

# PLC133 LAB 3.1: ADDING A NETWORK DEVICE

Student Name: \_\_\_\_\_

Student ID: \_\_\_\_\_

## LAB OUTCOMES:

1. Demonstrate how to manually map the DeviceNet to the 1756-DNB Scanner module
2. Demonstrate how to add a component to a DeviceNet network

## LAB PROCESS:

Lab Exercise 1 will cover adding device to a DeviceNet network, reconfiguring the Network Configuration settings in the 1756-DNB Scanner Module and, manually mapping the new component in the 1756-DNB Scanner Module. You will then test the reconfigured network.

**Required files:** PLC\_133\_Module\_3.DNT

PLC\_133\_Module\_3\_Dnet.ACD

## Part 1

### EQUIPMENT REQUIRED:

COMPUTER WITH RSLOGIX 5000 / STUDIO 5000 SOFTWARE

  RSLINX SOFTWARE

  RSNetWORX FOR DEVICENET SOFTWARE

  ETHERNET PORT

CONTROLLOGIX DEMO BOARD WITH 1756-DNB MODULE, 1756-PROCESSOR

  1756-ETHERNET COMMUNICATION MODULE

  DISCRETE INPUT / OUTPUT MODULES

DEVICENET DEMO BOARD WITH 871TM PROX SWITCH

  RIGHTSIGHT STANDARD DIFFUSE PHOTOELECTRIC SENSOR

  855T – STACK LIGHT

  1791D 8B8P COMPACT BLOCK I/O

  POWERFLEX 4 VFD

NOTE: OTHER COMPONENTS ARE ALSO INSTALLED ON DEVICENET DEMO BOARD

DEVICENET CONFIGURATION FILE REQUIRED - PLC220\_MODULE5.DNT

CONTROLLOGIX PROJECT FILE - PLC220\_MODULE\_5\_DNET.L5K OR THE ACD VERSION

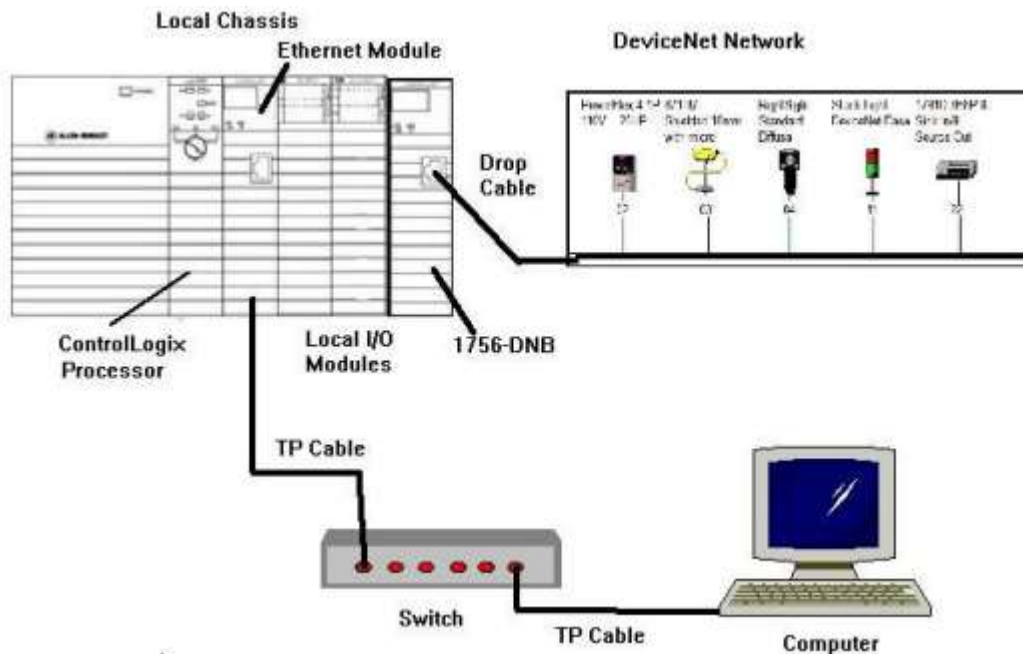


Figure 1-A

Ensure all the DeviceNet component's cables are connected to the IDC taps on the bottom of the DeviceNet Demo Board

Twisted pair Ethernet cables from Computer Ethernet Port the 1756-EtherNet Module

Note: the cable may be directly connected - no Switch required

DeviceNet drop cable to connect the DeviceNet Demo Board to the front port on the 1756-DNB Module located on the ControlLogix Demo Board.

Power-up ControlLogix and DeviceNet Demo Boards

Note: If the display on the 1756-DNB Module shows - No Network Power – the 1756-DNB Module is not receiving power from the DeviceNet network (drop cable) cable.

In the Lab exercise a connection will be made from the computer's Ethernet Port thru RSNetWorx for DeviceNet using a RSLinx, EtherNet/IP Driver to connect to the DeviceNet network

Ensure the Computer can connect to the ControlLogix Demo board using the 1756 – Ethernet Communication Module with an EtherNet/IP driver.

Note: DeviceNet Scanner Module - 1756-DNB – located in slot 6.

Studio 5000

1. Import the PLC133\_Module\_5\_Dnet.L5K file into Studio 5000
2. Download PLC133\_Module\_5\_Dnet.ACD to the ControlLogix Demo
3. Place the ControlLogix processor into PROGRAM Mode.

RSNetWorx

1. Open RSNetWorx for DeviceNet.



Figure 1-A

2. Load the PLC220\_Module5.dnt to the 1756-DNB Scanner Module.
3. Place the ControlLogix processor and 1756-DNB Scanner Module in RUN Mode
4. Verify operation

Note: These are the same files used in Module 2 Lab Exercises, just renamed



Figure 2-A

Ladder File for Module 5 Lab Exercise 1

5. Return to RSNetWorx for DeviceNet – verify it is Online to the DeviceNet Demo Board – Bottom right corner if the RSNetWorx software does not say Offline. See Figure 3-A

