



Dearborn Group
Technology

DATA LINK MONITOR (DLM)
SOFTWARE
USER'S MANUAL
VERSION 2.36

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1.0 INTRODUCTION

The Data Link Monitor (DLM) software package is a vehicle network monitoring tool. It supports J1939, J1850, and J1708 networks. DLM messaging functions include Receive, Transmit, Trigger, and Playback. DLM can be used with any Dearborn Protocol Adapter product.

1.1 Document organization and format

Chapter 1 – Introduction - Provides an overview of the manual. This section of the introduction summarizes the contents of the remaining chapters and appendices.

Chapter 2 – DLM Installation - Describes the procedures necessary for successful installation and operation of DLM software.

Chapter 3 – Software Overview - Describes DLM software functions.

1.2 Technical support

In the U.S., technical support representatives are available to answer your questions between 9 a.m. and 5 p.m. EST. You may also fax or e-mail your questions to us. Please include your [voice] telephone number, for prompt assistance. Non-U.S. users may choose to contact their local representatives.

Phone: (248) 488-2080
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e-mail: techsupp@dgtech.com
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Related documents

DPA Family User's Manual – Current Version

Chapter 2

2.0 DLM INSTALLATION

Please complete the registration card, and return it via fax or mail. As a registered user, you will receive technical support and important product upgrade information.

2.1 Required operating environment

The minimum required operating environment for the *DLM* software includes the following components:

- Personal computer – Celeron 300 MHz or higher
- 64MB RAM
- Windows 98se or later
- Dearborn Protocol Adapter interface (connected to the PC)
- At least 25MB of free disk space

Your DPA network interface hardware must be installed in order for the software to function. Please refer to the installation instructions for your particular interface type in the DPA Family Manual.

2.2 DLM installation instructions

1. Start Windows.
2. Insert the DLM installation CD into the cdrom drive. (Installation may begin automatically at this point.)
3. Click on **Start**, followed by **Run**.
4. Type d:\dlm\setup.exe (where “d” is the name of your computer cdrom drive) then click **OK**.
5. Follow the instructions on the screen.

Chapter 3

3.0 Software Overview

This chapter describes the steps to start the DLM software and configure the hardware to meet your specific testing or diagnostic requirements.

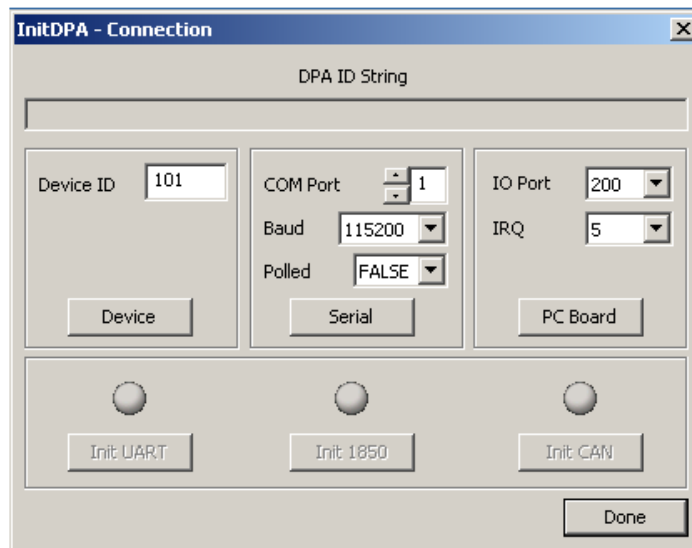
If you are using our *DPA 4 USB* hardware adapter, connect the USB cable before you apply power to it.

Note: No other USB device can be on the same port as the DPA 4.

3.1 Starting DLM: Initialize window

- Click **Start, Programs, Dearborn Group, DLM.**

The **DLM toolbar** is displayed along with a **Connection** dialog box, prompting you to configure your hardware and protocol initialization settings. If you do not configure these settings, the DLM program will use default parameters. The following sections (*Section 3.1.1* through *Section 3.1.6*) contain instructions specific to each area of the **Connection** dialog box.



3.1.1 Configuring a Serial DPA

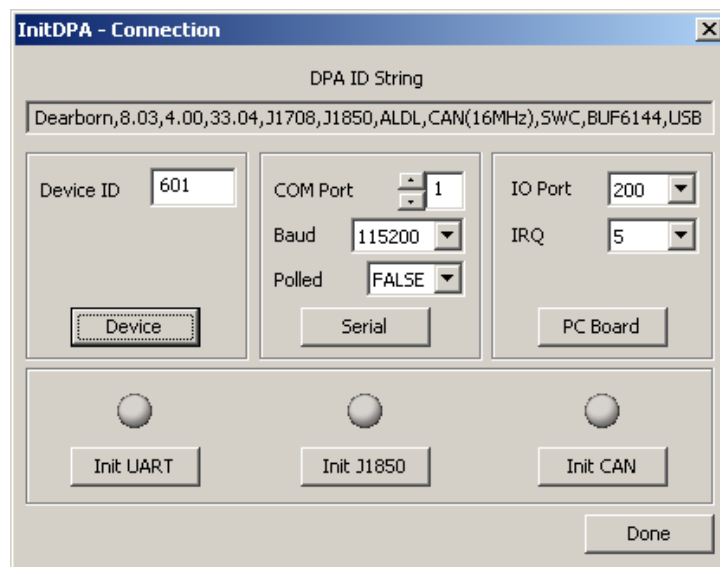
The upper middle boxed area on the **InitDPA - Connection** dialog box is used to configure the serial communication parameters. To configure these parameters, perform the following steps:

1. Select the appropriate **COM Port** (i.e., the serial communication port) that you will use to access to your DPA.
2. Select the appropriate **Baud** (baud rate) in the list.
3. Select the appropriate **Polled** value in the list.
4. Click **Serial** to initialize communications. If successful, a **DPA ID String** will be displayed. Then initialize protocols in the bottom portion of the window.

