EIP connection & Setup in NE1A



- Once you are online with the controller via the EIP Network **select Tools then Setup Parameters.**
- A Setup Parameters box will pop up, **fill in the fields as shown and hit send.**
- A series of numbers will appear in the results box that should look like this.
- The number in this box represents the status of the EIP communication byte that you had setup.
- If you see nothing come back in the result box, check that the controller is in Execute mode. If it still not working, check the configuration of the EIP for the controller.
- The number of Bytes in the results box will change if you add more I/O tags for the EIP communications.

Testing EIP connection & Setup in NE1A



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7								

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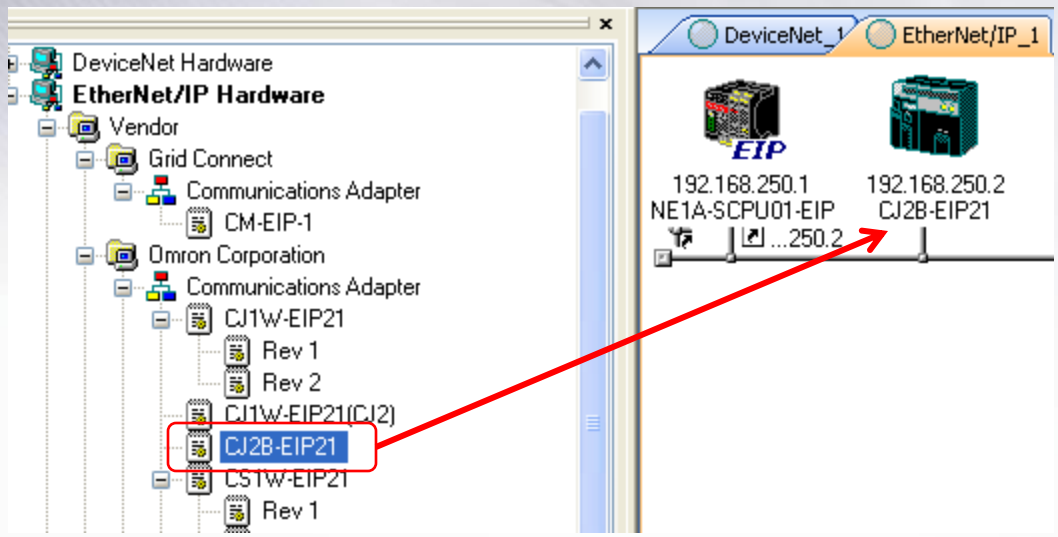
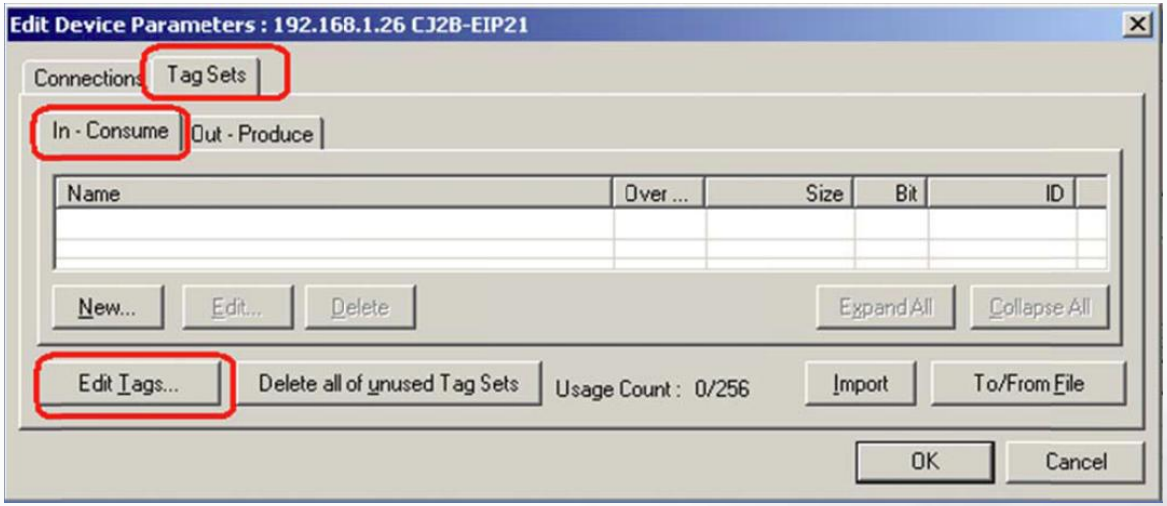
Setting up EIP Network For CJ2