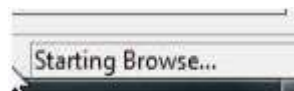


Figure 3-A

RSNetWorx Online – Not Browsing

6. Verify 1791D -8B8P Compact I/O Block is connected to the DeviceNet Network.

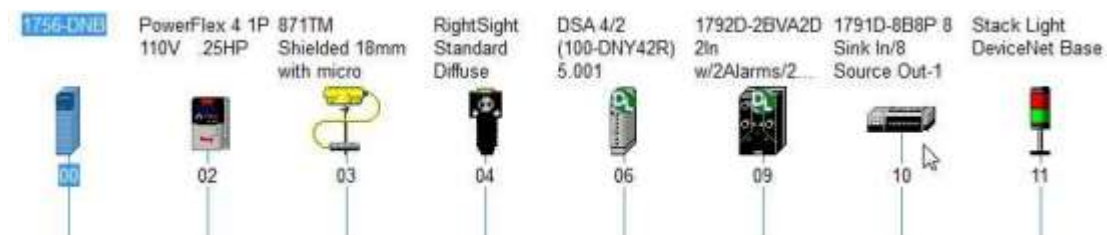


Figure 4-A

1791D -8B8P Compact I/O Block – Node 10

Note: DeviceNet Node Addresses may not be the same on all DeviceNet Demo Boards

7. Right click the Compact I/O Block, choose Properties from context menu



Figure 5-A

1791D -8B8P Compact I/O Block

Note: 1791D -8B8P Compact I/O Block has 8 Inputs and 8 Outputs  
On the DeviceNet Demo Board - Compact I/O Block Outputs wired to PL0 thru PL7 indicators

Compact I/O Block Inputs wired to PB0 thru PB3, SS4 and SS5  
SS6 and SS7 not wired to Compact I/O Block