3.1.2 Configuring a DPA 4 USB

To initialize the DG DPA 4 USB hardware adapter for DLM, perform the following steps:

1. Start the DLM program to display the **InitDPA – Connection** dialog.
2. Enter the number **601** into the **Device ID** field, replacing the previous value. This value represents the DPA 4 USB hardware adapter.
3. Click the **Device** button to connect to, and establish communication with, the DPA 4 USB. A successful connection will display information in the **DPA ID String** field of this dialog box.



3.1.3 Configuring an ISA DPA

The upper right boxed area on the **InitDPA - Connection** dialog box is used to configure the DPA parameters for ISA cards (DPA III-ISA). To configure these parameters, perform the following steps:

1. Select the appropriate **IO Port** in the list.
2. Select the appropriate **IRQ** in the list.
3. Click **PC Board** to initialize communications. If successful, a **DPA ID String** will be displayed. Then initialize protocols in the bottom portion of the window.

3.1.4 Configuring a Remote DPA

The upper left boxed area on the **InitDPA - Connection** dialog box is used to connect any type of DPA. To connect, perform the following steps:

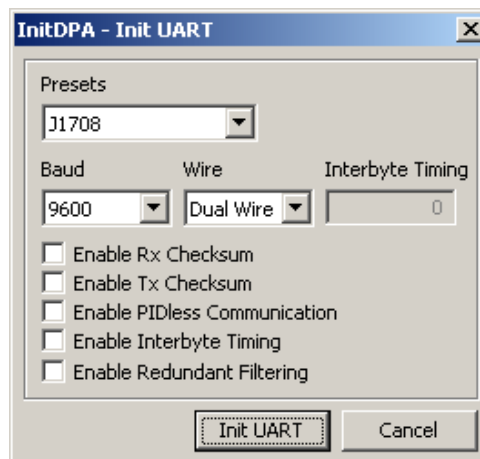
1. Enter the **Device ID** of the DPA. (Device settings are contained in dg_dpa32.ini in the Windows directory, and are used for many Dearborn products.)
2. Click **Device** to initialize communications. If successful, a **DPA ID String** will be displayed. Then initialize protocols in the bottom portion of the window.

Note: You can also configure the dg_dpa32.ini file to automatically set up the CommLink/Pccard and Datalink for initialization.

3.1.5 Initializing Protocols

3.1.5.1 Initializing UART protocols – J1708, ALDL, ISO 9141, J1922

Click **Init UART** to display the **InitDPA - UART** dialog box. This dialog box is used to select and configure UART protocols.



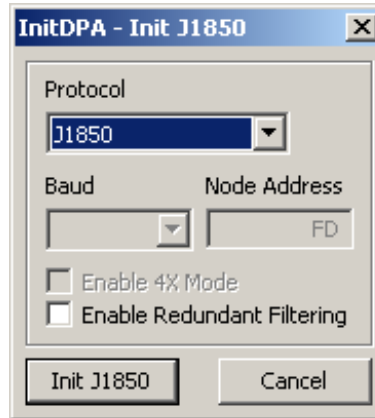
The above **InitDPA - Init UART** dialog box contains the following items:

Presets	Lets you select between J1708, ALDL, ISO 9141 or J1922 protocols to automatically set up the applicable UART link. The applicable "Enable" check boxes on this dialog box will be enable for the selected protocol.
Baud	This list is used to choose the Baud rate for the UART channel. Available baud rates: 7812, 8192, 9600 (default), 10400, 19200, 38400)
Wire	Select between Dual Wire and Single Wire.
Interbyte Timing	A user-supplied value that determines how much time (in milliseconds) will elapse between bytes on the UART data link.
Enable Rx Checksum	Enable receive message checksum when selected.
Enable Tx Checksum	Enable transmit message checksum when selected.
Enable PIDless Communication	Includes the PID with the data byte when selected.
Enable Interbyte Timing	Allow access to Interbyte Timing field on this dialog box when selected.
Enable Redundant Filtering	A DPA feature used to match up a single message to multiple filters.
Init UART	Initializes the UART channel with the settings selected in this dialog box.

3.1.5.2 Initializing J1850 Protocols

Click **Init J1850** to initialize the J1850 channel with the default settings. There are no additional options to this channel at this time. The pip above the "Init J1850" button turns green when initialized.

Note: Not all DPAs support SCP. Check your DPA Init String data that appears in the InitDPA – Connection dialog to determine the support for your DPA.



