



9948 SE Oak Street

Portland, OR 97216

TEL: 800.852.1368

FAX: 503.262.3410

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# Using an AIMCO Gen 4 Controller on a Rockwell PLC with DeviceNet

Authors: Kade Olson

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## Introduction

AIMCO torque controllers have the option of a DeviceNet interface. A common use is interfacing them to an Allen-Bradley PLC for error proofing and data collection. This document is intended to show the steps required to setup the PLC and AIMCO controller for DeviceNet communication.

## Equipment/Software

- DeviceNet capable controller from AIMCO (iEC4EGVD).
- 1769-L32E CompactLogix5332E Controller Rev 16.20.
- DeviceNet Scanner Master Module (1769-SDN).
- RSLogix 5000 Rev v16.3.
- RSNetworkx Rev 25.00.00
- 2 – Ethernet cables.
- DeviceNet cable.

## Hardware Setup

- Connect an Ethernet cable from the CompactLogix L32E to an Ethernet switch.
- Connect an Ethernet cable from the PC to an Ethernet switch.
- Set the PLC to programmer mode
- Connect the DeviceNet cable from the DeviceNet Module to the AIMCO controller.



## Assumptions

- RSLinx has been configured for communications from the PC to the PLC.

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## Initial Setup

### Defining the CompactLogix L32E Module for the PLC

After the RSLogix5000 software is initialized, you will choose to create a new project. Make sure that the 'Type' and 'Revision' fields match the PLC controller being used. After a 'Name' and 'Description' are created, select a destination where you will save the project (see Figure 1). Click OK.

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The screenshot shows the 'New Controller' dialog box with the following fields and values:

- Vendor: Allen-Bradley
- Type: 1769-L32E CompactLogix5332E Controller
- Revision: 16
- Redundancy Enabled
- Name: DeviceNet\_Tutorial
- Description: This is a DeviceNet Tutorial
- Chassis Type: <none>
- Slot: 0 (Safety Partner Slot)
- Create In: C:\Users\acrauser\Desktop

Buttons: OK, Cancel, Help, Browse...

Figure 1. Create a new Project with CompactLogix L32E Controller

## Defining the Profibus Module for the PLC

In order to define a module on the PLC, you will need to be 'Offline' of the PLC controller. Navigate the tree view in the "Controller Organizer" window pane and right click on the 'CompactBus Local' item under the 'Backplane, CompactLogix System' tree view (see Figure 2). Select 'New Module' and search for '1769-SDN/B' under the 'Communications' tree view. Click OK.

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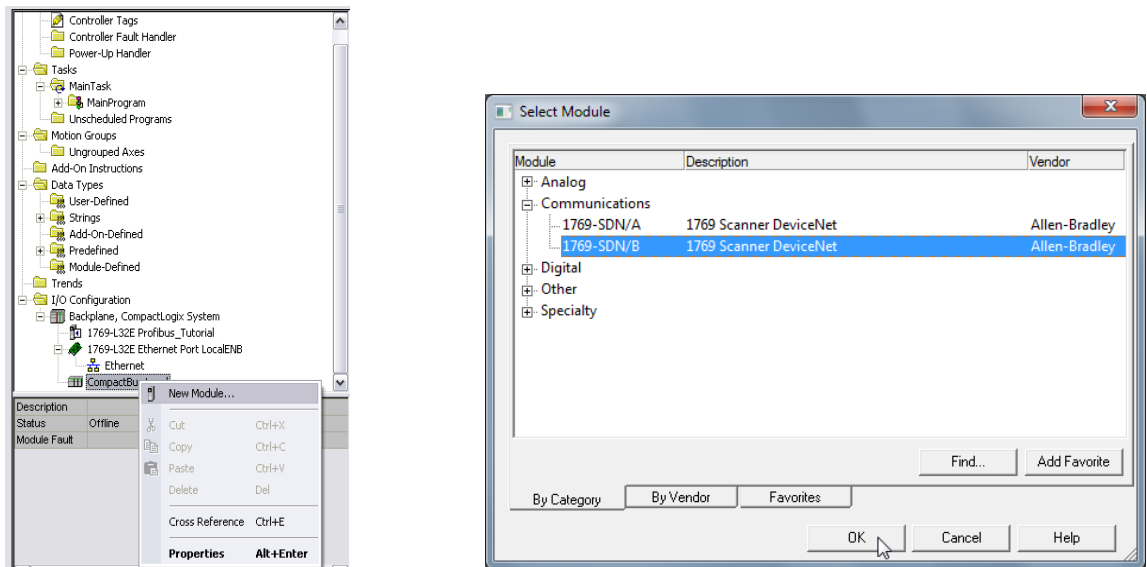


Figure 2. Define New 1769-SDN/B Module

Shortly after 'OK' has been selected, a dialog box will appear and require a major revision. This is located on the scanner module itself and is provided in the image below.

