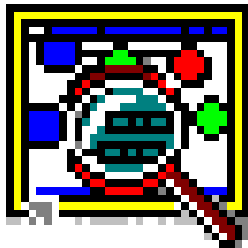




**Allen-Bradley**

**DeviceNet  
Monitor  
(9240-Mon16)**



# User Manual

Allen-Bradley HMI's

## Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes, and standards.

The illustrations, charts, sample programs, and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control* (available from your local Allen-Bradley office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this manual we use notes to make you aware of safety considerations:



**ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.

---

Attention statements help you to:

- identify a hazard
- avoid the hazard
- recognize the consequences

**Important:** Identifies information that is critical for successful application and understanding of the product.

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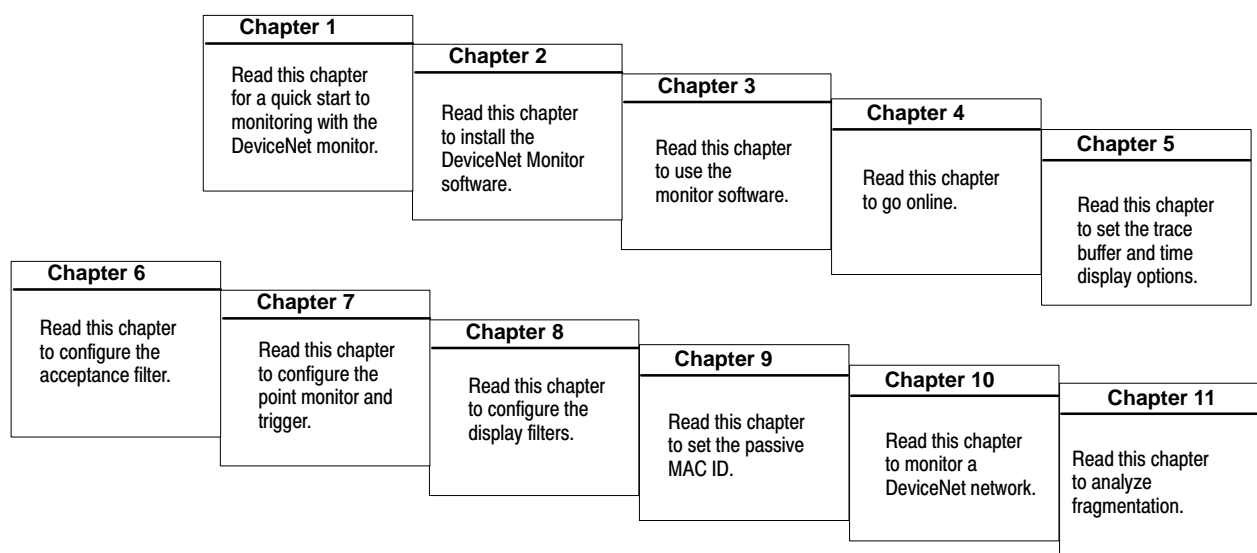
## About This Manual

Read this preface to familiarize yourself with the rest of the manual. This preface covers the following topics:

- what's in this manual
- who should use this manual
- about the conventions
- about Allen-Bradley support services

### What's in This Manual

This manual provides a general overview of the DeviceNet™ Monitor software.



### Who Should Use This Manual

This documentation is geared for control engineers, application engineers, or system integrators who need to monitor activity on the DeviceNet network.

### About the Conventions

The following conventions are used throughout the manual.

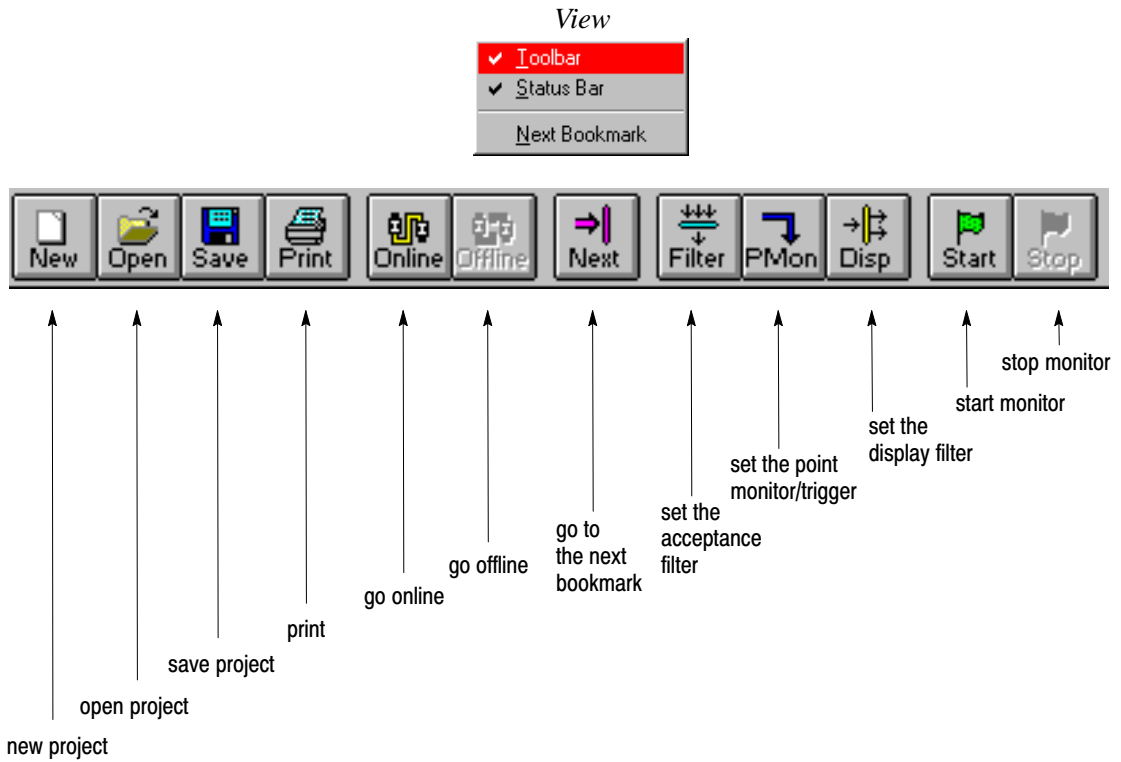
Type of text	Example
Menu names	<i>Utilities</i>
Text references to buttons	<b>OK</b>
Text that you enter	<i>setup</i>

## Understanding the Screens

This manual uses screen captures to represent the actual software. This section describes the various screen captures you'll see.

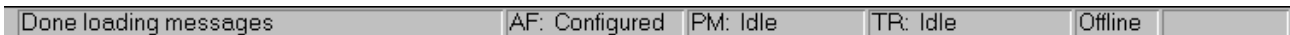
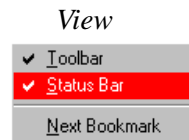
### Menu and Tool Bars

Through the *View* menu, you can toggle the tool bar or status bar menu item, choosing to show or hide the bar. A checkmark indicates that it's visible.



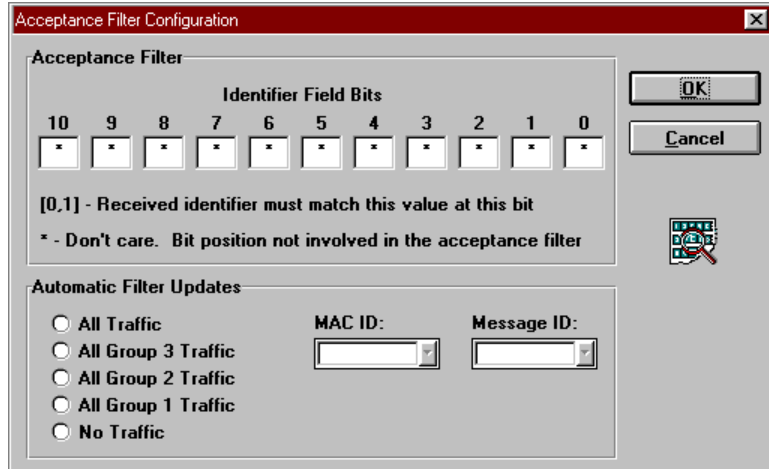
### Status Bar

The status bar appears at the bottom of your screen and provides the current status of an application.



## Dialog Boxes

Dialog boxes contain buttons you choose to cause a particular action to occur.



## Terminology

Term	Definition
CAN	(Controller Area Network) A serial communications protocol upon which the DeviceNet network is based.
MAC ID	The address of a DeviceNet node.
Message ID	The unique identifier that defines a particular connection within a message group. The message ID enables the establishment of multiple connections within a single message group.
Message Groups	The way in which the eleven CAN bits available on the DeviceNet network are divided.
Node	Hardware that has a single address on the network.

## **About Allen-Bradley Support Services**

At Allen-Bradley, customer service means experienced representatives at Customer Support Centers in key cities throughout the world for sales, service, and support. Our value-added services include:

### **Technical Support**

- SupportPlus programs
- telephone support and 24-hour emergency hotline
- software and documentation updates
- technical subscription services

### **Engineering and Field Services**

- application engineering assistance
- integration and start-up assistance
- field service
- maintenance support

### **Technical Training**

- lecture and lab courses
- self-paced computer and video-based training
- job aids and workstations
- training needs analysis

### **Repair and Exchange Services**

- your only “authorized” source
- current revisions and enhancements
- worldwide exchange inventory
- local support



## Quick Start to Monitoring a DeviceNet Network

### What's in This Chapter?

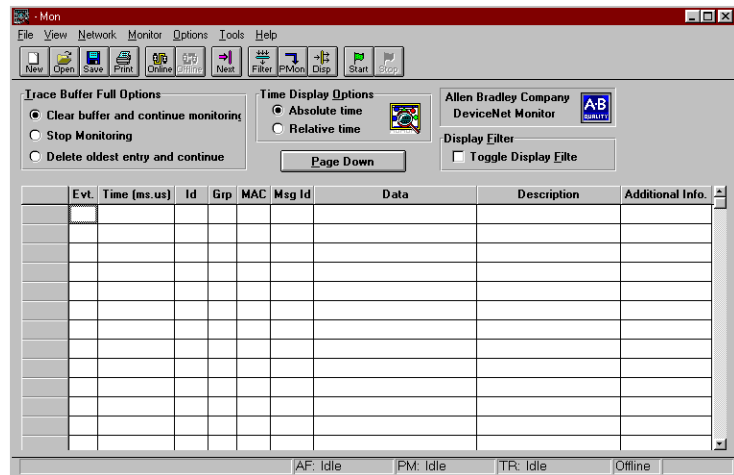
Read this chapter to quickly begin monitoring a DeviceNet network with the DeviceNet Monitor software.

### Monitoring a DeviceNet Network

Follow these directions to start monitoring a DeviceNet Network.

1. To start the monitor software, double-click on the DeviceNet Monitor icon.

You see this screen.

