

# **CAN 2.0 Analysis**

**with**

# **frontline<sup>®</sup> NetDecoder<sup>™</sup>**

# **User Manual**

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## Chapter 1 Introduction

This manual contains hardware and software setup information for using the Frontline NetDecoder to analyze CAN 2.0 networks.

This manual contains the setup instructions for CAN 2.0 using the Molex SST-DN4-USB interface card.

### 1.1 Computer Minimum System Requirements

Frontline supports the following computer systems configurations:

- Operating System: Windows 7/8/10
- USB Port: USB 2.0 High-Speed or or later

The Frontline software must operate on a computer with the following minimum characteristics.

- Processor: Core i5 processor at 2.7 GHz
- RAM: 1 GB minimum, 2 GB recommended
- Free Hard Disk Space on C: drive: 20 GB

### 1.2 Frontline NetDecoder Software

The Frontline NetDecoder software must be installed on the host computer. The software can be downloaded from <http://fte.com/products/NetDecoder-download.aspx>.

**Note:** The NetDecoder software installation requires a Frontline CC-Link ComProbe, RS-422/485 ComProbe, RS-232 ComProbe II, or Ethernet ComProbe hardware.



## Chapter 2 CAN Analysis Using Molex SST-DN4-USB Interface Module

This section contains hardware setup instructions for the Molex SST-DN4-USB.

1. Configuring the Molex SST-DN4-USB module.

**Note:** This step must be completed before starting to capture DeviceNet or other CAN-based networks.

2. Setup instructions for using the NetDecoder to capture CAN traffic.

### 2.1 Software and Driver installation

Download the Molex software and driver from <http://www.molex.com/molex/mysst/searchBrad.action?partnumber=SST-DN4-USB>. Download version 13.10 or higher.

Follow the manufacturer's instructions to install the software and drivers.

### 2.2 Hardware Setup

1. Connect the Molex SST-DN4-USB module to the USB TypeB connector on the module's cable.

**Note:** The DeviceNet software should be installed prior to connecting the interface module on the computer.

2. Connect the other end of the USB cable to a High-Speed USB 2.0 Type A port on the host computer.
3. Connect the Molex SST-DN4-USB module to a CAN network.

### 2.3 SST Interface Card Setup to Capture CAN Data

To capture CAN data using the Frontline NetDecoder, the CAN I/O must be configured followed by setting CAN capture filters.

**Note:** You must complete [Software and Driver installation on page 3](#) before starting this procedure.

### 2.3.1 Adding SST-DN4-USB Card Alias

Card aliases are used by an application to access Molex DeviceNet scanner modules. Each DeviceNet channel that exists in a system must be assigned a unique name.

1. From the Window **Start, SST, DeviceNet Software Suite, DeviceNet Remote Diagnostics.**
2. Click on the **Config** tab.