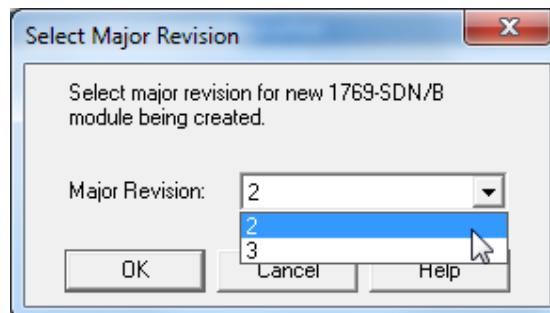


Figure 3. Major Revision

## Setting up the Connection

The AIMCO controller has two connection assemblies, Input and Output. The AIMCO controller can produce input and output sizes of 256 bytes each.

### Configuring the Connection

Configuring the connection will require you to define several pieces of information. See Figure 3

- Name of the Module
  - This will be used as an RSLogix references for Tags.
- Description of the Module.
- Minor Revision
  - Change to a value of 2.
- Select the slot where the DeviceNet module resides.
  - This example has the DeviceNet module in the fifth slot on the PLC bus (it is farthest away from the CompactLogix controller).
- Input and Output Size
  - Default values will work.

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The screenshot shows a 'New Module' dialog box with the following fields and values:

- Type: 1769-SDN/B 1769 Scanner DeviceNet
- Vendor: Allen-Bradley
- Name: DeviceNet
- Description: DeviceNet Module
- Slot: 5
- Input Size: 90 (32-bit)
- Output Size: 90 (32-bit)
- Revision: 2
- Electronic Keying: Compatible Keying

At the bottom, there is a checked checkbox for 'Open Module Properties' and three buttons: 'OK', 'Cancel', and 'Help'.

Figure 4 Defining the DeviceNet Module

Click the 'OK' button when you have defined the module.



Verify that the next prompt has the 'Major Fault On Controller If Connection Fails While in Run Mode' box checked (see Figure 4). Click OK after this has been verified.

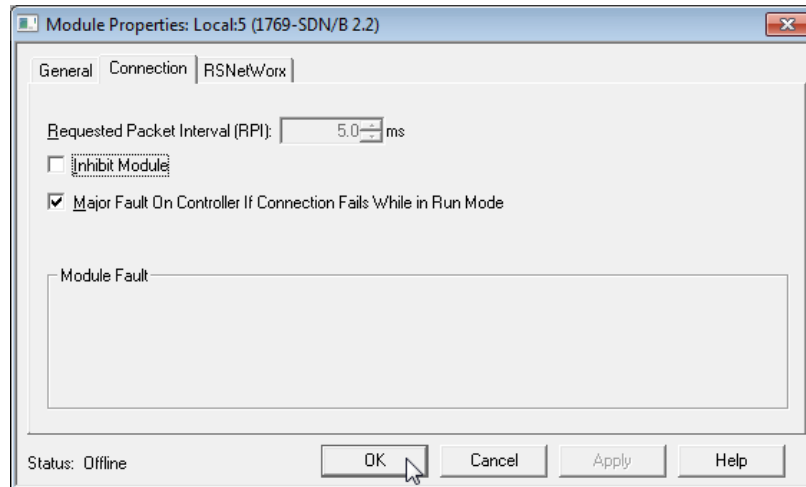


Figure 5 Defining the DeviceNet Module

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### Configure the AcraDyne Controller

Using the 'System Port' navigate to the IP address of the Gen 4 controller (AcraDyne Controllers have a default IP Address of 192.168.1.4). This step can also be done from the AcraDyne LCD touchscreen. From the Home screen, click 'Controller', 'Communication Interfaces', and 'ANYBUS' to bring up the Anybus settings of the controller. For this example, we have changed the Anybus node to 5. Click the green checkmark to enable your settings.