8. Click I/O Data tab on 1791D -8B8P Properties window

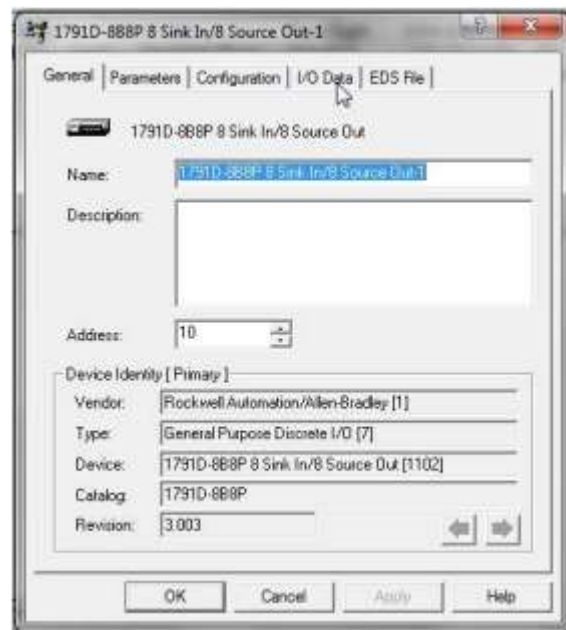


Figure 6-A  
1791D -8B8P Properties

9. Place the ControlLogix processor in RUN Mode

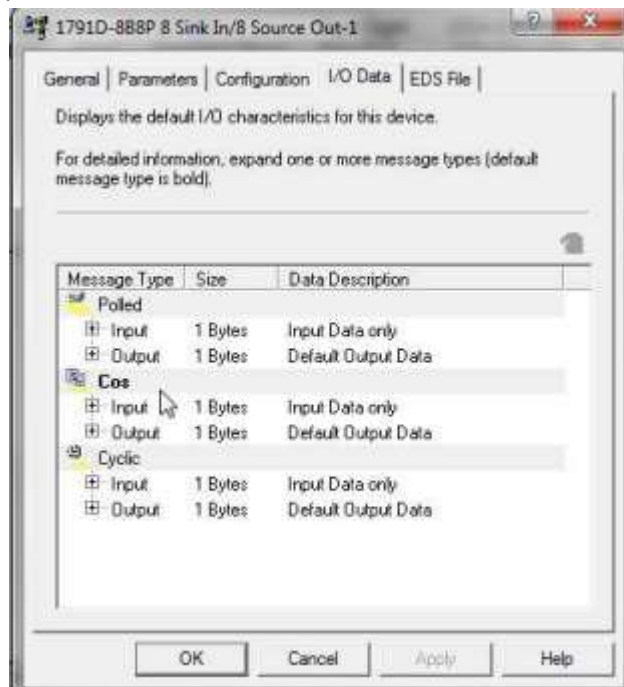


Figure 7-A  
1791D -I/O Data

Note: Default Message Type COS

1 Byte – Input Size – 1bit for each input point on I/O Block

1 Bytes- Output Size – 1bit for each output point on I/O Block

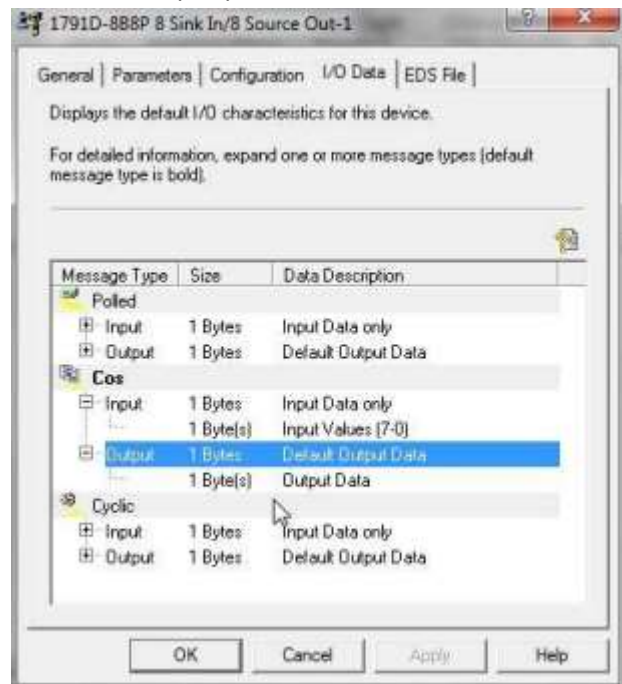


Figure 8-A

Input and Output Data- 1791D- 8B8P I/O Block

Click the OK button to close I/O the 1791D- 8B8P I/O Block Properties window

10. Right click 1756-DNB module. Select Properties from context menu.

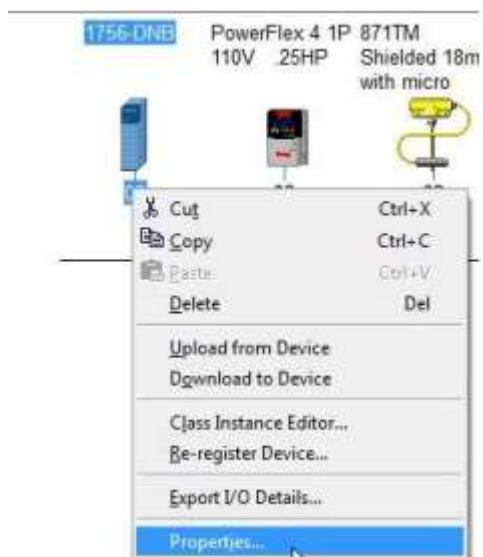


Figure 9-A  
1756-DNB Module

11. Click the Scanlist tab



Figure 10-A  
1756-DNB Module Scanlist



12. Uncheck the Automap on Add Check Box below the Available Devices box



Figure 11-A

Automap on Add Check Box Unchecked

13. Select the 1791D- 8B8P I/O Block in the Available Devices box

Click the > button to move the 1791D- 8B8P I/O Block to the Scanlist box

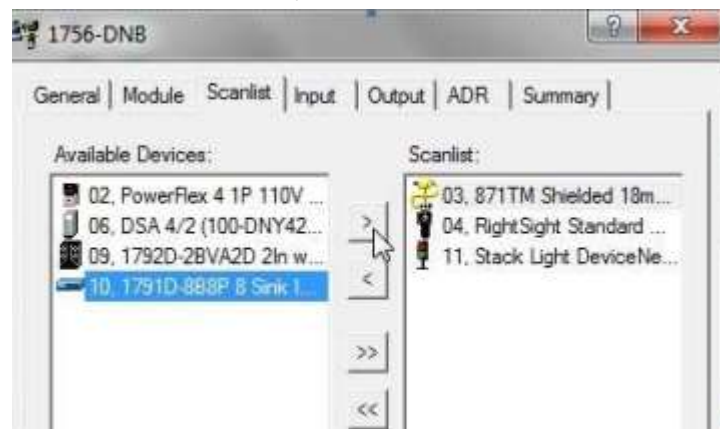


Figure 11-A

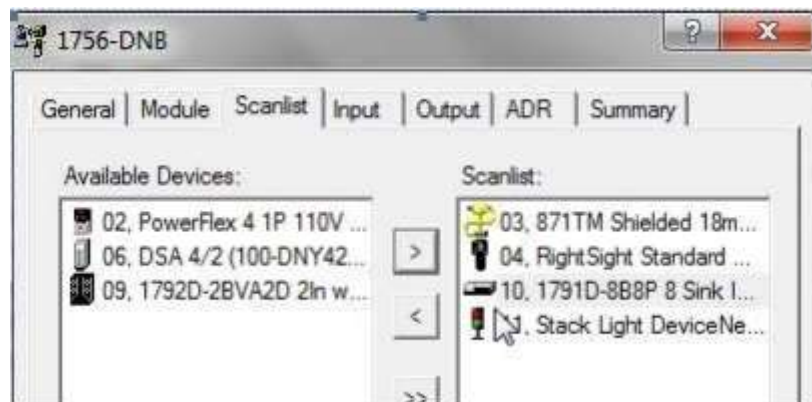


Figure 12-A

1791D- 8B8P I/O Block Moved to Scanlist box

14. Click the Input tab to view 1756-DNB Input mapping

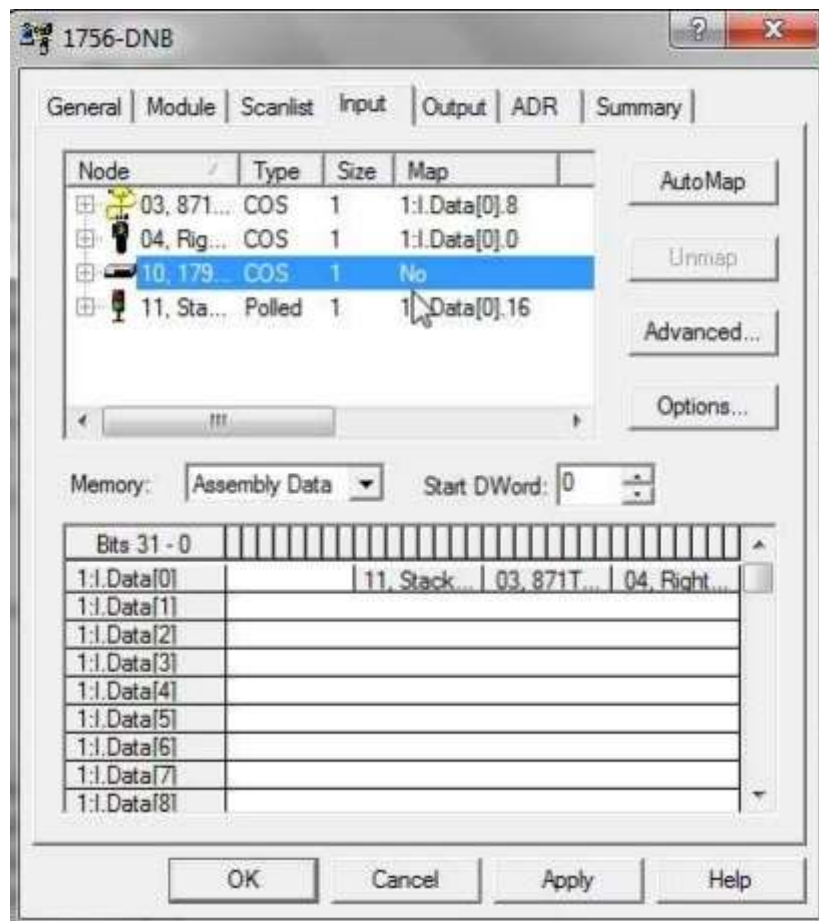


Figure 13-A  
1756-DNB Input mapping

Note: 1791D I/O Block not mapped.

