
DEVICENET SEMINAR LAB EXERCISES

What's in This Lab

Use these DeviceNet Seminar lab exercises to familiarize yourself with the DeviceNet network.

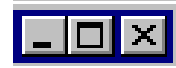


ATTENTION: Do not skip ahead! There is no race to finish the lab. No prizes will be awarded for the first people to finish. Please take your time and learn as much as you can.

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Windows Conventions Used in This Manual

This instruction manual assumes you are familiar with Windows™ conventions including minimizing, maximizing, and closing windows using the button bar at the top right corner of the window.



- Use the button with the horizontal bar to minimize the window but not close it.
- Use the button with the square to maximize the window.
- Use the button with the X to close the window.

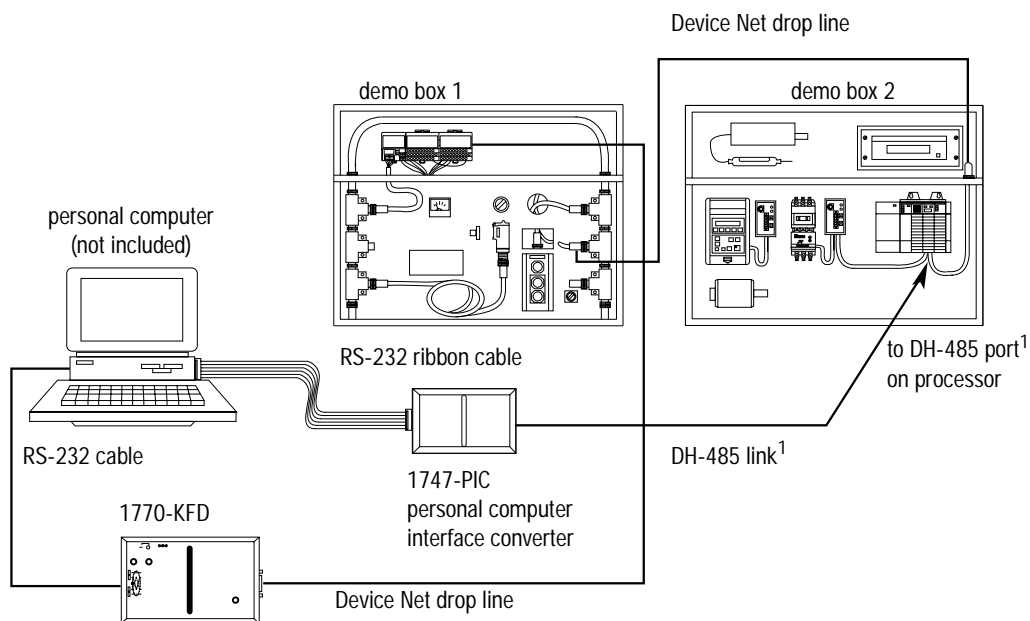
Getting Acquainted with the Lab

We'll go over the following DeviceNet™ features in the lab.

- Hardware overview
- Offline project building and device configuration
- Online project building and device configuration
- Online fault diagnostics and parameter monitoring
- Network Who and Mini Who
- Node commissioning
- SLC processor data monitoring

What's in the Demo Boxes

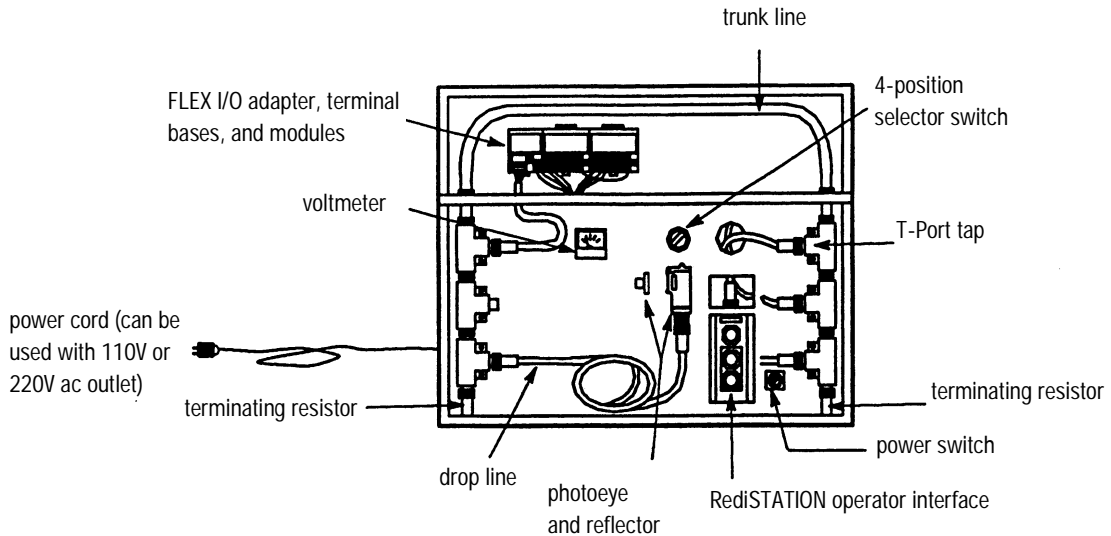
The following diagram illustrates what's in the demo boxes.



30205-M

¹ If you use an SLC 5/04 processor, a Data Highway Plus™ link is required.
Note: Demo is supplied with an SLC 5/03 processor.

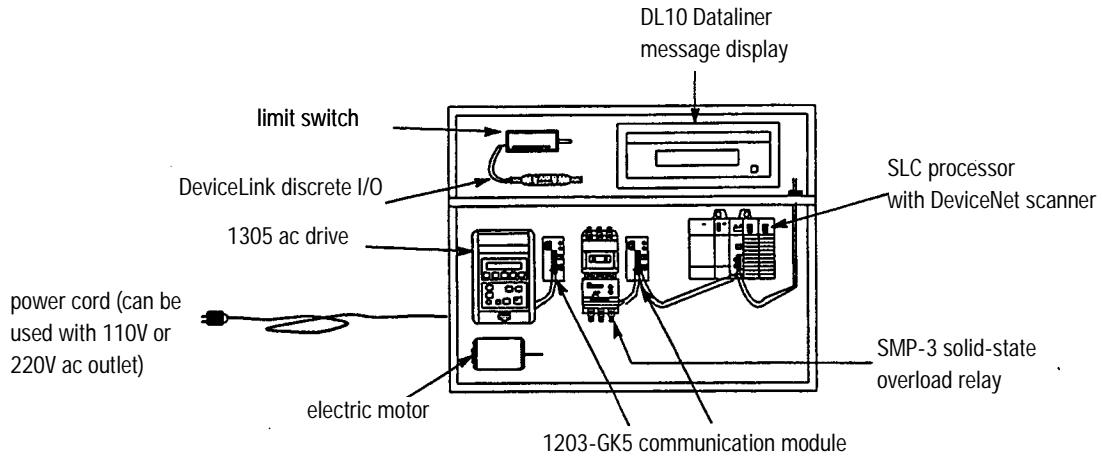
Demo Box 1 Description



Demo Box 1 includes the following components.

Component (clockwise on drawing)	Catalog number
Trunk line with female field-installable connector with male field-installable connector	1485R-P1M5-C 1485-P1T5-N5 1485-P1T5-M5
4-position selector switch	800T-N2KF4B
T-Port taps (right keyed)	1485P1N5-MN5R1
Terminating resistor (male)	1485-T1M5
Power switch	800A-H2BW
RediSTATION operator interface	2705-T3DN1A42A
Series 9000 photoeye retroreflective	42GNP-9000-QD1
1" reflector	880-N1
Drop line	1485R-P1N5-M5
Terminating resistor (female)	1485-AT1N5
Power cord	
Sola SLS-24-024 24V regulated power supply	
0-10V dc voltmeter (type 1212 1.5")	
FLEX I/O DeviceNet Adapter	1794-ADN
FLEX I/O Terminal Bases	1794-TB2
FLEX I/O Digital Input Module	1794-IB16
FLEX I/O Analog Output Module	1794-OE4

Demo Box 2 Description



Demo Box 2 includes the following components.

Component (clockwise on drawing)	Catalog number
DL10 Dataliner message display	2706-A11J
SLC processor with DeviceNet scanner	1747-SDN (scanner)
Communication module for power products	1203-GK5 (2 required)
SMP-3 solid-state overload relay	Bulletin 193
Parvalux electric motor	
Power cord	
1305 ac drive	1305
DeviceLink discrete I/O	1485D-A3C3-C
Oiltight limit switch	802T-WSP

Describing the Hardware

Here are the descriptions and the node numbers of the devices contained in the demo boxes.



- An I/O chassis with an SLC™ 500 processor and a 1747-SDN scanner
Scanner node number = 00

The scanner is the DeviceNet master coordinating all control data to and from all devices on the DeviceNet network. This DeviceNet data is transferred to and from the SLC 500 processor via M1/MO and discrete I/O transfers. This data is then used in the SLC 500 ladder program to do the actual control logic.



- A 1794-ADN FLEX I/O™ adapter connected to an analog output module and a discrete input module.
Adapter node number = 02

Analog output channel 0 is connected to a volt meter to easily display the voltage output. Also a 4-position selector switch is connected to bits 0-3 of the 1794-IB16 discrete input module.



- An SMP-3™ solid-state overload relay connected to the DeviceNet network via a 1203-GK5 communication module.
SMP-3 solid state overload relay node number = 03

The SMP-3 solid-state overload relay provides solid-state motor overcurrent protection in addition to ground fault protection, jam/stall protection, and protection against damage caused by phase loss conditions.



- A 1305 ac drive connected to the DeviceNet network via a 1203-GK5 communication module.
1305 ac drive node number = 04

The 1305 ac drive provides drive status and diagnostic data at the local panel using the part of the drive known as the Human Interface module or at a supervisory control station over DeviceNet5/03.



- A Series 9000 PHOTOSWITCH™ photoeye.
Photoeye node number = 07

The Series 9000 photoeye is designed to withstand harsh environments. The sensor for this lab is retroreflective.



- A DeviceLink™ discrete I/O connected to a limit switch.
DeviceLink discrete I/O node number = 10

The DeviceLink discrete I/O connects single non-DeviceNet dc source devices to the DeviceNet network.



- A 2705T RediSTATION™ operator interface.
2705T RediSTATION operator interface node number = 15

The RediSTATION operator interface is a pushbutton station that has a start button, a stop button, and a red pilot light.



- 1787-MGR DeviceNetManager™ software, version 3.001 connected to the DeviceNet network via a 1770-KFD interface module.
Software node number = 62

DeviceNet Manager software configures software parameters of DeviceNet devices from multiple vendors and performs network diagnostics and troubleshooting.

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Starting the Software

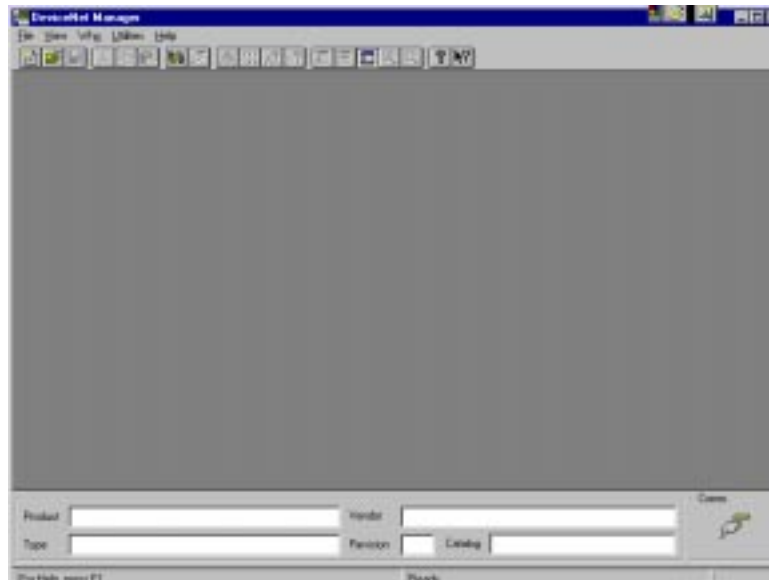
Follow these directions to start the DeviceNet Manager software.

1. Double-click the DeviceNet Manager 3.001 icon that you placed on your desktop when you installed the software.



Note: If you did not place the icon on your desktop when you installed the software, you can access DeviceNet Manager 3.001 from Windows Explorer in the directory c:\DNETMGR, file name Dnetmgr3.exe.

You see this screen.

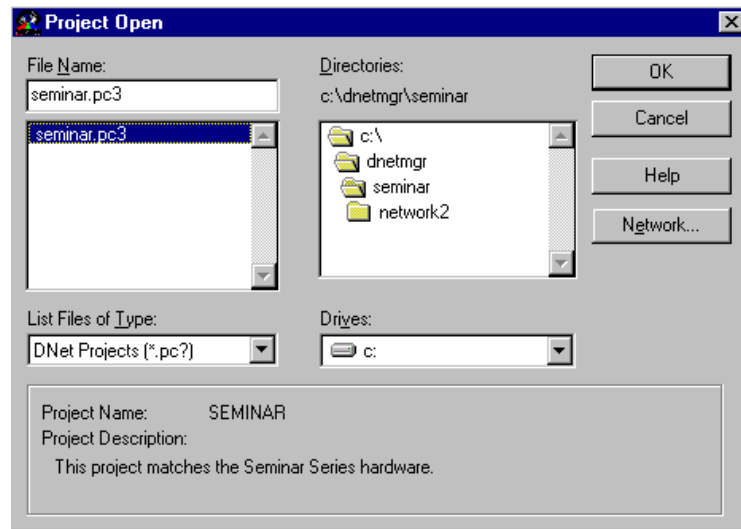


2. From the *File* menu, choose **Open Project...**



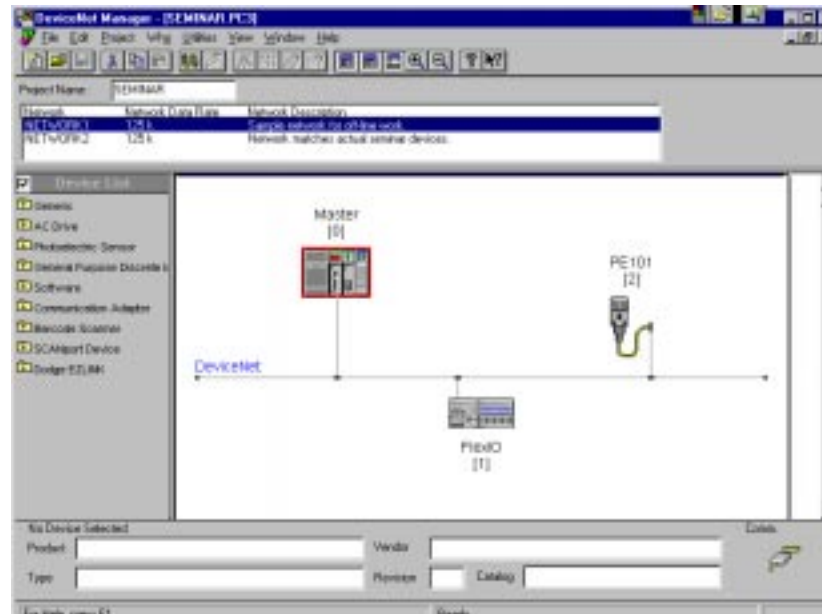
3. Double-click **seminar** in the Directories box.

You see this screen.



4. Choose

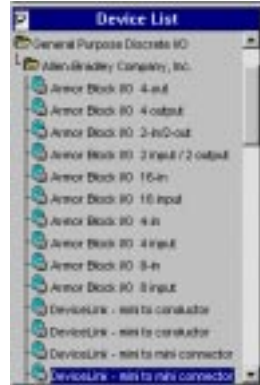
You see the main project screen.



Adding Devices Offline

Follow these directions to add devices to your project offline.

1. In the Device List, double-click **General Purpose Discrete I/O**.
2. Double-click **Allen Bradley Company, Inc.**



▶ **Tip:** You can resize a window by grabbing the frame edge with the pointer (the pointer turns to a double arrow) and dragging the bar to the right or left.

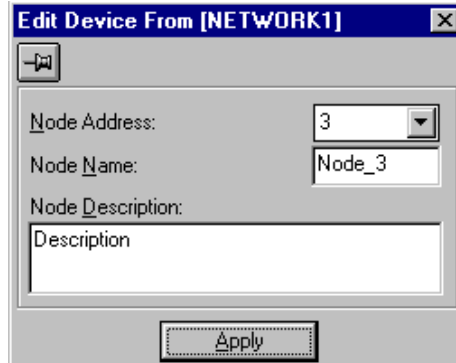
3. Using the up- and down-arrow keys, scroll down to the *second* DeviceLink - mini to mini connector (Revision 2.1). Observe the dialog box at the bottom of the screen as you scroll through the list to see the revision number.



4. While holding down the left mouse button (with the device highlighted), drag the device name from the list to the DeviceNet network in the right frame. Drop the device anywhere in this frame.

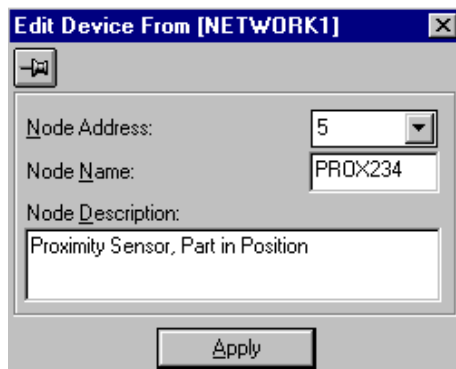
Note: The DeviceNet Manager 3.001 software provides a graphical interface to build your network. Electronic Data Sheet (EDS) files are contained in the software. EDS files allow different devices to be added to a project offline. These same EDS files also allow devices to be configured both online or offline. EDS files can be quickly and easily installed into the DeviceNet Manager software for any devices, regardless of vendor, that will be connected to your DeviceNet network.

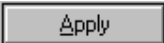
You see this screen.



We will now edit the DeviceLink we just placed.