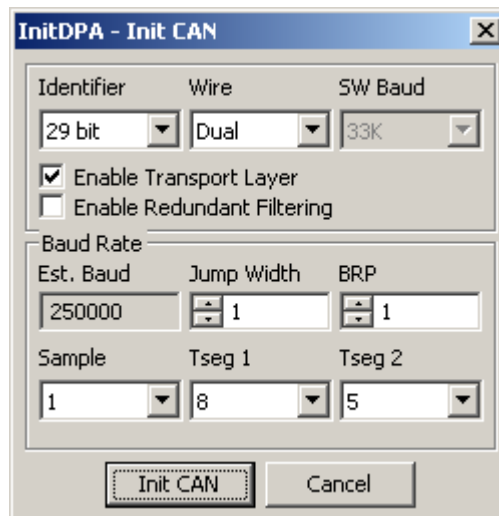
The above **InitDPA - Init J1850** dialog box contains the following items:

Protocol	This list is used to choose J1850 (VPWM, Class 2 at 10.4 kbps) or SCP (PWM, Ford at 41.6 kbps).
Baud	This list is used to choose the Baud rate for the UART channel. Available baud rates: 7812, 8192, 9600 (default), 10400, 19200, 38400)
Node Address	Sets the source address for SCP messages.
Enable 4X Mode	Enables the 4-speed mode when selected. This is only available on certain DPAs with SCP enabled. The 4X mode is most often used to reprogram ECUs. This box lets you use the 4X mode rather than normal mode for reprogramming.
Enable Redundant Filtering	This is a way for you to control how the DPA determines if it has received a message that matches your parameters. There are 16 mailboxes for a protocol in the DPA. If redundant filtering is enabled, the DPA will check and return all mailboxes that match. If it is off, then the DPA will return only the first mailbox that matches and then quit looking. This speeds up the message processing significantly.

	For example, if you load Mailbox 1 and 2 with the same identifiers and redundant filtering is on, you would receive two notifications that the message had arrived, one for each mailbox. If redundant filtering is off, you will receive one notification as the DPA will match the received message to mailbox 1.
Init UART	Initializes the UART channel with the settings selected in this dialog box.

3.1.5.3 Initializing CAN

Click **Init CAN** to display the **InitDPA – Init CAN** dialog box. It is used to configure CAN parameters.



The above **InitDPA – Init CAN** dialog box contains the following items:

Identifier	This list will let you choose <i>11 Bit Identifiers</i> (standard CAN) or <i>29 Bit Identifiers</i> (extended CAN).
Wire	This list will let you choose <i>Single-wire CAN</i> or <i>Dual wire CAN</i> (ISO 11898, J1939). Note: If Single-wire CAN is selected, the J1939 options throughout the software will be used as single-wire CAN).
SW Baud	This list is available when <i>Single-wire CAN</i> is selected. 33K and 83.3K baud rates are available.

Enable Transport Layer	Check to enable the transport layer for J1939. The transport layer is resident on the hardware. (For more information, refer to the <i>SAE J1939 /21</i> documentation)
Est. Baud	This field computes the baud rate from the values entered into the <i>Tseg1</i> and <i>Tseg2</i> fields in this dialog. The formula used to compute this number is: $16\text{MHz} / (2 * (\text{BRP} + 1) * (3 + \text{Tseg1} + \text{Tseg2})).$ See the DPA manual for more information.
Jump Width	This field defines the maximum number of time quanta by which re-synchronization can modify <i>tseg1</i> and <i>tseg2</i> .
BRP	This field (Baud-Rate Prescaler) defines the length of one time quantum. See DPA manual for more information.
Sample	This list is used to choose the sampling rate (1 or 3 times per bit).
Tseg 1	This list is used to choose the value for <i>Tseg 1</i> (the bit segment between the first segment of a bit and the last segment of a bit). See Baud Rate Formulas below for the formulas to manually set a baud rate.
Tseg 2	This list is used to choose the value for <i>Tseg 2</i> (last segment of a bit). See Baud Rate Formulas below for the formulas to manually set a baud rate.
Init CAN	Initializes the CAN channel with the settings selected above.

Baud Rate Formulas

For J1939 / ISO 11898 (high-speed) protocols:

Bus Frequency = 16MHz

$$4 \times (3 + TSEG1 + TSEG2)$$

For J2411 (single-wire) – normal – 33.3K:

$$\text{Bus Frequency} = \frac{16 \text{ MHz}}{12 \times (3 + TSEG1 + TSEG2)}$$

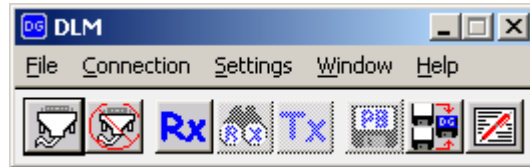
For J2411 (single-wire) – high speed – 83.3K:

$$\text{Bus Frequency} = \frac{16 \text{ MHz}}{30 \times (3 + TSEG1 + TSEG2)}$$

For all selection, SJW (Synchronization Jump Width) = 1

3.2 DLM menus and toolbar

When you first run the DLM program, a **DLM** window appears. It contains several menus and a toolbar. The menus and toolbar are described below.



3.2.1 DLM menus






The following DLM menus are available:




File	Exit. Close the DLM program.
Connection	<p>Connect. Initializes the software for the connected hardware.</p> <p>Disconnect. Returns system resources associated with the DPA and unloads the device driver.</p> <p>Reset & Disconnect. Performs a software reset of the DPA and also returns system resources associated with the DPA and unloads the device driver.</p>
Settings	<p>Data Dictionaries. Enables/Disables a database that lets you edit messages.</p> <p>Enable Tx Echo. Causes any transmitted message to appear in the Receive window.</p> <p>Enable Multiple PIDs. Enables/Disables a function that lets the Receive window display multiple PIDs in a message.</p>
Window	<p>Receive. Opens a Receive window to collect messages from a connected J1708, J1850 and/or J1939 network.</p> <p>Message Spy. Opens a Message Spy window to</p>

	<p>monitor user-specified messages over connected networks.</p> <p>Transmit. Opens a Transmit window to send messages over connected networks.</p> <p>Playback. Opens a file of saved messages for playback over connected networks.</p> <p>File Converter. Opens a conversion window to translate Network Analysis Software (DG-NAS) files to DLM format files</p> <p>Communicator. Opens a communication window to send chat-like messages to a user at DG Remote.</p>
Help	About DG-DLM. Display the version number and contact information.