Automap on Add Check Box was unchecked

15. Click the Advanced button on the Input tab window.

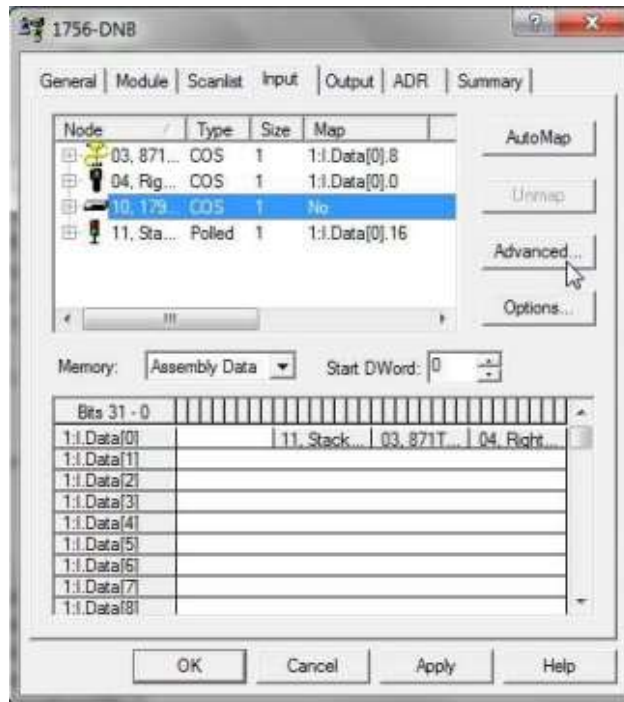


Figure 14-A

Input Tab Advanced Button

16. On the Advanced Mapping window - Select COS in Map From region – Message: Selection box

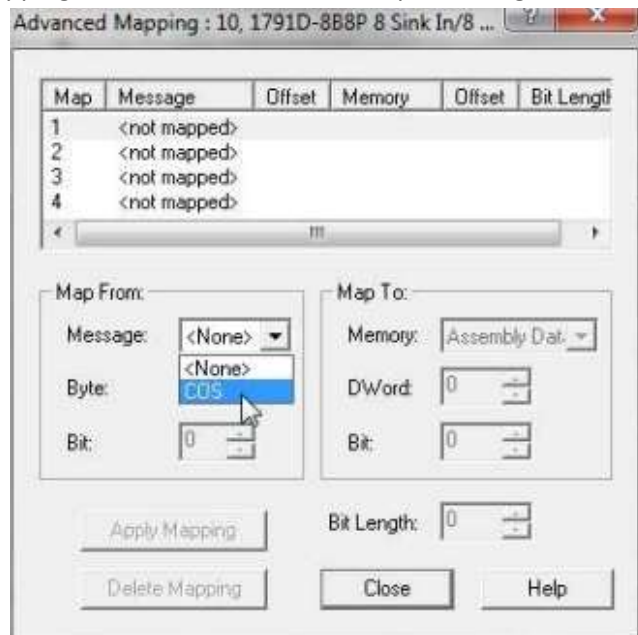


Figure 15-A

Map From: Message

17. In Map to region of the Advanced Mapping window enter the value of 7 in the DWord selection box

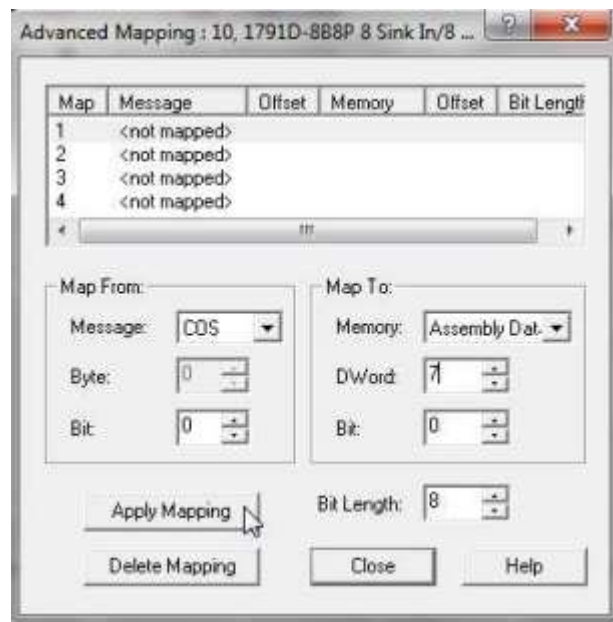


Figure 16-A  
Map To: Message Dword

Click the Apply Mapping button.