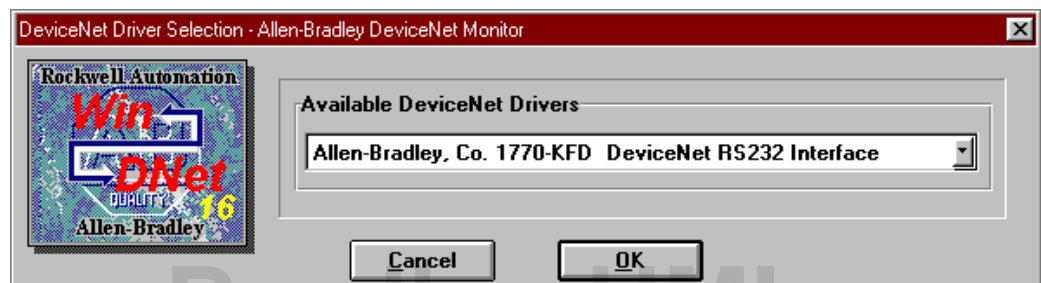


2. From the *Network* menu, choose **Connect**.

*Network*

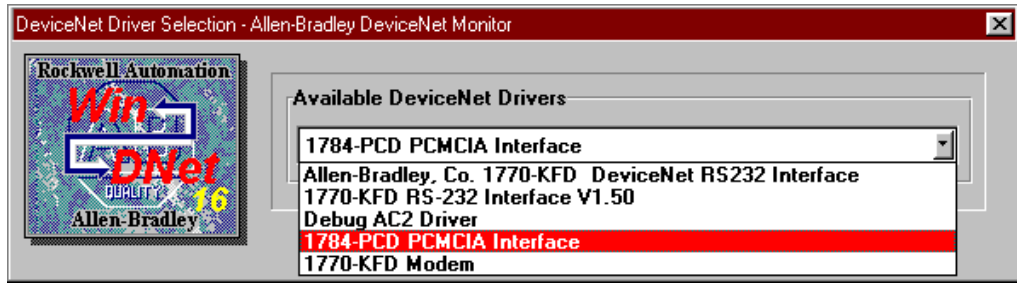


You see this screen.



Allen-Bradley HMI

3. From the pull-down menu, choose your driver.

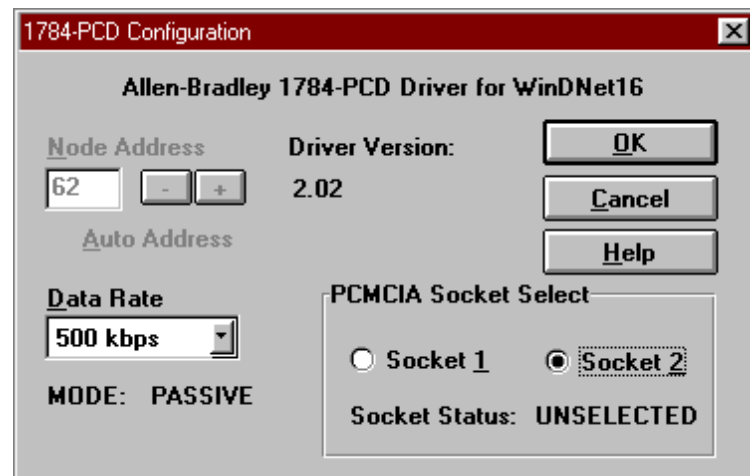


**Important:** You cannot go online with the Allen-Bradley 1770-KFD DeviceNet RS-232 interface module. You must use an interface card such as the 1784-PCD PCMCIA interface card or any other WinDNet16™ interface card.


4. Choose 

You see a screen similar to this one depending upon your driver.

*The software automatically enters your last used node address and data rate for the driver.*



**ATTENTION:** Make sure that all devices are set to the proper data rate. Attempting to go online at the wrong data rate may cause some or all devices on the network to fault.

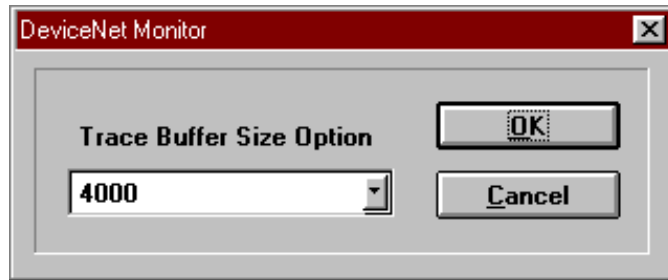
5. Select the proper settings and choose 

Once you are online, the status bar indicates you are online and the proper baud rate.



6. From the *Options* menu, choose **Set Trace Buffer Size**.

You see this screen.

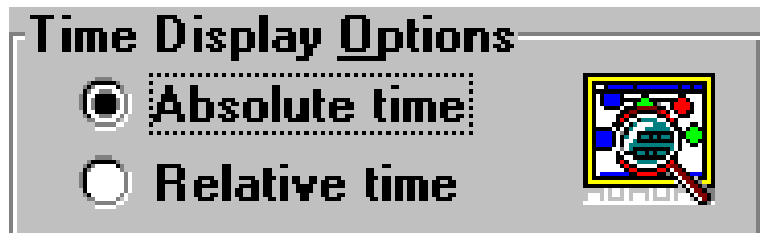


7. Click on the arrow and choose the appropriate trace buffer size.  
See page 5-1 for more information.

8. Choose 

9. Click on the radio button next to the appropriate time display option.

*This allows you to view a snapshot of the interface's "time tick" when the message was received.  
You can also view the relative time between messages by choosing the relative time option.  
All times are displayed in ms/μs.*



See page 5-2 for more information.

10. From the *Monitor* menu, choose **Start Monitor**.

*Monitor*



11. To stop the monitor, from the *Monitor* menu, choose **Stop Monitor**.

*Monitor*



Since the default configuration settings were used, all network traffic is captured in a trace buffer size of 4,000 messages.

Notice the messages are displayed.

The screenshot shows the 'Mon' window of the Allen Bradley Company DeviceNet Monitor. The interface includes a menu bar (File, View, Network, Monitor, Options, Tools, Help), a toolbar with icons for New, Open, Save, Print, Online, Offline, Next, Filter, PMon, Disp, Start, and Stop. Below the toolbar are three main sections: 'Trace Buffer Full Options' with radio buttons for 'Clear buffer and continue monitoring' (selected), 'Stop Monitoring', and 'Delete oldest entry and continue'; 'Time Display Options' with radio buttons for 'Absolute time' and 'Relative time' (selected); and 'Display Filter' with a 'Toggle Display Filter' checkbox. A 'Go To End' button is also present. The central area is a table of network messages.

	Evt.	Time (ms.us)	Id	Grp	MAC	Msg Id	Data	Description	Additional Info.
0	AF	99999.00802	3e8	1	40	15	00 00 00 00 00 00 ff 00	Slave Poll Rsp	Src Mac 40
1	AF	001.00088	3e8	1	40	15	41 00 00 00 00 00 ff ff	Slave Poll Rsp	Src Mac 40
2	AF	001.00024	3e8	1	40	15	42 00 00 00 00 00 00 00	Slave Poll Rsp	Src Mac 40
3	AF	000.00945	3e8	1	40	15	43 00 00 00 10 00 00 00	Slave Poll Rsp	Src Mac 40
4	AF	000.00950	3e8	1	40	15	44 10 00 00 00 00 00 00	Slave Poll Rsp	Src Mac 40
5	AF	000.00942	3e8	1	40	15	45 00 02 00 00 00 0c 00	Slave Poll Rsp	Src Mac 40
6	AF	000.00942	3e8	1	40	15	46 00 00 00 00 00 00 29	Slave Poll Rsp	Src Mac 40
7	AF	000.00949	3e8	1	40	15	47 00 00 00 0c 00 00 00	Slave Poll Rsp	Src Mac 40
8	AF	000.00946	3e8	1	40	15	48 02 00 00 00 16 00 00	Slave Poll Rsp	Src Mac 40
9	AF	000.00868	3e8	1	40	15	89 00 16 00	Slave Poll Rsp	Src Mac 40
10	AF	000.00340	56d	2	45	5		Mst P/COS/CYC Cmd	Dst Mac 45
11	AF	000.00152	595	2	50	5		Mst P/COS/CYC Cmd	Dst Mac 50
12	AF	000.00152	5bd	2	55	5		Mst P/COS/CYC Cmd	Dst Mac 55

At the bottom of the window, a status bar displays: Done loading messages | AF: Configured | PM: Idle | TP: Idle | Online: 500k Baud

## Installing the DeviceNet Monitor Software

### What's in This Chapter?

Read this chapter to install the DeviceNet Monitor software.

For information on	See page
Installing the software	2-1
Exiting the installation	2-4

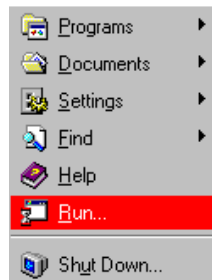
### Installing the Software

Follow these steps to install the software.

1. Start Windows.
2. Insert the software disk into the 3.5" disk drive.
3. Click on the Start button in the task bar.

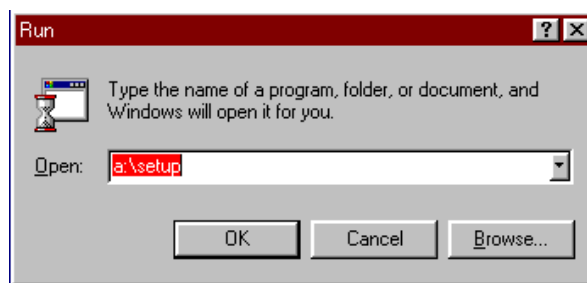


4. Choose *Run*.



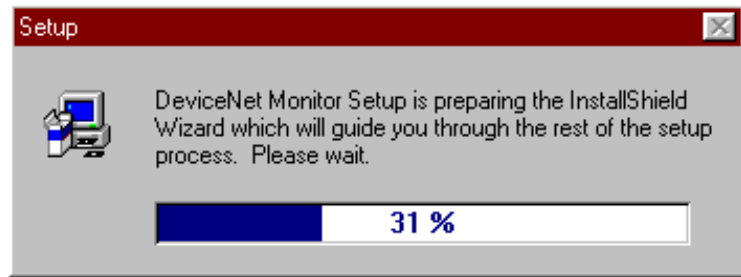
5. Type `a:\setup.exe` at the Command Line.

*If you inserted the software disk into another disk drive, use the appropriate drive letter instead of a :*

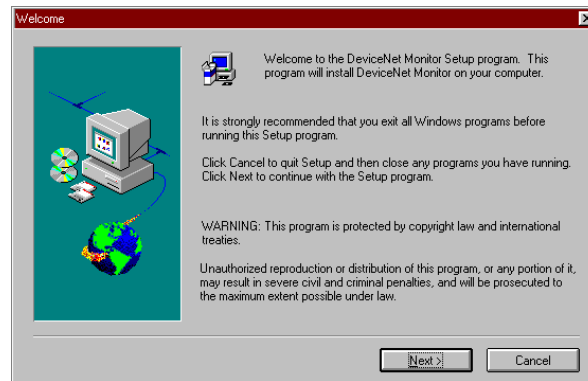



6. Choose 

You see this installation screen.

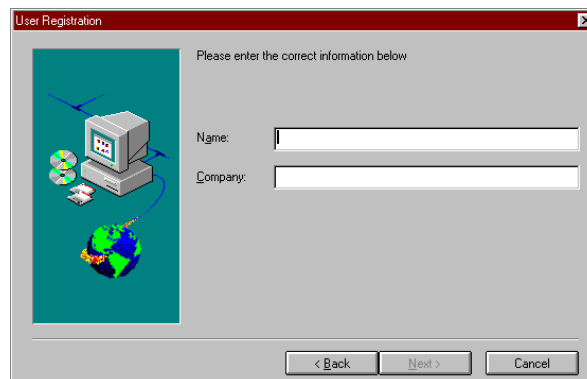


You see this screen after the setup is complete.



7. Choose  to proceed with the installation.

You see this installation screen.


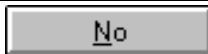


8. Click on the respective fields and enter your name and company name.

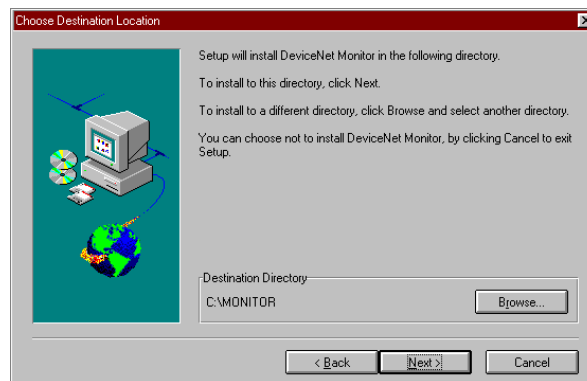
9. Choose 



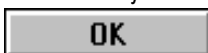
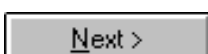
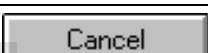
You see this screen with the information you entered.