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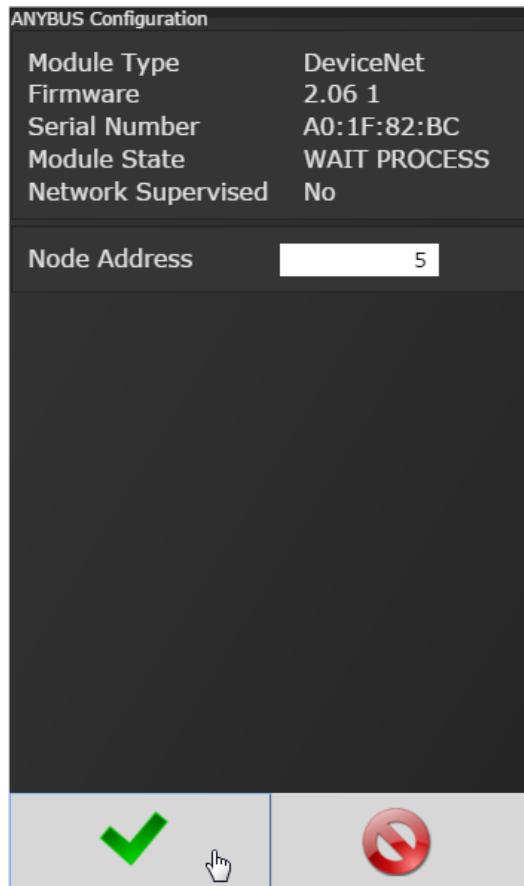


Figure 6 Gen 4 Controller Communication Settings

While in the 'Controller' menu select 'I/O' and either 'ANYBUS Inputs' or 'ANYBUS Outputs' will bring up the input and output default parameters. These are shown in Figure 7.

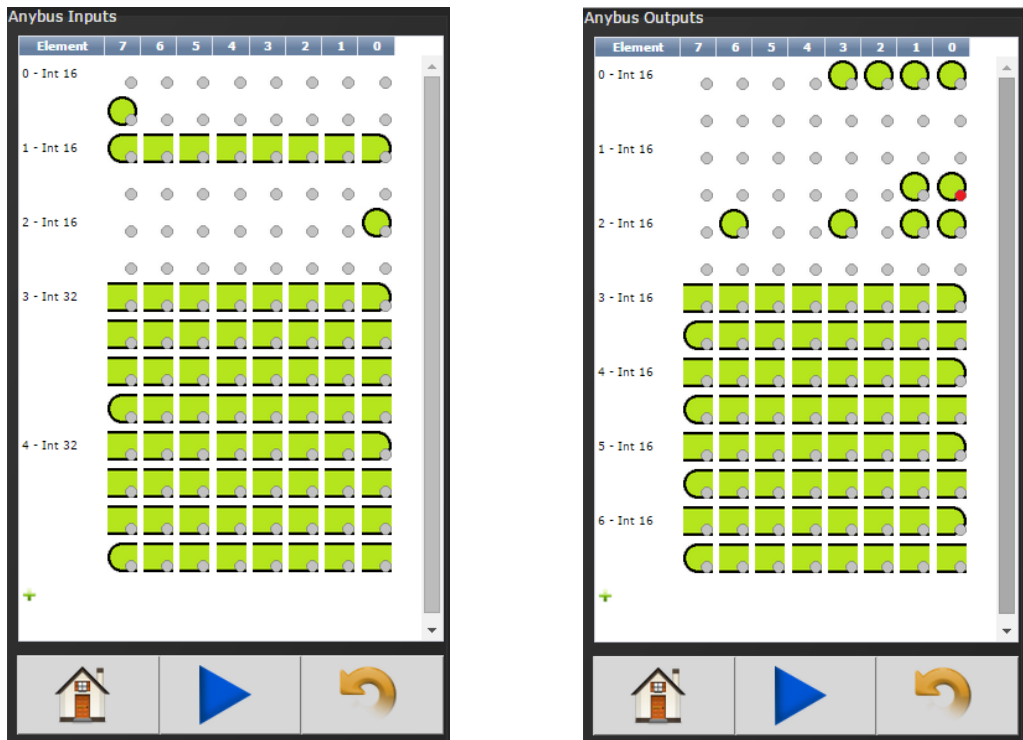


Figure 7 Controller ANYBUS Settings

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## Adding the Logic

The Gen 4 controller's default input image.

		Controller Inputs							
		Bit							
		7	6	5	4	3	2	1	0
Byte	0								
	1	Stop							
	2	Select Job							
	3								
	4								Reset Job
	5								
	6-9	Set ID							
	10-13	Set Date/Time							

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The Gen 4 controller's default output image.