18. Upper area of the Advanced Mapping window shows the mapping information has been applied

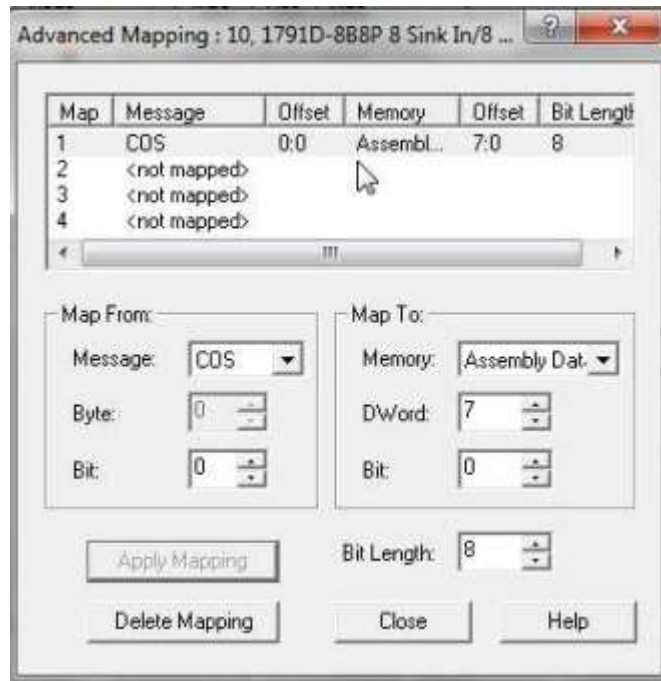


Figure 17-A  
Mapping Applied

19. Click the Close button to return to the Input tab.

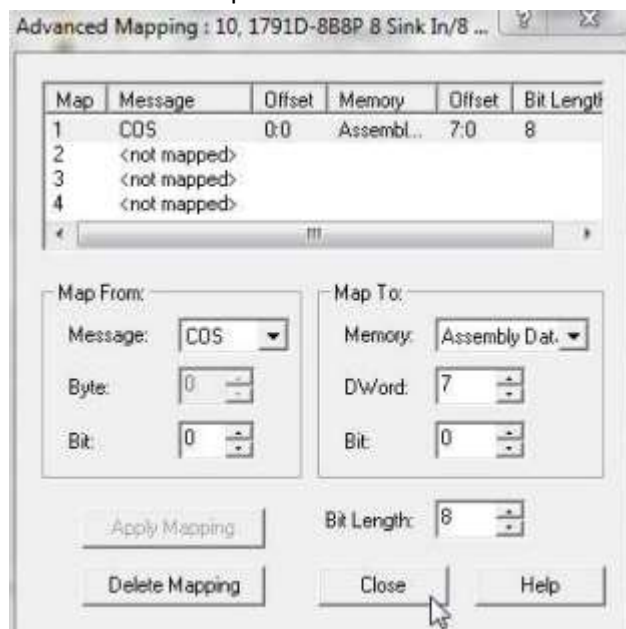


Figure 18-A  
Close Advance Mapping Window

20. The Input tab shows that the 1791D- 8B8P I/O Block is mapped to Data Element 7 I:Data[7] - first 8 bits

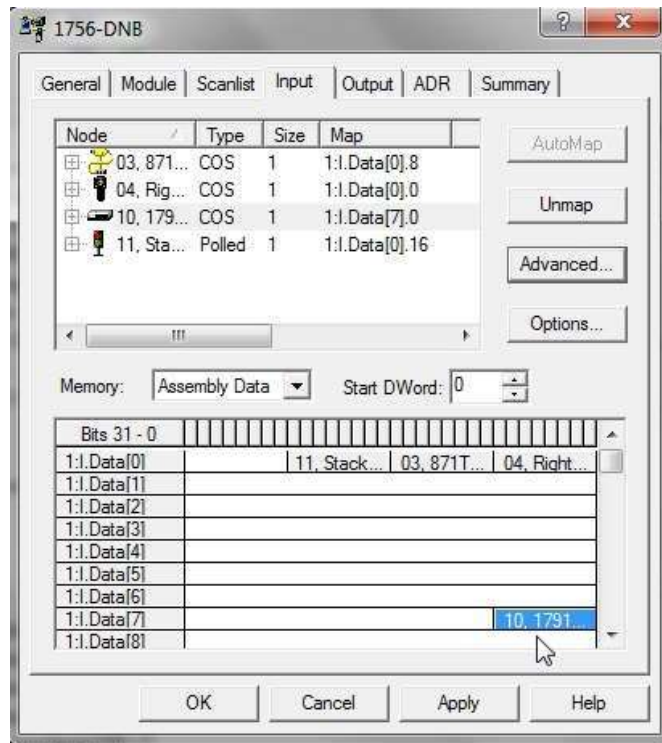


Figure 19-A  
Input Mapping Window

The Input Mapping for the 1791D- 8B8P I/O Block is completed.

21. Click the Output tab to view 1756-DNB Output mapping

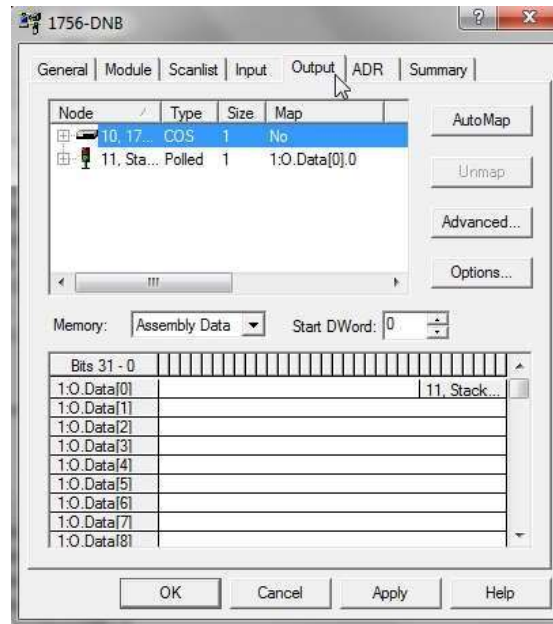


Figure 20-A 1756-DNB

Output mapping Note: 1791D I/O Block not mapped.

Automap on Add Check Box was unchecked

22. Click the Advanced button on the Output tab window.

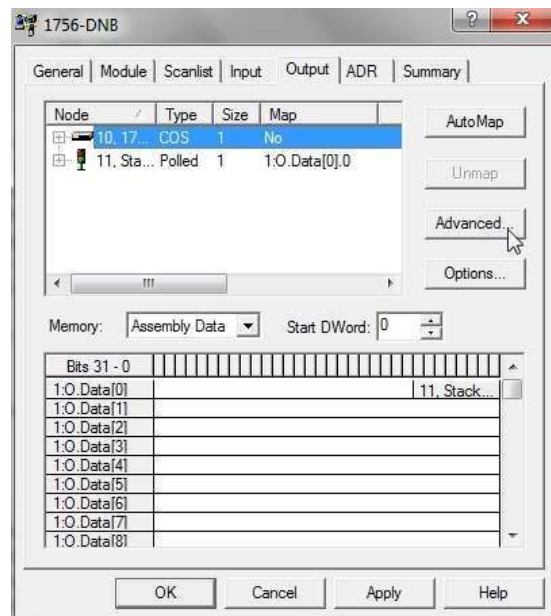


Figure 21-A

Output Tab Advanced Button

23. On the Advanced Mapping window - Select COS in Map From region – Message: Selection box

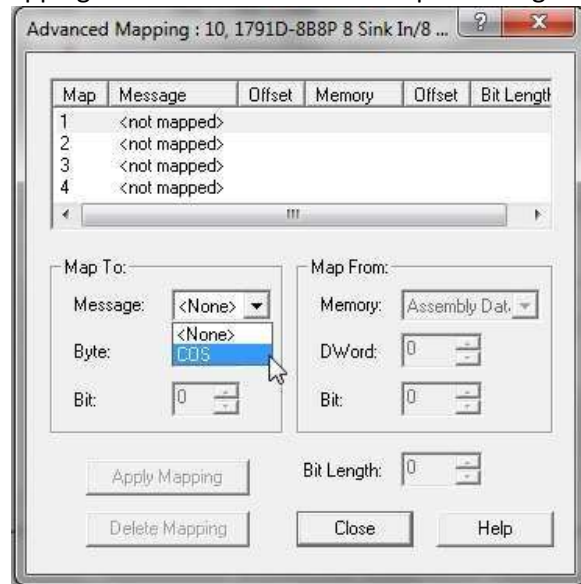


Figure 23-A

Map From: Message

24. In Map to: region of the Advanced Mapping window enter the value of 7 in the DWord selection box

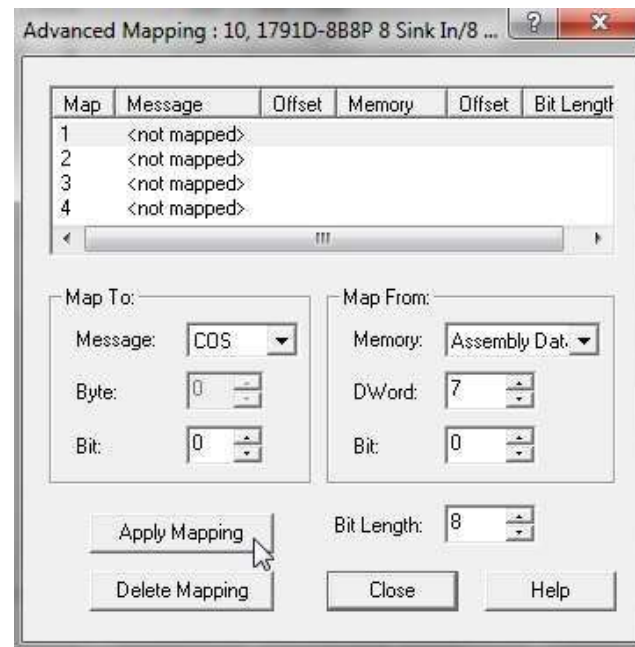


Figure 24-A

Map To: Message Dword



Note: Bit Length – 8 – all 8 bits – 1 Byte is being mapped      Click the Apply Mapping button.