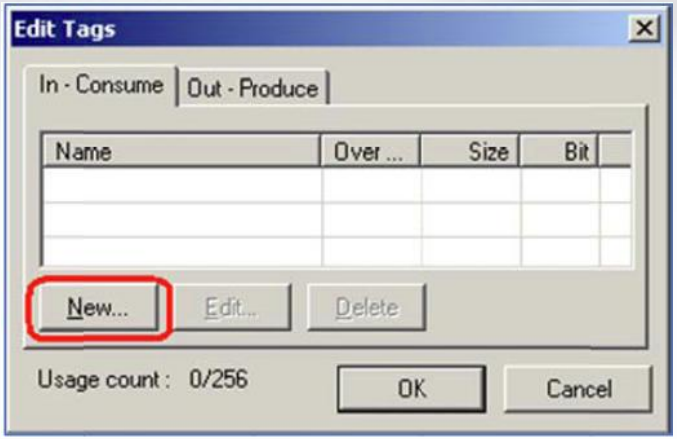
- Drag a CJ2B-EIP21 into the network diagram as shown. Change the IP address of the CJ2 to 192.168.250.1 as shown, by right clicking on the controller and selecting **Change Node Address.**
- Double click on the CJ2B-EIP21 in the network diagram



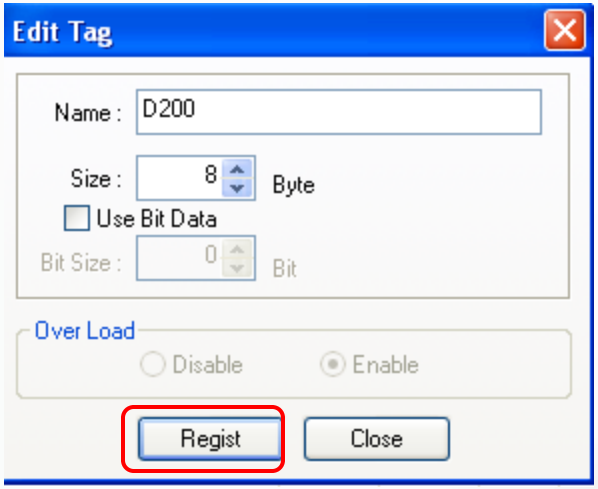
- Click on the **Tag Set** tab, **In-Consume,** and then **Edit Tags**

Setting up EIP Tags For CJ2

For this example we are only reading data from the NE1A so only the **In-Consume** section will be configured, if the system was to write to the NE1A the **Out-Produce** section would have to be configured, this is done the same as the **In-Consume** section.