3.2.2 DLM toolbar

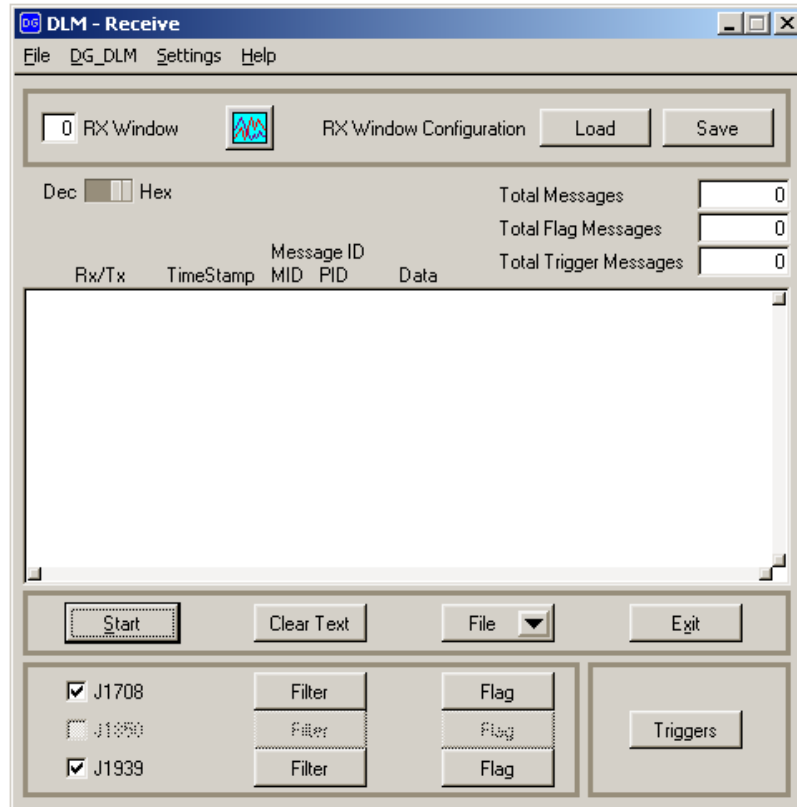
The following “shortcut” buttons are on the main menu toolbar:

	Initialize links	Initializes the software for the connected hardware. (This command can also be selected in the <i>Communications</i> menu.)
	Restore links	Returns system resources associated with the DPA and unloads the device driver. (This command can also be selected in the <i>Communications</i> menu.)
	Receive	Opens a Receive window to collect messages from a connected network. (This command can also be selected in the <i>Windows</i> menu.)
	Message Spy	Opens a Message Spy window to monitor user-specified messages over connected networks. (This command can also be selected in the <i>Windows</i> menu.)
	Transmit	Opens a Transmit window to send messages over connected networks. (This command can also be selected in the <i>Windows</i> menu.)


	Playback	Opens a file of saved messages for playback over connected networks. (This command can also be selected in the <i>Windows</i> menu.)
	File converter	Opens a conversion window to translate Network Analysis Software (DG-NAS) files to DLM format files. (This command can also be selected in the <i>Windows</i> menu.)
	Communicator	Opens a communication window to send chat-like messages to a user at DG Remote. (This command can also be selected in the <i>Windows</i> menu.)

3.3 Receive window

The *Receive* window is used to view messages and store them to disk as they are transmitted over the network. You can open up to eight *Receive* windows simultaneously. Each *Receive* window is identified by a number in the **RX Window** box (in the upper left corner of this screen) and displays information specific to the filters and protocols you have selected.

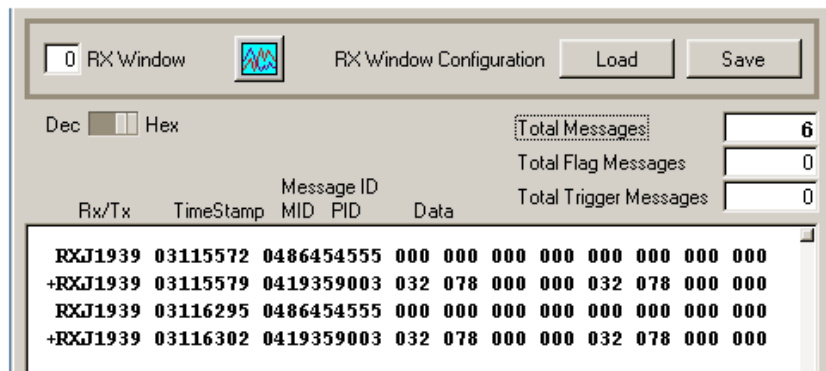


The **Receive** window contains the following items:

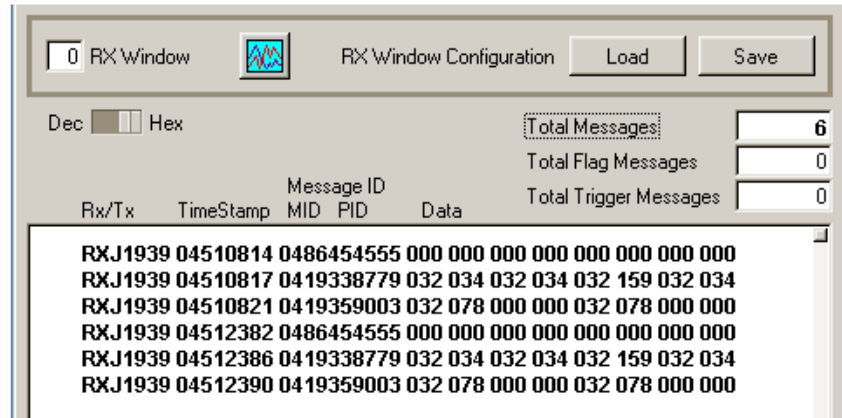
RX Window	Receive window identifier.
Receive Histograms 	Analog graphical display of the translated data to engineering units. (See <i>Section 3.3.4</i>)
RX Window Configuration	Used to Load and Save filter, flag, and trigger configurations.

Dec/Hex	Select the viewing format to view data: decimal or hexadecimal.
Total Messages	Displays a count of the messages received.
Total Flag Messages	Displays a count of the messages received with flags.
Total Trigger Messages	Displays a count of the messages received with triggers.
RX/TX	Identifies each message as a received (RX) or transmitted (TX) message, and the network over which it was sent.
Timestamp	Displays the timestamp, in one-millisecond intervals.
Message ID (MID/PID)	Displays the message identifier. Also shows the MID and PID numbers for J1708 messages.
Data	Displays message data. Right-click in the data window to display Create Tx Message and Interpret Message options.

Plus (+) symbols may appear to the left of viewed messages (shown below). This indicates that not all of the messages received from the network have been displayed in the window. (Notice that the **Total Messages** box shows that six messages were received, while only four messages appear in the window.)



When you click **Stop**, you are asked, “Would you like to refresh the screen?” (Only if “Enable Buffer Spill” is selected from settings.) If you select **No**, the display will remain as shown. If you select **Yes**, the screen will be updated with the missing messages, as shown below:



Start button	Initiates the receiving of messages in the window. This button toggles to a Stop button.
Clear Text button	Deletes the current data in the window.
File button	Specifies a file name. (Click the arrow to Append or Overwrite current file.)
Exit button	Closes the <i>Receive</i> window.



For each of the supported network protocols, you can configure individual message filters, flags, and triggers from the screen shown above and described in the following sections.

3.3.1 Filtering

Filters are used to block certain messages (i.e., to prevent them from being received), or to only pass certain messages (i.e., allow them to be received) in the Receive window.

To configure a filter, an identifier (or J1708 MIDs and PIDs) and mask are needed. ANDing is performed bit-by-bit across a byte. The result is that each bit is assigned the value of 1, 0, or "don't care," through the combination of the *ID* (Data) and *Mask* fields.

The *ID* field determines whether the bit value is 1 or 0. The *Mask* field determines whether the bit is "care" (1) or "don't care" (0). Thus, all ID bits matched with Mask bits equal to 1 are set to their respective value (0 or 1). All ID bits matched with Mask bits equal to 0 are set as "don't care"; a "don't care" bit is represented by an X in the examples below.

The following examples each use one data byte, but the same principle would be applied to additional bytes in the dialog boxes.

Example A:

To create a filter to see a range of messages, use a mask of E0hex.

	Hex Value	Byte							
ID	28hex	0	0	1	0	1	0	0	0
Mask	E0hex	1	1	1	0	0	0	0	0
Result	20hex – 3Fhex	0	0	1	X	X	X	X	X

Displays all messages that satisfy the filter or trigger condition.

Example B:

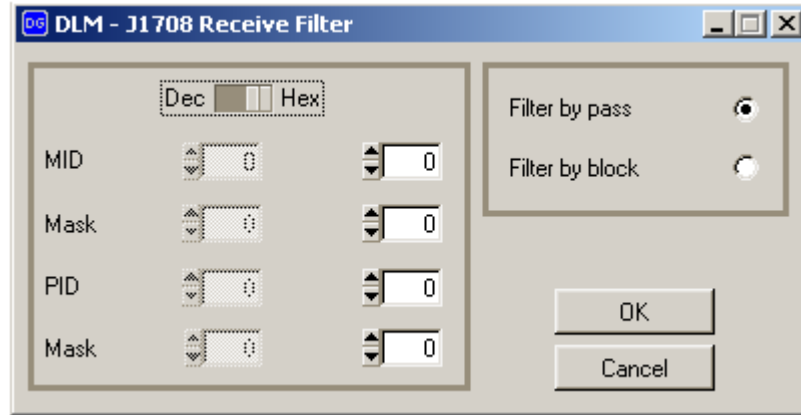
To create a single ID filter or trigger, use a mask of FFhex.

	Hex Value	Byte							
ID	28hex	0	0	1	0	1	0	0	0
Mask	FFhex	1	1	1	1	1	1	1	1
Result	28hex	0	0	1	0	1	0	0	0

Displays only the message that satisfies the filter or trigger condition.

3.3.1.1 J1708 filter

MIDs and PIDs each have a mask associated with them for the J1708 filter.