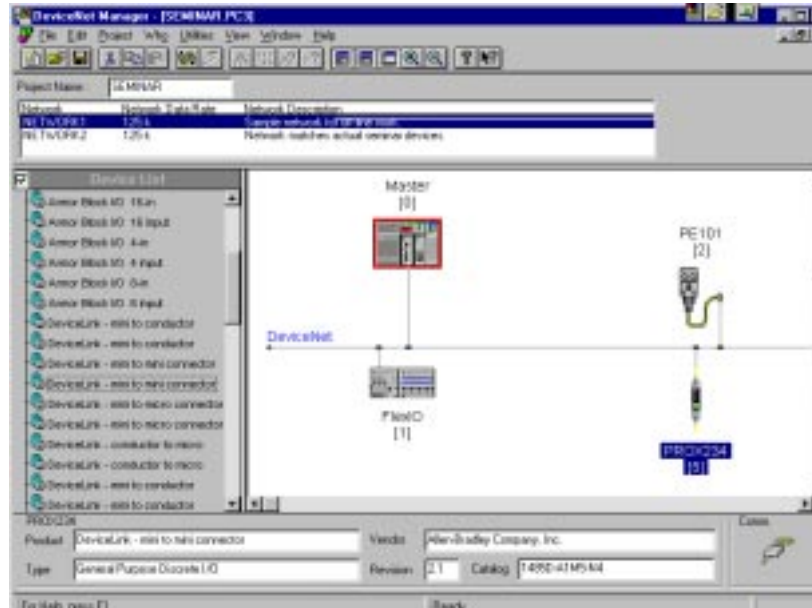
5. Make the following changes in the *Edit Device From* dialog box.
 - A. Scroll down in the Node Address box and choose **5**.
 - B. Type in **PROX234** for the Node Name.
 - C. Type **Proximity Sensor, Part in Position** for the Node Description.



6. Choose  for the changes to take effect.

You return to the main project screen.

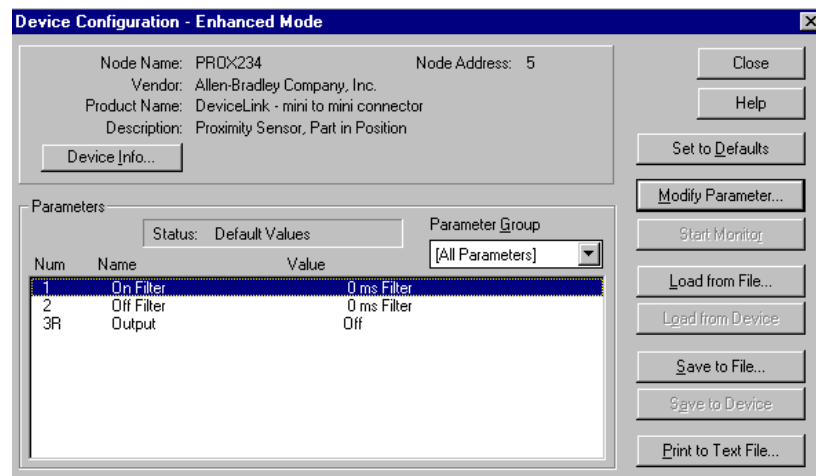
Note that PROX234 is now added to the graphical DeviceNet network.



Configuring The DeviceLink Discrete I/O

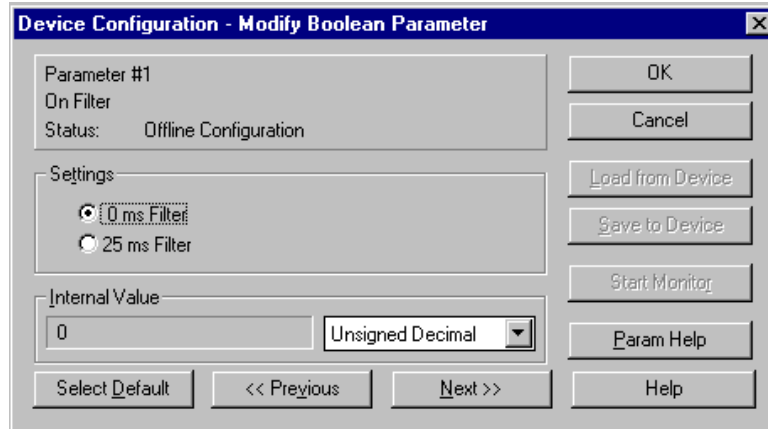
Follow these directions to configure the DeviceLink discrete I/O.

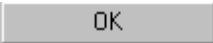
1. Double-click **PROX234** (node 5) on the DeviceNet network.
You see this screen.



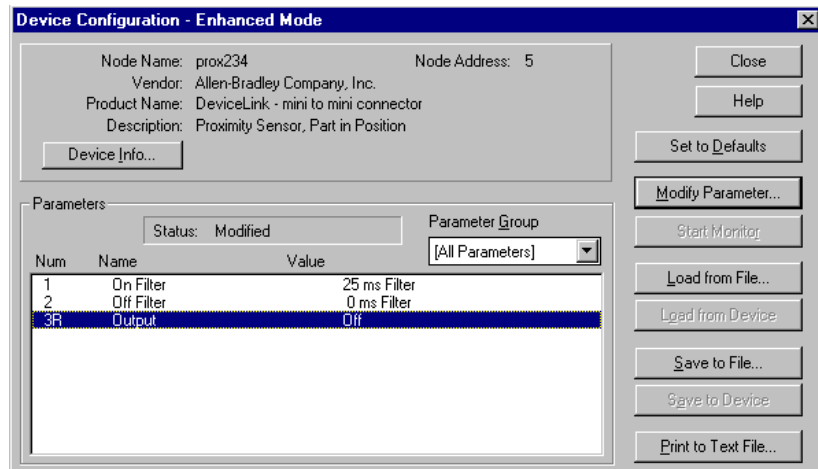
2. Double-click **On Filter**.

You see this screen.



3. Click the radio button (circle) next to **25 ms Filter**.
4. Choose 
5. Click Parameter 3R.

You see this screen.



The configuration is changed in the software but has not been saved to a file or to the DeviceLink discrete I/O itself.

6. Choose 

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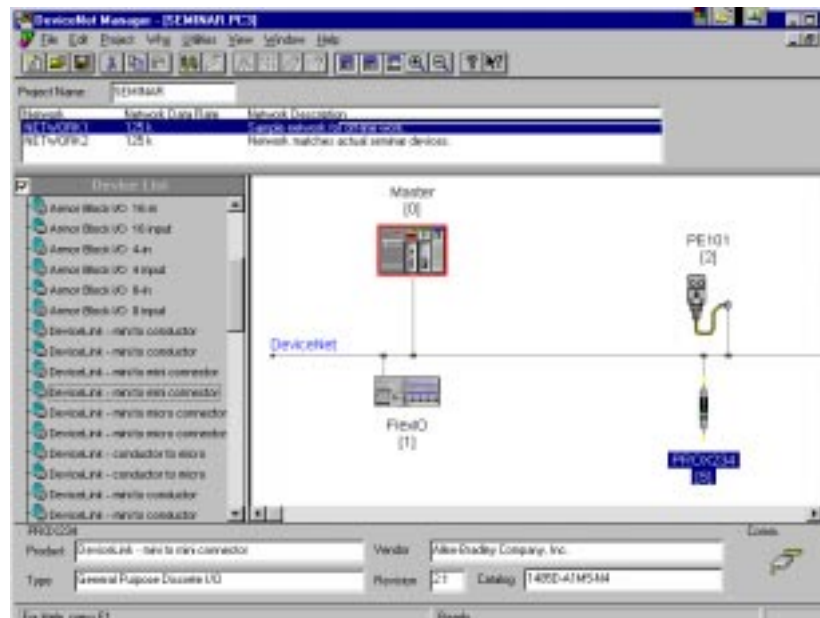
You see this screen.



Note: We will NOT be saving this new configuration now! In offline mode, the configuration can be stored to a file inside the personal computer running the software for future recall.

7. Choose

You return to the main project screen.



Configuring the FLEX I/O Module

Follow these directions to configure the FLEX I/O module.

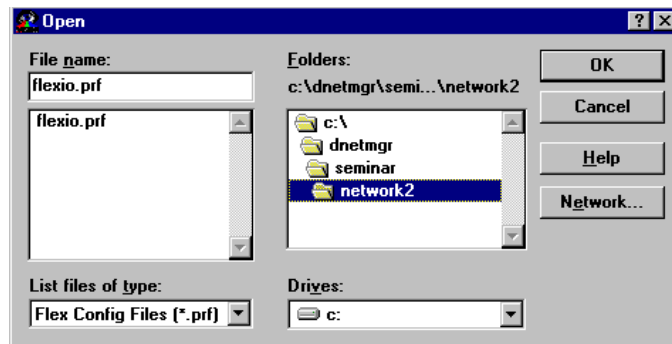
1. Double-click FLEX I/O (node 1) on the DeviceNet network.
You see this screen.

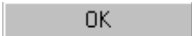


The FLEX I/O configuration screen is a custom application used to configure the various modules within the FLEX I/O rack.

2. Choose 

You see this screen.



3. Double-click the **seminar** directory.
4. Then double-click the **network2** directory.
5. Click once on **flexio.prf** to highlight it.
6. Choose 

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You see this screen.



This file has a previously stored configuration. Four modules displayed by name are in the module configuration field.

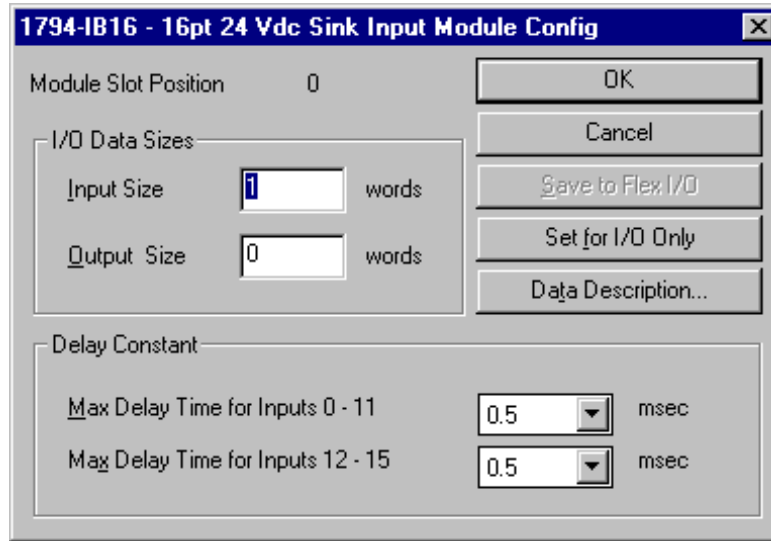
7. To display the module type by Allen-Bradley catalog number, click the radio button next to **Catalog No.**

You see this screen.



8. To custom configure the 16-point discrete input module in slot 0 (1794-IB16), choose

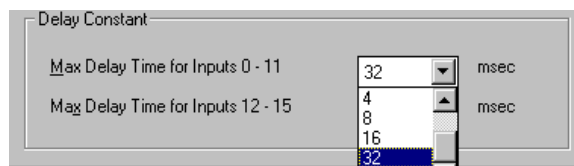
You see this screen.



This screen allows you to enter the amount of input and output used by the 1794-IB16 along with other module-specific configurations.

Delay constants can be chosen for each of two subgroups of the inputs (0-11 and 12-15).

9. Click once on the arrow next to the msec box for inputs 0-11 to highlight your choices.



10. Choose **32 msec**.

11. Choose 

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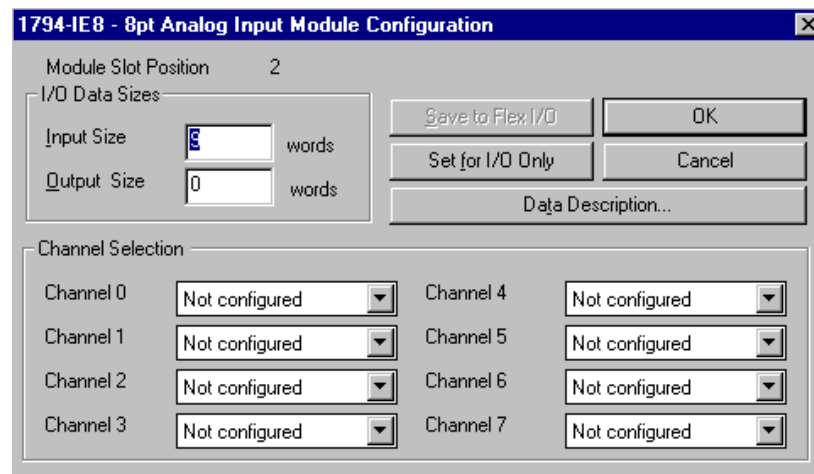
You return to this screen.



12. To custom configure the 8-channel analog input module in slot 2

(1794-IE8), choose

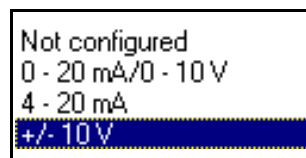
You see this screen.



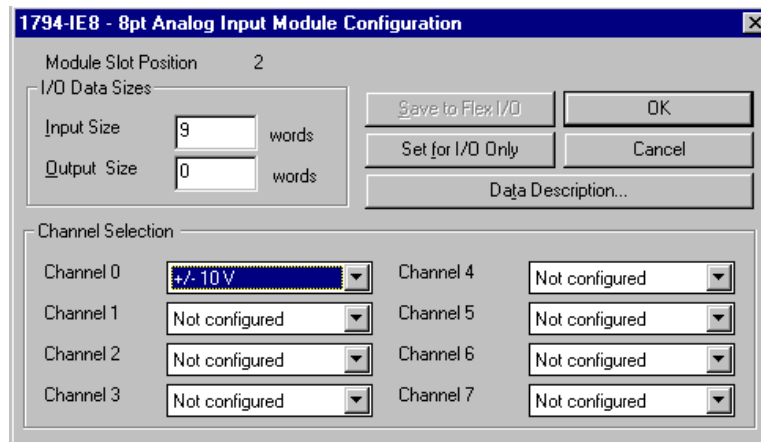
You can choose the analog mode configuration for each of the 8 channels on the module.

13. Click the arrow next to Channel 0.

You see these choices.



14. Click once on +/- 10 V.



15. To exit the 1794-IE8 Configuration screen, choose

OK

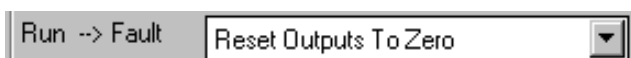
You see this screen.



The I/O configuration box determines what will happen to the analog and discrete outputs in the FLEX I/O rack when there is a fault or idle condition on the DeviceNet network.

An example of idle condition is when the PLC processor is placed in program mode. An example of fault condition is a broken communication line.

16. In the I/O Configuration box, click once on the arrow next to




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17. Click once on **Hold Outputs in Last State** to select it.

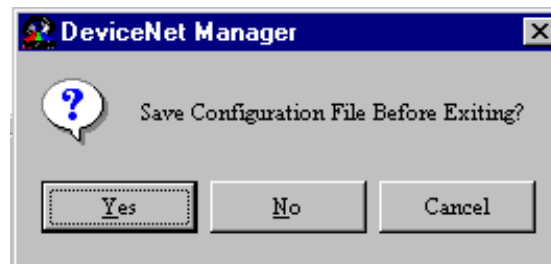


The 1794-ADN will now default to Hold Outputs in Last State if a fault is detected while the 1794-ADN is in Run mode.

Note: We will NOT be saving this new configuration now! In future uses, once all modules are configured, the configuration needs to be saved. You would choose Yes to save the configuration to a file within this project. When online, the configuration can be both read and saved directly to the 1794-ADN adapter using the Load from Device, Apply Configuration and Save to Device buttons.

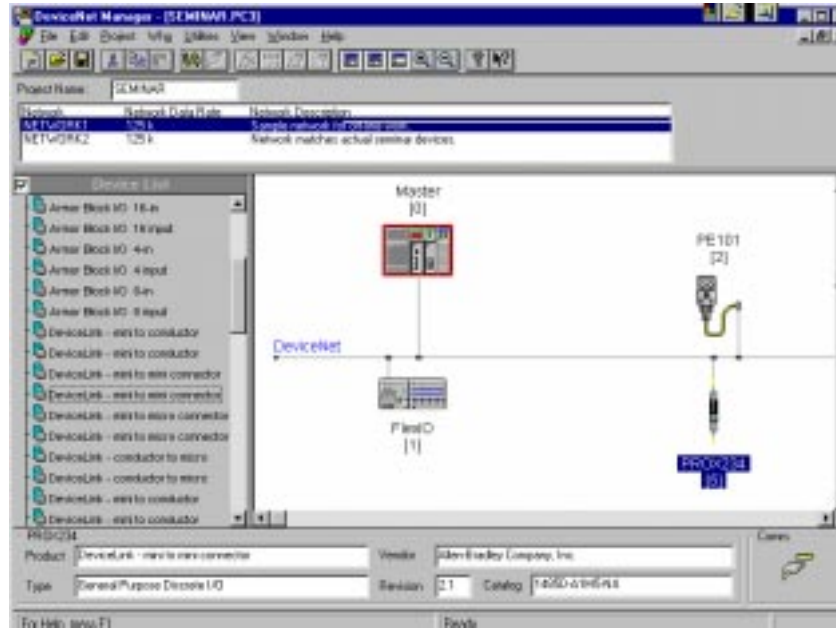
18. Choose  to exit the FLEX I/O configuration screen.

You see this screen.



19. Choose .

You return to the main project screen.

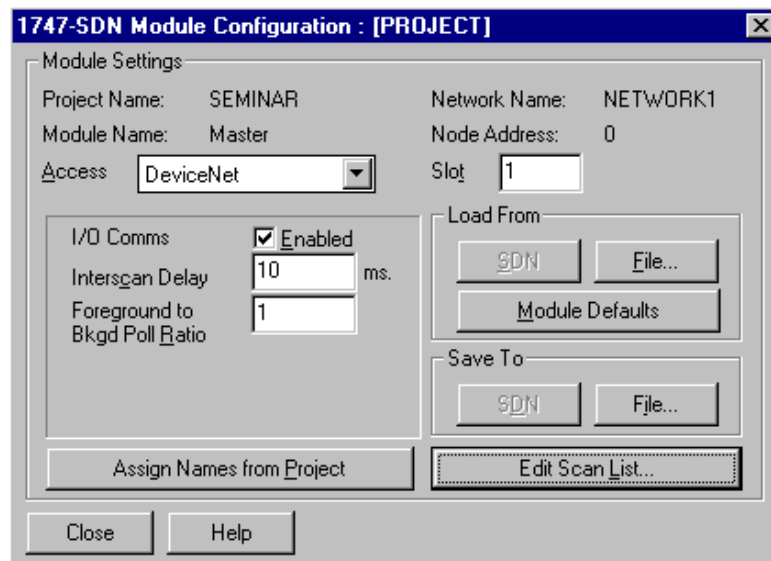


Configuring the Scanner

Follow these directions to configure the 1747-SDN scanner.