		Controller Outputs							
		Bit							
		7	6	5	4	3	2	1	0
Byte	0				Angle High	Angle Low	Torque High	Torque Low	
	1								
	2								
	3						Error	Tool En.	
	4	External Controlled			Job Complete		NOK	OK	
	5								
	6-7	Angle							
	8-9	Torque (x10)							
	10-11	Angle							
	12-13	Angle							

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## Configure the DeviceNet Scanner

Open the RSNetworkx for DeviceNet software. After the software initializes, select 'File' and create a new file for DeviceNet Configuration. Click 'OK' when finished.

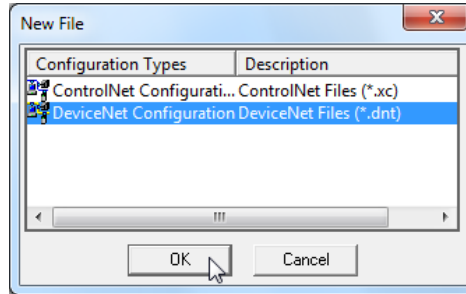
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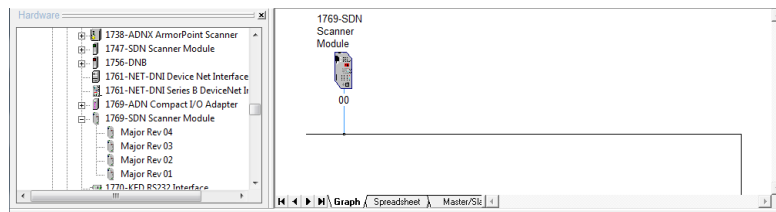
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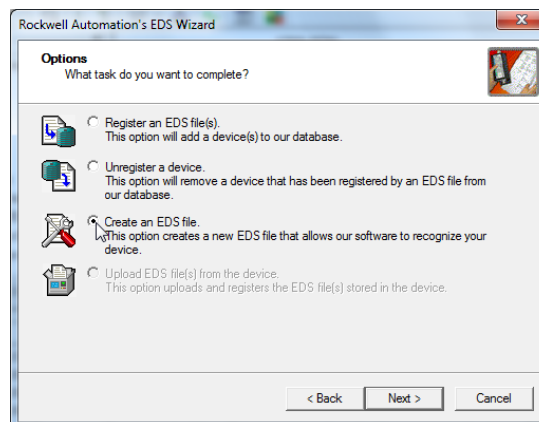
**Figure 8 Creating New DeviceNet Config. File**

Before proceeding to the next step, be sure to save the file in an accessible place. It will need to be referenced in RSLogix5000 when the configuration is complete. The first step is to add the scanner device to the graph. From the treeview, expand 'Vendor', 'Rockwell Automation/Allen-Bradley', 'Communications Adapter', '1769-SDN Scanner Module', and drag 'Major Rev 2' into the graph field.



**Figure 9 Scanner Module**

In order to communicate with the Gen 4 controller slave module, an EDS file will need to be created. To do so, click 'Tools' and 'EDS Wizard...'. Click 'Next' on the first prompt. It is important to select 'Create an EDS file'.



**Figure 10 Create EDS File**



Insert values according to the image below. Select 'Next' when finished.

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The screenshot shows the 'Device Description' step of the Rockwell Automation's EDS Wizard. The window title is 'Rockwell Automation's EDS Wizard'. The main heading is 'Device Description' with the instruction 'Enter the device's identification information.' Below this, there are two columns of input fields. The left column is titled 'Device Identity' and contains: Vendor ID (1348), Product Type (43), Product Code (4), Major Revision (1), and Minor Revision (1). The right column contains: Vendor Name (AIMCO), Product Type String (Generic Device(keyable)), Product Name (Gen 4 Controller DeviceNet), and Catalog (empty). At the bottom, there is a 'File Description Text' field containing the text: 'This is an EDS file created by Rockwell Automation's EDS Installation Wizard.' Navigation buttons at the bottom right include '< Back', 'Next >', and 'Cancel'.

Figure 11 Create EDS File

In this example, the inputs and outputs are polled with a size of 14 each. Click 'Next' for the following three menus. Select 'Finish' when complete.

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The screenshot shows the 'Input/Output' step of the Rockwell Automation's EDS Wizard. The window title is 'Rockwell Automation's EDS Wizard'. The main heading is 'Input/Output' with the instruction 'Enter the device's input/output type and sizes.' There are four radio button options: 'Strobed', 'Polled', 'COS', and 'Cyclic'. The 'Polled' option is selected. For the 'Polled' option, the 'Input Size' and 'Output Size' are both set to 14. There is also an unchecked checkbox for 'Output Bit Used'. Below these options, a note states: 'To continue enable at least one of the I/O characteristics.' Navigation buttons at the bottom right include '< Back', 'Next >', and 'Cancel'.