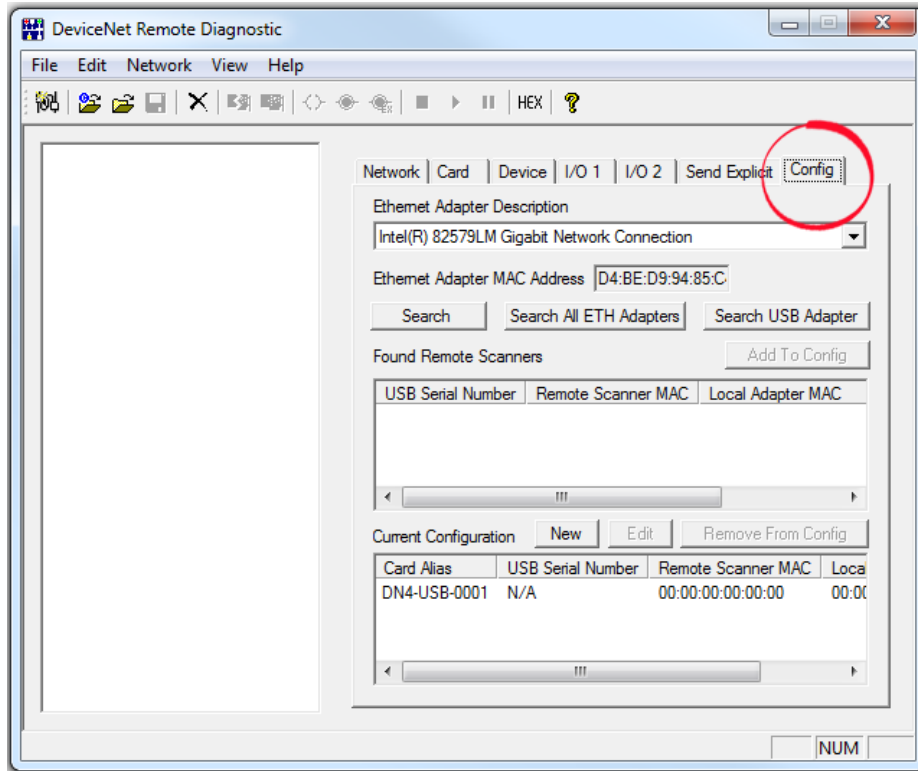


Figure 2.1 - DeviceNet Remote Diagnostics Config Tab.