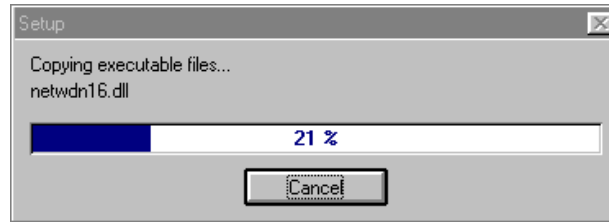
10. To	Choose
Approve the information	
Go back and make corrections	

The software creates a default directory on the host hard drive called *Who* for the test application. All other related files will be placed in this directory.

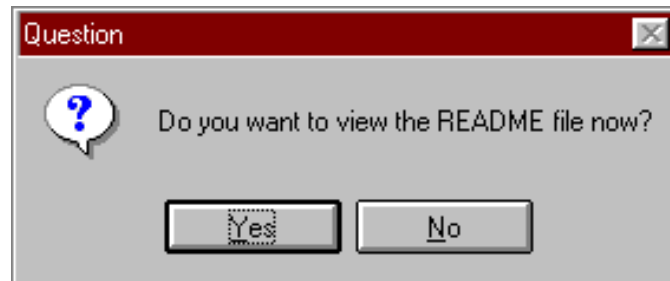


11. If you want to	Then
Use the default settings	Choose 
Change the default settings	a. Choose 
	b. Select the new directory.
	c. Choose 
	d. Choose 
Exit the installation process and go to page 2-4	Choose 

When you choose Next, you see this installation screen.

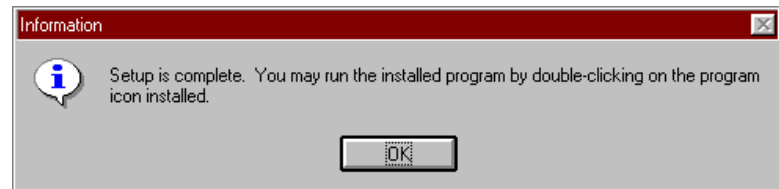


You see this message.



12. To	Choose
View the README file	<input type="button" value="Yes"/>
Continue without viewing the README file	<input type="button" value="No"/>

You see this message.



13. Choose

An icon now appears in your Program Manager.

## Exiting the Installation

When available, you may stop the installation process by choosing



## Using the Monitor Software

### What's in This Chapter?

Read this chapter to use the basic functions of the DeviceNet Monitor software.

For information on	See page
Creating a new file	3-1
Opening an existing file	3-2
Saving a file	3-3
Printing a file	3-4
Using bookmarks	3-5
Exiting the monitor software	3-6

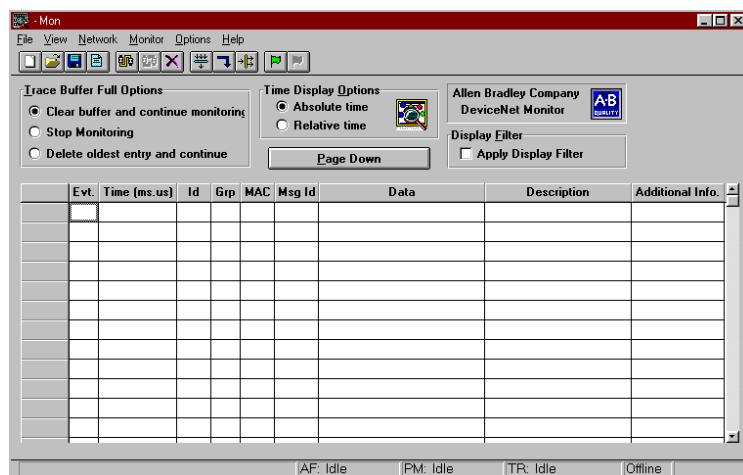
### Creating a New File

From the *File* menu, choose *New*.

*File*



You see this screen.

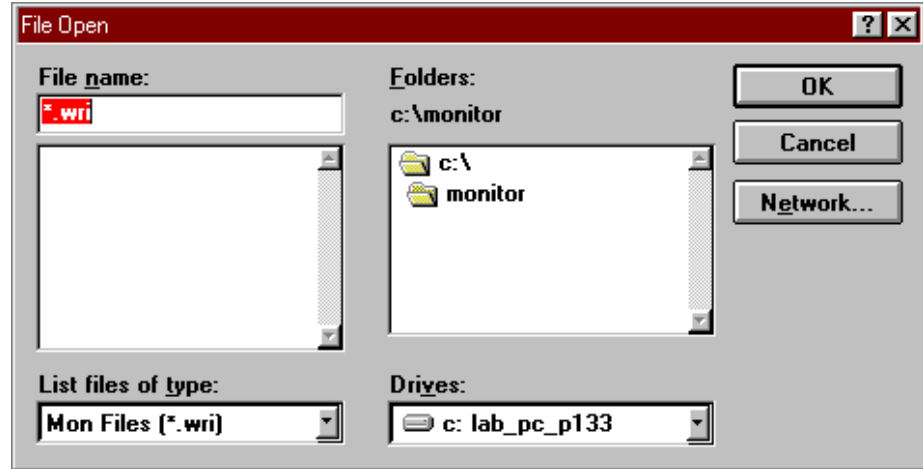


## Opening an Existing File

Follow these directions to open an existing file.

1. From the *File* menu, choose **Open**.

You see this screen.



2. Choose the appropriate drive and folder and double-click on the file name.

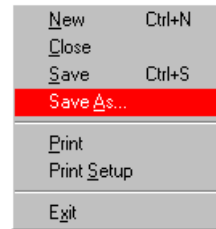
3. Choose 

## Saving a File

Follow these directions to save a file.

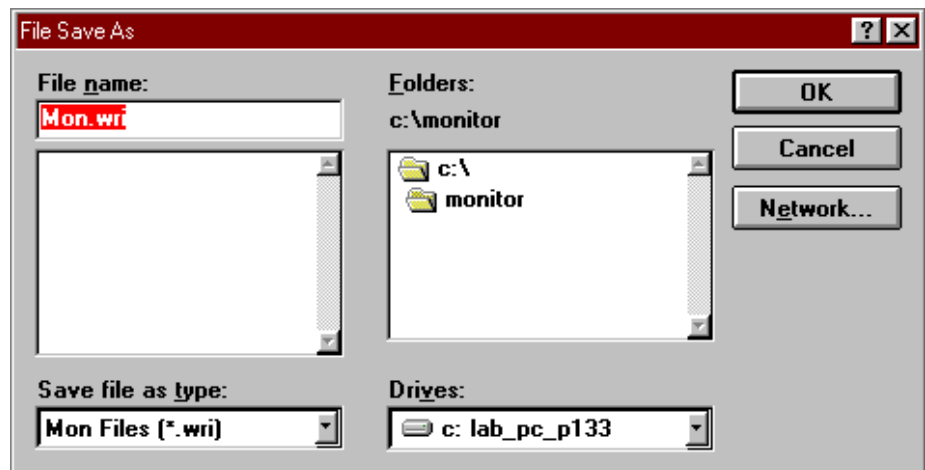
1. From the *File* menu, choose **Save As**.

*File*




If you've already named the file, from the *File* menu, choose **Save** to automatically save the file to the predetermined location.

You see this screen.



2. To save a file, enter the file name in the file name field and select the directory to which the project will be saved.

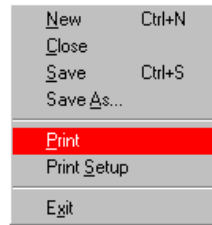
3. Choose 

## Printing a File

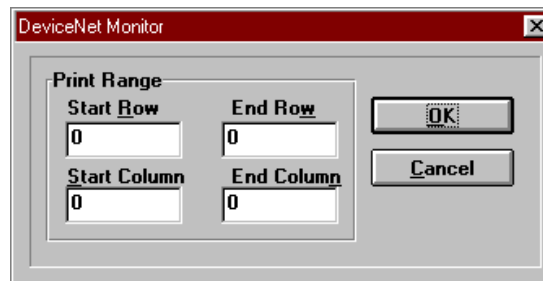
Follow these directions to print a file.


1. From the *File* menu, choose **Print**.

*File*

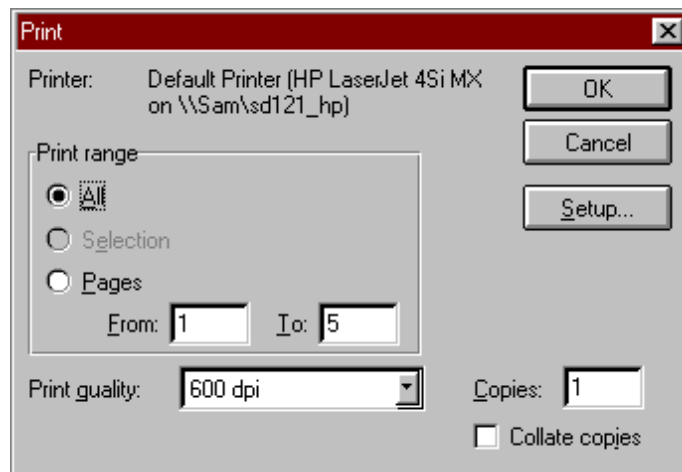


You see this screen.




2. Click in the appropriate field and enter the range of data you would like to print.
3. Choose 

You see this screen.



To access the print setup screen, from the *File* menu, choose **Print Setup**.

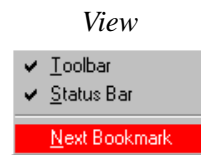
- Click on the appropriate radio button to determine how much of the file you wish to print.
- Choose 

## Using Bookmarks

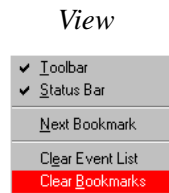
Once the messages are loaded, you can set bookmarks on specific messages.

To set a bookmark, double-click on the specific message in the left-most column (the numbered column). The text becomes red indicating it is a bookmark.

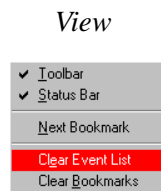
To view bookmarks you already set, from the *View* menu, choose **Next Bookmark**.



To clear a bookmark, from the *View* menu, choose **Clear Bookmark**.



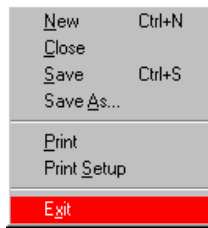
To clear the event list, from the *View* menu, choose **Clear Event List**.



## Exiting the Monitor Software

To exit the monitor software, from the *File* menu, choose **Exit**.

### *File*



If you haven't saved your changes, you see this screen.



To	Choose
Save changes to the file	<input type="button" value="Yes"/>
Exit without saving changes to the file	<input type="button" value="No"/>
Return to the application	<input type="button" value="Cancel"/>

## Online Operation

### What's in This Chapter?

Read this chapter to go online with a DeviceNet network.

For information on	See page
Going online	4-1
Going offline	4-2

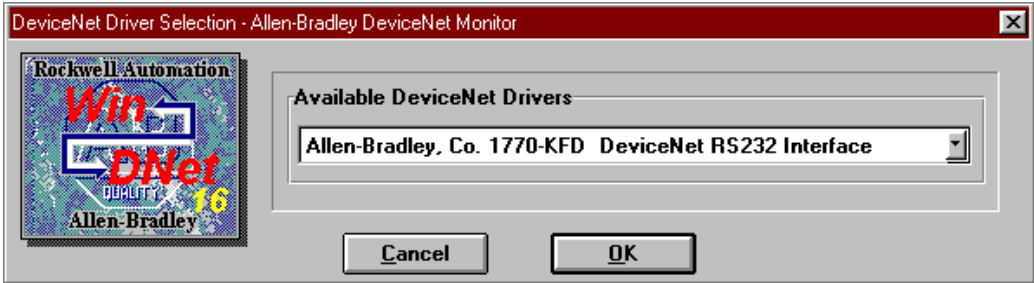
### Going Online

Follow these directions to go online.