1. Double-click the Master (node 0) on the DeviceNet network.

You see this screen.

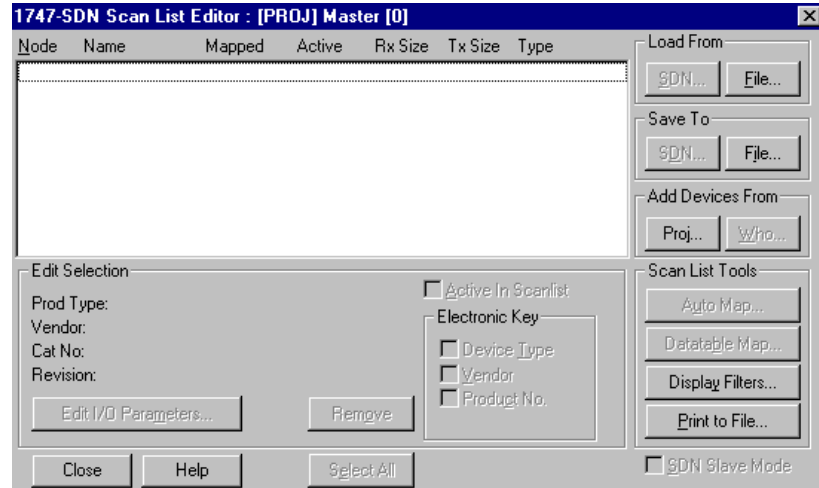


This screen allows you to configure the 1747-SDN scanner's operating parameters along with entering the scan list of what devices will be scanned on the network.

Notice that the project name is SEMINAR and the network name is NETWORK1.

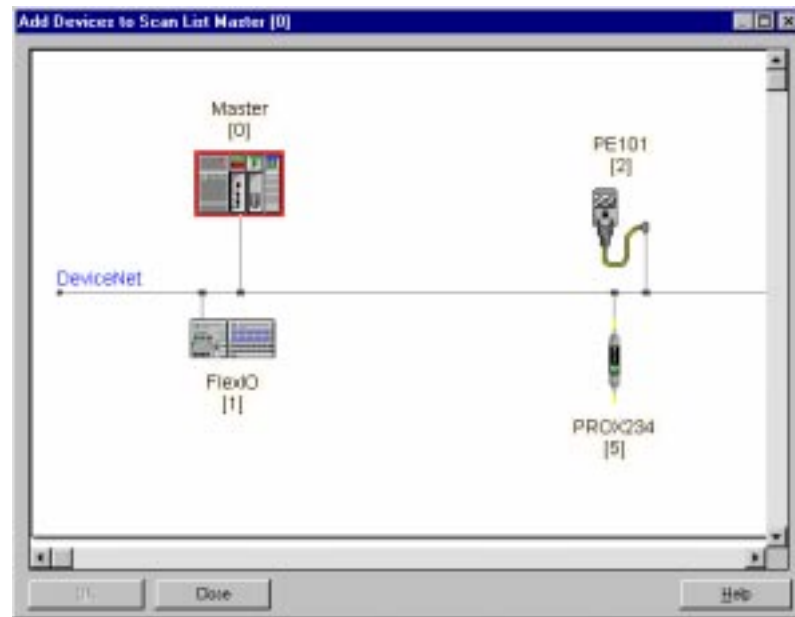
2. Choose 

You see this screen.



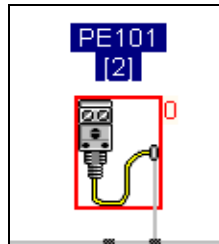
3. Choose 

You see the main project screen.



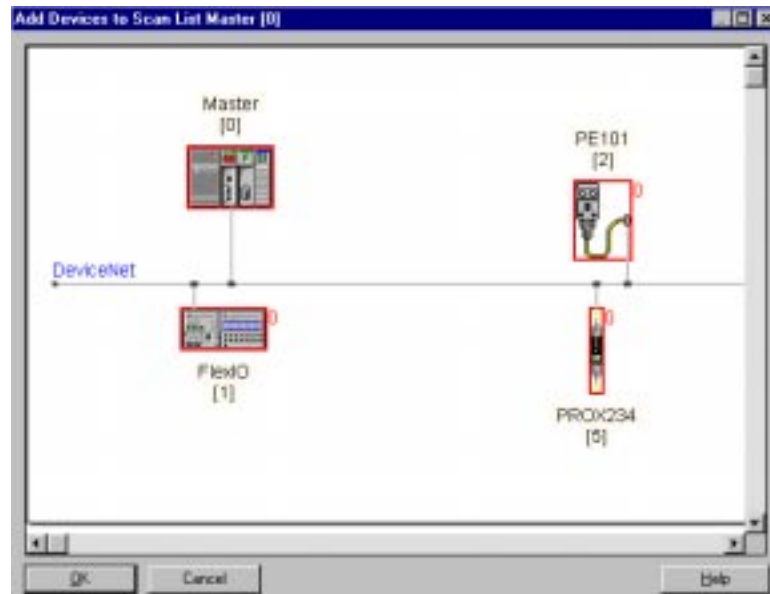
We will now build the scan list by dragging and dropping devices onto the Master device (node 0).

- Click PE101 (node 2) once to highlight it. While holding down the left mouse button, drag PE101 over to the master and drop it. Notice that PE101 now has a red square around it with a "0" next to the red square.



- Repeat this step to add the other two devices on the DeviceNet network to the Master.

When all devices are added to the Master you see this screen.

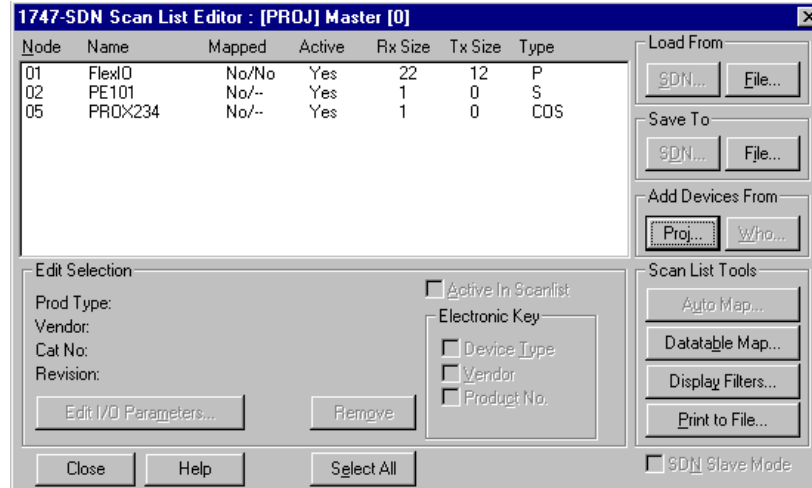


- Choose



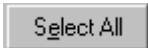

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You see this screen.

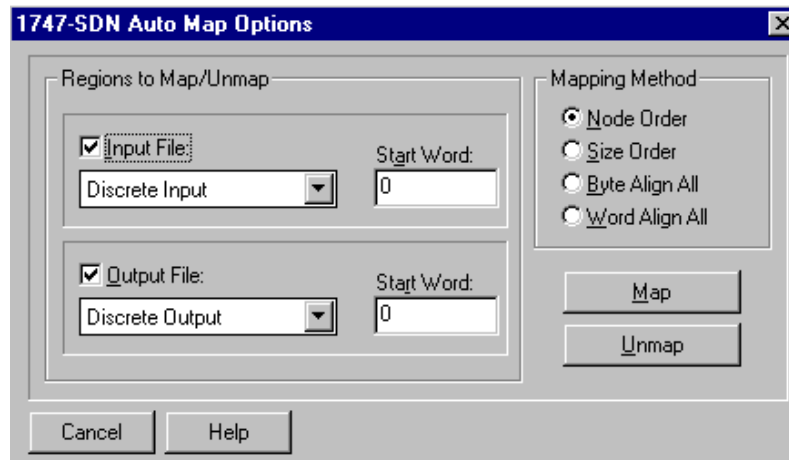


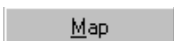
Automapping the Network

Follow these directions to automap your DeviceNet devices' data into the SLC-500 input and output I/O memory.

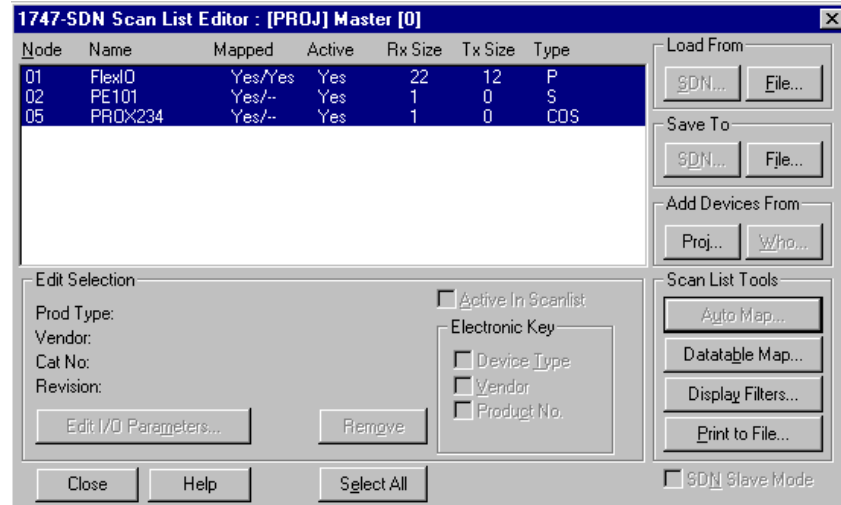
1. Choose  to highlight all of the devices.
2. Choose .

You see this screen.



3. To start automapping, choose .

The software maps the devices and returns you to this screen.



Notice that all three slave devices in the list have “Yes” in the active column as they are now active in the scan list and will communicate to the 1747-SDN scanner on the network.

Also notice the “Yes” in the Mapped column, which is showing that data is currently mapped to and/or from the SLC-500. The “Yes” in the left column means that data is mapped from the device to the SLC-500. The “Yes” in the right column means that the data is mapped to the device from the SLC-500.

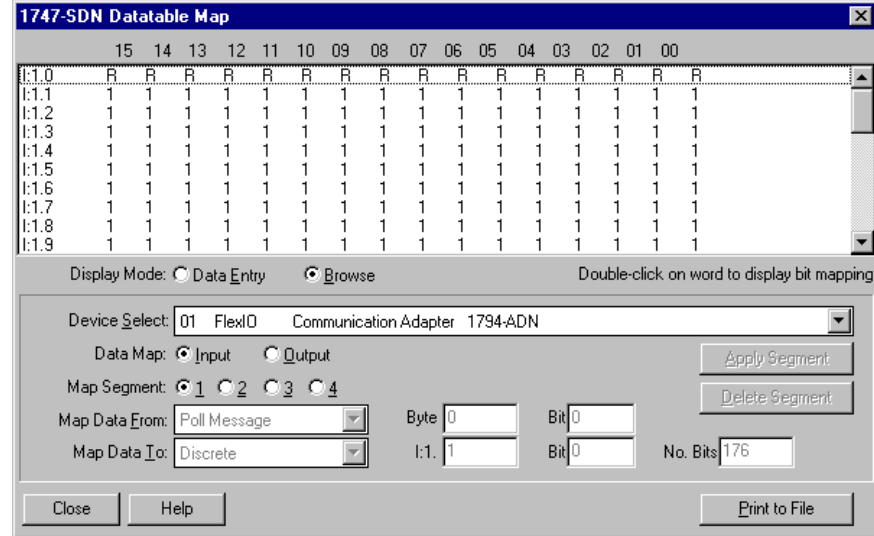
Observe that the FLEX I/O is mapped both from the device to the SLC-500 and is also mapped to the device from the SLC-500.

- To view the actual areas inside the SLC-500 where the device data will be

transferred to and from, choose

Datable Map...

You see this screen.

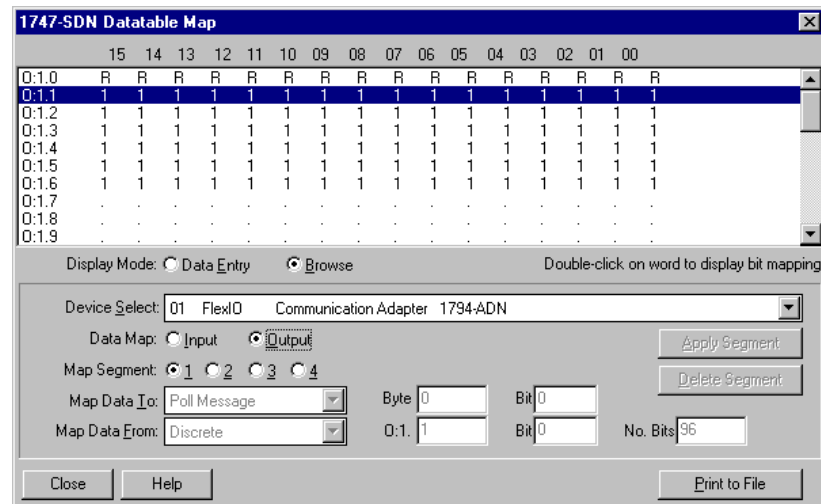


Notice that node 1 occupies words 1 through 11 of the discrete input area. This is the input data from the FLEX I/O node. You may need to scroll down to see I:1.11 on the screen.

Notice that word I:1.0 is reserved for the module status register of the 1747-SDN (denoted above by the letter R).

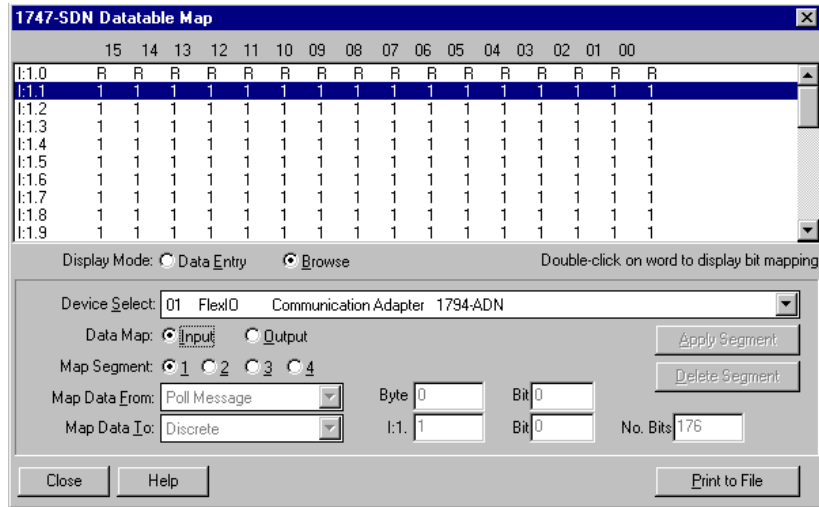
5. Click the radio button next to **Output** in the Data Map section.

You see this screen.



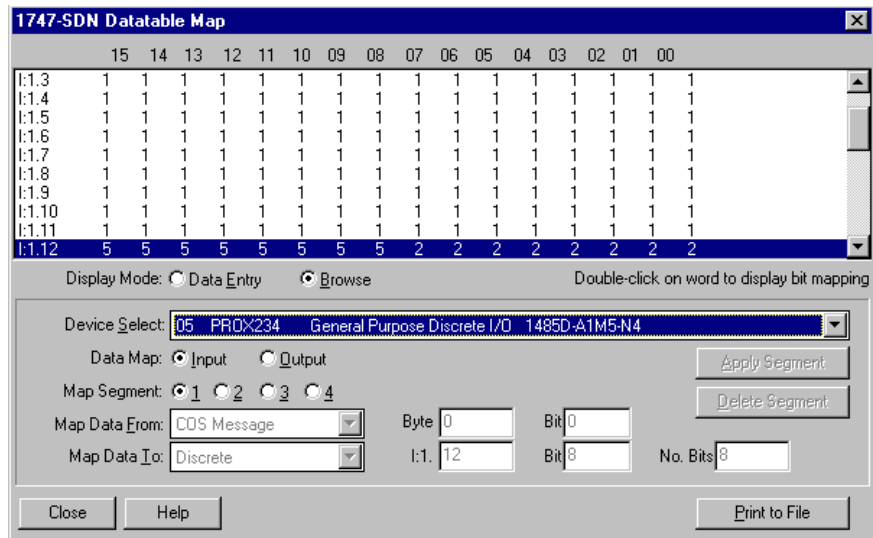
Notice that node 1 occupies words 1 through 6 of the discrete output area. This area is for the output data to the FLEX I/O rack. Word 0 is reserved for the module command register.

- Return to Input by clicking on the radio button next to **Input** in the Data map section.



- In the Device Select box, click once on the arrow to display your choices.
- Choose **PROX234** (node 5).

You see this screen.



Notice that nodes 2 and 5 share word 12 of the discrete input area where the input data from these devices will be put.

- Click the radio button next to **Data Entry** in the Display Mode section.

You can manually remap data to anywhere in the SLC-500 memory space allocated to the 1747-SDN.

We will now direct the DeviceLink discrete I/O from the discrete input file into the M1 file area.

10. In the Map Data To box, click the arrow to display your choices.

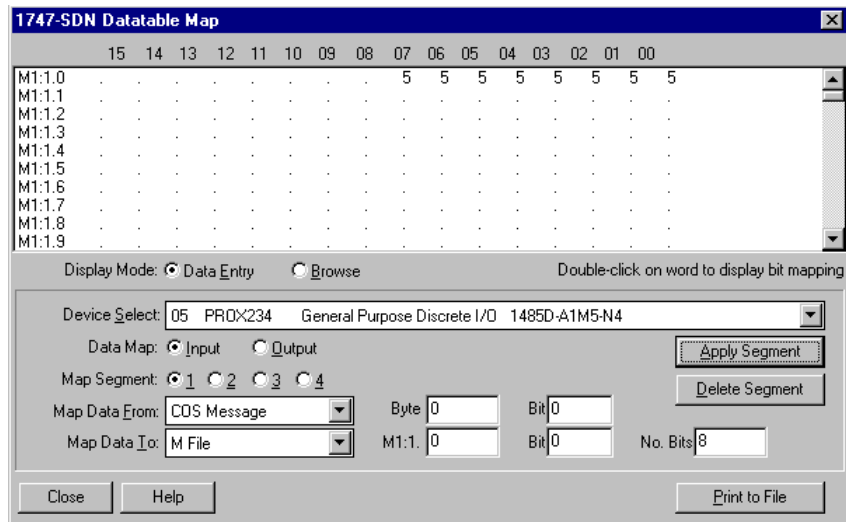
A. Choose **M File**.