3. Click on the **Search USB Adapter** button to locate the connected USB scanner.



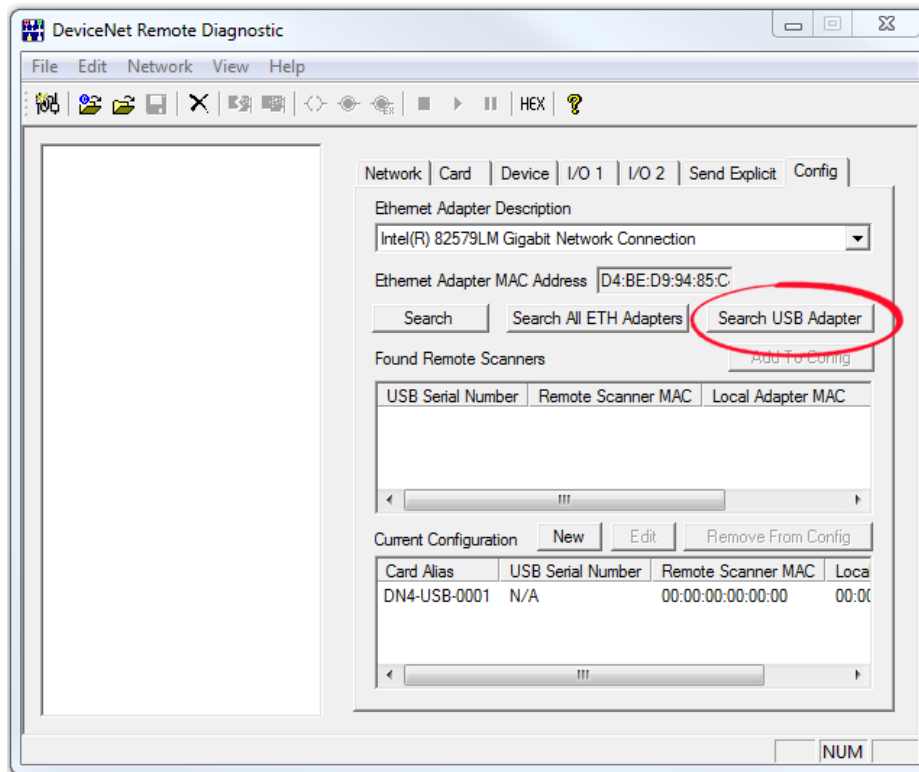


Figure 2.2 - DeviceNet Remote Diagnostics Search USB Adapter

4. In the **Found Remote Scanners** list click on the USB device, and click on the **Add to Config** button.

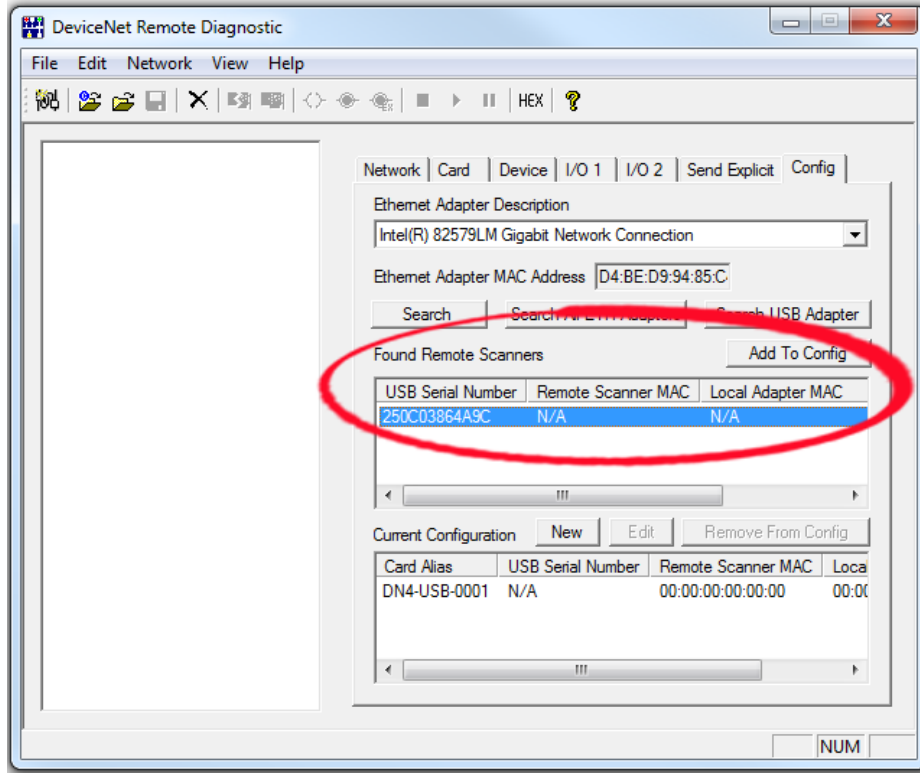


Figure 2.3 - DeviceNet Remote Diagnostics Add to Config

- 5. The **ADD USB Remote Scanner Serial** dialog opens. In the **Card Alias** enter an alias for the connected USB scanner. The alias can be any name. In this example, this is the second DN4-USB to be configured.

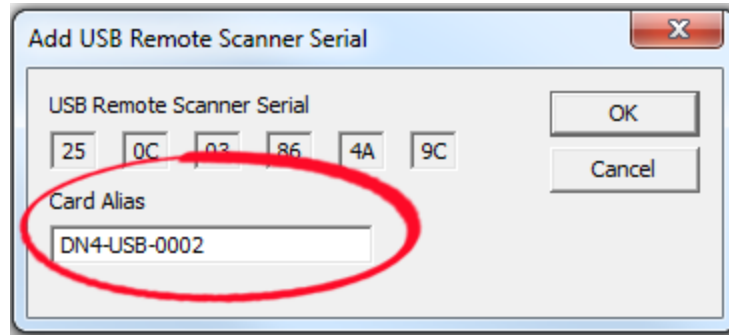


Figure 2.4 - DeviceNet Remote Diagnostics Set Alias

Click the **OK** button when finished and the USB device is added to the **Current Configuration** list.

The SST-DN4-USB is now installed and named on your computer or system and is ready to be used to capture CAN data.

### 2.3.2 NetDecoder CAN 2.0 Capture Settings

1. If the **DeviceNet I/O Settings** dialog is already open proceed to [In the CAN I/O Settings dialog, select the Device Setup tab. on page 7](#), otherwise, from the Windows **Start** select **All Programs, Frontline NetDecoder <version#>, Frontline NetDecoder**.

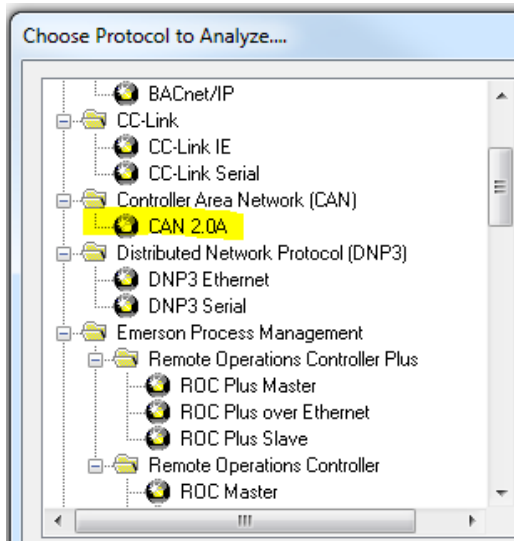


Figure 2.5 - Choose the CAN 2.0A Protocol

- a. In the **Choose Protocol to Analyze**, select **Controller Area Network (CAN)**.
  - b. Select **CAn 2.0A** and then click the **Run** button.
  - c. Then choose **Hardware Settings** from the **Options** menu on the **Control** window.
2. Then choose **Hardware Settings** from the **Options** menu on the **Control** window.