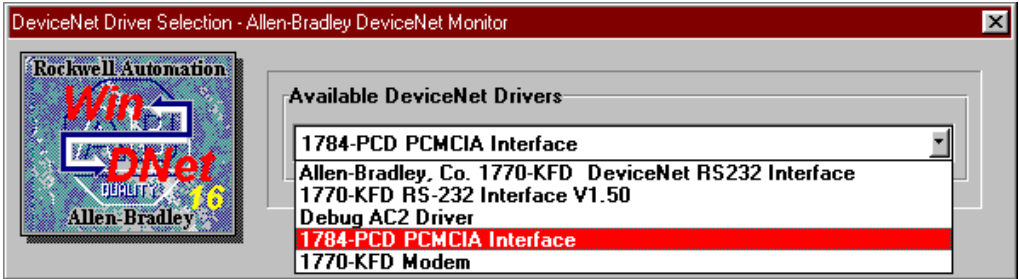
1. From the *Network* menu, choose **Connect**.



You see this screen.



2. From the pull-down menu, choose your driver.

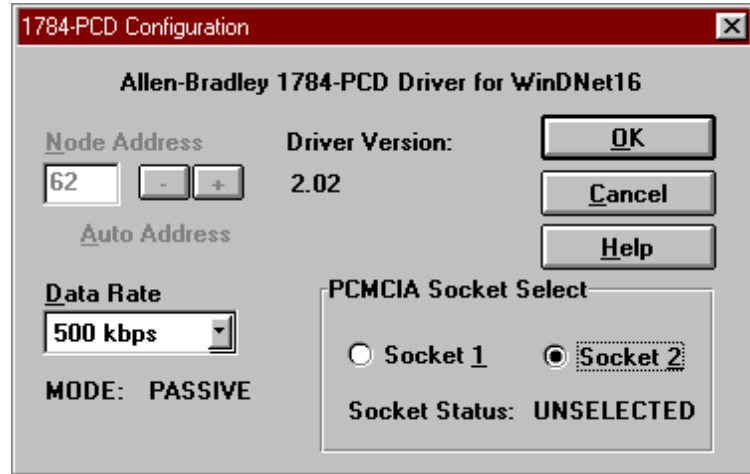


**Important:** You cannot go online with the Allen-Bradley 1770-KFD DeviceNet RS-232 interface module. You must use an interface card such as the 1784-PCD PCMCIA interface card or any other WinDNet16 interface card.


3. Choose 

You see a screen similar to this one depending upon your driver.

*The software automatically enters your last used node address and data rate for the driver.*



**ATTENTION:** Make sure that all devices are set to the proper data rate. Attempting to go online at the wrong data rate may cause some or all devices on the network to fault.

4. Select the proper settings and choose 

Once you are online, the status bar indicates you are online and the proper baud rate.



## Going Offline

To go offline, from the *Network* menu, choose **Disconnect**.





# Setting the Trace Buffer and Time Display Options

## What's in This Chapter?

Read this chapter to set the trace buffer and time display options.

For information on	See page
Setting the trace buffer options	5-1
Setting the time display options	5-2

## Setting the Trace Buffer Options

The monitor tool has the ability to capture up to 10,000 messages. This equals about 10 to 15 seconds of data on a network operating at 500k baud. However, the default is 4000 for optimum performance.

The time it takes to display data depends upon the configuration you are running:

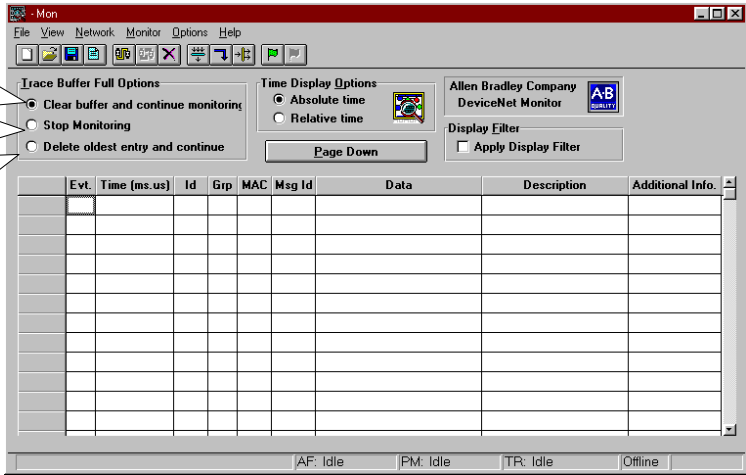
- poll and strobe only
- poll, strobe, change of state, and cyclic

Another factor in the time it takes to display data is how often changes occur in a change of state configuration.

Click on this radio button to clear the buffer once it is full and continue monitoring.

Click on this radio button to stop the monitor once the buffer is full.

Click on this radio button to delete the oldest entry and continue to monitor the network.

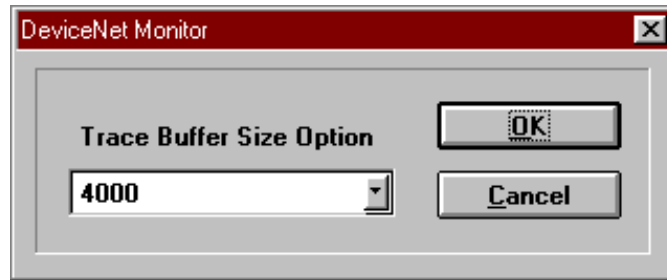


1. From the *Options* menu, choose **Set Trace Buffer Size**.

### Options



You see this screen.



2. Click on the arrow and choose the appropriate trace buffer size.

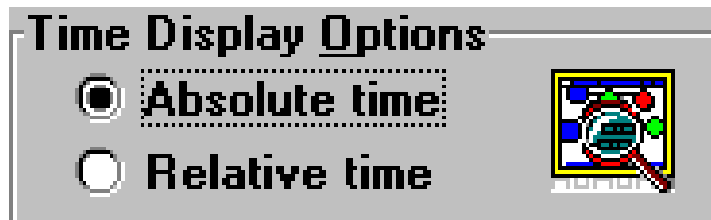
**Important:** If you are running Windows™ 95 or Windows, version 3.1, with 16MB of RAM, *do not* select a buffer size of more than 6000 bytes. Doing so can lock up your computer. You need 32MB of RAM to allow a 10000 byte buffer size.

3. Choose 

## Setting the Time Display Options

The time display option allows you to view a snapshot of the interface's "time tick" when the message was received. The time stamp default is absolute time (displayed in ms/μs).

You can also view the relative time delay between messages (displayed in ms/μs) by choosing the relative time option.



## Setting the Acceptance Filter

### What's in This Chapter?

Read this chapter to set the acceptance filter. The acceptance filter informs the DeviceNet interface which types of messages should be received and passed up to the Monitor software to be displayed.

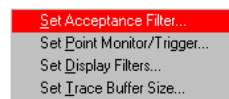
### Configuring the Acceptance Filter

Setting the acceptance filter for “All Traffic” will pass all Group 1, Group 2, and Group 3 messages to the DeviceNet Monitor software. Setting the acceptance filter to a special value (ie., Group 3, Msg ID 5, MAC ID 63) informs the software to automatically capture data for the 11-bit CAN identifier field for that particular set of values.

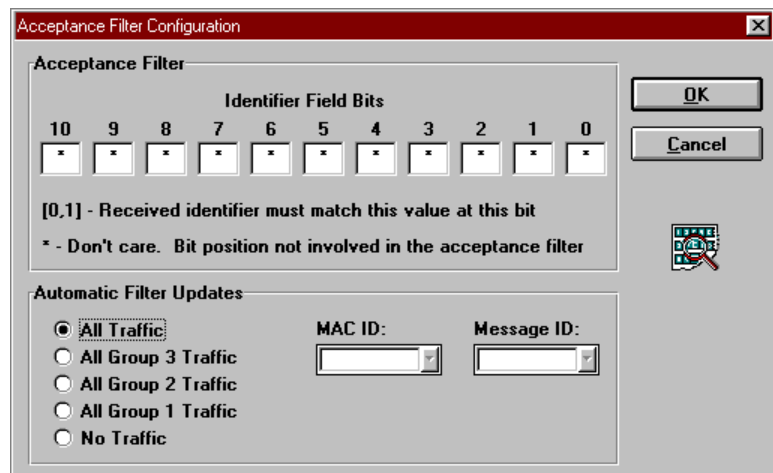
Follow these directions to configure the acceptance filter.

1. From the *Options* menu, choose **Set Acceptance Filter**.

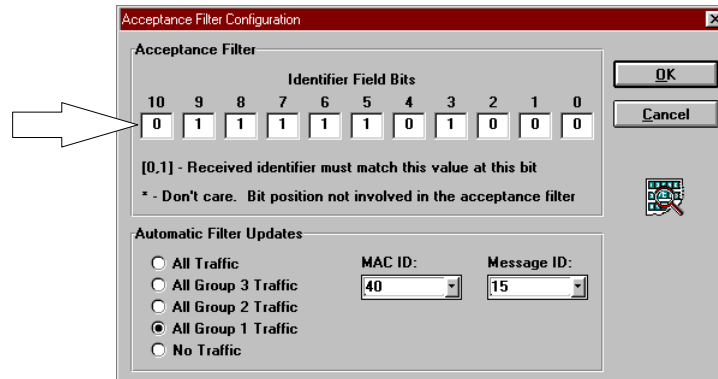
#### Options




You see this screen.



- Enter the appropriate information in the Identifier Field Bits edit box.



- Click on the radio button next to the type of messaging you would like to receive.
- If you clicked on a radio button other than All Traffic, go to step 4. If you click on the All Traffic radio button, go to step 6.
- Click on the arrow in the MAC ID field and choose the appropriate MAC ID from the list.
- Click on the arrow in the Message ID field and choose the appropriate Message ID from the list.
- Choose 

You return to the main screen.

Seq	Time (sec:ms)	Src	Dst	MAC	Msg ID	Date	Description	Additional Info
0	AP 18918.440	340	1	40	15	00 08 00 00 00 00 00	Slave Poll Resp	Src: Mac: 40
1	AP 18918.384	340	1	40	15	01 08 00 00 00 00 00	Slave Poll Resp	Src: Mac: 40
2	AP 18918.328	340	1	40	15	02 08 00 00 00 00 00	Slave Poll Resp	Src: Mac: 40
3	AP 18918.272	340	1	40	15	03 08 00 00 00 00 00	Slave Poll Resp	Src: Mac: 40
4	AP 18918.216	340	1	40	15	04 08 00 00 00 00 00	Slave Poll Resp	Src: Mac: 40
5	AP 18918.160	340	1	40	15	05 08 00 00 00 00 00	Slave Poll Resp	Src: Mac: 40
6	AP 18918.104	340	1	40	15	06 08 00 00 00 00 00	Slave Poll Resp	Src: Mac: 40
7	AP 18917.207	340	1	40	15	07 08 00 00 00 00 00	Slave Poll Resp	Src: Mac: 40
8	AP 18918.345	340	1	40	15	08 08 00 00 00 00 00	Slave Poll Resp	Src: Mac: 40
9	AP 18918.212	340	1	40	15	09 08 00 00 00 00 00	Slave Poll Resp	Src: Mac: 40
10	AP 18917.174	340	1	40	15	10 08 00 00 00 00 00	Slave Poll Resp	Src: Mac: 40
12	AP 18918.353	340	1	40	15	12 08 00 00 00 00 18	Slave Poll Resp	Src: Mac: 40

## Setting the Point Monitor and Trigger

### What's in This Chapter?

Read this chapter to set the point monitor and trigger. The point monitor and trigger begins capturing data after a pre-defined condition (trigger) has been fulfilled.