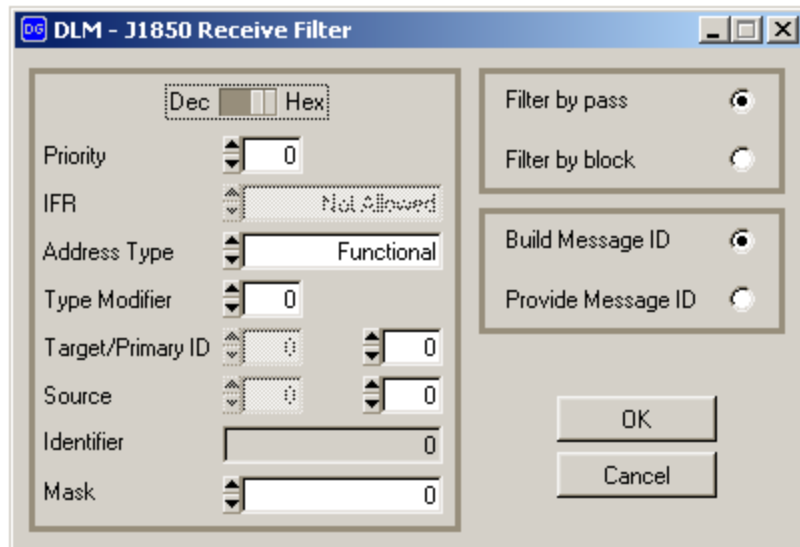


The **J1708 Receive Filter** window contains the following items:

Dec/Hex	Select the format for the data: hexadecimal or decimal format. (Alternate boxes are <i>grayed</i> out.)
MID	J1708 Message ID.
Mask	J1708 MID mask. (See <i>Section 3.3.1</i> for more mask information.)
PID	J1708 Parameter ID.
Mask	J1708 PID mask. (See <i>Section 3.3.1</i> for more mask information.)
Filter by pass	Allows messages that satisfy the filter to pass into the window. Either this option or the Filter by block option must be selected.
Filter by block	Only allows messages that do not satisfy the filter to enter the window; blocks those that do satisfy the filter. Either this option or the Filter by pass option must be selected.

3.3.1.2 J1850 filter

The J1850 filter allows you to select **Build Message ID** and enter the Priority, Address Type, Type Modifier, Target/Primary ID and Source to construct the J1850 header. Alternately, you can select **Provide Message ID** if you wish only to provide the identifier. The constructed or inserted ID is then ANDed with the supplied mask.



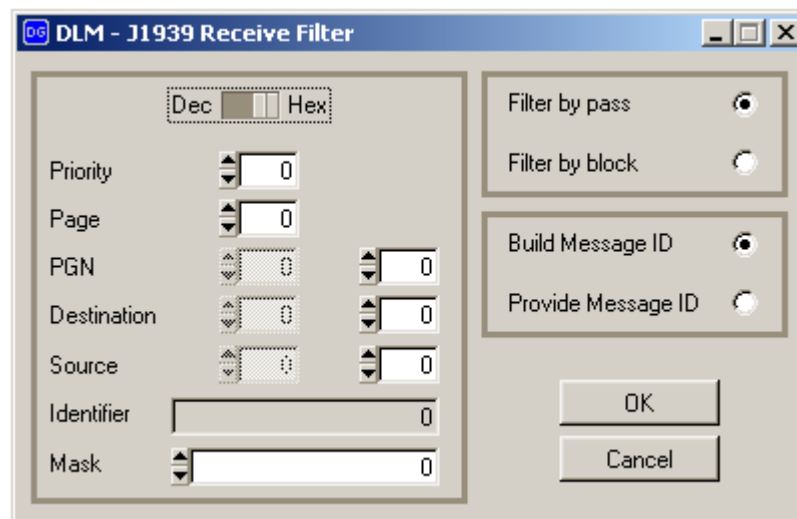
The **J1850 Receive Filter** window contains the following items:

Dec/Hex	Select the format for data: hexadecimal or decimal format. (Alternate boxes are <i>grayed out</i> .)
Priority	Defined by J1850.
IFR	In-Frame Response bit (defined by J1850).
Address Type	Defined by J1850.
Type Modifier	Defined by J1850.
Target/Primary ID	Defined by J1850.
Source	Defined by J1850.
Identifier	J1850 Identifier.

Mask	J1850 Identifier mask. (See <i>Section 3.3.1</i> for more mask information.)
Filter by pass	Allows messages that satisfy the filter to pass into the window. Either this option or the Filter by block option must be selected.
Filter by block	Allows only the messages that do not satisfy the filter to enter the window. Either this option or the Filter by pass option must be selected.
Build message ID	Allows the user to insert field values for automatic construction of a J1850 identifier.
Provide message ID	Allows the user to type in a J1850 identifier value.

3.3.1.3 J1939/CAN filter

The J1939 filter allows you to select **Build Message ID** and enter the Priority, Page, PGN, Source and Destination to construct the CAN identifier. Alternately, you can select **Provide Message ID** if you wish only to provide the identifier. The constructed or inserted ID is then ANDed with the supplied mask.