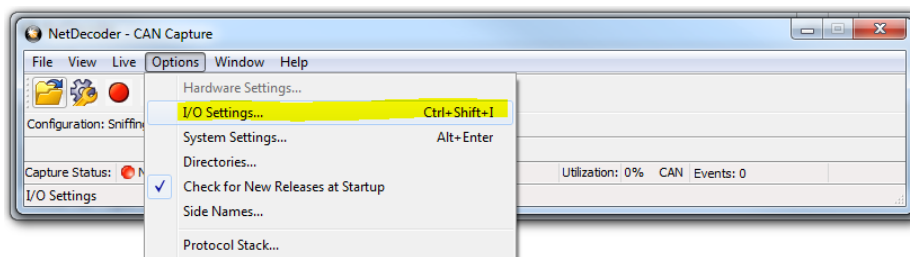


Figure 2.6 - CAN Capture Control Window

3. In the **CAN I/O Settings** dialog, select the **Device Setup** tab.  
The settings tabs are discussed in the following sections.

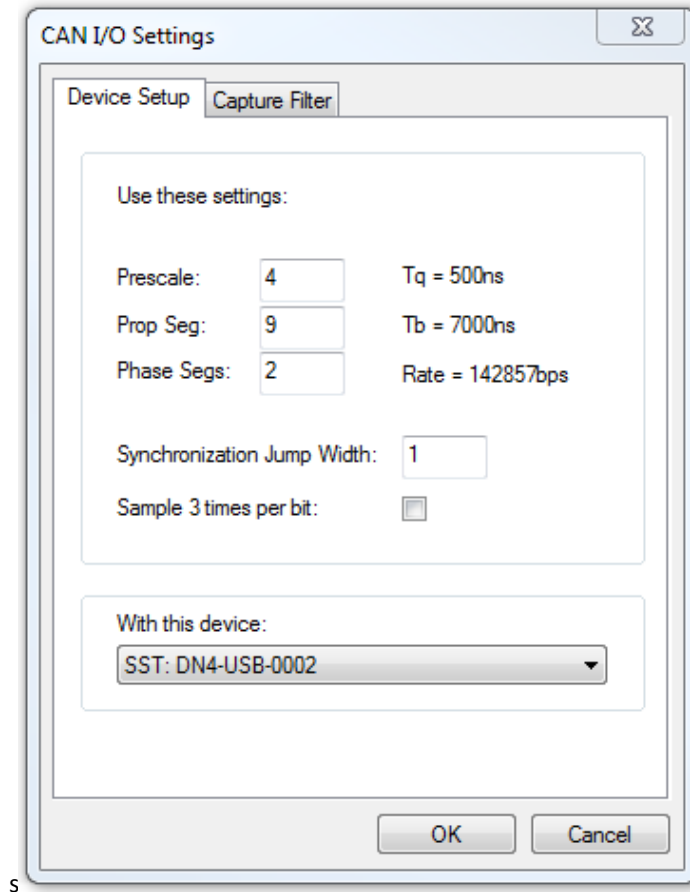


Figure 2.7 - NetDecoder CAN I/O Settings Device Setup Tab

### 2.3.2.1 CAN I/O Device Setup

CAN Device setup configures a specific Molex module to use for the capture.