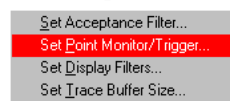
### Configuring the Point Monitor and Trigger

The point monitor and trigger allows you to start capturing data only after a particular event has occurred on the network. This event is defined by the trigger, which lets you access the bit-level of a particular event.

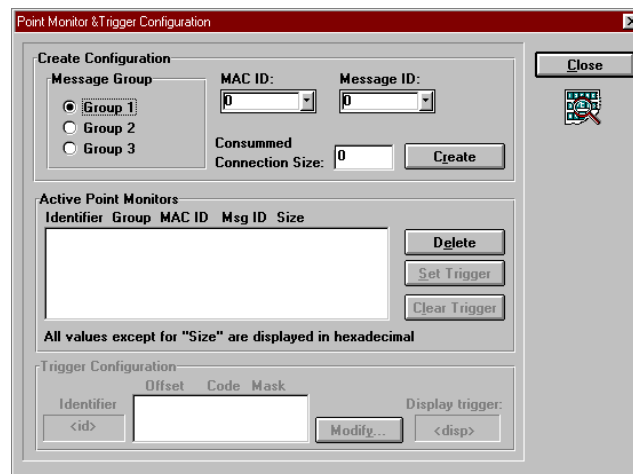
Follow these directions to configure the point monitor and set the trigger.

1. From the *Options* menu, choose **Set Point Monitor Trigger**.

#### Options



You see this screen.



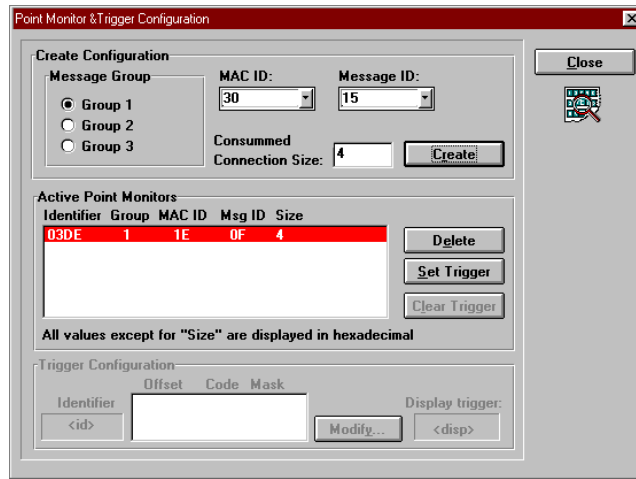
2. Click on the appropriate radio button next to the group you wish to configure.

3. Click on the arrow in the MAC ID field and choose the appropriate MAC ID from the list.
4. Click on the arrow in the Message ID field and choose the appropriate Message ID from the list.
5. Enter the consumed connection size.

The consumed connection size is the received packet data size.

6. Choose 

*Notice the screen updates to include the new information.*



7. Once you've finished creating point monitors, click on the point monitor for which you would like to set a trigger.

8. Choose 

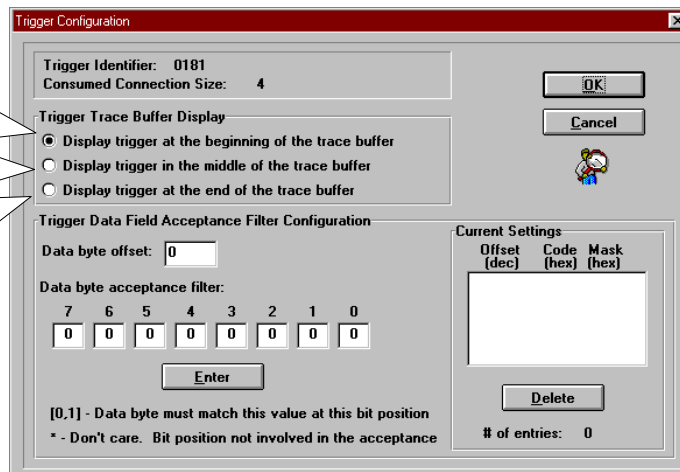
9. Choose 

You see this screen.

*Click on this radio button to capture data after the trigger has been detected.*

*Click on this radio button to capture data before and after the trigger has been detected.*

*Click on this radio button to capture data before the trigger was detected.*



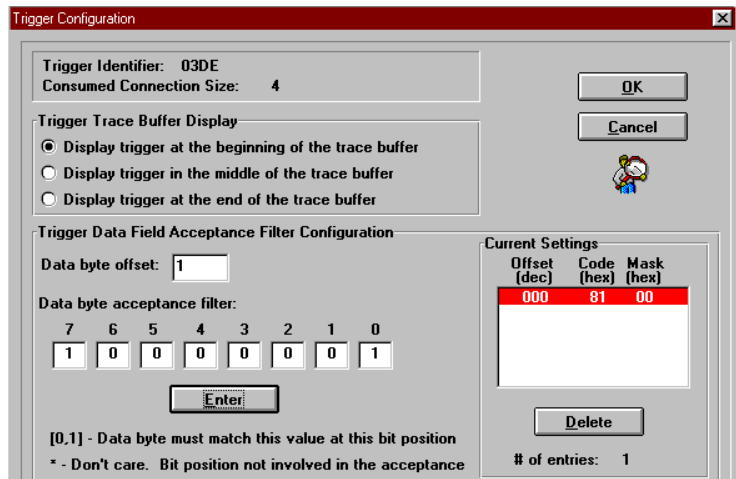
10. Click on the radio button next to the appropriate trigger trace buffer display option.

This will be automatically filled in if you choose **Enter**.

11. Click in the Data Byte Offset field and enter the appropriate value.

12. Enter the data byte acceptance filter in the appropriate fields.

13. Choose 



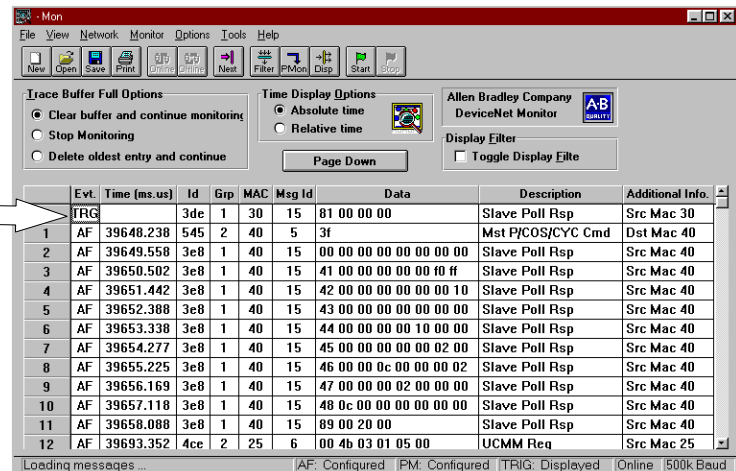
14. Choose 

You return to the Point Monitor and Trigger configuration screen.

15. Choose 

You return to the main screen.

Notice the trigger and then data is captured.



## Setting the Display Filters

### What's in This Chapter?

Read this chapter to set the display filters. The display filters further separate the messages once the monitor has stopped and all necessary data has been captured.

### Configuring the Display Filters

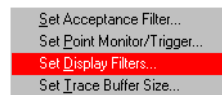


Follow these directions to configure the display filters.

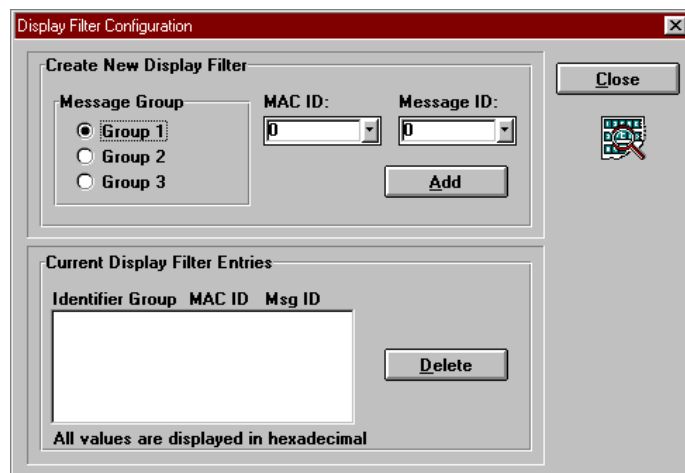
You can filter after the monitor has captured data or even offline. You can even bring up an existing file, and set the display filters then.

1. From the *Options* menu, choose **Set Display Filters**.

#### *Options*



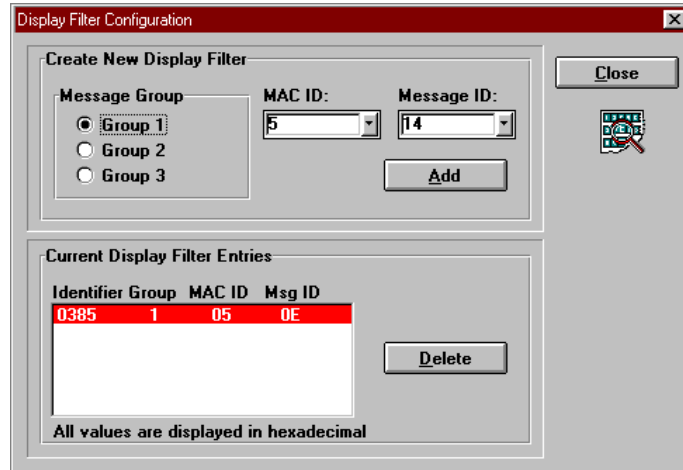
You see this screen.



2. Click on the appropriate radio button next to the group you wish to configure.
3. Click on the arrow in the MAC ID field and choose the appropriate MAC ID from the list.
4. Click on the arrow in the Message ID field and choose the appropriate Message ID from the list.



5. Choose 

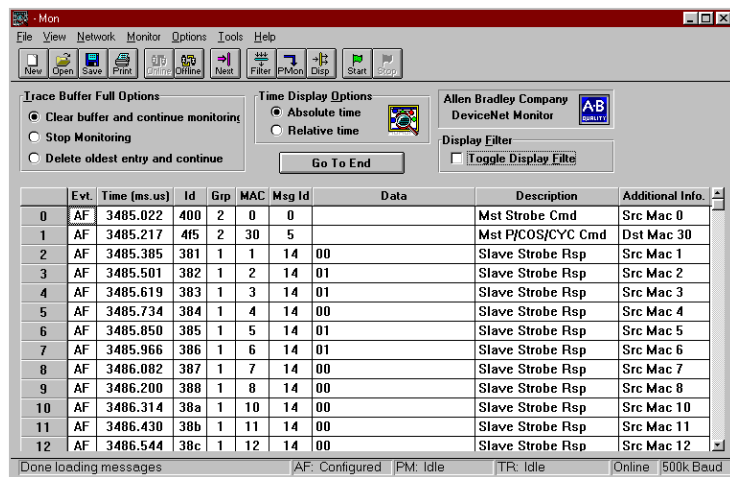


6. Choose 

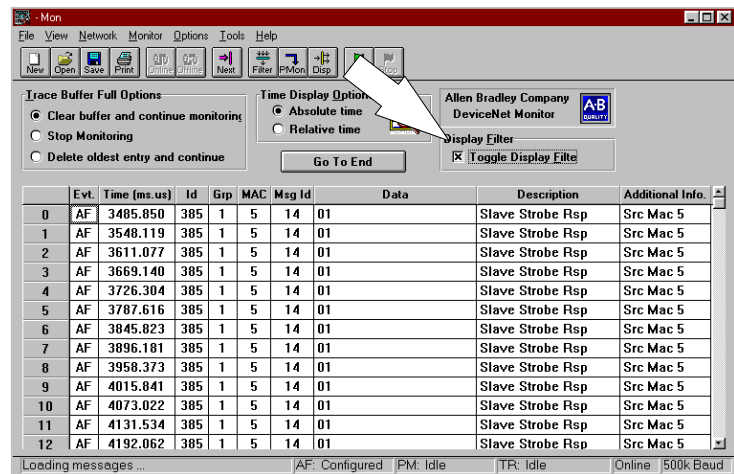
You return to the main screen.