Figure 12 Create EDS File

There should now be an AIMCO tree view at the top (or near) of the vendor list. Expand 'AIMCO', 'Generic Device (keyable)', and drag 'Gen 4 Controller DeviceNet' to the graph field.

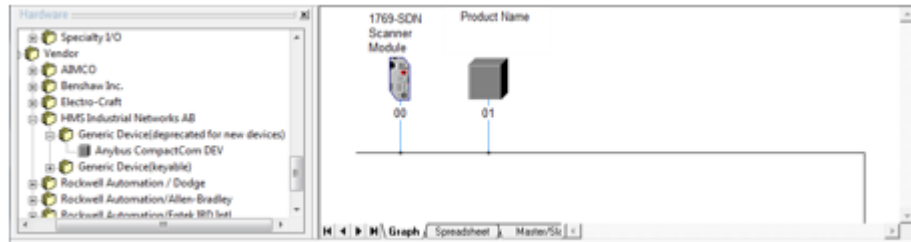


Figure 13 Anybus Module

Set the address of the scanner module to 1 (This value is shown in RSLinx). Change the product name to 'Gen 4 Controller DeviceNet' and the Anybus module address to 5 (This was set earlier on the Gen 4 controller). To do this, simply right click on each device and select 'Properties...'. Be sure to change the slave device first as it may be currently occupying the specific address of the master.

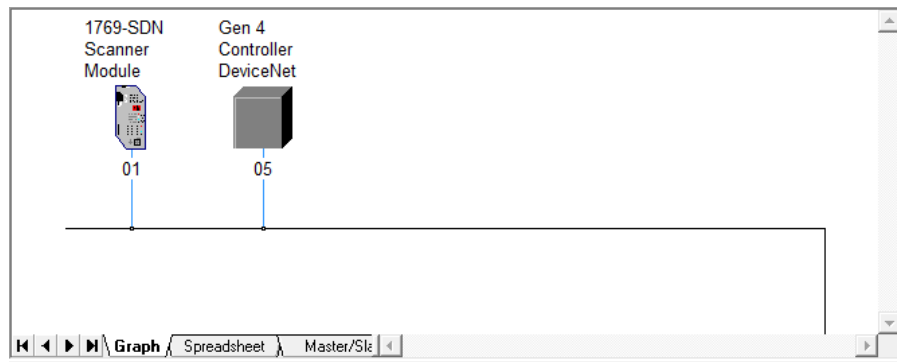


Figure 14 Module Addressing

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The last offline step is to right click on the scanner module and select 'Properties...' and navigate to the "Scanlist" tab. Select '05, Gen 4 Controller DeviceNet' and move to the Scanlist. Apply and click 'OK' when finished.

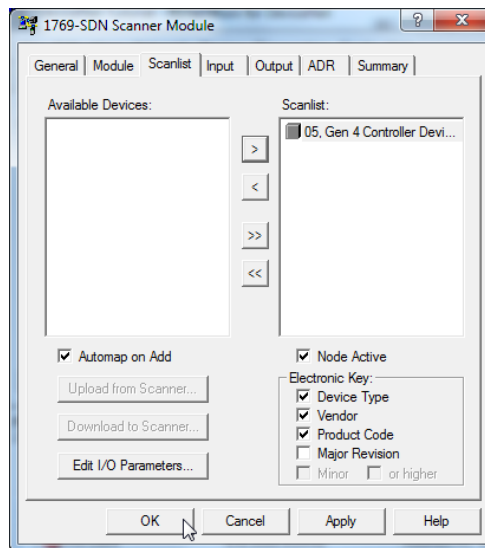


Figure 15 Anybus Module

Under 'Network', select 'Online' and, using the tree view, navigate to the Port where the DeviceNet Scanner module resides and click 'OK'. Save the changes and click 'OK' when the dialog message appears.