The **J1939/CAN Receive Filter** window contains the following items:

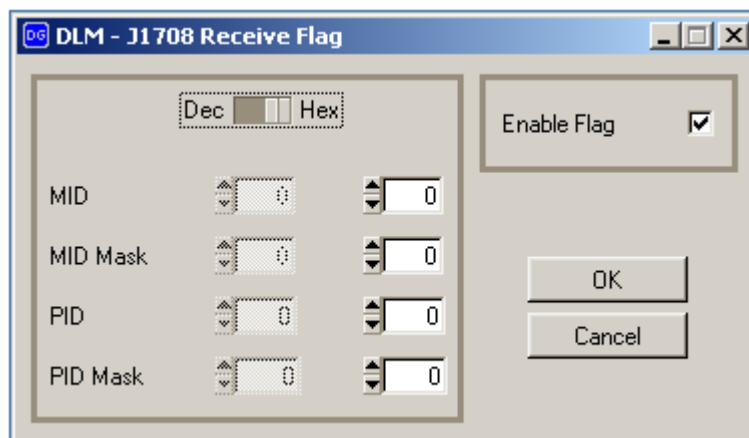
Dec/Hex	Select the format to view data: hexadecimal or decimal. (Alternate boxes are <i>grayed out</i> .)
Priority	Defined by J1939/21.
Page	Defined by J1939/21.
PGN	Parameter Group Number, as defined by J1939/21.
Destination	Defined by J1939/21.
Source	Defined by J1939/21.
Identifier	CAN identifier, either constructed or provided.
Mask	CAN identifier mask. (See <i>Section 3.3.1</i> for more mask information.)
Filter by pass	Allows messages that satisfy the filter to pass into the window. Either this option or the Filter by block option must be selected.
Filter by block	Allows only the messages that do not satisfy the filter to enter the window. Either this option or the Filter by pass option must be selected.
Build message ID	Lets you insert Priority, Page, PGN, Destination and Source values for automatic construction of a CAN identifier.
Provide message ID	Lets you type in a CAN identifier value.

3.3.2 Flagging

Flags are used to mark specific received messages. Once activated, this function places an “F” in the left column of selected message entries as the message appears on the network.

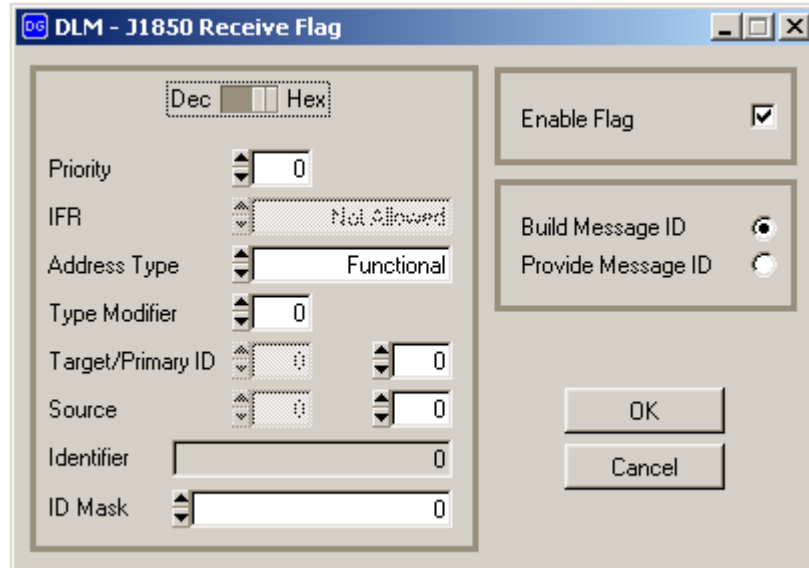
Rx/Tx	TimeStamp	Message ID		Data	Total Trigger Messages						
		MID	PID								
	RXJ1939	16756104	18FEDD1B	19 C4 09	FF	FF	FF	FF	FF	FF	FF
	RXJ1939	16756107	1CFEA21B	20 9F 20	22	20	22	20	22	20	22
F	RXJ1939	16756110	18FE9A1B	20 22 20	22	20	22	20	22	20	22

3.3.2.1 J1708 flag



Input the MID and MID mask and/or the PID and PID Mask of the message you wish to flag. Make sure the **Enable Flag** option has been checked.

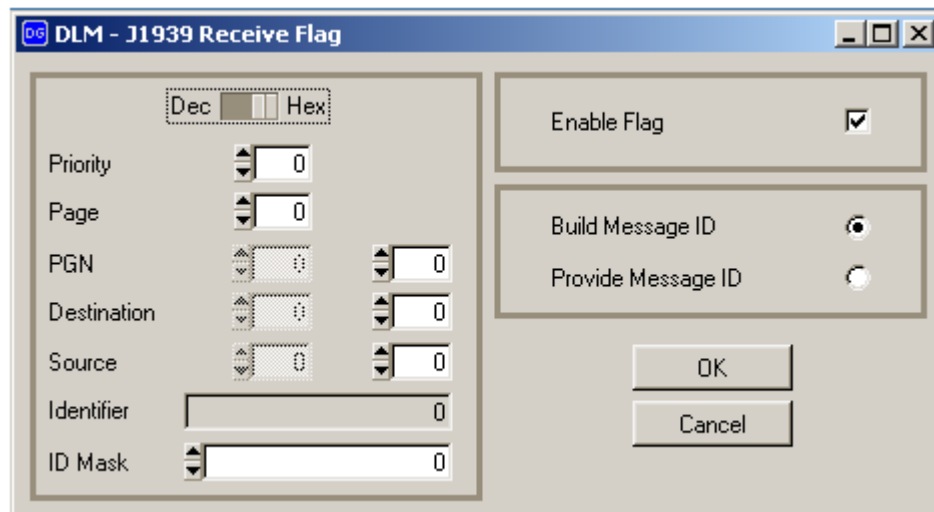
3.3.2.2 J1850 flag



If the **Build Message ID** option is checked, input the following information if required; Priority, IFR (In-Frame Response), Address Type, Type Modifier, Target/Primary ID, and Source. Make sure the **Enable Flag** option has been checked.