7. Begin monitoring the network.



Once the monitor has captured the data, if the display filter check box is not marked, all data will appear in the list.



If the display filter check box is marked, only the data you set appears in the list.



### Deleting a Display Filter

1. Click on the current display filter you wish to delete so it is highlighted.
2. Choose 
3. Choose 

## Setting the Passive MAC ID

### What's in This Chapter?

Read this chapter to set the passive MAC ID option.

### Configuring the Passive MAC ID

The passive MAC ID displays a list of active nodes on a network by doing a who and listening for nodes talking on the network.

If a node is not displayed, it does not necessarily indicate that the node is not present. It may only indicate that the node was not active during the listening period.

The passive MAC ID listens to the network for a period of 60 seconds. You may decrease this time by choosing the **STOP** button.

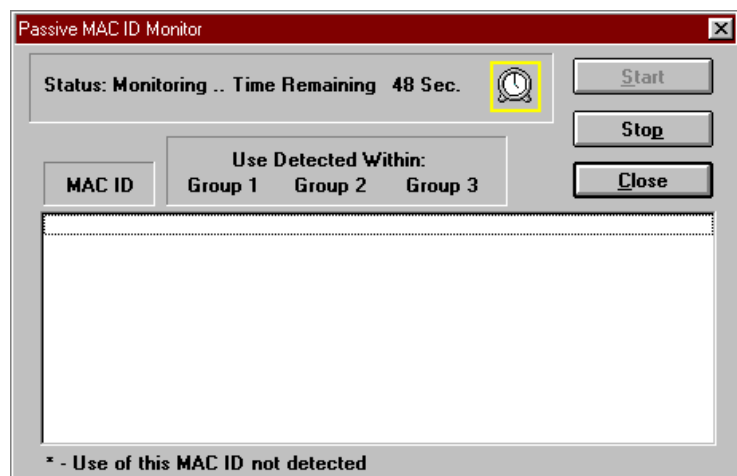
Follow these directions to configure the passive MAC ID.

1. From the *Tools* menu, choose **Passive MAC IDs**.

*Tools*

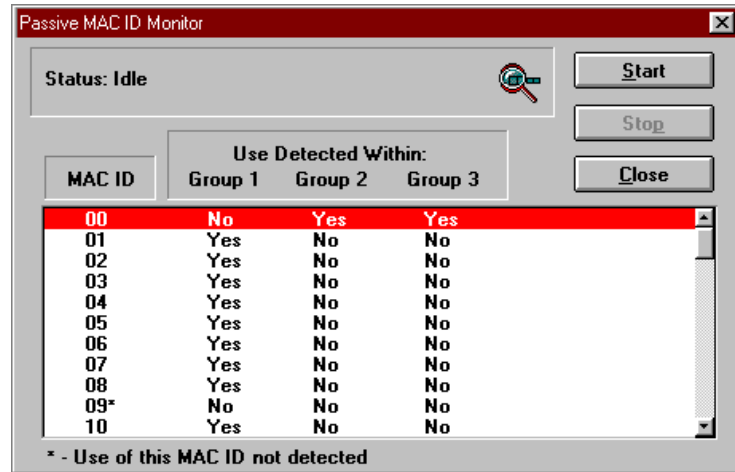
Passive MAC Ids...

You see this screen.

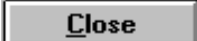


2. To activate the passive MAC ID tool, choose **Start**

Once 60 seconds has passed, you will see the active nodes on the network.



To stop the passive MAC ID tool before 60 seconds, choose 

3. Once you've finished viewing the passive MAC IDs, choose 

## Monitoring a DeviceNet Network

### What's in This Chapter?

Read this chapter to monitor a DeviceNet network once all of your parameters are set.

### Monitoring a DeviceNet Network

Follow these directions to start monitoring a DeviceNet Network.

**Important:** You must be online to monitor traffic on a DeviceNet network.

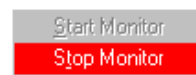
1. From the *Monitor* menu, choose **Start Monitor**.

*Monitor*



2. To stop the monitor, from the *Monitor* menu, choose **Stop Monitor**.

*Monitor*



Since the default configuration settings were used, all network traffic is captured in a trace buffer size of 4,000 messages.

Notice the messages are displayed.

Evt.	Time (ms.us)	Id	Grp	MAC	Msg Id	Data	Description	Additional Info.
0	AF 99999.00802	3e8	1	40	15	00 00 00 00 00 10 ff 00	Slave Poll Rsp	Src Mac 40
1	AF 001.00088	3e8	1	40	15	41 00 00 00 00 00 ff ff	Slave Poll Rsp	Src Mac 40
2	AF 001.00024	3e8	1	40	15	42 00 00 00 00 00 00 00	Slave Poll Rsp	Src Mac 40
3	AF 000.00945	3e8	1	40	15	43 00 00 00 10 00 00 00	Slave Poll Rsp	Src Mac 40
4	AF 000.00950	3e8	1	40	15	44 10 00 00 00 00 00 00	Slave Poll Rsp	Src Mac 40
5	AF 000.00942	3e8	1	40	15	45 00 02 00 00 00 0c 00	Slave Poll Rsp	Src Mac 40
6	AF 000.00942	3e8	1	40	15	46 00 00 00 00 00 00 29	Slave Poll Rsp	Src Mac 40
7	AF 000.00949	3e8	1	40	15	47 00 00 00 0c 00 00 00	Slave Poll Rsp	Src Mac 40
8	AF 000.00946	3e8	1	40	15	48 02 00 00 00 16 00 00	Slave Poll Rsp	Src Mac 40
9	AF 000.00868	3e8	1	40	15	89 00 16 00	Slave Poll Rsp	Src Mac 40
10	AF 000.00340	56d	2	45	5		Mst P/COS/CYC Cmd	Dst Mac 45
11	AF 000.00152	595	2	50	5		Mst P/COS/CYC Cmd	Dst Mac 50
12	AF 000.00152	5bd	2	55	5		Mst P/COS/CYC Cmd	Dst Mac 55

## Analyzing Fragmentation

### What's in This Chapter?

Read this chapter to begin understanding fragmentation using several examples from the DeviceNet Monitor Tool software.

### Understanding Fragmentation Examples

In the following fragmentation examples, the 1771-SDN scanner module and the 1794-ADN FLEX I/O adapter module are configured for change of state messaging.

The 1771-SDN scanner module is the master at node 1.  
The 1794-ADN FLEX I/O adapter module is the slave at node 13.

Transmitting and receiving sizes for the 1794-ADN adapter are relative to the 1771-SDN scanner module as it is the master.

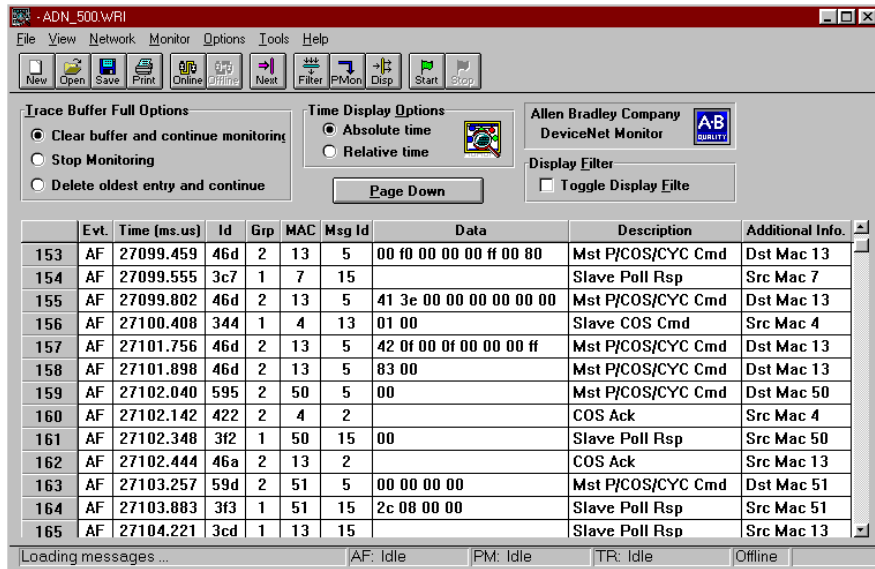
These are the 1794-ADN byte sizes:

- Tx (transmit) size 22 bytes
- Rx (receive) size 30 bytes

Slot	Module	Tx Size (bytes)	Rx Size (bytes)
—	1794-ADN	0	2
0	1794-OB16	2	2
1	1794-IB16	2	2
2	1794-IE8	2	18
3	1794-OE4	12	2
4	1794-IA8	2	2
5	1794-OA8	2	2

For more information about packet structures, refer to Volume I of the ODVA DeviceNet Communication Model and Protocol, release 2.0, section 4-4.1.

### Analyzing Buffer 153 (Master's Change of State)



The data captured for buffer 153 is described in the table below.

**00 f0 00 00 00 ff 00 80**

Byte(s)	Data	Description
0	00	This is the first fragment. Packet count is 0.
1 and 2	f0 00	This is the 1794-OB16 output data from the 1771-SDN scanner where f0 is the low byte (terminals 00 to 07) and 00 is the high byte (terminals 08 to 15).
3 and 4	00 00	This is the 1794-IB16 output data from the 1771-SDN scanner where 00 is the low byte and 00 is the high byte for the delay time.
5 and 6	ff 00	This is for the 1794-IE8/A. Since the appropriate bits are set to 1 in byte 5, the channels default to -10 to +10V dc.
7	80	This is for the 1794-OE4/A. This is the low byte of channel 0.

### Analyzing Buffer 155 (Master's Change of State)

The screenshot shows the Allen Bradley Company DeviceNet Monitor software. The main window displays a table of captured packets. The table has columns for Evt., Time (ms.us), Id, Grp, MAC, Msg Id, Data, Description, and Additional Info. Packet 155 is highlighted, showing a Master P/COS/CYC Command with data 41 3e 00 00 00 00 00 00.

Evt.	Time (ms.us)	Id	Grp	MAC	Msg Id	Data	Description	Additional Info.
155	27099.802	46d	2	13	5	41 3e 00 00 00 00 00 00	Mst P/COS/CYC Cmd	Dst Mac 13
156	27100.408	344	1	4	13	01 00	Slave COS Cmd	Src Mac 4
157	27101.756	46d	2	13	5	42 0f 00 0f 00 00 00 ff	Mst P/COS/CYC Cmd	Dst Mac 13
158	27101.898	46d	2	13	5	83 00	Mst P/COS/CYC Cmd	Dst Mac 13
159	27102.040	595	2	50	5	00	Mst P/COS/CYC Cmd	Dst Mac 50
160	27102.142	422	2	4	2		COS Ack	Src Mac 4
161	27102.348	3f2	1	50	15	00	Slave Poll Rsp	Src Mac 50
162	27102.444	46a	2	13	2		COS Ack	Src Mac 13
163	27103.257	59d	2	51	5	00 00 00 00	Mst P/COS/CYC Cmd	Dst Mac 51
164	27103.883	3f3	1	51	15	2c 08 00 00	Slave Poll Rsp	Src Mac 51
165	27104.221	3cd	1	13	15		Slave Poll Rsp	Src Mac 13
166	27106.638	34d	1	13	13	00 c0 00 00 00 01 00 70	Slave COS Cmd	Src Mac 13
167	27107.708	34d	1	13	13	41 00 00 00 60 00 58 00	Slave COS Cmd	Src Mac 13

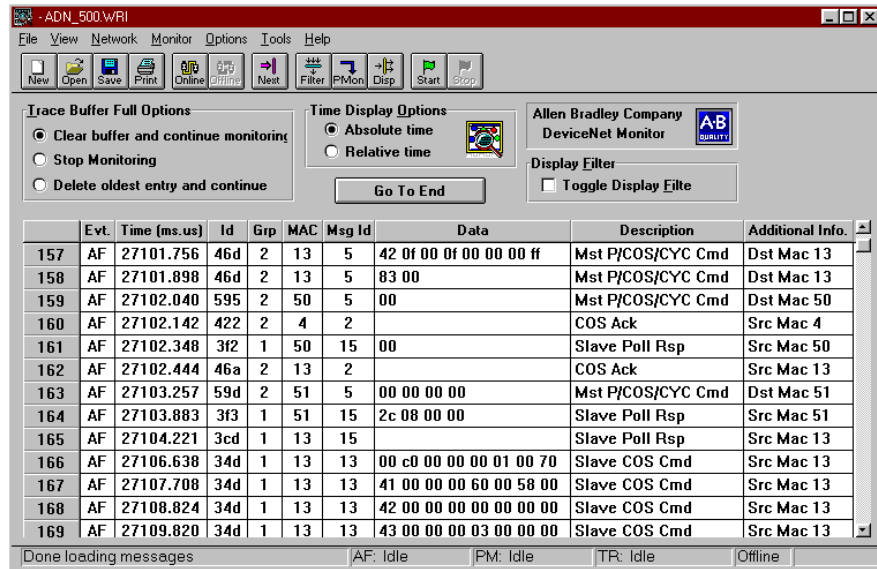
The data captured for buffer 155 is described in the table below.