25. Upper area of the Advanced Mapping window shows the mapping information has been applied

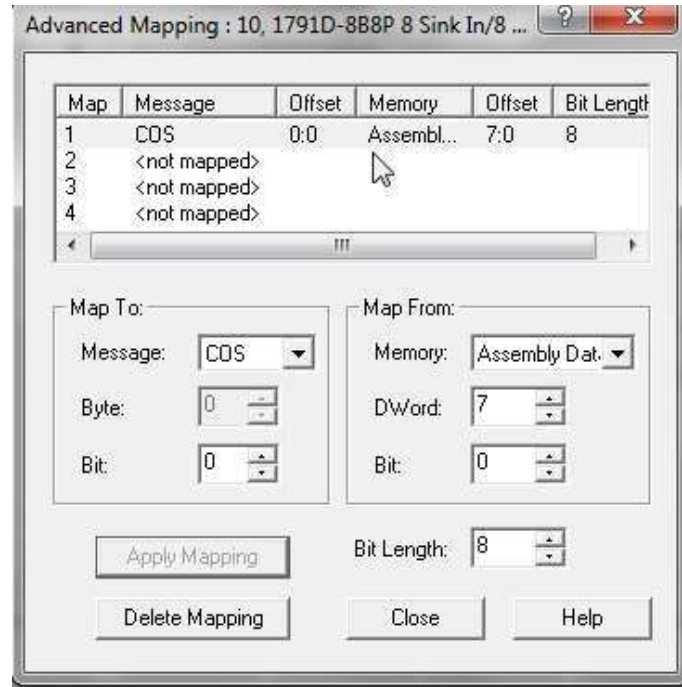


Figure 25-A  
Mapping Applied

26. Click the Close button to return to the Output tab.

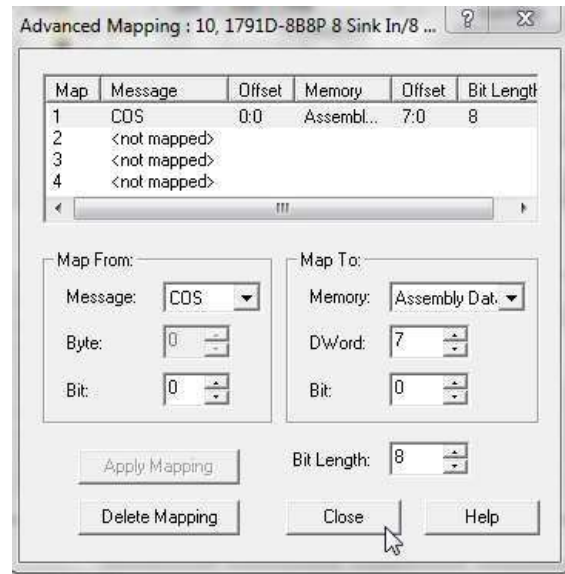


Figure 26-A  
Close Advance Mapping Window

27. The Output tab shows that the 1791D- 8B8P I/O Block is mapped to Data Element 7 O:Data[7] - first 8 bits

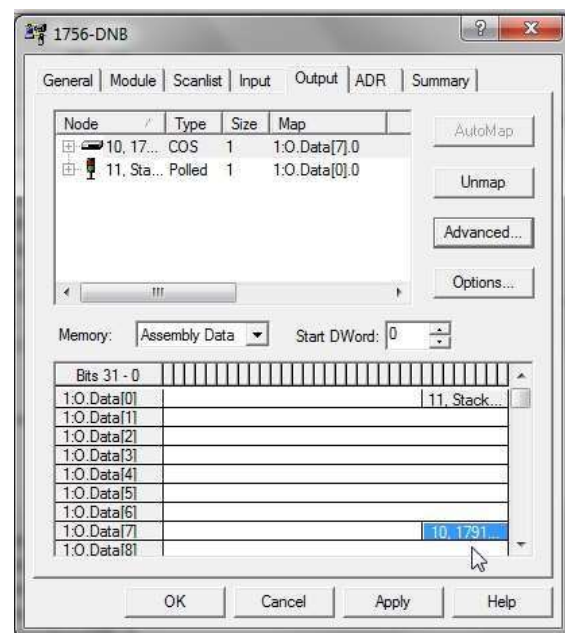


Figure 27-A  
Output Mapping Window

The Output Mapping for the 1791D- 8B8P I/O Block is completed.

28. Click the Scanlist tab to return to the 1756-DNB Scanlist window

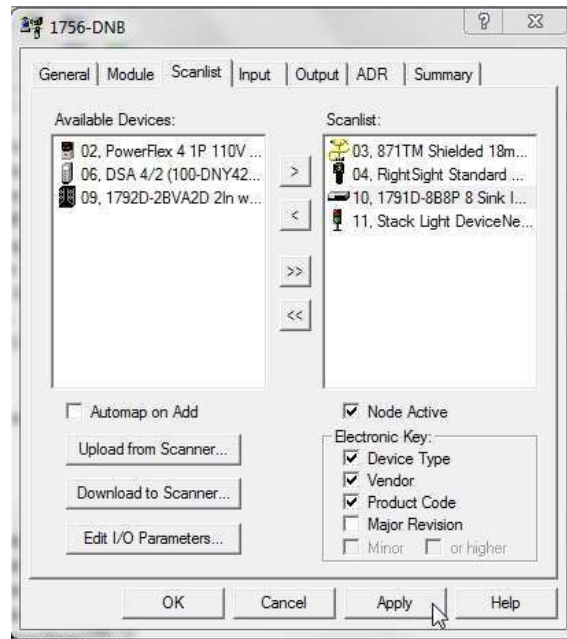


Figure 28-A  
1756-DNB Scanlist tab Window

Click the Apply button on the Scanlist window to download the mapping changes to the 1756-DNB

29. Click Yes button on the Scanner Configuration Applet window to confirm download



Figure 29-A  
Confirm Download to1756-DNB

30. If the ControlLogix processor and the 1756-DNB module are in RUN the following message window will appear.



Figure 30-A  
Run Mode Message

Place the 1756-DNB in IDLE mode or put the ControlLogix processor in PROGRAM (which puts the 1756-DNB in IDLE mode) to facilitate the download.