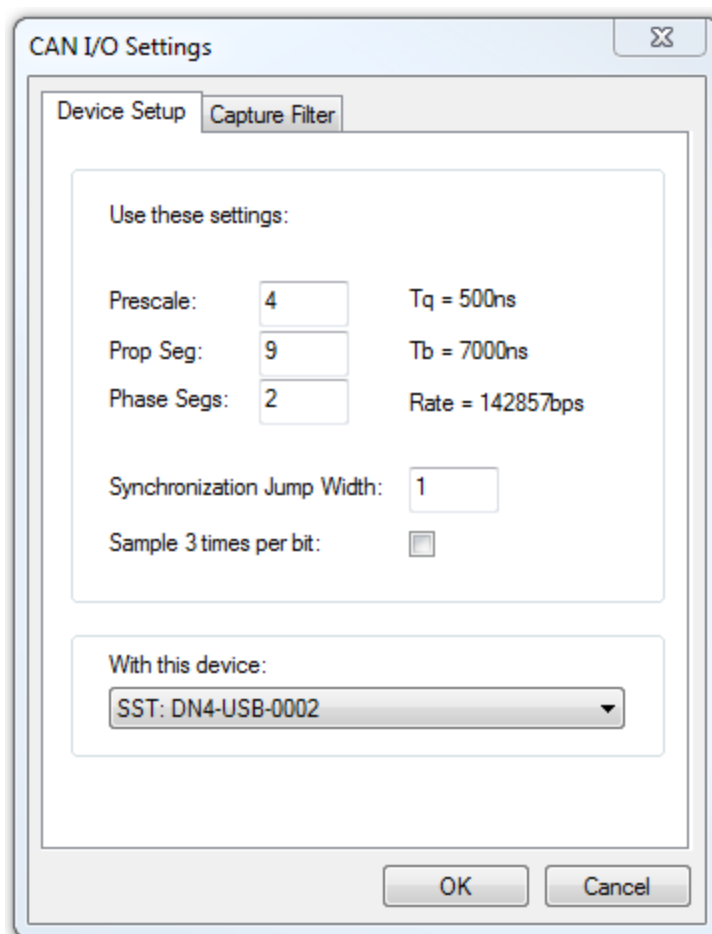


Figure 2.8 - CAN Device Setup

Table 2.1 - CAN I/O Device Setup Fields

Sections	Field	Description
<b>Use These Settings</b>	<b>Prescale</b>	This value is multiplied by the minimum time quantum of 125 nsec to produce the time quantum.
	<b>Prop Seg</b>	This value is multiplied by the time quantum to produce the propagation time segment that compensates for physical network delays.
	<b>Phase Segs</b>	This value is multiplied by the time quantum to produce phase buffer segment 1 and phase buffer segment 2 that may be lengthened or shortened to compensate for phase errors.  The nominal bit time is the sum of the synchronization segment (one time quantum), propagation time segment, and phase buffer segments. The nominal bit rate is the inverse of the nominal bit time.
	<b>Synchronization Jump Width</b>	Each bit is sampled at the end of phase buffer segment 1. The synchronization jump width is the number of time quanta by which phase buffer segment 1 is lengthened, or phase buffer segment 2 shortened, to resynchronize upon detection of a phase error.
	<b>Sample 3 times per bit</b>	When checked, this feature enables two additional samples to be taken, one ahead of the normal sample point and one behind it to eliminate detection of false bit values on noisy networks.
<b>With this device</b>	Device drop down list	Select an SST-DN4-USB device from the list of aliases. See <a href="#">Adding SST-DN4-USB Card Alias on page 4</a> .

### 2.3.2.2 CAN I/O Capture Filter Settings

The **CAN I/O Settings Capture Filter** tab displays the CAN node IDs from which NetDecoder will capture data. In this tab CAN IDs can be created, added, and deleted to configure a unique capture scenario. The displayed CAN IDs is the current filter. The user must have prior knowledge of the network CAN node IDs.