B. In that same row, change Word 12 in the M1:1 box to **0**.

C. Change Bit 8 to **0**.

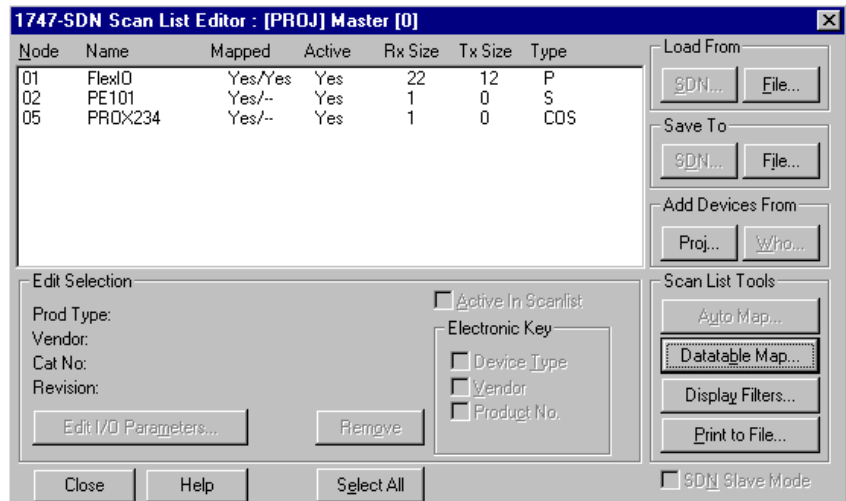
11. Choose 

Scroll up to see this screen.



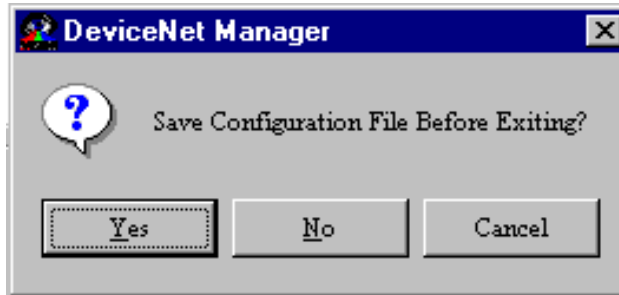
12. Choose 

You return to this screen.



13. Choose 

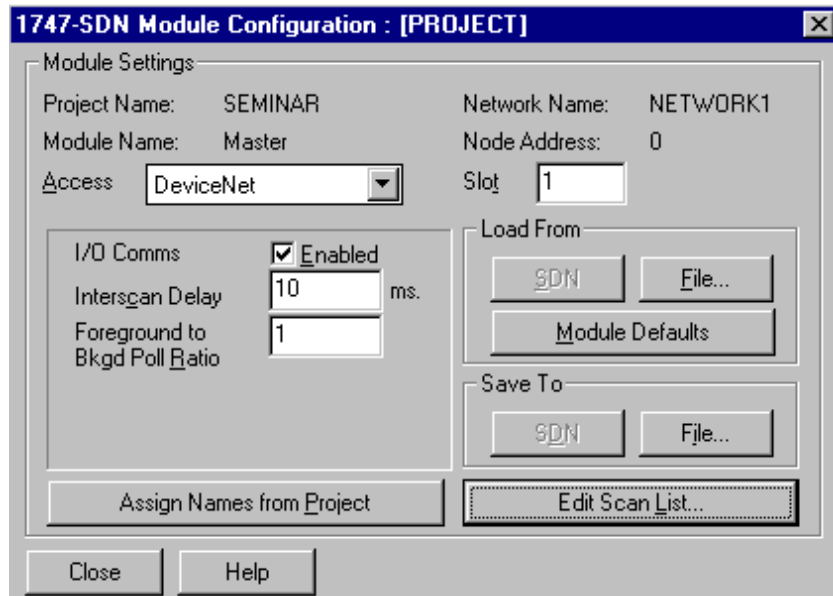
You see this screen.



Note: We will NOT be saving this new configuration now! In future uses, once all of the data is mapped, the configuration needs to be saved. You would choose Yes to save the configuration to a file within this project. When online, the configuration can be both read and saved directly to the 1747-SDN scanner using the Save To and Load From buttons.

14. Choose 

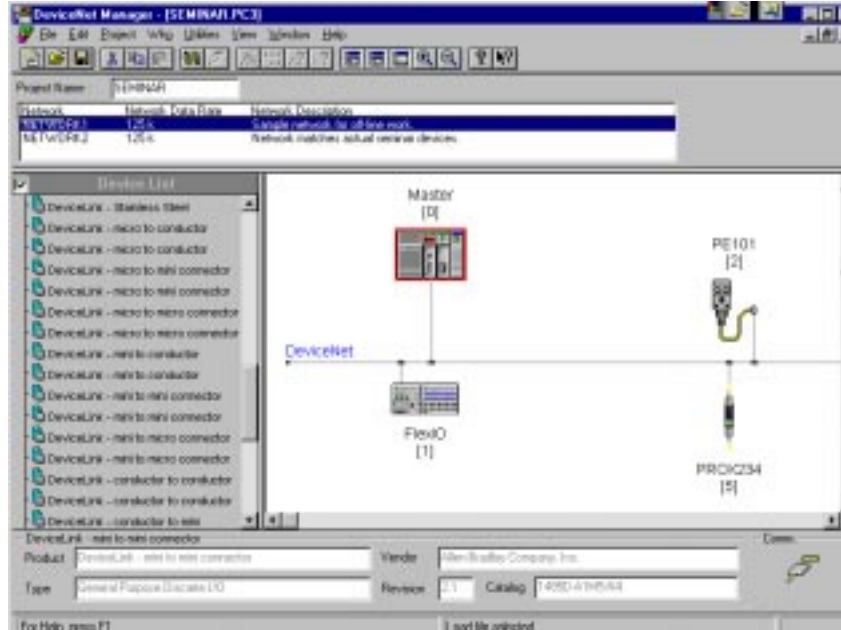
You return to this screen.



15. Choose 

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You return to the main project screen.



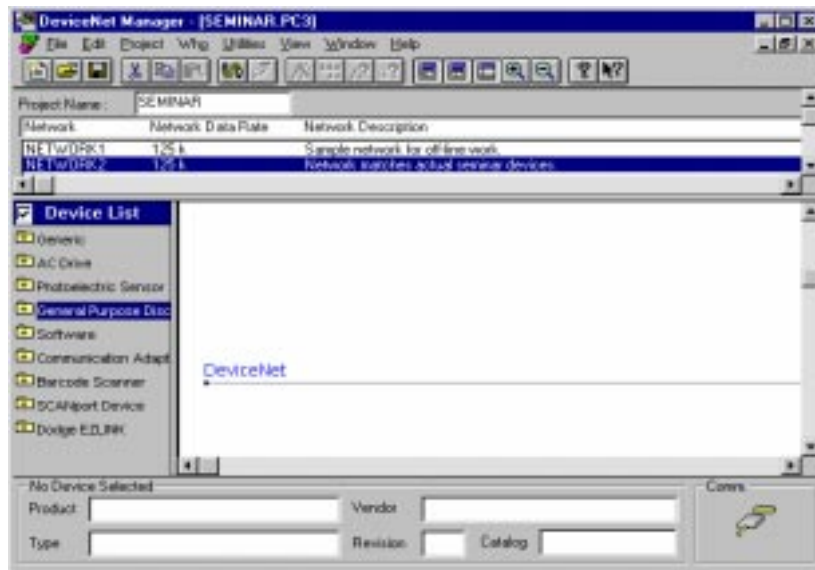
Going Online

Follow these directions to go online with the DeviceNet network.

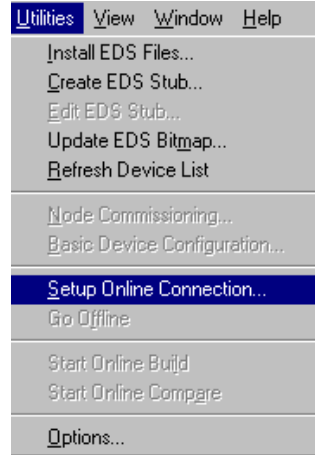
Note: You should be at the main project screen with SEMINAR.PC3 at the top of the screen.

1. Click once on Network2.

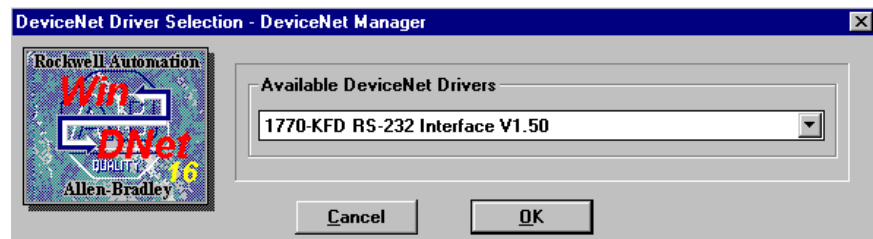
You see this screen.



2. From the *Utilities* menu, choose **Setup Online Connection...**



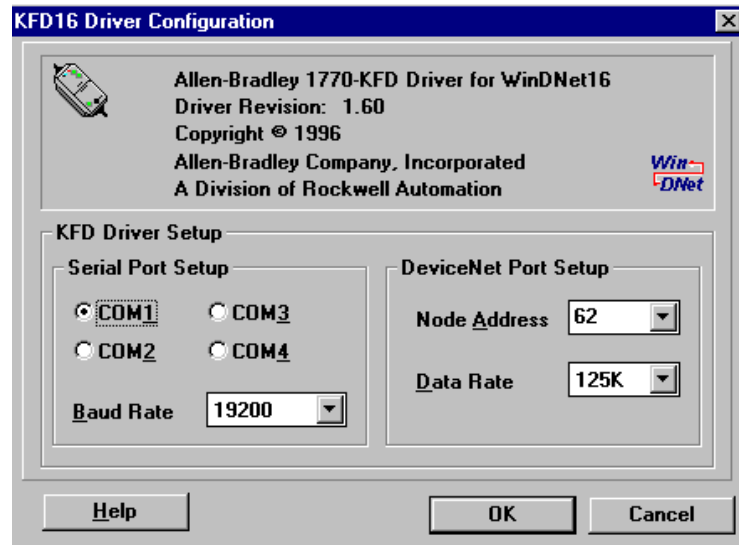
You see this screen.



3. Choose

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You see this screen.



Important: Your values should match those seen on this screen.

4. Choose

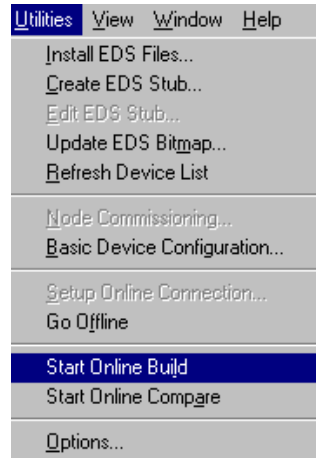


ATTENTION: In future uses, you need to make sure that all devices are set to the proper data rate. Attempting to go on-line at the wrong data rate may cause some or all devices on the network to fail.

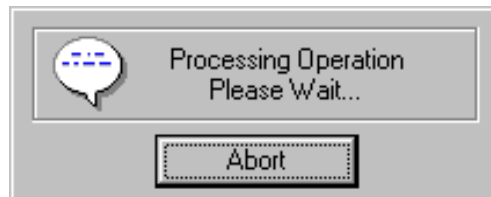
Building Your Network

Follow these directions to have the software build your network once you are online.

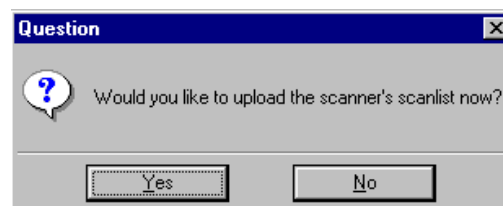
1. From the *Utilities* menu, choose Start Online Build...



You see this message while Online Build is occurring.



When the Online Build is finished, you see this screen.

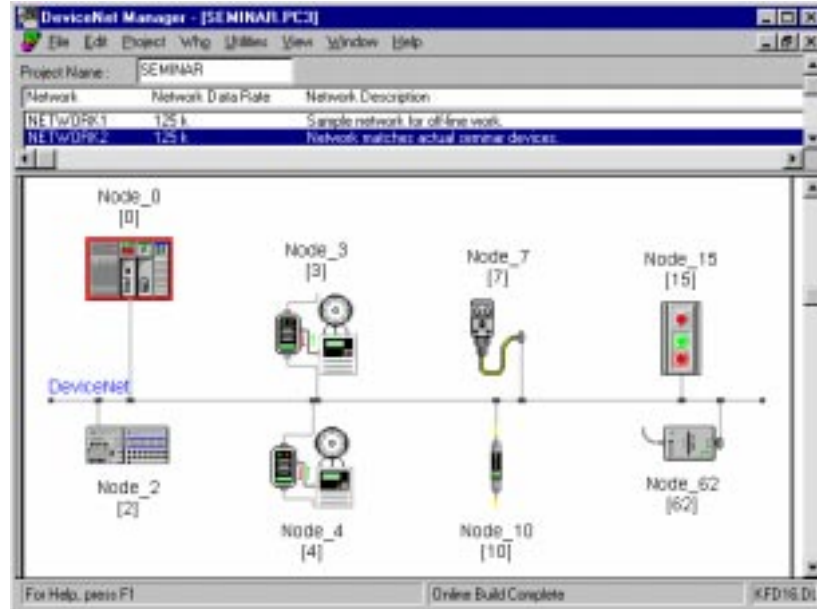


At this time it is not necessary to upload the 1747-SDN scan list over the network. The scan list will be loaded from a file later in the exercises.

2. Choose

Allen-Bradley Parts

You see the device list screen.



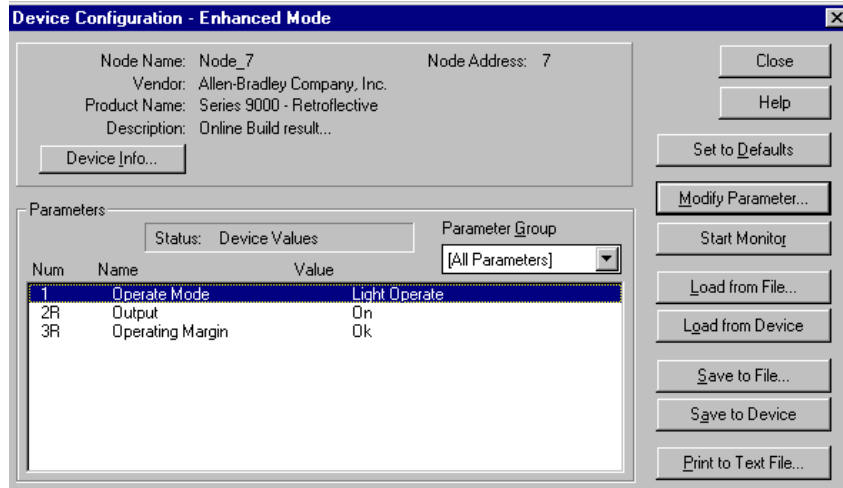
We will now monitor and configure a few of these devices online.

Configuring the Photoeye Online

Follow these directions to configure the photoeye online.

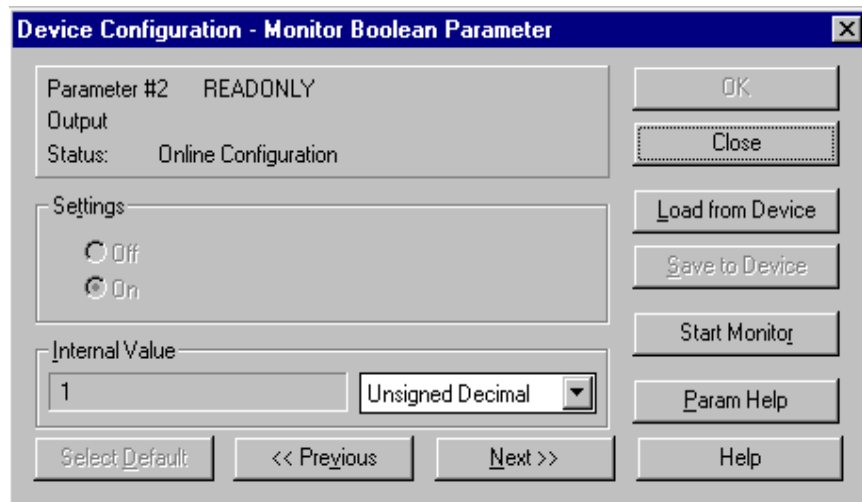
1. **Rotate the selector switch at the top of the demo box** so that an amber 2 is illuminated on the front of the 1794-IB16 FLEX I/O module.
2. In the Device List, double-click on **node_7**, the Series 9000 Retroflective photoeye.

You see this screen.



3. Double-click **Parameter 2R**.

You see this screen.



Notice that the green margin status indicator on the sensor is lit as the reflector is correctly aligned with the sensor.

4. Choose

5. Put your hand between the reflector and the photoeye.

You will see that the setting on the software changes from On to Off.

Also notice that the red light on the RediSTATION operator interface module goes on.

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6. Remove your hand from between the reflector and the photoeye.

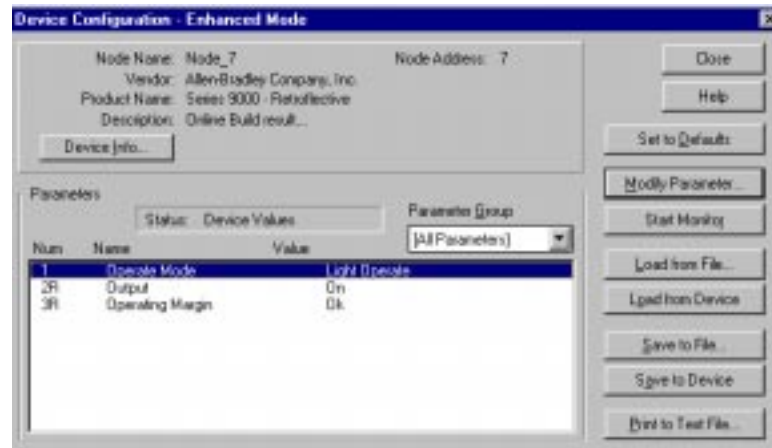
You will see that the setting on the software changes back from Off to On and the red light on the RediSTATION operator interface module goes off.