**41 3e 00 00 00 00 00 00**

Byte(s)	Data	Description
0	41	This is the middle fragment. Packet count is 1.
1	3e	This is the high byte of channel 0s data for 1794-OE4.
2 and 3	00 00	This is data from the 1794-OE4s channel 1.
4 and 5	00 00	This is data from the 1794-OE4s channel 2.
6 and 7	00 00	This is data from the 1794-OE4s channel 3.



### Analyzing Buffer 157 (Master's Change of State)



The data captured for buffer 157 is described in the table below.

#### 42 0f 00 0f 00 00 00 ff

Byte(s)	Data	Description
0	42	This is the middle fragment. Packet count is 2.
1 and 2	0f 00	Multiplex control of the 1794-OE4. Use words 0, 1, 2, and 3 as directed by the channel number n. That is, use the analog-data value and not the safe-state value.
3 and 4	0f 00	Full range bits for the individual channels are in byte 3, which is the value 0f. Only the lower nibble, bits 0 to 3, is actually used. Byte 4 has the configure-select bits. This has the value 00. Actually only bits 8 to 11 are used. Since the full-range bits are "1" and the configure-select bits are "0", select 0 to 10V dc/0 to 20mA.
5 and 6	00 00	Bits 0 to 2 in byte 5 have the delay times for the 1794-IA8.
7	ff	This is the lower byte of the 1794-OA8 data terminals 0 to 7.

### Analyzing Buffer 158 (Master's Change of State)

The screenshot shows the Allen Bradley Company DeviceNet Monitor software. The main window displays a table of network events. Event 158 is selected, showing a Master Poll Command (Mst P/COS/CYC Cmd) with data '83 00' and destination MAC '13'. The interface includes various control buttons and options for monitoring and displaying data.

Evt.	Time (ms.us)	Id	Grp	MAC	Msg Id	Data	Description	Additional Info.
158	27101.898	46d	2	13	5	83 00	Mst P/COS/CYC Cmd	Dst Mac 13
159	27102.040	595	2	50	5	00	Mst P/COS/CYC Cmd	Dst Mac 50
160	27102.142	422	2	4	2		COS Ack	Src Mac 4
161	27102.348	3f2	1	50	15	00	Slave Poll Rsp	Src Mac 50
162	27102.444	46a	2	13	2		COS Ack	Src Mac 13
163	27103.257	59d	2	51	5	00 00 00 00	Mst P/COS/CYC Cmd	Dst Mac 51
164	27103.883	3f3	1	51	15	2c 08 00 00	Slave Poll Rsp	Src Mac 51
165	27104.221	3cd	1	13	15		Slave Poll Rsp	Src Mac 13
166	27106.638	34d	1	13	13	00 c0 00 00 00 01 00 70	Slave COS Cmd	Src Mac 13
167	27107.708	34d	1	13	13	41 00 00 00 60 00 58 00	Slave COS Cmd	Src Mac 13
168	27108.824	34d	1	13	13	42 00 00 00 00 00 00 00	Slave COS Cmd	Src Mac 13
169	27109.820	34d	1	13	13	43 00 00 00 03 00 00 00	Slave COS Cmd	Src Mac 13
170	27110.717	34d	1	13	13	84 00 00	Slave COS Cmd	Src Mac 13

The data captured for buffer 158 is described in the table below.

#### 83 00

Byte(s)	Data	Description
0	83	The upper nibble "8" indicates this is the final fragment. The lower nibble "3" indicates this is packet count 3.
1	00	This is the upper byte of the data from 1794-OA8. This byte is not usually used.

## Analyzing Buffer 162 (Master's Change of State Ack)

The screenshot shows the Allen Bradley DeviceNet Monitor software interface. The main window displays a table of network events. The table has columns for Event Number, Event Type, Time (ms.us), ID, Group, MAC, Message ID, Data, Description, and Additional Info. Event 162 is highlighted, showing it is a COS Ack from Src Mac 13. Other events include Mst P/COS/CYC Cmds and Slave Poll Rsp/Slave COS Cmds from various source MACs.

	Evt.	Time (ms.us)	Id	Grp	MAC	Msg Id	Data	Description	Additional Info.
162	AF	27102.444	46a	2	13	2		COS Ack	Src Mac 13
163	AF	27103.257	59d	2	51	5	00 00 00 00	Mst P/COS/CYC Cmd	Dst Mac 51
164	AF	27103.883	3f3	1	51	15	2c 08 00 00	Slave Poll Rsp	Src Mac 51
165	AF	27104.221	3cd	1	13	15		Slave Poll Rsp	Src Mac 13
166	AF	27106.638	34d	1	13	13	00 c0 00 00 00 01 00 70	Slave COS Cmd	Src Mac 13
167	AF	27107.708	34d	1	13	13	41 00 00 00 60 00 58 00	Slave COS Cmd	Src Mac 13
168	AF	27108.824	34d	1	13	13	42 00 00 00 00 00 00 00	Slave COS Cmd	Src Mac 13
169	AF	27109.820	34d	1	13	13	43 00 00 00 03 00 00 00	Slave COS Cmd	Src Mac 13
170	AF	27110.717	34d	1	13	13	84 00 00	Slave COS Cmd	Src Mac 13
171	AF	27110.831	42d	2	5	5	03	Mst P/COS/CYC Cmd	Dst Mac 5
172	AF	27111.215	3c5	1	5	15		Slave Poll Rsp	Src Mac 5
173	AF	27111.917	485	2	16	5	01 00 00 00	Mst P/COS/CYC Cmd	Dst Mac 16
174	AF	27112.155	346	1	6	13	01	Slave COS Cmd	Src Mac 6

The data captured for buffer 162 is described in the table below.

### *Nothing*

This is the master's change of state ack of data previously received from slave node 13.

## Analyzing Buffer 165 (Slave's Change of State Ack)

The screenshot shows the Allen Bradley Company DeviceNet Monitor software interface. The main window displays a table of captured network events. The table has columns for Event (Evt.), Time (ms.us), Id, Grp, MAC, Msg Id, Data, Description, and Additional Info. The event at buffer 165 is highlighted, showing it is an AF (Absolute Frame) event with a time of 271104.221 ms.us, Id 3cd, Grp 1, MAC 13, and Msg Id 15. The description is 'Slave Poll Rsp' and the source MAC is 'Src Mac 13'.

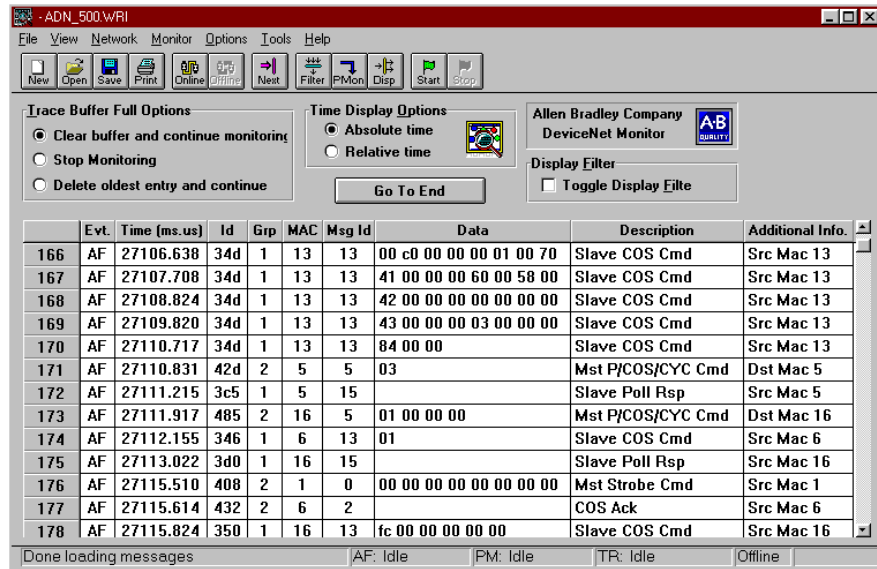
	Evt.	Time (ms.us)	Id	Grp	MAC	Msg Id	Data	Description	Additional Info.
165	AF	27104.221	3cd	1	13	15		Slave Poll Rsp	Src Mac 13
166	AF	27106.638	34d	1	13	13	00 c0 00 00 00 01 00 70	Slave COS Cmd	Src Mac 13
167	AF	27107.708	34d	1	13	13	41 00 00 00 60 00 58 00	Slave COS Cmd	Src Mac 13
168	AF	27108.824	34d	1	13	13	42 00 00 00 00 00 00 00	Slave COS Cmd	Src Mac 13
169	AF	27109.820	34d	1	13	13	43 00 00 00 03 00 00 00	Slave COS Cmd	Src Mac 13
170	AF	27110.717	34d	1	13	13	84 00 00	Slave COS Cmd	Src Mac 13
171	AF	27110.831	42d	2	5	5	03	Mst P/COS/CYC Cmd	Dst Mac 5
172	AF	27111.215	3c5	1	5	15		Slave Poll Rsp	Src Mac 5
173	AF	27111.917	485	2	16	5	01 00 00 00	Mst P/COS/CYC Cmd	Dst Mac 16
174	AF	27112.155	346	1	6	13	01	Slave COS Cmd	Src Mac 6
175	AF	27113.022	3d0	1	16	15		Slave Poll Rsp	Src Mac 16
176	AF	27115.510	408	2	1	0	00 00 00 00 00 00 00 00	Mst Strobe Cmd	Src Mac 1
177	AF	27115.614	432	2	6	2		COS Ack	Src Mac 6

The data captured for buffer 165 is described in the table below.

### *Nothing*

This is the slave's (node 13) change of state ack of data received from the master.

### Analyzing Buffer 166 (Slave's Change of State)



The data captured for buffer 166 is described in the table below.

**00 c0 00 00 00 01 00 70**

Byte(s)	Data	Description
0	00	This is the first fragment. Packet count is 0.
1 and 2	c0 00	This is the 1794-ADN adapter status word.
3 and 4	00 00	This word of data from the 1794-OB16 is not used and should be set to 0.
5 and 6	01 00	This is the input data from the 1794-IB16. This data 01 is the data from terminals 0 to 7. The data 00 is from terminals 8 to 15.
7	70	This is the low byte of data from the 1794-IE8s channel 0 data.