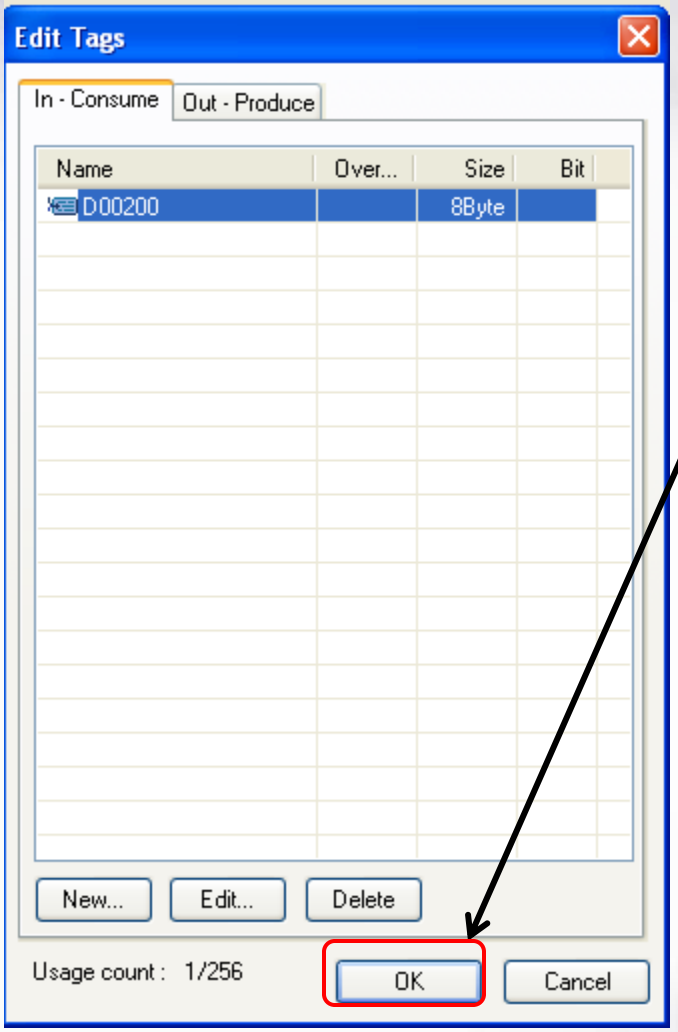


- Click **New** to create a new tag



- Enter **D200** for name, this field will determine the memory location written too in the PLC. D200 would be location DM200 in the PLC. In the size field put **8 bytes**, this number has to match the number of **Target Input** bytes that was set up in the NE1A.
- Click **Regist** to create the tag.
- Click **Close** after creating the D200 tag, as the software assumes that another tag will be created.

Setting up EIP Tags For CJ2

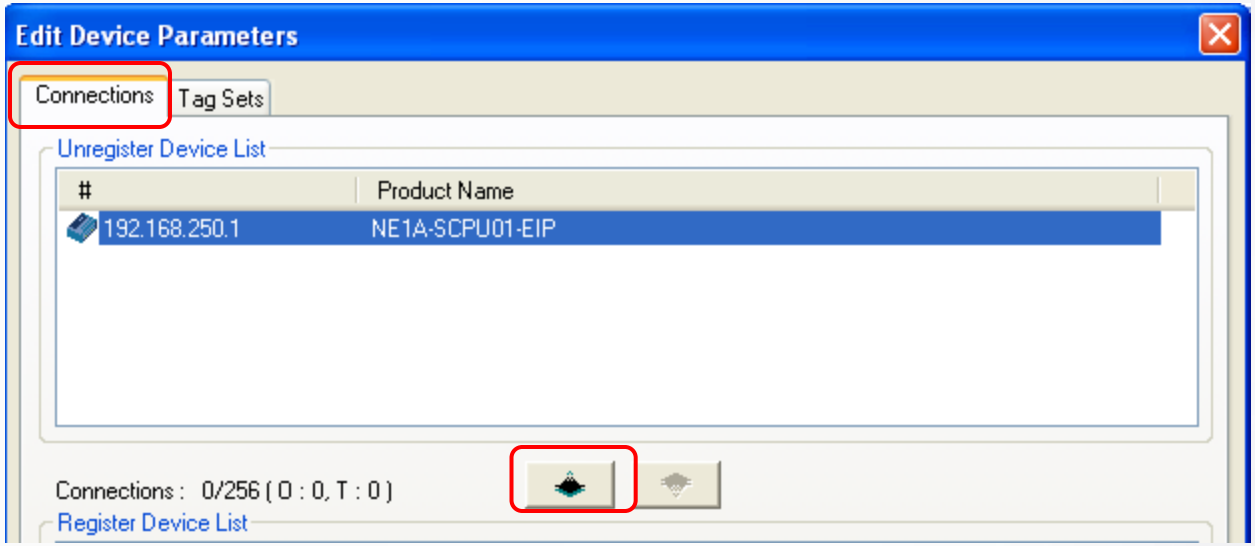


- Click **Ok** to complete the creation of the tag

- When prompted, click **Yes** to create Tag Set with the same name as the Tags that they contain