The RediSTATION operator interface's light is controlled from the SLC-500 processor using the status bit from the photoeye as an input into the 1747-SDN scanner.

7. Choose **Stop Monitor**.

8. Choose 

You return to this screen.

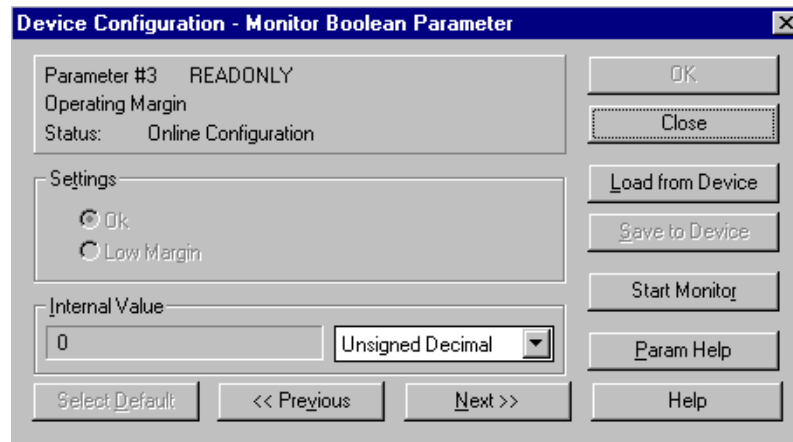


Testing the Low-Margin Capability

Low margin is determined by the sensor when it is not receiving enough light for optimum operation. The amber status indicator is lit but the green margin status indicator is not when in low margin mode.

1. Double-click **Parameter 3R**.

Notice that the operating margin of the photoeye is OK.



2. Choose

3. Swivel the reflector out of position until the outermost green margin status indicator on the photoeye goes off and the amber indicator is still on. The parameter setting will show low margin.

Notice the red light on the RediSTATION operator interface blinks and the DL10 Dataliner display show a PHOTO OUT OF MARGIN message. This message is made available to the SLC-500 processor for control purposes.

Note: While low on margin, the photoeye will still operate correctly. It is just alerting you that something is wrong. Maybe the lens is getting dirty or the reflector has moved.

To demonstrate this feature while the reflector is still swiveled out of position (low on margin), place your hand between the reflector and the photoeye. The RediSTATION operator interface's light goes on.

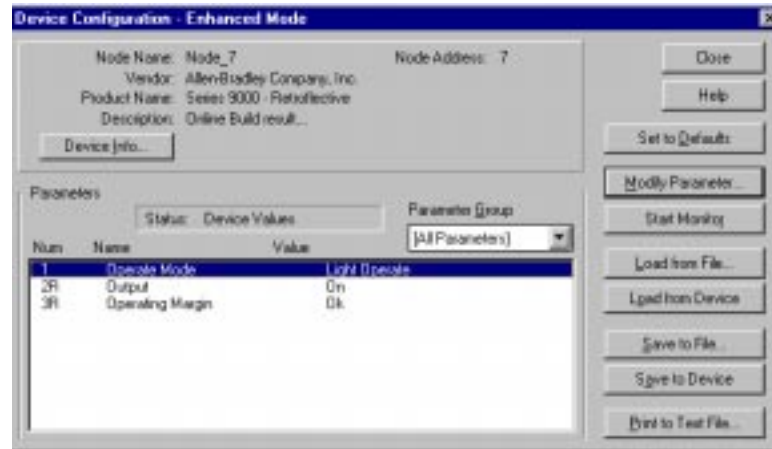
4. Reposition the reflector so all three status indicators on the photoeye are on solid.

5. Choose **Stop Monitor**.

6. Choose

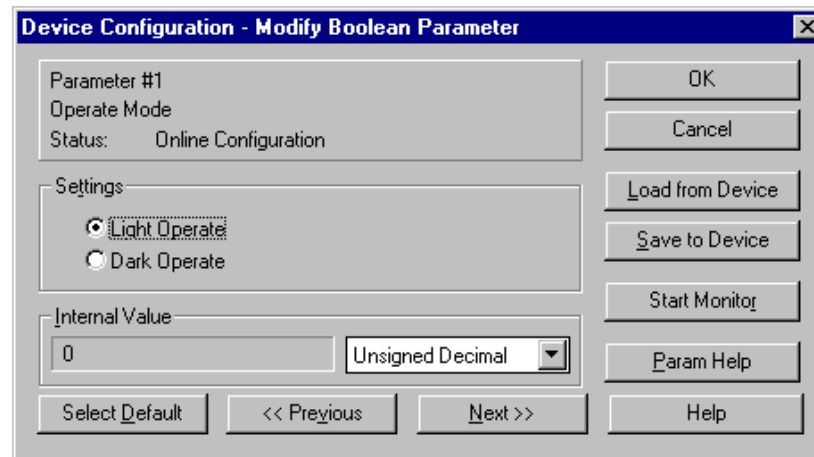
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You return to this screen.



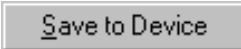
7. Double-click Parameter 1.

You see this screen.



Notice the current Operate Mode is Light Operate.

8. Click the radio button next to Dark Operate.

9. Choose 

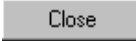
Notice that the RediSTATION operator interface's red light goes on. The light will turn off if you put your hand between the photoeye and the reflector. This behavior is opposite of what it was before because you inverted the operate mode of the photoeye over the network.

10. To return operation to the original mode, click the radio button next to **Light Operate**.

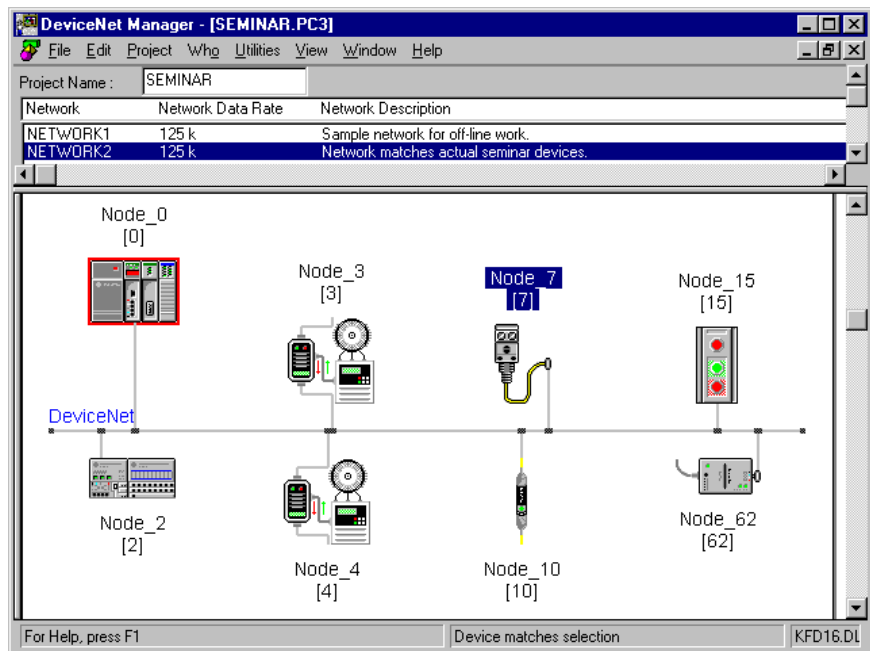
11. Choose 

12. Choose 

Important: All three lights on the photoeye should be illuminated and the RediSTATION operator interface's red light off. Go back to step 7 if this is not true.

13. To exit the Device Configuration screen, choose 

You return to this screen.



In summary, we have just shown you control status (on/off), diagnostics (low margin), and configuration (light/dark operate), all from one device over the DeviceNet network.

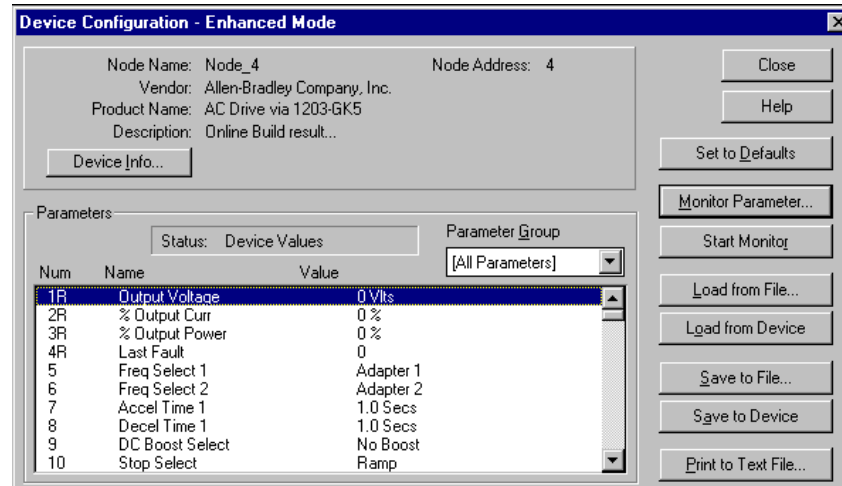
Allen-Bradley Parts

Monitoring and Configuring the AC Drive Online

Follow these directions to configure the ac drive online.

1. **Rotate the selector switch at the top of the demo box** so that an amber 0 is illuminated on the front of the 1794-IB16 FLEX I/O module.
2. Double-click **Node 4**, the ac drive via the 1203-GK5 module.

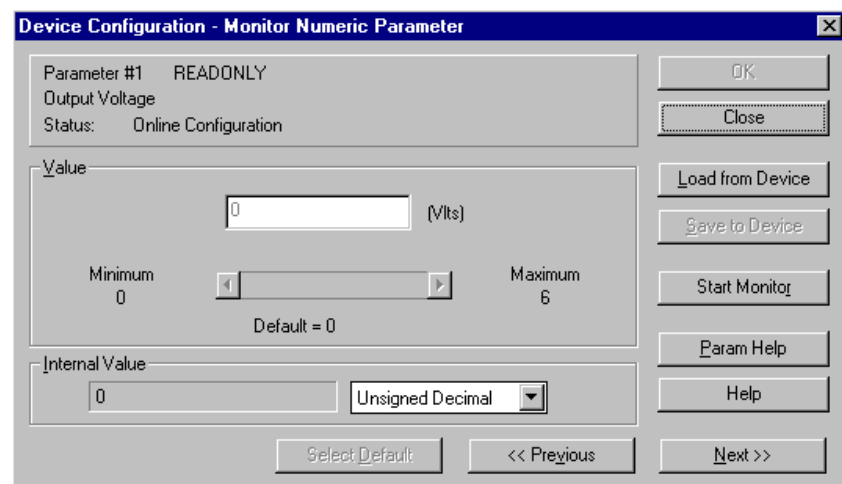
You see this screen in approximately 10 seconds.




Important: If you do not see this screen, ask your instructor for assistance.

3. Double-click **Parameter 1R**.

You see this screen.



Notice the output voltage is 0.

4. Choose 
5. Press the green Start button on the front of the RediSTATION operator interface.

Notice that the output voltage displays a voltage around 56 V. Also notice that the 1305 ac drive displays **At Speed** and **15.00 Hz**.

Each time the green Start button is pressed, the voltage will increase or decrease by 56 V until it finally wraps around to 56 V again.

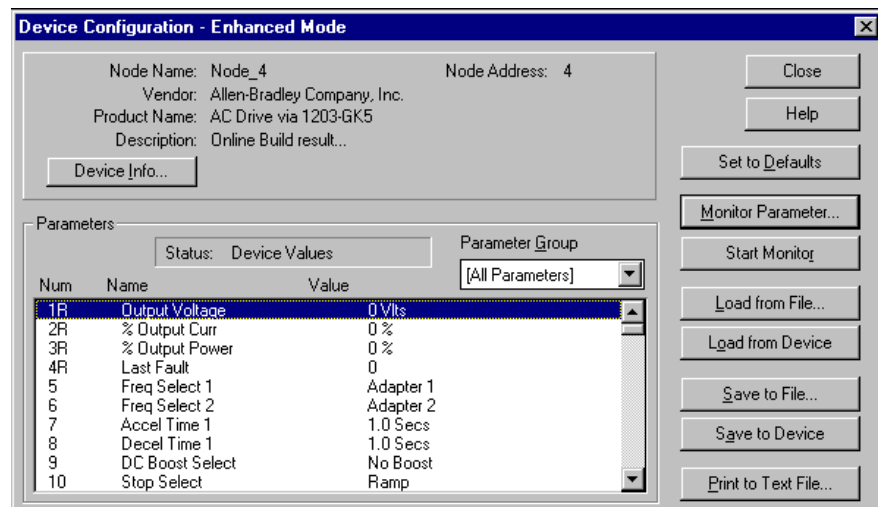
Each time you press the green Start button, the speed display on the drive will also increase by 15.00 Hz until it reaches 60 Hz where it will wrap back around to 15.00 Hz. Pressing the red Stop button causes the speed and output voltage to go to 0.

Notice that the drive reverses direction the next time you press the Start button. After you press the Stop button, each time you press the Start button the drive will again change direction.

6. Choose **Stop Monitor**.

7. Choose 

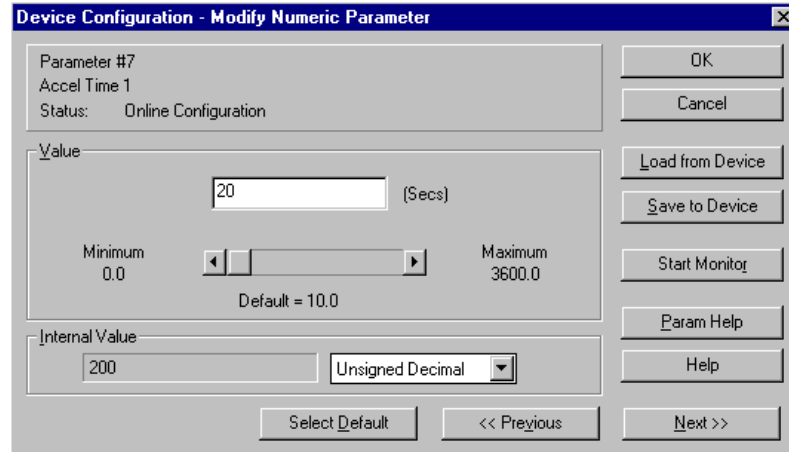
You return to this screen.



8. Double-click **Parameter 7** “Accel Time 1”.

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9. Change the accel time to 20s by typing 20 in the value field.



10. Choose 

11. Press the RediSTATION operator interface's red Stop button.

Now look at the front of the drive.

12. Press the RediSTATION operator interface's green Start button.

Notice that it took longer to reach 15.00 Hz due to the new accel time.

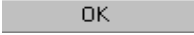
13. Press the RediSTATION operator interface's red Stop button.

14. **Important:** Restore the accel time to 5s by typing 5 in the value field.

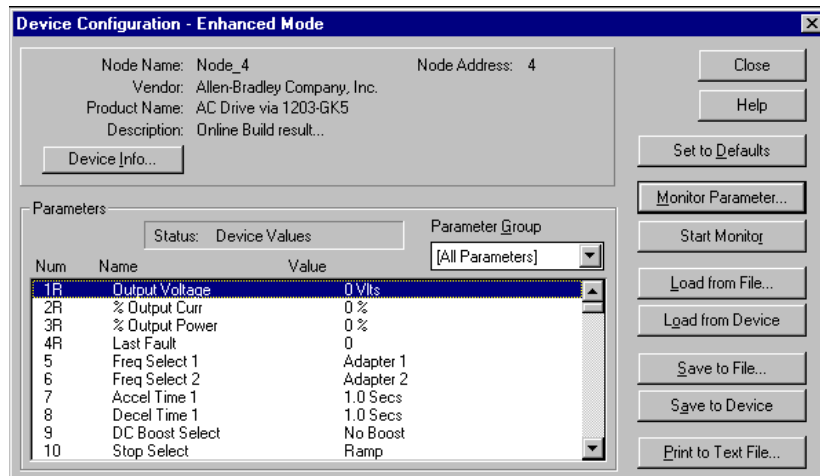
15. Choose 

The original accel time has been restored.

This exercise showed our ability to monitor and configure the ac drive over the network with the software. It also showed our ability to start, stop, and change the speed of the drive from the SLC-500 processor over the DeviceNet network.

16. To exit the Device Configuration screen, choose 

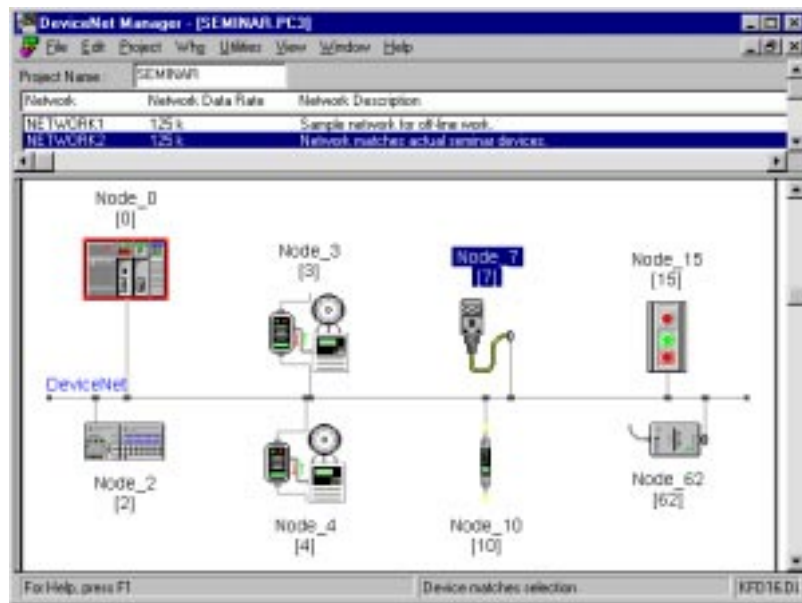
You see this screen.



17. Choose

Close

You see this screen.