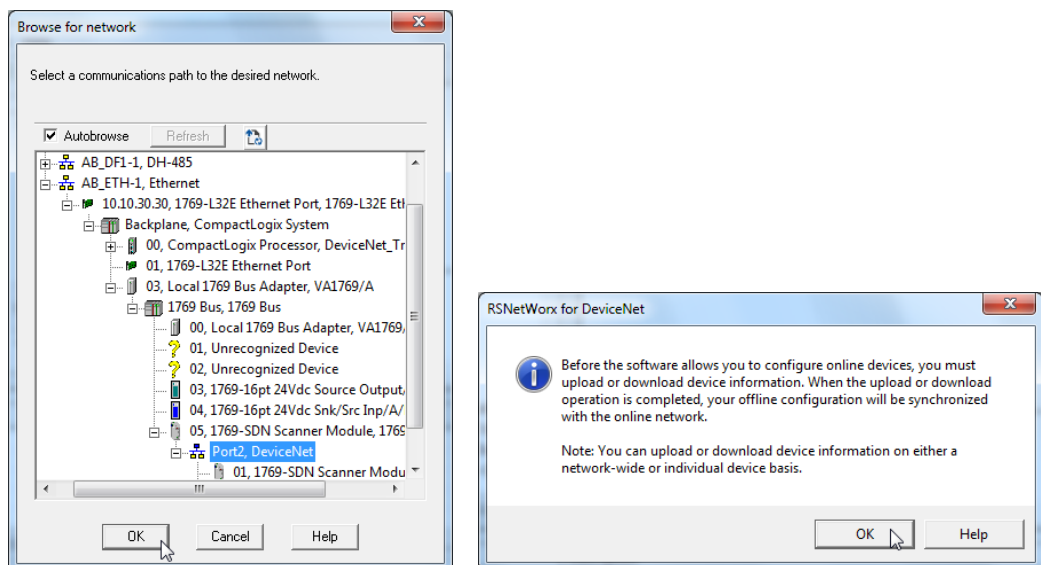


Figure 16 Online Mode

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RSNetwork will begin browsing for any DeviceNet devices on the specified network. This may take a few minutes.

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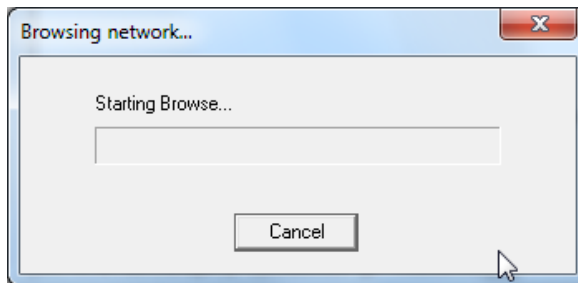


Figure 17 Browsing...

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After the browse finishes, the graph should show something similar to the image below. If the slave device does not appear, proceed to the end of the document for troubleshooting.

If the devices have identity mismatches, click on the device, select 'Device', and 'Resolve Device Mismatch...' as shown below.

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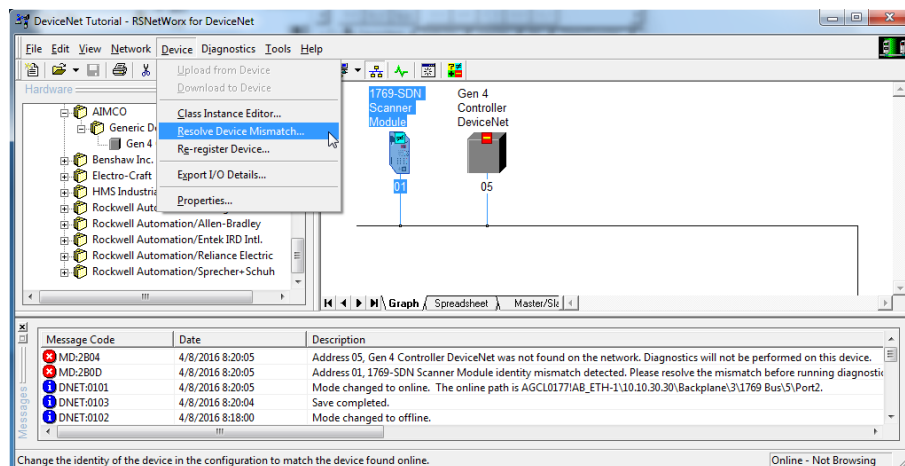


Figure 18 Device Mismatch

Simply click 'OK' on the following screen to make the changes (the changes are highlighted in red). Be sure to resolve the device mismatch for both modules.