Setting up EIP Tags For CJ2

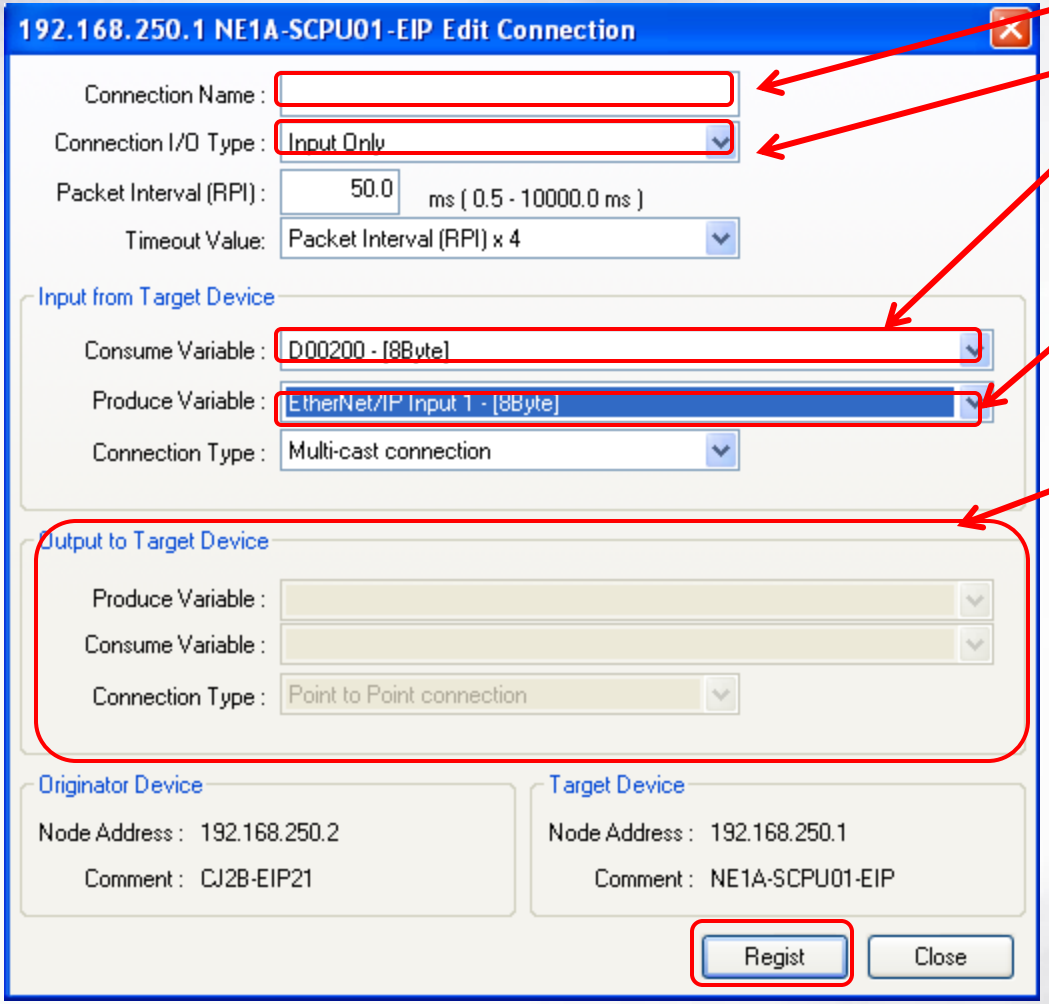
Click on the **Connections** tab, highlight the NE1A-SCPUXXX and click the **Down Arrow** as shown to move the device from Unregistered device list to the Registered device list. This will register the NE1A as a slave device to the CJ2



Double click on the device in the Registered device list. This will pop a new window that can be used to configure the tag usage in the PLC

Setting up EIP Tags For CJ2

Once this box pops up you have a number of field that will need to be configured.