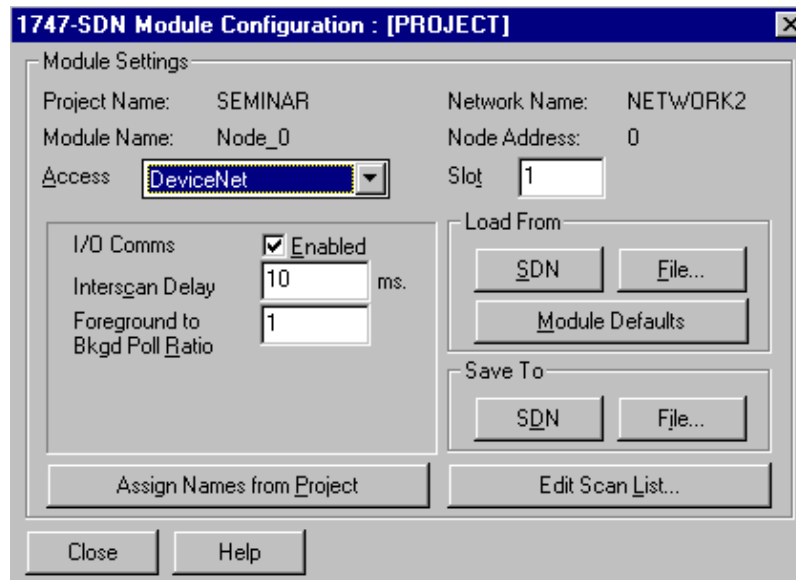
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Configuring the 1747-SDN Scanner Online

Follow these directions to configure the scanner online.

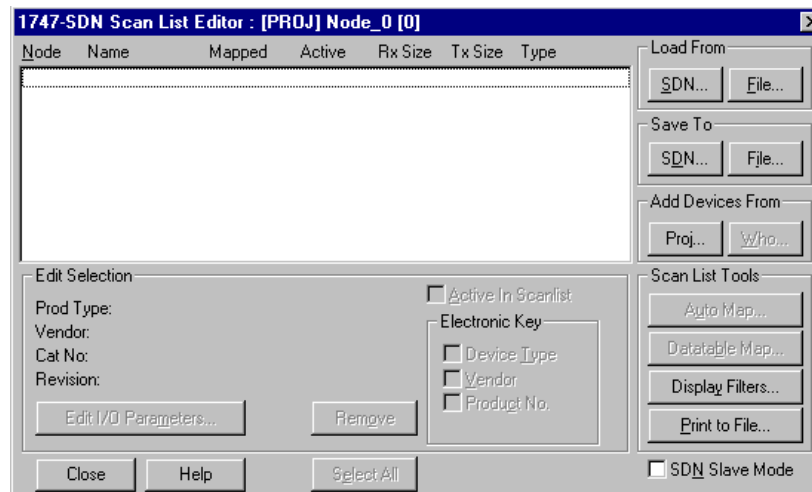
1. Double-click **Node_0**, the 1747-SDN scanner.

You see this screen.



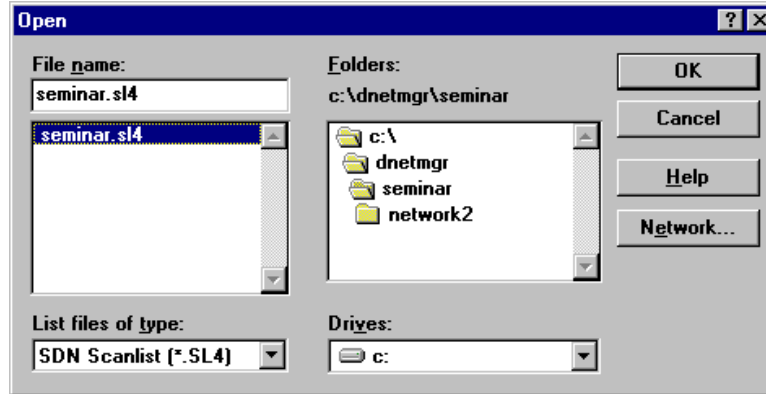
2. Choose 

You see this screen.



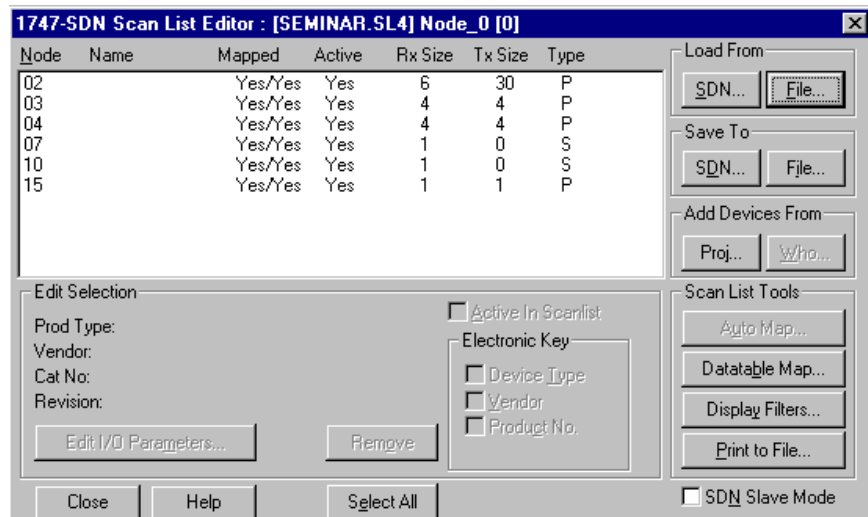
3. Choose **Load From File**.
4. Click once on **seminar.sl4** to highlight it.

You see this screen.



5. Choose 

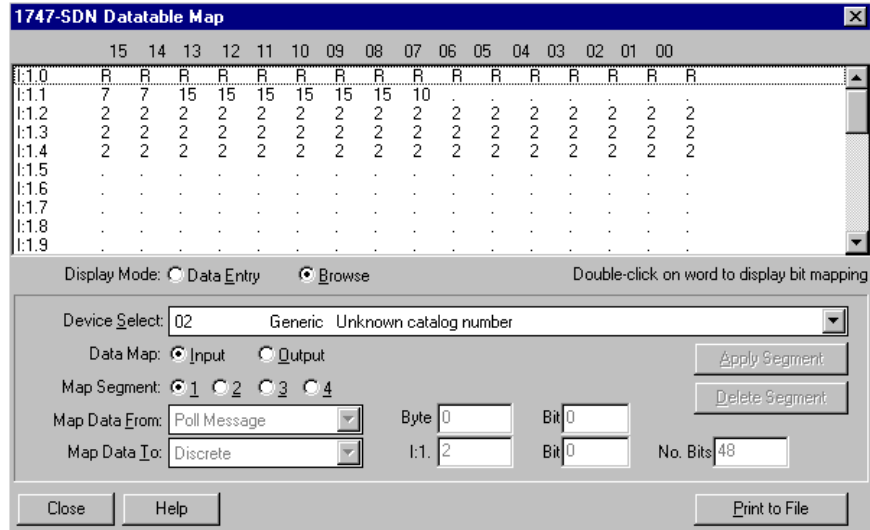
You see this screen.



6. Choose 

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You see this screen.



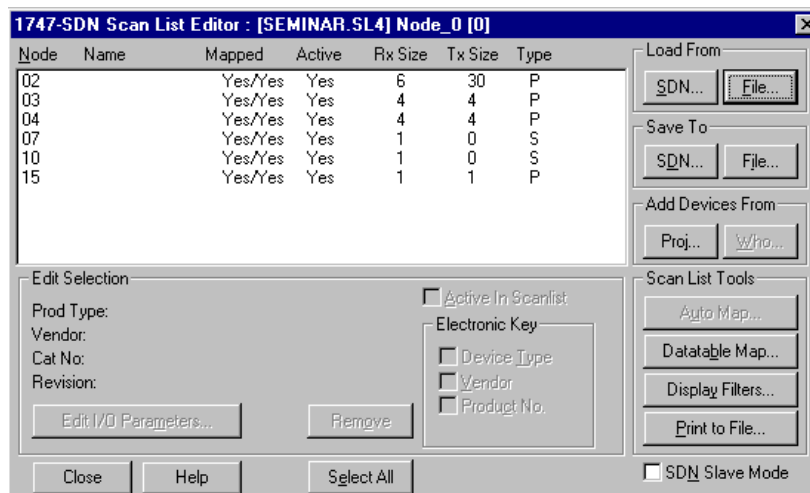
By using the device select field, you can view the mapping of each device into the data table inside the SLC-500 processor.

Note: The RediSTATION, photoeye, and DeviceLink are all sharing the same data field. This shows the versatility of the DeviceNet Manager software for mapping device data. The scan list is the same as what is actually loaded in the 1747-SDN of your seminar. These bits will be monitored later in the SLC-500 using RSLogix™ 500 programming software.

7. To exit the Scan List Editor screen, choose

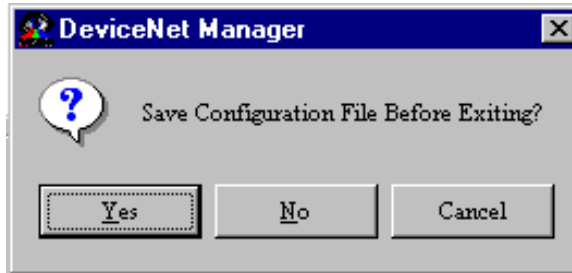
Close

You see this screen.



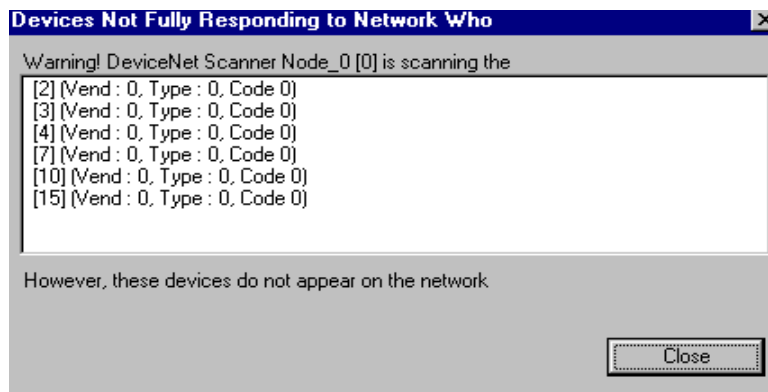
8. Choose 

You see this screen.



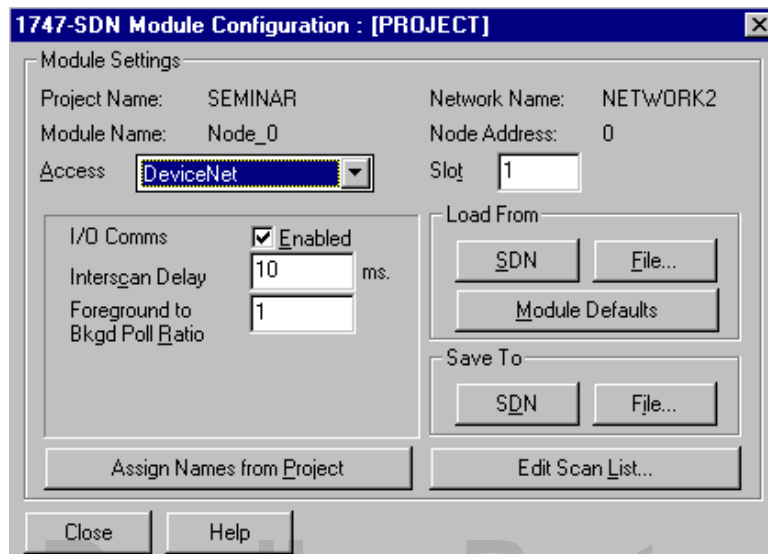
9. Choose 

You see this warning screen.



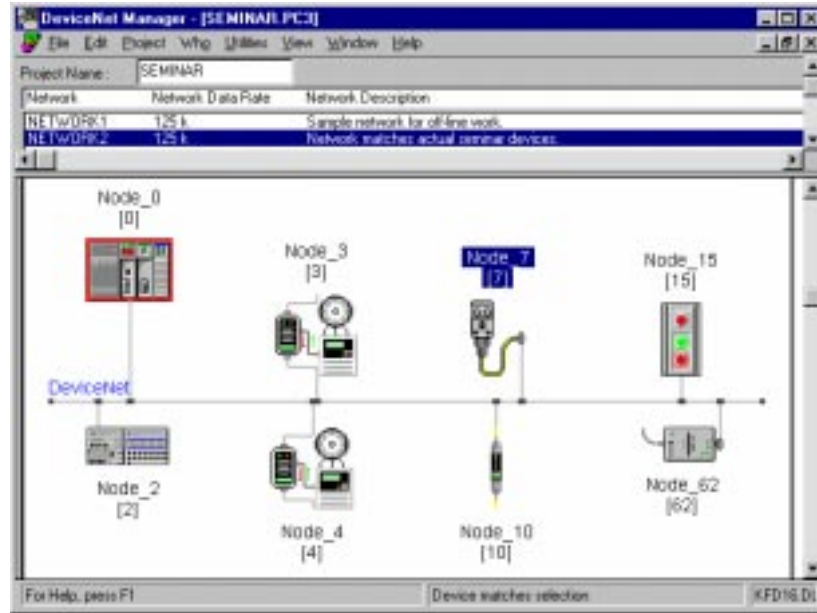
10. Choose 

You return to this screen.



11. Choose

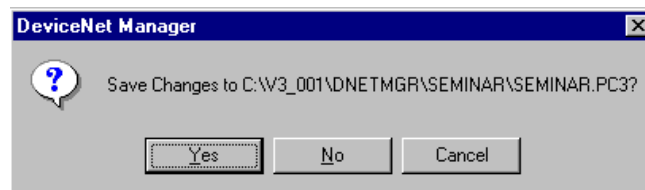
You return to the project screen.



12. Close the project window by clicking the button with an X in the upper right corner of the project window.

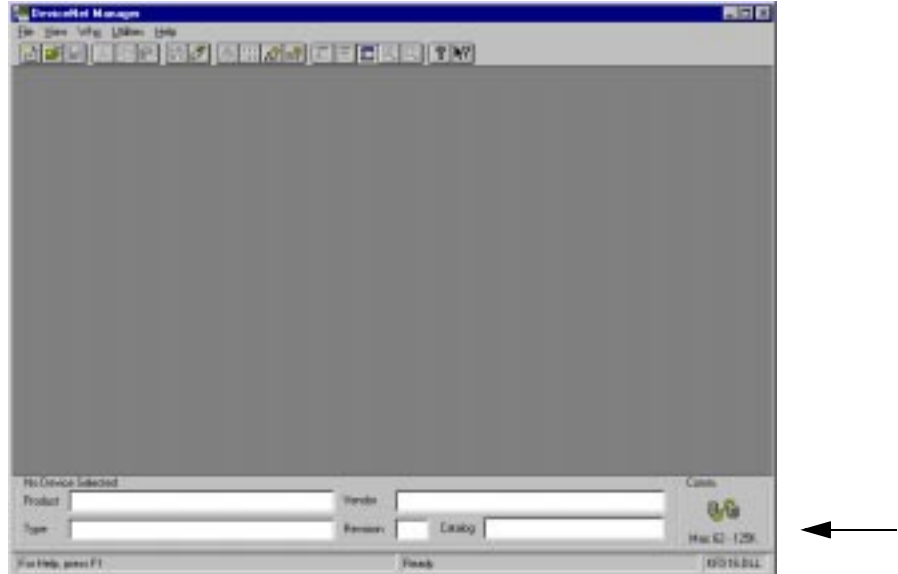
Important: Click the lower X, so as to close the project but not DeviceNet Manager software.

You see this screen.



13. Choose

You return to the main DeviceNet Manager screen.



Note that you are still online.

Using Network Who

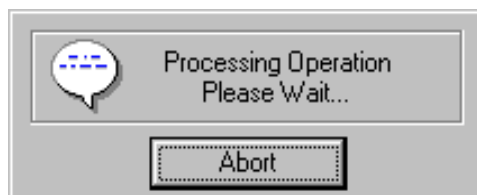
Network Who provides you with a summary of the node address, manufacturer of the device, device type, product name and serial number for each device on the network, plus the total number of devices identified.

Important: You must be online to select Network Who.

1. From the *Who* menu, choose **Network Who**.

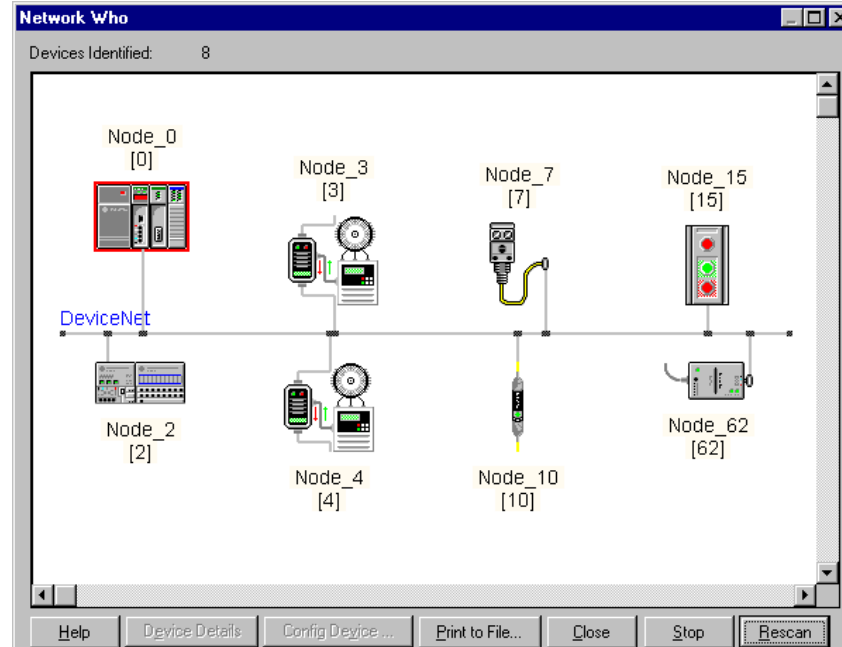


This screen appears while Network Who operates.



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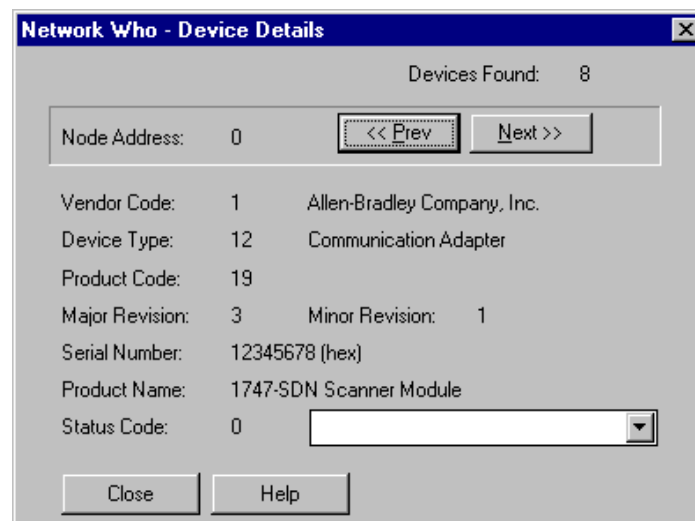
When it is finished scanning the network, you see this screen.