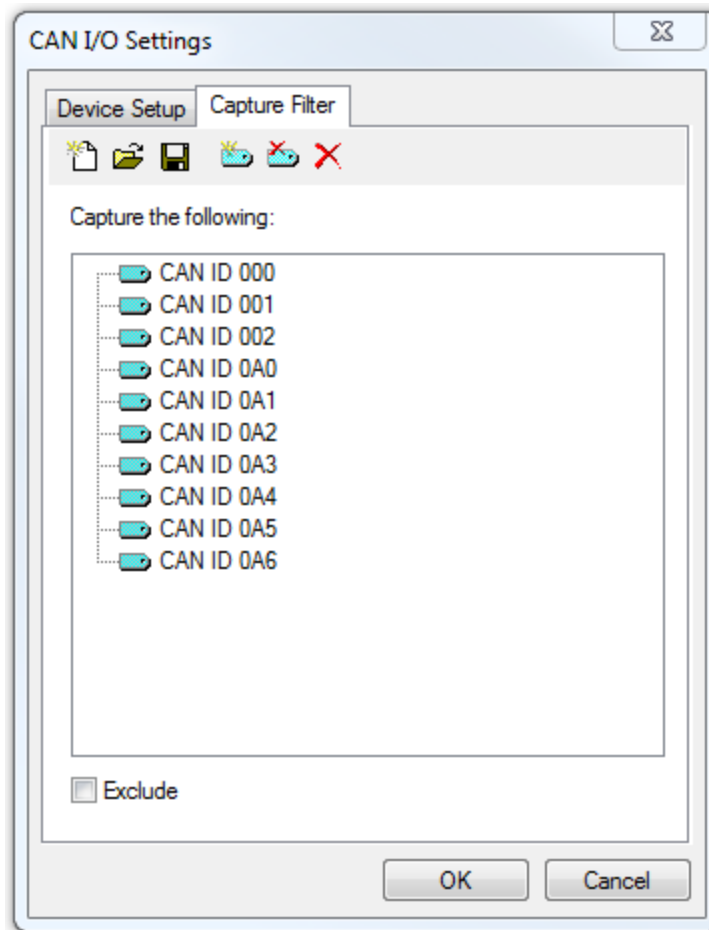











Figure 2.9 - **CAN Filter** Settings Tab


CAN Filter Toolbar Tools

Tool	Icon	Description
Create Filter		Deletes the currently displayed CAN IDs.
Load Filter		Loads a previously saved filter with the .csFilter file extension.
Save Filter		Saves the current filter to a Windows file with the .csFilter file extension.
Add CAN IDs		Adds one or more CAN IDs to the current filter. The range of IDs is 0x00 to 0xFF
Delete CAN IDs		Delete one or more CAN IDs from the current filter. The range of IDs is 0x00 to 0xFF.
Delete Selected		Delete the CAN ID selected in the current filter.


## Create Filter

1. Click on the Create Filter tool . If the current filter has not been saved a warning will appear, otherwise the filter displayed in the **Capture the following:** field is erased. This step must be followed with Load Filter  or Add CAN ID .

## Load Filter

1. Click on the Load Filter tool . If the current filter has not been saved a warning will appear, otherwise the loaded filter will overwrite the currently displayed filter.

## Save Filter

1. Click on the Save Filter tool . A Windows **Save As** dialog will open.
2. Once the filter is saved, the filter will remain in the **Capture in the following** field.

## Add CAN IDs

1. Click on the Add CAN IDs tool . The **ADD CAN IDs** dialog opens.

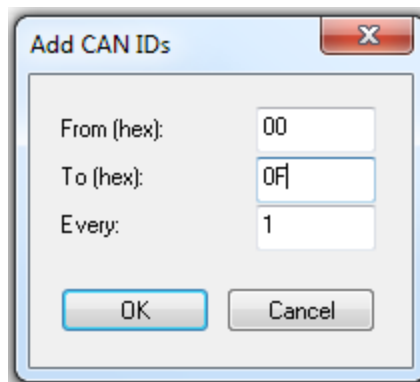




Figure 2.10 - Add CAN IDs dialog

2. In the From (hex) field and the To (hex) field, enter a starting node and ending node value from 0x00 to 0xFF in ascending order from start to end. If you are entering only one node enter the same value into both fields.
3. Enter a decimal number in the **Every** field to represent the ID interval. For example, entering "1" will add every ID in the entered range, and entering 2 will enter every other ID beginning at the **From (hex)** field ID, that is, 00, 02, 04,...0E from [Add CAN IDs dialog on page 13](#).
4. Click on OK and all the CAN IDs between and including the ID values in the From and Start fields are added to the **Capture in the following** field.
5. If your filter will not include contiguous CAN IDs, repeat this process for various ranges, or use the Delete CAN ID tool  or the Delete tool  after a contiguous range has been entered to deleted specific IDs.