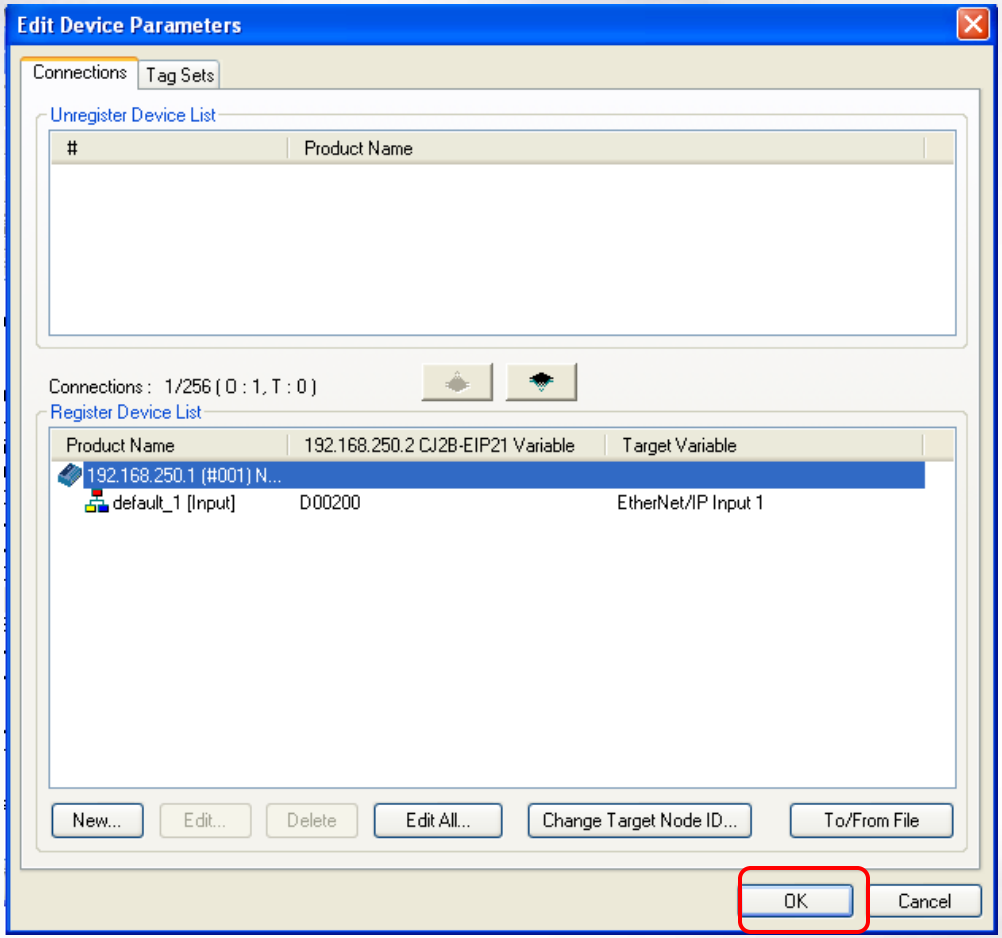


- The first field to configure would be **Connection Name**, this can be any name you would like.
- The next field would be **Connection I/O type** select **Input Only**.
- In the **Consume Variable** field select **D00200-(8byte)**, this should be the only choice you have if you had setup other variable tags for this NE1A there would be more choices.
- In the **Produce Variable** field select **EtherNet/IP Input1- (8byte)**

- If the NE1A had been configured with **Target Outputs**, the fields for this section would be available.

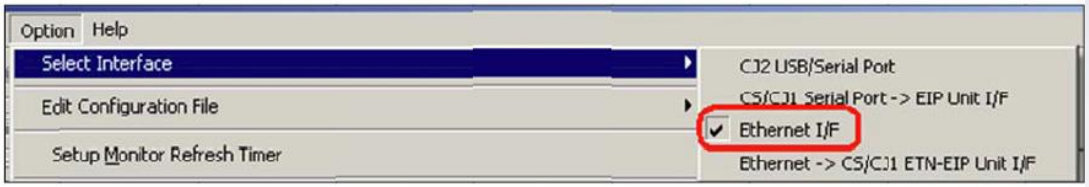
- Click **Regist** when finished to complete the device registration.
- Click **Close** after creating the connection, as the software will assume that another connection will be created.

Setting up EIP Tags For CJ2



- Click **OK** in the edit device parameters.
- This is all that is needed to configure the Tags

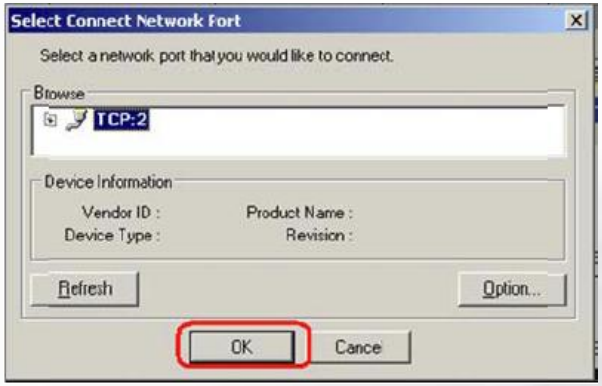
Down Loading EIP Configuration For CJ2



- To select the connection method to connect to the EtherNet/IP network, click on the **Options/ Select Interface** menus. **Select Ethernet I/F**