### Analyzing Buffer 167 (Slave's Change of State)

	Evt.	Time (ms.us)	Id	Grp	MAC	Msg Id	Data	Description	Additional Info.
	167	AF 27107.708	34d	1	13	13	41 00 00 00 60 00 58 00	Slave COS Cmd	Src Mac 13
	168	AF 27108.824	34d	1	13	13	42 00 00 00 00 00 00 00	Slave COS Cmd	Src Mac 13
	169	AF 27109.820	34d	1	13	13	43 00 00 00 03 00 00 00	Slave COS Cmd	Src Mac 13
	170	AF 27110.717	34d	1	13	13	84 00 00	Slave COS Cmd	Src Mac 13
	171	AF 27110.831	42d	2	5	5	03	Mst P/COS/CYC Cmd	Dst Mac 5
	172	AF 27111.215	3c5	1	5	15		Slave Poll Rsp	Src Mac 5
	173	AF 27111.917	485	2	16	5	01 00 00 00	Mst P/COS/CYC Cmd	Dst Mac 16
	174	AF 27112.155	346	1	6	13	01	Slave COS Cmd	Src Mac 6
	175	AF 27113.022	3d0	1	16	15		Slave Poll Rsp	Src Mac 16
	176	AF 27115.510	408	2	1	0	00 00 00 00 00 00 00 00	Mst Strobe Cmd	Src Mac 1
	177	AF 27115.614	432	2	6	2		COS Ack	Src Mac 6
	178	AF 27115.824	350	1	16	13	fc 00 00 00 00 00	Slave COS Cmd	Src Mac 16
	179	AF 27115.940	38b	1	11	14	00	Slave Strobe Rsp	Src Mac 11

The data captured for buffer 167 is described in the table below.

**41 00 00 00 60 00 58 00**

Byte(s)	Data	Description
0	41	This is the middle fragment. Packet count is 1.
1	00	This is the high-data byte from the 1794-IE8s channel 0.
2 and 3	00 00	Data from the 1794-IE8s channel 1.
4 and 5	60 00	This is data from the 1794-IE8s channel 2.
6 and 7	58 00	This is data from the 1794-IE8s channel 3.

### Analyzing Buffer 168 (Slave's Change of State)

The screenshot shows the Allen Bradley DeviceNet Monitor software interface. The main window displays a table of captured messages. The message at buffer 168 is highlighted, showing its details in the table below.

Evt.	Time (ms.us)	Id	Grp	MAC	Msg Id	Data	Description	Additional Info.
168	27108.824	34d	1	13	13	42 00 00 00 00 00 00 00	Slave COS Cmd	Src Mac 13
169	27109.820	34d	1	13	13	43 00 00 00 03 00 00 00	Slave COS Cmd	Src Mac 13
170	27110.717	34d	1	13	13	84 00 00	Slave COS Cmd	Src Mac 13
171	27110.831	42d	2	5	5	03	Mst P/COS/CYC Cmd	Dst Mac 5
172	27111.215	3c5	1	5	15		Slave Poll Rsp	Src Mac 5
173	27111.917	485	2	16	5	01 00 00 00	Mst P/COS/CYC Cmd	Dst Mac 16
174	27112.155	346	1	6	13	01	Slave COS Cmd	Src Mac 6
175	27113.022	3d0	1	16	15		Slave Poll Rsp	Src Mac 16
176	27115.510	408	2	1	0	00 00 00 00 00 00 00 00	Mst Strobe Cmd	Src Mac 1
177	27115.614	432	2	6	2		COS Ack	Src Mac 6
178	27115.824	350	1	16	13	fc 00 00 00 00 00	Slave COS Cmd	Src Mac 16
179	27115.940	38b	1	11	14	00	Slave Strobe Rsp	Src Mac 11
180	27116.054	38c	1	12	14	00	Slave Strobe Rsp	Src Mac 12

The data captured for buffer 168 is described in the table below.

**42 00 00 00 00 00 00 00**

Byte(s)	Data	Description
0	42	This is a middle fragment. Packet count is 2.
1 and 2	00 00	This is data from the 1794-IE8s channel 4.
3 and 4	00 00	This is data from the 1794-IE8s channel 5.
5 and 6	00 00	This is data from the 1794-IE8s channels 6.
7	00	This is data from the 1794-IE8s channel 7. This is the lower data byte only.

## Analyzing Buffer 169 (Slave's Change of State)

The screenshot shows the Allen Bradley Company DeviceNet Monitor software. The main window displays a list of network events. Event 169 is selected, showing a Slave COS Cmd with data 43 00 00 00 03 00 00 00. The interface includes a menu bar (File, View, Network, Monitor, Options, Tools, Help), a toolbar with icons for New, Open, Save, Print, Online, Offline, Next, Filter, PMon, Disp, Start, and Stop, and a control panel with options for Trace Buffer Full Options, Time Display Options, and Display Filter.

	Evt.	Time (ms.us)	Id	Grp	MAC	Msg Id	Data	Description	Additional Info.
	169	AF 27109.820	34d	1	13	13	43 00 00 00 03 00 00 00	Slave COS Cmd	Src Mac 13
	170	AF 27110.717	34d	1	13	13	84 00 00	Slave COS Cmd	Src Mac 13
	171	AF 27110.831	42d	2	5	5	03	Mst P/COS/CYC Cmd	Dst Mac 5
	172	AF 27111.215	3c5	1	5	15		Slave Poll Rsp	Src Mac 5
	173	AF 27111.917	485	2	16	5	01 00 00 00	Mst P/COS/CYC Cmd	Dst Mac 16
	174	AF 27112.155	346	1	6	13	01	Slave COS Cmd	Src Mac 6
	175	AF 27113.022	3d0	1	16	15		Slave Poll Rsp	Src Mac 16
	176	AF 27115.510	408	2	1	0	00 00 00 00 00 00 00 00	Mst Strobe Cmd	Src Mac 1
	177	AF 27115.614	432	2	6	2		COS Ack	Src Mac 6
	178	AF 27115.824	350	1	16	13	fc 00 00 00 00 00	Slave COS Cmd	Src Mac 16
	179	AF 27115.940	38b	1	11	14	00	Slave Strobe Rsp	Src Mac 11
	180	AF 27116.054	38c	1	12	14	00	Slave Strobe Rsp	Src Mac 12
	181	AF 27116.169	38e	1	14	14	00	Slave Strobe Rsp	Src Mac 14

The data captured for buffer 169 is described in the table below.

**43 00 00 00 03 00 00 00**

Byte(s)	Data	Description
0	43	This is a middle fragment. Packet count is 3.
1	00	This is upper data byte from the 1794-IE8s channel 7.
2 and 3	00 00	These bytes are also from the 1794-IE8. The lower byte, byte 2, gives us the under range bits for 4 to 20mA. This does not apply to this set up. The upper byte has only the most significant bit being used. This is for the power-up bit.
4 and 5	03 00	These two bytes are status information from the 1794-OE4.
6 and 7	00 00	This is the input data from the 1794-IA8.



### Analyzing Buffer 170 (Slave's Change of State)

The screenshot shows the 'ADN\_500 vRI' window with a menu bar (File, View, Network, Monitor, Options, Tools, Help) and a toolbar. The main area contains control panels for 'Trace Buffer Full Options', 'Time Display Options', and 'Display Filter'. Below these is a table of captured messages.

	Evt.	Time (ms.us)	Id	Grp	MAC	Msg Id	Data	Description	Additional Info.
170	AF	27110.717	34d	1	13	13	84 00 00	Slave COS Cmd	Src Mac 13
171	AF	27110.831	42d	2	5	5	03	Mst P/COS/CYC Cmd	Dst Mac 5
172	AF	27111.215	3c5	1	5	15		Slave Poll Rsp	Src Mac 5
173	AF	27111.917	485	2	16	5	01 00 00 00	Mst P/COS/CYC Cmd	Dst Mac 16
174	AF	27112.155	346	1	6	13	01	Slave COS Cmd	Src Mac 6
175	AF	27113.022	3d0	1	16	15		Slave Poll Rsp	Src Mac 16
176	AF	27115.510	408	2	1	0	00 00 00 00 00 00 00 00	Mst Strobe Cmd	Src Mac 1
177	AF	27115.614	432	2	6	2		COS Ack	Src Mac 6
178	AF	27115.824	350	1	16	13	fc 00 00 00 00 00	Slave COS Cmd	Src Mac 16
179	AF	27115.940	38b	1	11	14	00	Slave Strobe Rsp	Src Mac 11
180	AF	27116.054	38c	1	12	14	00	Slave Strobe Rsp	Src Mac 12
181	AF	27116.169	38e	1	14	14	00	Slave Strobe Rsp	Src Mac 14
182	AF	27116.265	46a	2	13	2		COS Ack	Src Mac 13

The data captured for buffer 170 is described in the table below.

#### 84 00 00

Byte(s)	Data	Description
0	84	This is the final fragment. The packet count is 4.
1 and 2	00 00	This is from the 1794-OA8. This data is not really used and should be set to 0.

## Analyzing Buffer 182 (Master's Change of State Ack)

The screenshot shows the Allen Bradley Company DeviceNet Monitor software. The interface includes a menu bar (File, View, Network, Monitor, Options, Tools, Help), a toolbar with icons for New, Open, Save, Print, Online, Offline, Next, Filter, PMon, Disp, Start, and Stop. Below the toolbar are three main sections: 'Trace Buffer Full Options' with radio buttons for 'Clear buffer and continue monitoring', 'Stop Monitoring', and 'Delete oldest entry and continue'; 'Time Display Options' with radio buttons for 'Absolute time' and 'Relative time'; and 'Display Filter' with a 'Toggle Display Filter' checkbox. A 'Go To End' button is also present. The main area is a table with the following columns: Evt., Time (ms.us), Id, Grp, MAC, Msg Id, Data, Description, and Additional Info.

Evt.	Time (ms.us)	Id	Grp	MAC	Msg Id	Data	Description	Additional Info.
182	AF 27116.265	46a	2	13	2		COS Ack	Src Mac 13
183	AF 27117.328	482	2	16	2		COS Ack	Src Mac 16
184	AF 27117.876	4cd	2	25	5	1a 20 00 38	Mst P/COS/CYC Cmd	Dst Mac 25
185	AF 27118.236	595	2	50	5	00	Mst P/COS/CYC Cmd	Dst Mac 50
186	AF 27118.574	59d	2	51	5	00 00 00 00	Mst P/COS/CYC Cmd	Dst Mac 51
187	AF 27118.742	3d9	1	25	15	0d 8e 00 00	Slave Poll Rsp	Src Mac 25
188	AF 27118.986	34d	1	13	13	00 c0 00 00 00 00 c8	Slave COS Cmd	Src Mac 13
189	AF 27119.105	3f2	1	50	15	00	Slave Poll Rsp	Src Mac 50
190	AF 27119.273	3f3	1	51	15	2c 08 00 00	Slave Poll Rsp	Src Mac 51
191	AF 27120.254	34d	1	13	13	41 00 00 00 d8 00 e0 00	Slave COS Cmd	Src Mac 13
192	AF 27121.241	34d	1	13	13	42 e8 00 d8 00 d8 00 e0	Slave COS Cmd	Src Mac 13
193	AF 27122.257	34d	1	13	13	43 00 00 00 03 00 00 00	Slave COS Cmd	Src Mac 13
194	AF 27123.153	34d	1	13	13	84 00 00	Slave COS Cmd	Src Mac 13

At the bottom of the window, there are status indicators: 'Done loading messages', 'AF: Idle', 'PM: Idle', 'TR: Idle', and 'Offline'.

*Nothing*

This is the master's change of state ack of data it received from the 1794-ADN adapter.

Pub. Name DeviceNet Monitor User Manual

Cat. No. 9240-Mon16 Pub. No. 1787-6.5.8 Pub. Date June 1997 Part No. 955129-06

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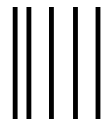
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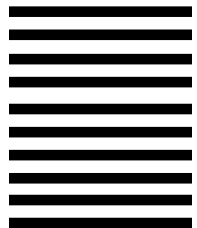
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