### Delete CAN IDs

1. Click on the Delete CAN IDs tool . The **Delete CAN IDs** dialog opens.

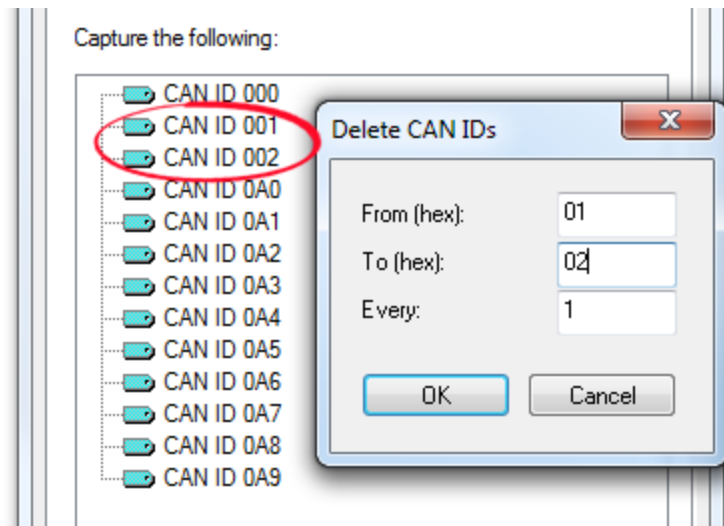


Figure 2.11 - Add CAN IDs dialog

2. In the From (hex) field and the To (hex) field, enter a starting node and ending node value from 0x00 to 0xFF in ascending order from start to end. If you are entering only one node enter the same value into both fields.
3. Enter a decimal number in the **Every** field to represent the ID interval. For example, entering "1" will delete every ID in the entered range, and entering 2 will enter every other ID beginning at the **From (hex)** field ID.
4. Click on OK and all the CAN IDs between and including the ID values in the From and Start fields are deleted from the **Capture in the following** field.

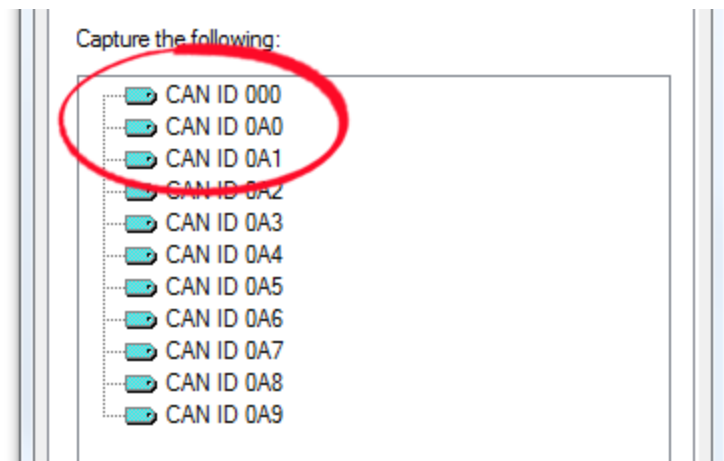



Figure 2.12 - Deleted Can IDs.

## Delete Selected

1. Click on a CAN ID in the current filter. Click on the Delete Selected tool . The ID will be erased from the filter list. Because the filter has changed you must save it with the same name or another name.


## Using the Filter in a CAN capture

To use the filter in a CAN capture, you must first save the filter, then click on the **OK** button.


All of the CAN IDs in a filter are an inclusive capture. That is, data is captured only from those network nodes listed in the filter and excludes all data from nodes not listed. In a very large network, creating an inclusive filter could be demanding. The **Exclude** checkbox will make the CAN IDs in the filter exclude data from those node and include data from all other nodes.

## 2.4 Capturing CAN Data

After completing the NetDecoder CAN I/O Settings, capture of network data will begin by one of the following methods:

- Click on the **CAN Capture** Control Window Start Capture tool .
- From the **CAN Capture** Control Window **Live** menu select **Start Capture**.
- From the keyboard press Shift-F5.

To stop network data capture, do one of the following:

- Click on the **CAN Capture** Control Window Stop Capture tool .
- From the **CAN Capture** Control Window **Live** menu select **Stop Capture**.
- From the keyboard press F10.

## Contacting Technical Support

Technical support is available in several ways. The online help system provides answers to many user related questions. Frontline's website has documentation on common problems, as well as software upgrades and utilities to use with our products.

On the Web: <http://fte.com/support/supportrequest.aspx>

Email: [tech\\_support@fte.com](mailto:tech_support@fte.com)

If you need to talk to a technical support representative about your NetDecoder software, support is available between 9 am and 5 pm, U.S. Eastern Time zone, and between 9 am and 5 pm, Pacific Time zone, on Monday through Friday. Technical support is not available on U.S. national holidays.

Phone: +1 (434) 984-4500

Fax: +1 (434) 984-4505

### Instructional Videos

Teledyne LeCroy provides a series of videos to assist the user and may answer your questions. These videos can be accessed at [fte.com/support/videos.aspx](http://fte.com/support/videos.aspx). On this web page use the **Video Filters** sidebar to select instructional videos for your product.