31. Click the Apply button on the Scanlist window to download

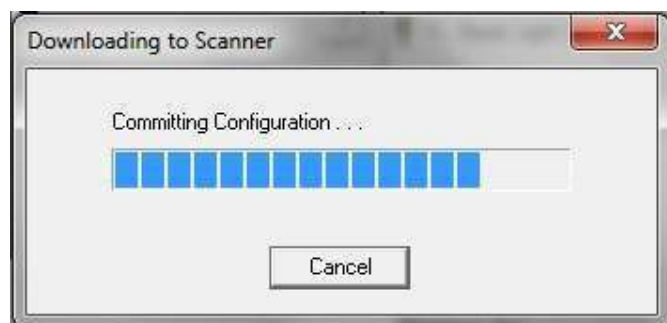


Figure 31-A  
Download Progress Bar

32. When the download completes – navigate to the ControlLogix processor with the Studio 5000 software –Online

Open the Controller Tags window from the Controller Organizer window.

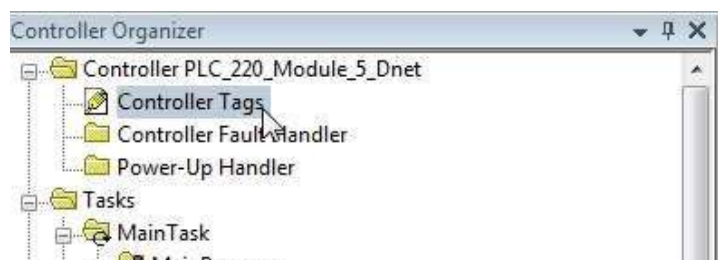


Figure 32-A

ControlLogix Processor – Controller Tags

33. Monitor the tag Local:6:I.Data[7] – Input tags for the 1791D- 8B8P I/O Block

Name	Value	Force	Mask	Style	Data Type
+ Local:5:I	{...}	{...}			AB:1756_OF4_Flo...
+ Local:5:O	{...}	{...}			AB:1756_OF4_Flo...
- Local:6:I	{...}	{...}			AB:1756_DNB_5...
+ Local:6:I.StatusRegister	{...}	{...}			AB:1756_DNB_St...
- Local:6:I.Data	{...}	{...}		Decimal	DINT[124]
+ Local:6:I.Data[0]	0			Decimal	DINT
+ Local:6:I.Data[1]	0			Decimal	DINT
+ Local:6:I.Data[2]	0			Decimal	DINT
+ Local:6:I.Data[3]	0			Decimal	DINT
+ Local:6:I.Data[4]	0			Decimal	DINT
+ Local:6:I.Data[5]	0			Decimal	DINT
+ Local:6:I.Data[6]	0			Decimal	DINT
+ Local:6:I.Data[7]	48			Decimal	DINT

Figure 33-A

1791D- 8B8P I/O Block Input Tag Location

34. Toggle SS4 and / or SS5 Switches and or actuate PB0 thru PB3. The value of the Local:6:I.Data[7] will change.

Click the + sign to the left of Local:6:I.Data[7] to see bits values

Scope: PLC_220_Modul		Show: All Tags	
Name	Value	For	
- Local:6:I.Data[7]	48		
- Local:6:I.Data[7].0	0		
- Local:6:I.Data[7].1	0		
- Local:6:I.Data[7].2	0		
- Local:6:I.Data[7].3	0		
- Local:6:I.Data[7].4	1		
- Local:6:I.Data[7].5	1		
- Local:6:I.Data[7].6	0		
- Local:6:I.Data[7].7	0		
- Local:6:I.Data[7].8	0		

Figure 34-A - 1791D- 8B8P I/O Block Input Bits

35. Monitor the tag Local:6:O.Data[7] – Output tags for the 1791D- 8B8P I/O Block

Scope: PLC\_200\_Modul Show: All Tags Enter Name Filter...

Name	Value	Force Mask	Style	Data Type
Local:6:O.Data	{ ... }	{ ... }	Decimal	DINT[123]
+ Local:6:O.Data[0]	0		Decimal	DINT
+ Local:6:O.Data[1]	0		Decimal	DINT
+ Local:6:O.Data[2]	0		Decimal	DINT
+ Local:6:O.Data[3]	0		Decimal	DINT
+ Local:6:O.Data[4]	0		Decimal	DINT
+ Local:6:O.Data[5]	0		Decimal	DINT
+ Local:6:O.Data[6]	0		Decimal	DINT
+ Local:6:O.Data[7]	0		Decimal	DINT
+ Local:6:O.Data[8]	0		Decimal	DINT

Figure 35-A

1791D- 8B8P I/O Block Output Tag Location

36. Click the + sign to the left of Local:6:O.Data[7] to view Output bits  
Ensure the 1756-DNB Module is in RUN Mode

Scope: PLC\_220\_Modul Show: All Tags

Name	Value	Force Mask
- Local:6:O.Data[7]	0	
Local:6:O.Data[7].0	0	
Local:6:O.Data[7].1	0	
Local:6:O.Data[7].2	0	
Local:6:O.Data[7].3	0	
Local:6:O.Data[7].4	0	
Local:6:O.Data[7].5	0	
Local:6:O.Data[7].6	0	
Local:6:O.Data[7].7	0	

Figure 36-A

1791D- 8B8P I/O Block Output Tag – Bit Locations

Type 1s into the value column for 1791D- 8B8P I/O Block output bits

View PL0 thru PL7 on DeviceNet Demo Board

A 1 in the bit value columns turns ON the 1791D- 8B8P I/O Block outputs

Example: 1 in the tag Local:6:O.Data[7].0 will turn PL0 on the DeviceNet Demo Board

37. Add rungs 4 and 5 to the Ladder Logic File in the ControlLogix processor
- Rung 4 – SS5 on ControlLogix Demo Board turns ON PL0 on the DeviceNet Demo Board
- Rung 5 – SS5 on DeviceNet Demo Board turns ON PL0 on the ControlLogix Demo Board