- Click the **Connect** icon as shown

- Select the appropriate network adapter, and click **OK**



- Click **OK** to select TCP port2 to connect to network directly

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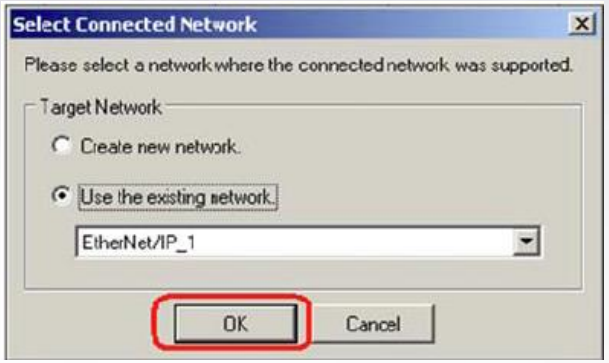
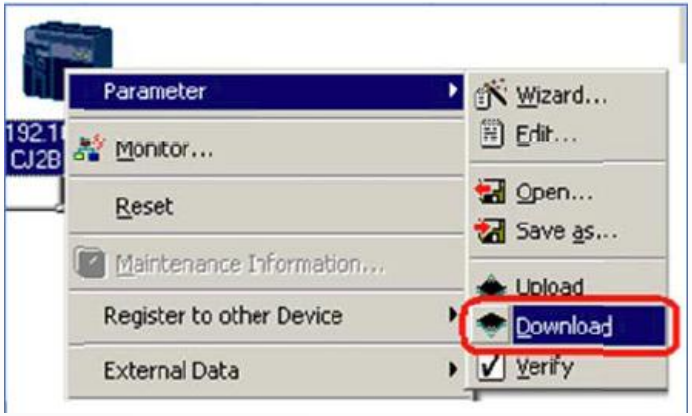
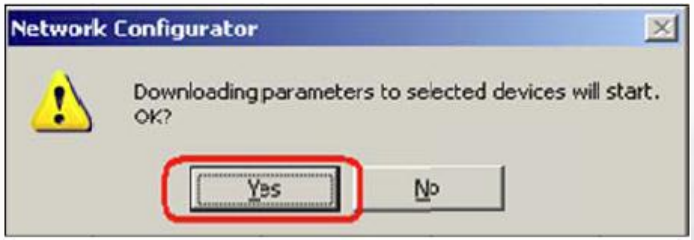
Down Loading EIP Configuration For CJ2



- Select **Use the existing network**, and click **OK**



- Right click on the CJ2B-EIP21 module in the network diagram, and select **Download**



- Click **Yes** to download the parameters

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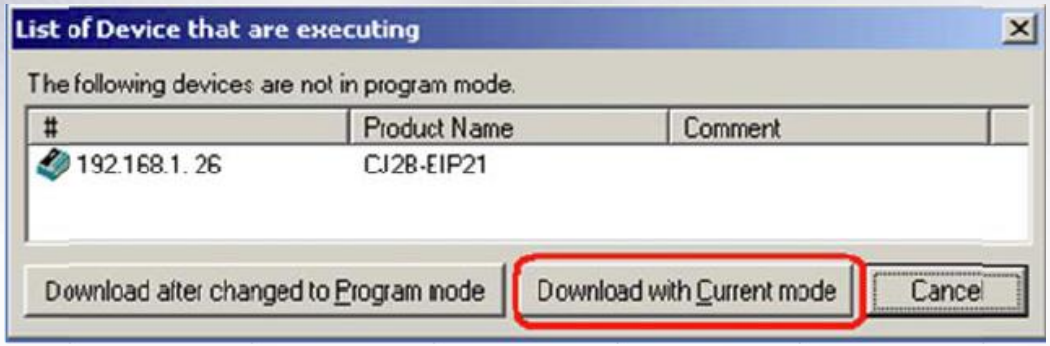
Down Loading EIP Configuration For CJ2



- To download to the EIP module without changing the PLC to Program mode, click **Download with Current Mode**

- When the download is complete, click **OK**

Using CX Programmer to monitor the PLC data, and the Network Configurator to monitor the NE1A