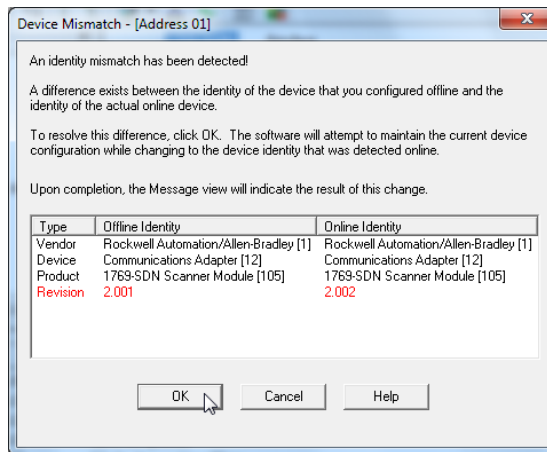


Figure 19 Online Mode

For now, ignore red icon on the slave device. Right click on the scanner module and select 'Properties...'. Navigate to the 'Scanlist' tab and the following dialog will appear. Again, be sure the PLC is in the program mode and click 'Download'. The I/O configuration will begin the download to the scanner module. Click 'OK' when finished.

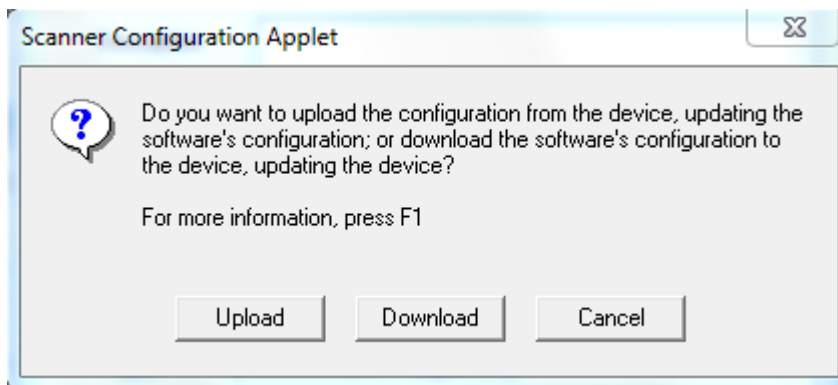


Figure 20 I/O Configuration

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Lastly, click on 'Network' and 'Download to Network'.

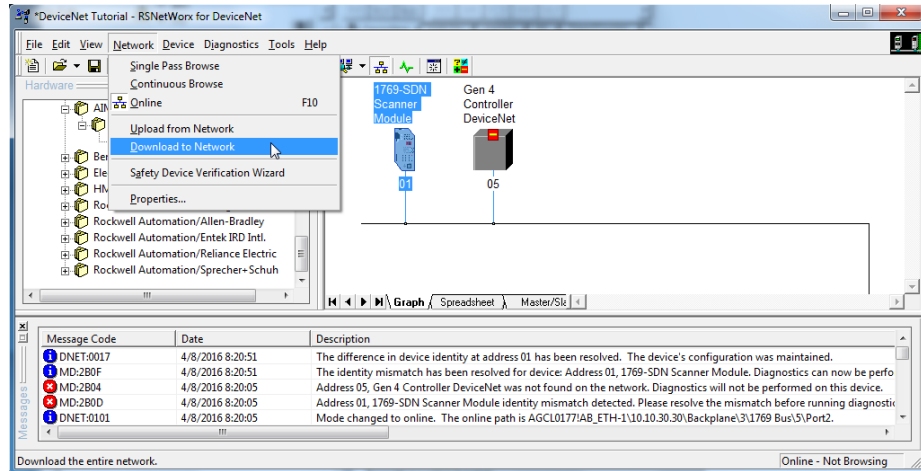


Figure 21 Network Download

Re-open RSLogix 5000 and right click on the DeviceNet module under the 'CompactBus Local' tree view. Click on 'Properties'.

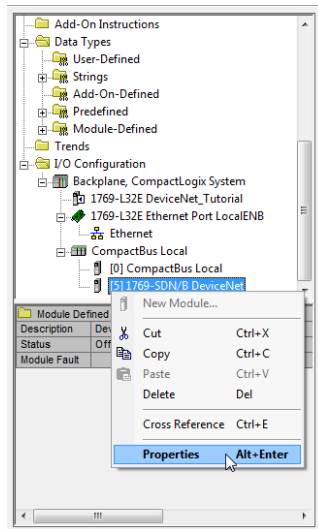


Figure 22 Scanner Module Properties

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Navigate to the RSNetwork tab and browse for the configured RSNetwork file from the previous steps. In this example, the file was saved on the Desktop. Click 'OK' when finished.