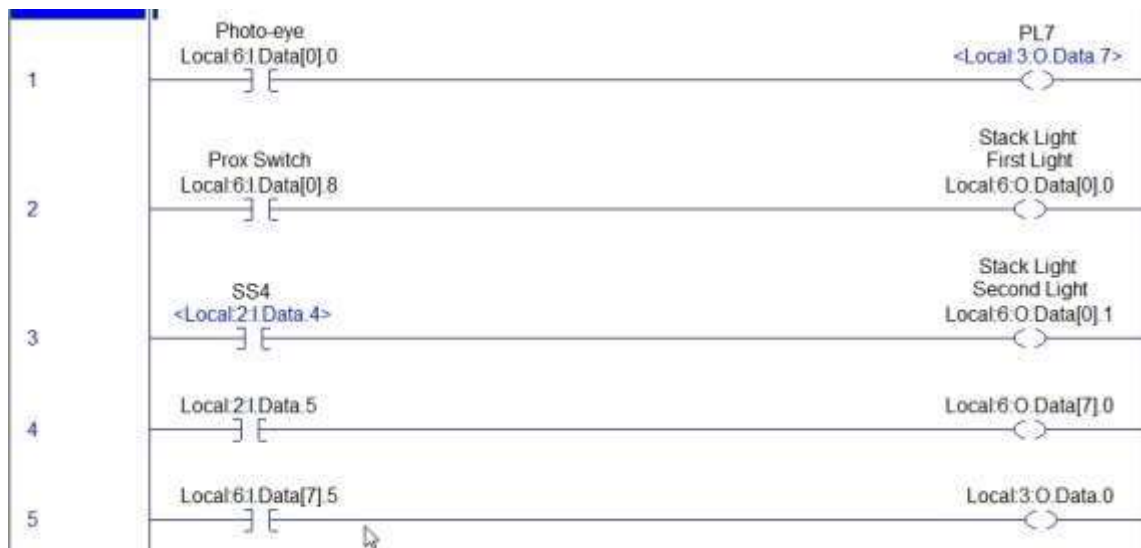


Figure 37-A  
Ladder File with 1791D- 8B8P I/O Block Programmed

Verify Ladder Logic operation.

38. Save modified Ladder Logic File as PLC\_220\_Module\_5\_IO\_Block.ACD

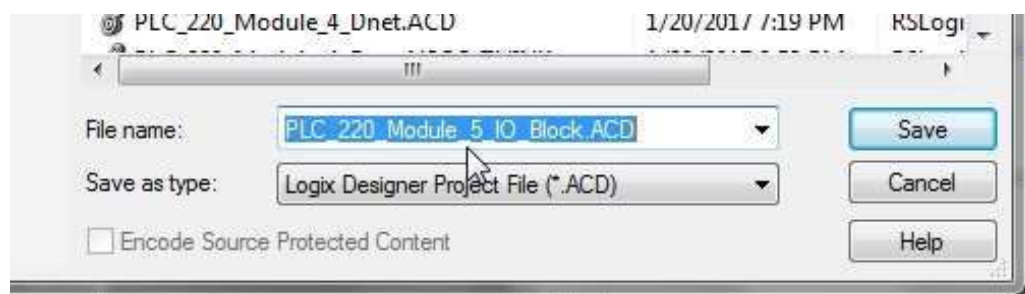


Figure 38-A  
Save Ladder Logic File

Return to RSNetWorx for DeviceNet software

The Network Configuration File has been modified to include the 1791D- 8B8P I/O Block in the Scanlist

39. Save modified DeviceNet Configuration File as PLC\_220\_Module\_5\_IO\_Block.dnt

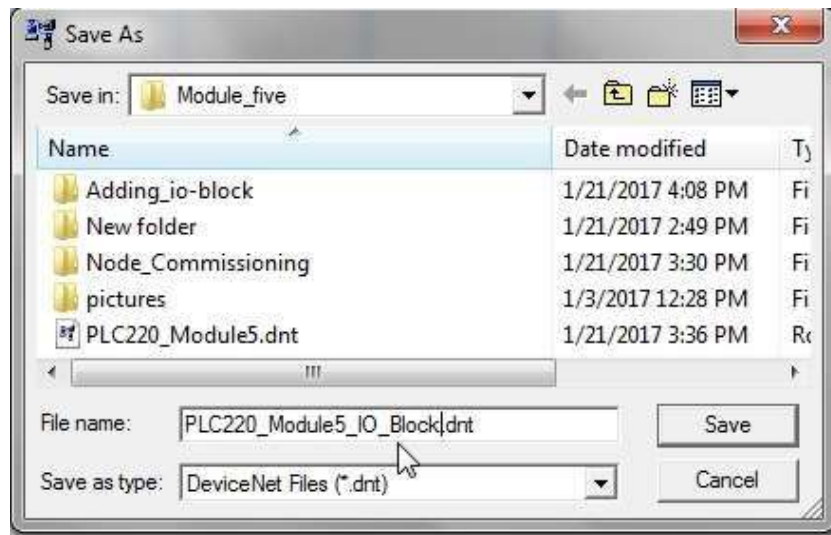


Figure 39-A  
Save DeviceNet Configuration File

#### Review Questions

1. T or F 1756-DNB module must be mapped in successive Elements.
2. Which software is used to monitor data values of DeviceNet component tags.
  - a) RSLogix 5000
  - b) Studio 5000
  - c) RSLinx
  - d) RSNetWorx
3. What mode of a DeviceNet Scanner is similar to a PLC in PROGRAM mode.
  - a) Bus OFF
  - b) NoTX.
  - c) IDLE
  - d) NoRX



4. T or F One Byte is equal 16 bits.
5. Input Mapping for a 1791D- 8B8P I/O Block is
  - a) 1 Bit
  - b) 1 Word
  - c) 1 DINT Element
  - d) 2 INT Elements
  - e) 1 Byte
6. T or F Devicenet components always have the same size of Input and Output mapping.

*The outcomes of this exercise (listed on page 1) specifies the skills that the Student must demonstrate to the Instructor. Once the Instructor is satisfied with the demonstration of Knowledge & Skills by the individual student, they will sign this document (for the student), then enter a 100% into the Hands-On Lab grade in Sakai.*

I verify that this student has completed all of the requirements of this Hands-On Assessment:

Student Name: \_\_\_\_\_

Faculty Signature: \_\_\_\_\_ Date: \_\_\_\_\_

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