2. Click once on **Node_ 0** to highlight it.

3. Choose 

You see this screen.

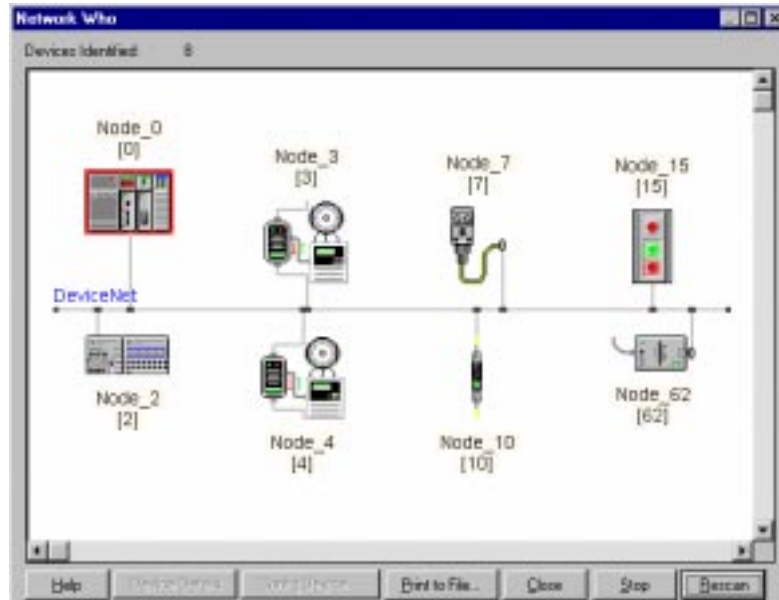


Notice the details that can be accessed directly from the devices, such as firmware revisions and serial numbers.

4. To scroll through the list, choose or

5. Once you have finished, choose

You return to this screen.



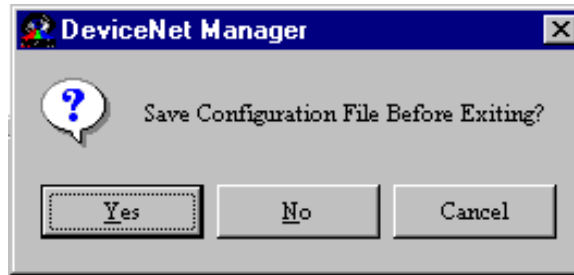
You could also configure a device from Network Who

by choosing

This method is the same as double clicking an icon on the DeviceNet network as we did earlier in this seminar in the Configuring Devices Offline section.

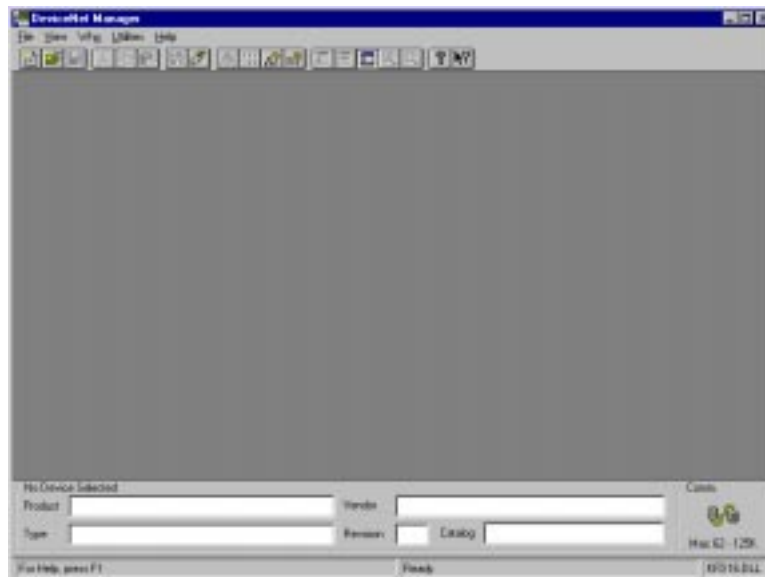
6. Choose

You see this screen.



7. Choose

You return to the main DeviceNet Manager screen.



Using Mini Who

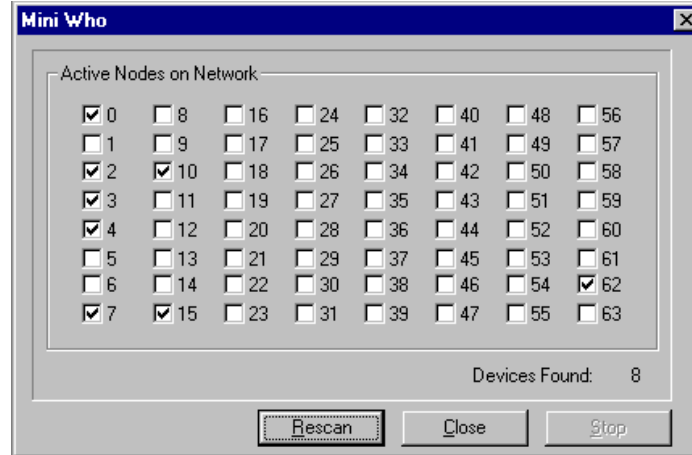
Mini Who is a quick way to determine devices on the network by node number and the total number of devices found on the network.


Important: You must be online to select Mini Who.


1. From the *Who* menu, choose **Mini Who**.



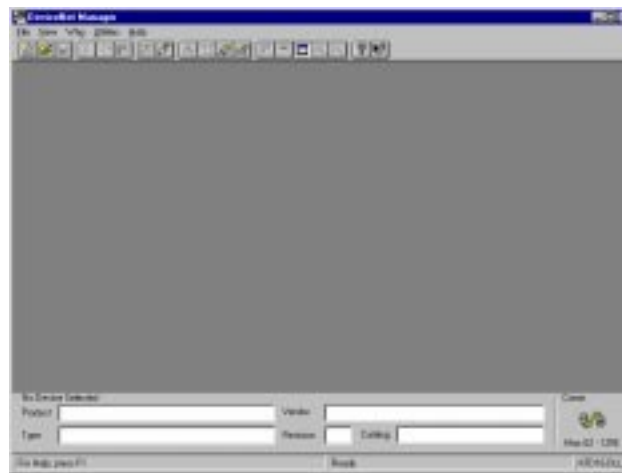
You see this screen.



You can wait for Mini Who to finish scanning the network, which doesn't take long, or you can choose 

2. Choose 

You return to this screen.



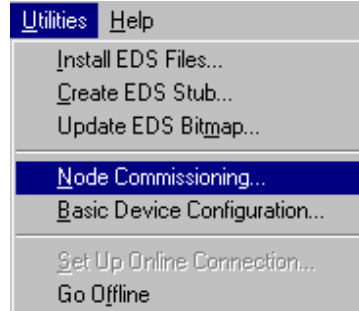
Using Node Commissioning

Node Commissioning allows you to change the node address and data rate of individual devices. This is normally done when a network is initially assembled. Devices out of the box will have node 63 and 125 k baud as defaults.

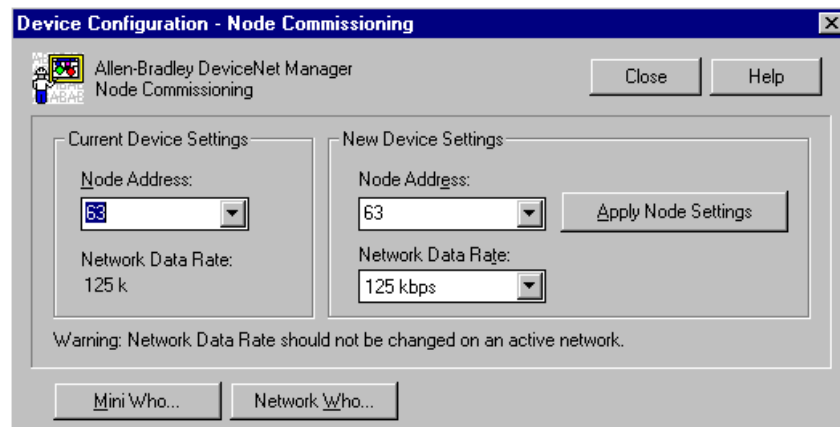
Important: You cannot be within a project to commission nodes.

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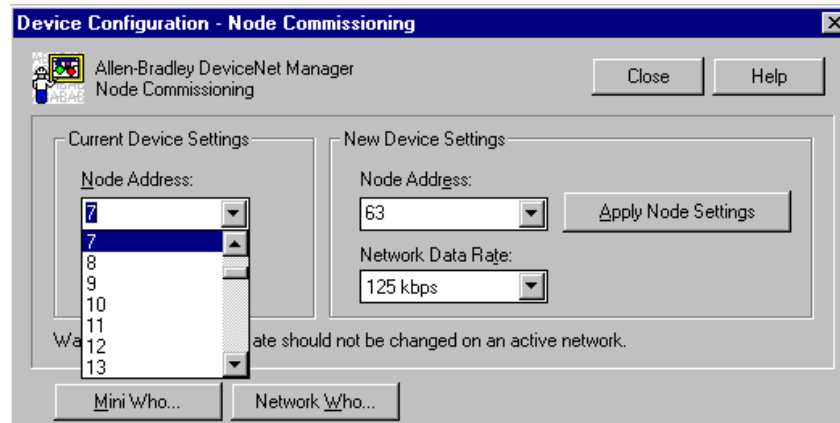
1. From the *Utilities* menu, choose **Node Commissioning...**



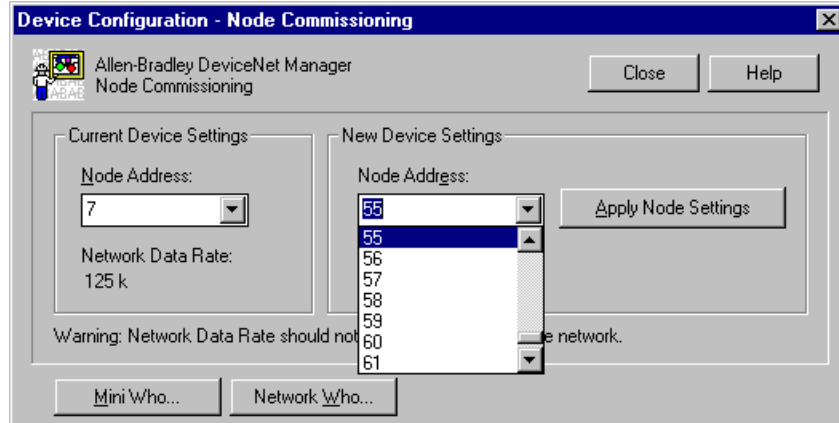
You see this screen.



2. In the *Current Device Settings* box, scroll the list and choose **node 7** (the photoeye).



3. In the *New Device Settings* box, scroll the list and choose **node 55**.



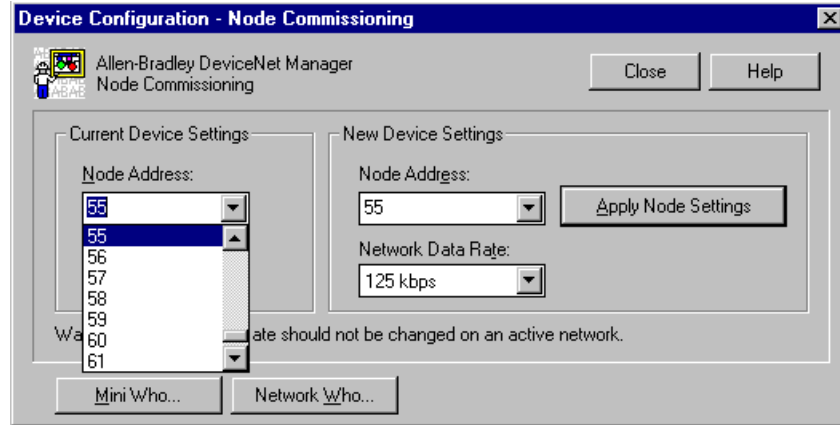
4. Choose

Notice that the RediSTATION operator interface's red light starts blinking, the DL10 Dataliner display shows a PHOTO OFF DEVICENET message, and the scanner display alternatively blinks between 72 and 07. Also, the green status indicator on the photoeye should be blinking green.

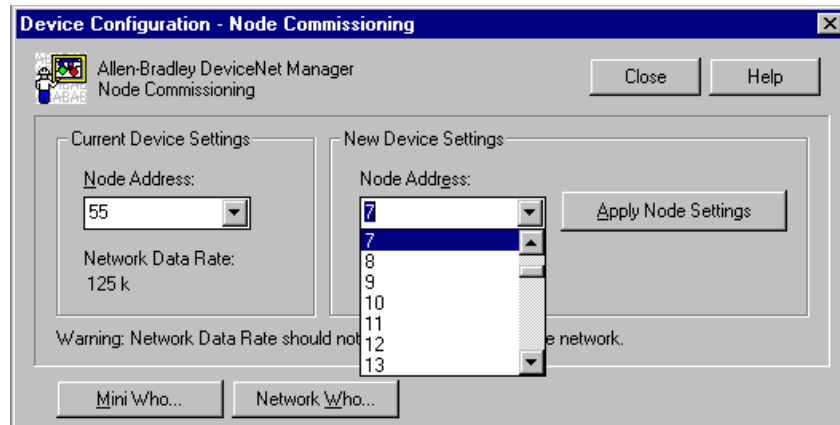
The reason for the above warning messages is that the 1747-SDN scanner module is expecting a slave device (the photoeye) at node address 7. By changing the node address to 55, node 7 has “disappeared”. This disappearance sets a fault bit in the scanner's memory, which can be read by the SLC processor to display fault diagnostics, such as flashing a red light or displaying a text message. Also, the photoeye with its new node address no longer has a master to communicate with thus causing it to flash its green communication status indicator.

Now let's return the photoeye to node address 7.

5. In the *Current Device Settings* box, scroll the list and choose **node 55**.



6. In the *New Device Settings* box, scroll the list and choose **node 7**.

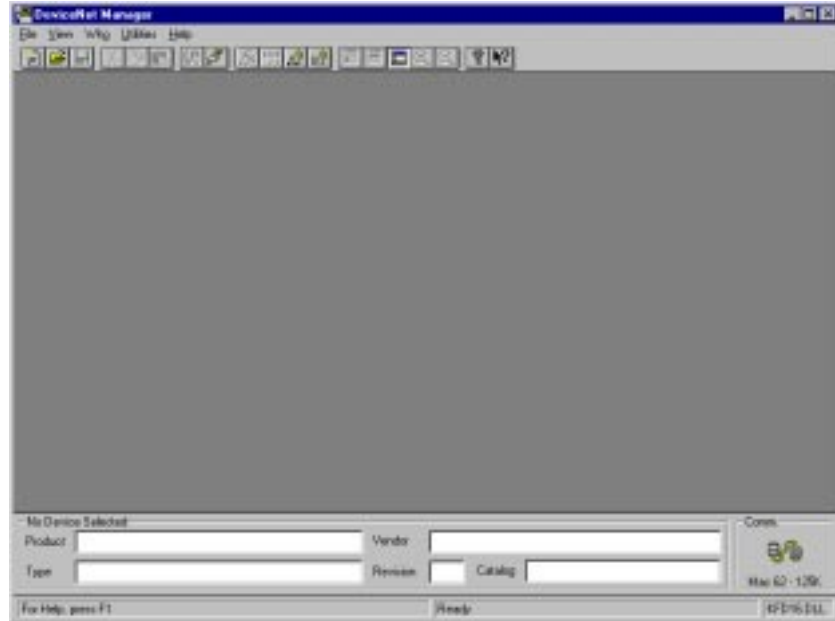


7. Choose

Notice that the RediSTATION operator interface's red light stops blinking, the DL10 Dataliner display returns to the normal message, the scanner displays 00, and the photoeye's communications status indicator turns solid green.

8. Choose

You return to the main DeviceNet Manager screen.



Minimize the software by clicking the button with the horizontal bar in the upper right corner of the window.

Important: Do not close the software. Only minimize it.

Starting RSLogix 500 Software

The next section of the lab uses RSLogix 500 programming software.

1. Double-click the RSLogix 500 icon on your desktop to start the program.



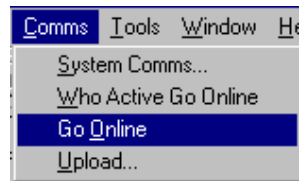
Note: If you do not have the RSLogix 500 icon on your desktop, you can access it from Windows Explorer in the directory `c:\RSI\logix500`, file name `RS500.exe`.

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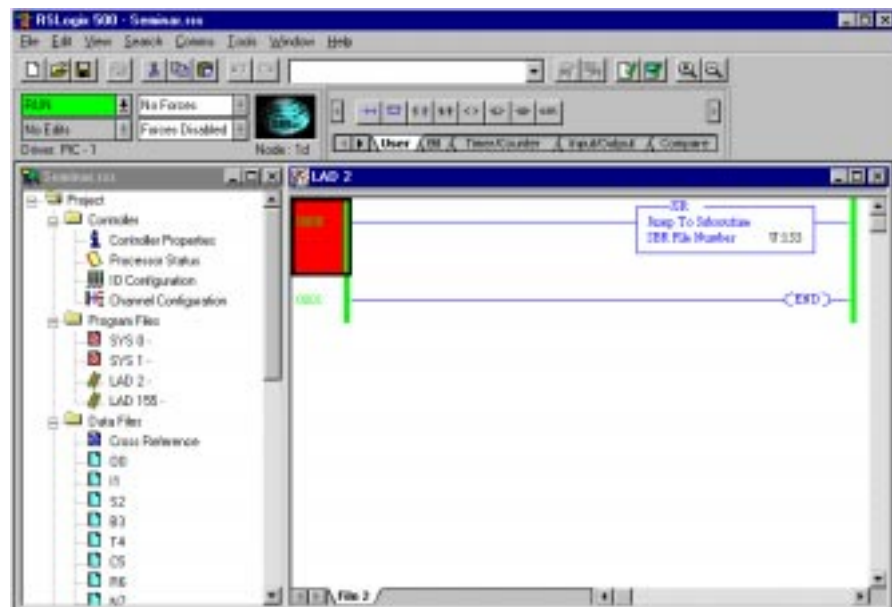
You see this screen.