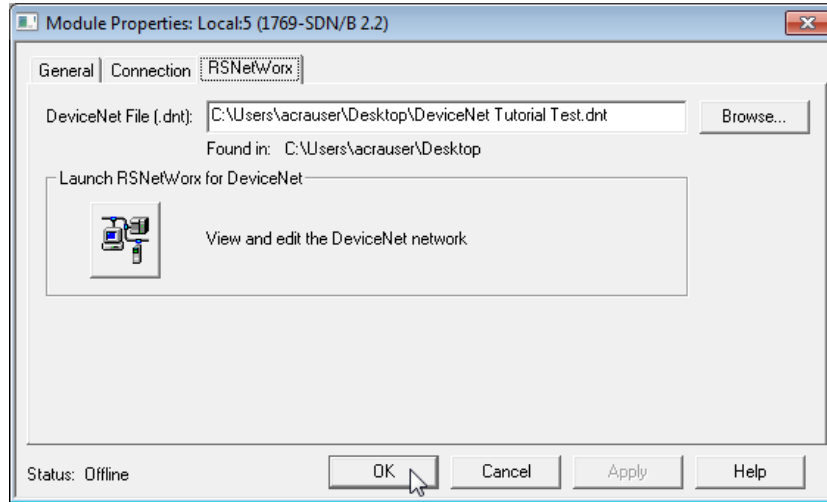


Figure 23 RSNetwork File Import

The last step is to add the following output on the ladder rung.

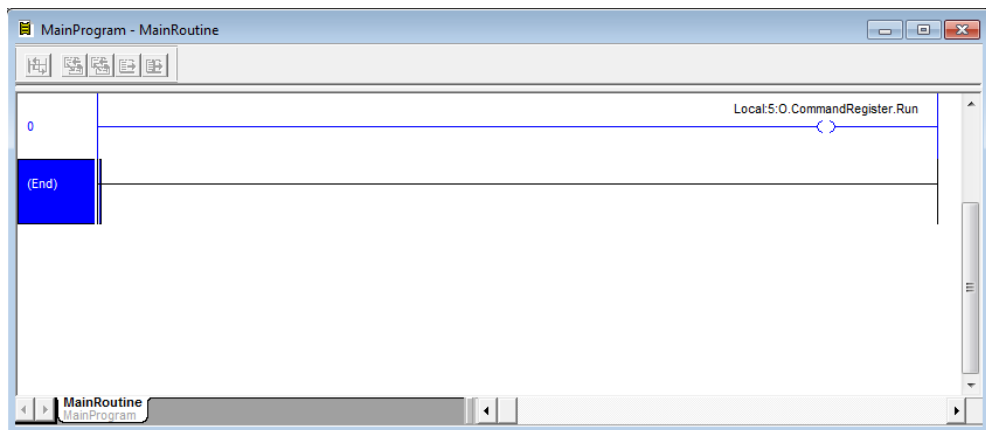


Figure 24 DeviceNet Ladder Rung

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### Downloading the configuration

Under the Communications tab at the top of the RSLogix 5000 screen, select 'Communications', 'Who Active'. Expand the tree on the IP address that corresponds to the PLC controller you are using. Click on '00, CompactLogix Processor' under the 'Backplane, CompactLogix System' and select 'Download' to the right of the menu.

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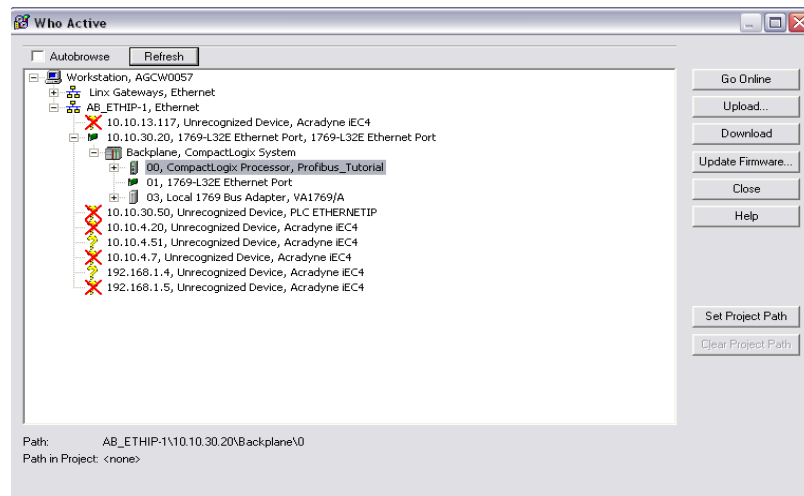


Figure 5 Defining the Profibus Module

Follow the prompts. Be sure to switch the PLC back into the 'Run' mode.