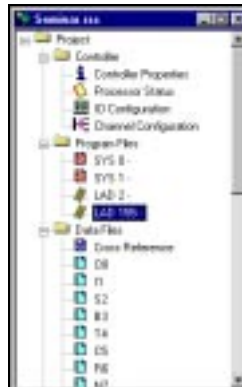
2. From the *Comms* menu, choose **Go Online**.



You see this screen.



- From the navigation window in the left frame, scroll down from *Project* to *Program Files* and choose **LAD 155** by double clicking.



You see this screen in the right frame. You see the rungs of ladder logic.



Monitoring Inputs

Follow these directions to monitor the inputs using RSLogix 500 software.

- From *Data Files*, choose **I1** by double clicking.



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You see this screen.

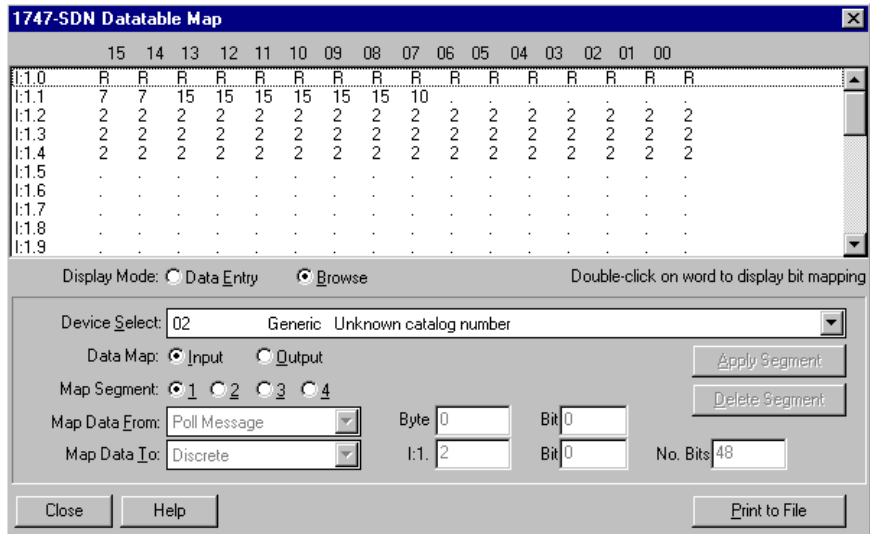
Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
I:1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
I:1.1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I:1.2	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0
I:1.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
I:1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Symbol: I:1/0 Radix: Binary Columns: 16

Desc:

I1 Properties Usage Forces Help

Notice that Word I:1.1 format (shown on page 44 and again here for reference), is shared by nodes 7, 10 and 15.



2. Rotate the selector switch completely counter-clockwise until an amber 0 is illuminated on the 1794-IB16.
3. Press and hold the **Start** button until you see that data location I:1.1, bit 9 changes to a 1.

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
I:1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
I:1.1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0

4. Release the Start button.
5. Press and hold the **Stop** button until you see that data location I:1.1, bit 8 changes to a 1.

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
I:1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
I:1.1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0

6. Release the Stop button.
7. Press and release the Start button.

Notice the red light on the RediSTATION operator interface goes on.

8. Carefully unscrew the red lens and remove the light bulb by pressing down

gently and turning the light bulb counter-clockwise.
Notice in data location I:1.1 that bit 12 changes to a 1.

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
I:1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
I:1.1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0

- Replace the light bulb by gently pressing it into its socket and turning it clockwise. Bit I1:1/12 goes to a 0.

- Replace the red lens.

Note: This diagnostic only works if the RediSTATION light is on (the Start button has been pushed).

- Press the RediSTATION operator interface's Stop button.
- Move the lever up and down on the limit switch connected to the DeviceLink discrete I/O.

Notice in I:1.1 that bit 7 goes from a 0 to a 1 each time you move the lever connected to the DeviceLink discrete I/O.

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
I:1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
I:1.1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0

Also notice in I:1.1 that bit 14 goes from a 1 to a 0 each time you put your hand between the photoeye and the reflector. Bit 15 of I:1.1 goes from a 0 to a 1 when the photoeye is low on margin.

- To demonstrate low on margin, swivel the reflector until the green margin status indicator on the photoeye goes off and the amber indicator is on.

Notice that the red light on the RediSTATION operator interface blinks and the DL10 Dataliner displays a PHOTO OUT OF MARGIN message. (Bits 14 & 15 are 1). This message is made available to the SLC-500 processor for control purposes.

- To verify this operation, put your hand in front of the photoeye and notice that the RediSTATION operator interface's light goes solid.
- Swivel the reflector back so that it is not in low margin. All three LEDs should be on.

Notice as you rotate the selector switch clockwise and counter-clockwise, one of bits 0 through 3 in data location I:1.4 goes to a 1 depending on which position the switch is in.

16. Close the Data File by clicking the button with an X in the upper right corner of the Data File window.

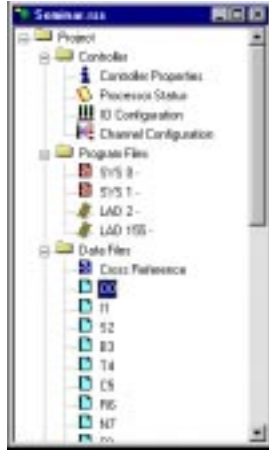
You return to this screen.



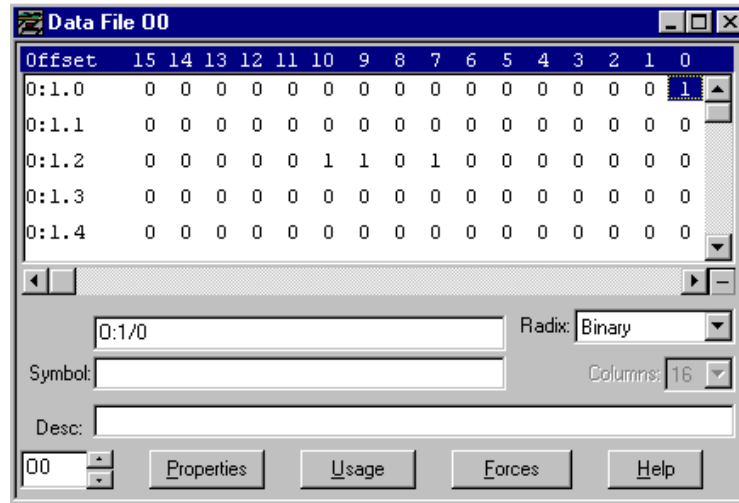
Monitoring Outputs Follow these directions to monitor the outputs using RSLogix 500 software.

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1. From *Data Files*, choose **O0** by double clicking.



You see this screen.



2. **Rotate the selector switch counter-clockwise** until an amber 0 is illuminated on the 1794-IB16.
3. Press the RediSTATION operator interface's Start button.

Notice in O:1.1 that bit 0 goes to a 1 and the RediSTATION operator interface's light is on. This bit is directly mapped to the RediSTATION operator interface's light. When O:1.1, bit 0, is a 1 the light will be on and when it is a 0 the light will go off.

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
O:1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
O:1.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

4. Press the RediSTATION operator interface's Stop button.

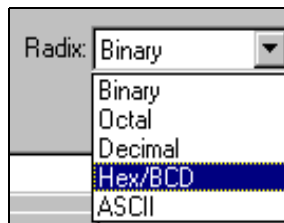
Notice in O:1.1, that bit 0 changes to a 0.

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
O:1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
O:1.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

5. Rotate the selector switch clockwise until an amber 1 is illuminated on the 1794-IB16.

Notice the voltmeter on the demo box swings continuously from 0 V to 10 V and back to 0 V.

6. In the Radix selection box, choose **Hex/BCD**.



You see this screen.

Offset	0	
O:1.0	1	1747-SDN - DeviceNet Scanner Module
O:1.1	0	1747-SDN - DeviceNet Scanner Module
O:1.2	2A40	1747-SDN - DeviceNet Scanner Module
O:1.3	0	1747-SDN - DeviceNet Scanner Module
O:1.4	0	1747-SDN - DeviceNet Scanner Module
O:1.5	0	1747-SDN - DeviceNet Scanner Module
O:1.6	F	1747-SDN - DeviceNet Scanner Module
O:1.7	F	1747-SDN - DeviceNet Scanner Module
O:1.8	0	1747-SDN - DeviceNet Scanner Module
O:1.9	0	1747-SDN - DeviceNet Scanner Module
O:1.10	0	1747-SDN - DeviceNet Scanner Module
O:1.11	0	1747-SDN - DeviceNet Scanner Module

Notice that output word O:1.2 is the analog data that is being sent to channel 0 of the 1794-OE4 card and ultimately to the voltmeter.

7. Close the Data File by clicking the button with an X in the upper right corner of the Data File window.

You return to this screen.



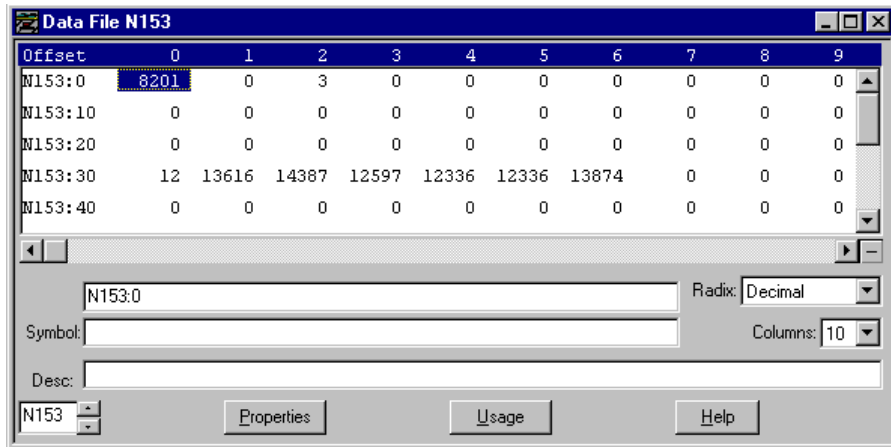
Monitoring the AC Drive Data

Follow these directions to monitor the ac drive data using RSLogix 500 programming software.

1. From *Data Files*, scroll down the list and choose **N153**.



You see this screen.



Notice the value in N153:0 is 8201, which is mapped to the ac drive command register.

Notice the value in N153:1 is 0, which is mapped to the ac drive speed register.

2. Rotate the selector switch counter-clockwise until an amber 0 is illuminated on the 1794-IB16.
3. Press the RediSTATION operator interface’s Start button.

Notice in N153:0, that the value changes to an 8218 (forward direction)

Offset	0	1	2	3	4	5	6	7	8	9
N153:0	8218	8191	0	0	0	0	0	0	0	0
N153:10	0	0	0	0	0	0	0	0	0	0

or 8234 (reverse direction).

Offset	0	1	2	3	4	5	6	7	8	9
N153:0	8234	8191	8	0	0	0	0	0	0	0
N153:10	0	0	0	0	0	0	0	0	0	0

These values map to certain bits in the drive command register, which tells the drive to start and whether to go forward or reverse.

Also notice that the value in N153:1 increments by 8191 for every push of the RediSTATION operator interface's Start button. Every increase of 8191 in the drive speed register commands the ac drive to increase by 15.00 Hz. Pressing the RediSTATION operator interface's Stop button loads a value of 8201 into N153:0, which commands the ac drive to stop.

Monitoring the SMP-3 Overload Relay

Follow these directions to monitor the SMP-3 overload relay using RSLogix 500 programming software.

Notice the value in N153:2 is 0, which is mapped to the SMP-3 overload relay command register.

1. **Press and hold** in the RediSTATION operator interface's **Start** button.

Notice in N153:2, the value changes to an 8 (start triac A /reverse direction) or 16 (start triac B/forward direction). These values map to certain bits in the SMP-3 overload relay command register telling the SMP-3 overload relay to energize either output A or output B.

2. **Release the Start** button.

3. **Press and hold** in the RediSTATION operator interface's **Stop** button.

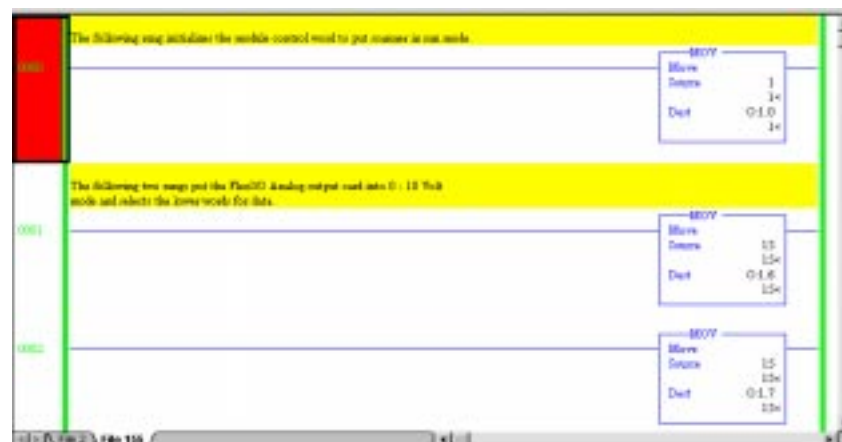
Notice in N153:2, the value changes to a 3, which commands the SMP-3 overload relay to de-energize outputs A or B.

Offset	0	1	2	3	4	5	6	7	8	9
N153:0	8201	0	3	0	0	0	0	0	0	0
N153:10	0	0	0	0	0	0	0	0	0	0

4. **Release the Stop** button.

5. Close the Data File.

You return to this screen.



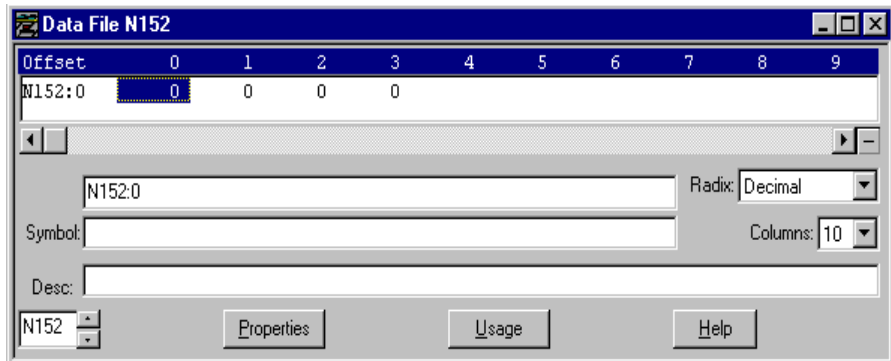
Monitoring with the Device Failure Table

Follow these directions to monitor the device failure table using RSLogix 500 software.

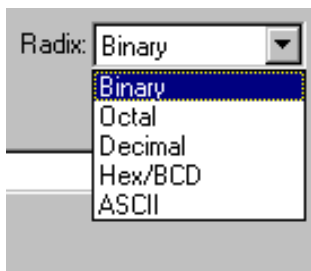
1. From *Data Files*, scroll down the list and choose **N152** by double clicking.



You see this screen.



2. Change the radix to binary format.



You see this screen.

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
N152:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N152:1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N152:2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N152:3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notice that all bits between N152:0, bit 0, and N152:3, bit 15, are 0s. These 64 bits are the device failure bits forming a bitmask with each bit representing a node between 0 and 63 decimal.

3. Disconnect the photoeye's drop line from the trunk line.

You see this screen.

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
N152:0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
N152:1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N152:2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N152:3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Verify that N152:0, bit 7, changes to a 1. Notice that 72 and 07 are alternatively flashing on the node address display of the scanner. The net status indicator flashes red indicating that station 07 has failed.

4. Reconnect the photoeye's drop line from the trunk line.

Notice that bit 7 goes back to 0 and the scanner display returns to 00.

5. Close the Data File.

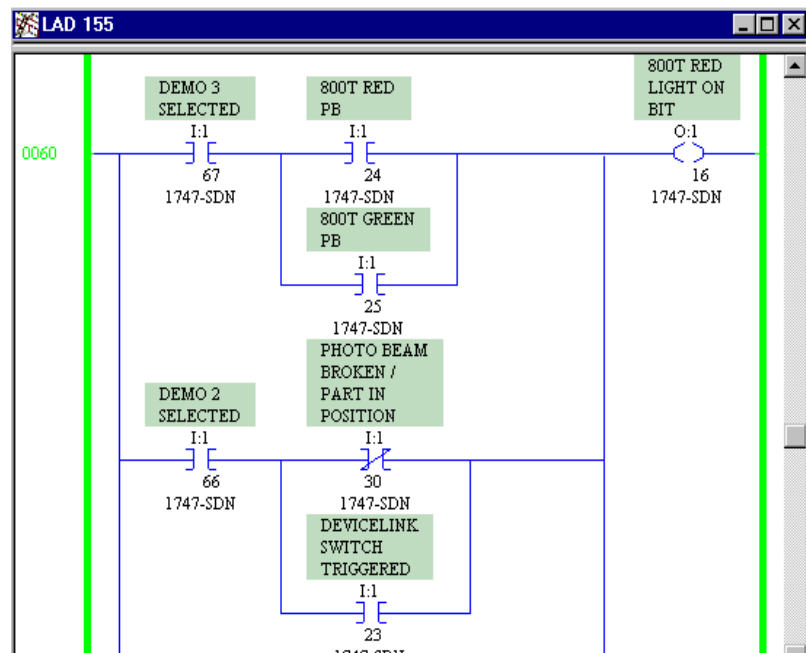
You return to this screen.



Monitoring a Rung

Follow these directions to monitor a rung on the ladder logic display using RSLogix 500 programming software.

1. Scroll down the LAD 155 screen to rung 0060.



Scrolling to 0060 advances you to rung 60, which controls bit O:1/16. Bit O:1/16 is mapped to the RediSTATION operator interface's light.

2. Rotate the selector switch until an amber 3 is illuminated on the 1794-IB16.

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Notice that the I:1/67 contact is green. Pressing the RediSTATION operator interface's Start button or Stop button causes bits I:1/24 or I:1/25 to go green. This energizes O:1/16, which is represented by the coil turning green, and turns on the RediSTATION operator interface's light.

- 3. Rotate the selector switch** until an amber 2 is illuminated on the 1794-IB16.

Notice that the I:1/66 contact is green. Putting your hand between the photoeye and the reflector causes bit I:1/30 to go green. This energizes O:1/16, which is represented by the coil turning green, and turns on the RediSTATION operator interface's light.

- 4. Minimize the RSLogix 500 programming software.**

This completes the organized laboratory exercises for DeviceNet Manager and RSLogix 500 programming software.

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