If **Provide Message ID** is checked, input the J1850 Identifier and ID Mask. Then ensure the **Enable Flag** option has been checked.

3.3.2.3 J1939/CAN flag



If the **Build Message ID** button is selected, input the Priority, Page, PGN, Destination, and Source data values for construction of the the CAN identifier. Make sure the **Enable Flag** option has been checked.

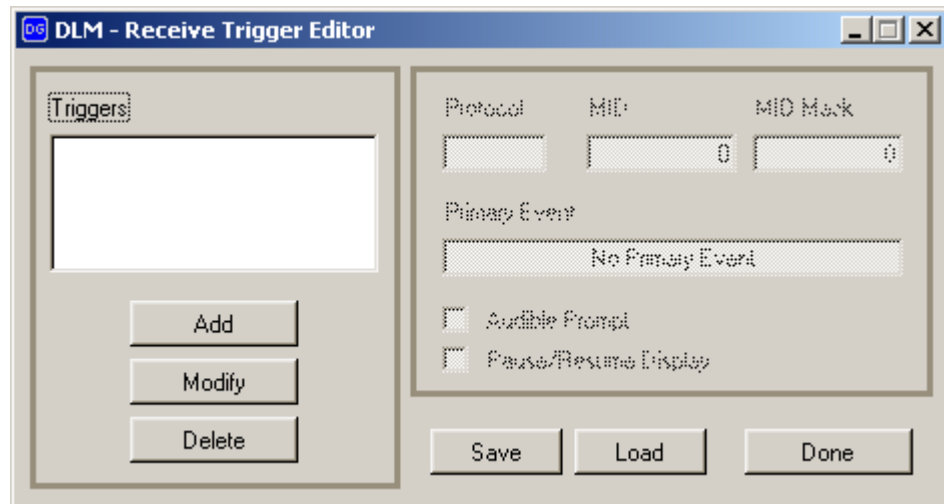
If the **Provide Message ID** Button is selected, input the CAN identifier. Make sure the **Enable Flag** option has been checked.

3.3.3 Triggering

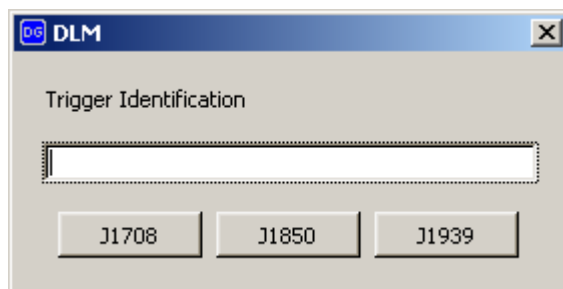
Triggers cause specific events to occur when specified message(s) are received. Event options are as follows: Audible Prompt, Pause/Resume display, Begin logging to file, Start/Stop playback, and Transmit a message. Multiple trigger options may be selected.

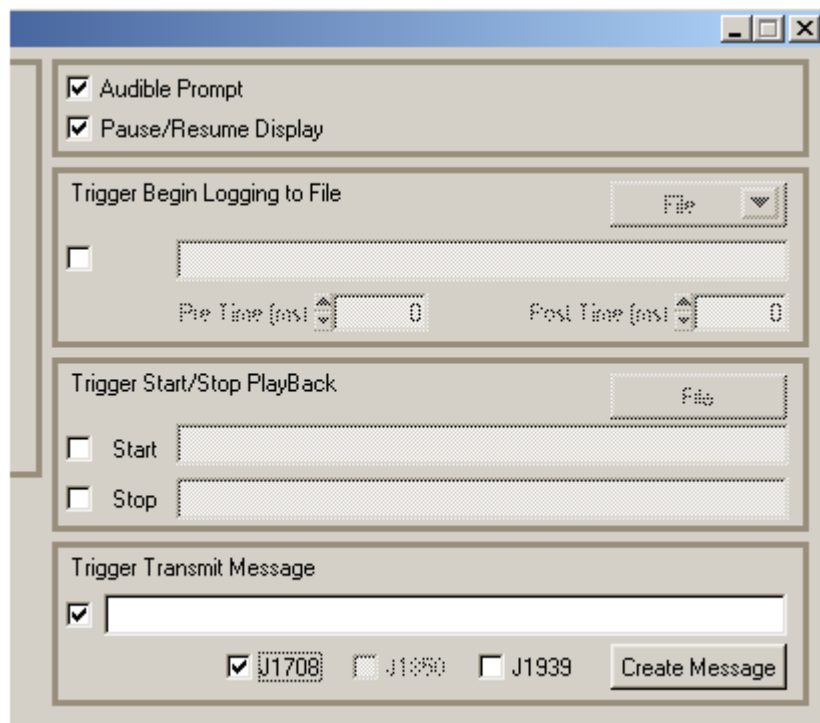
3.3.3.1 Trigger Editor

To access the trigger editor, select the **Windows** menu, then selecting the **Receive** option. This displays the Receive window. Click the **Triggers** button in this window to display the **Receive Trigger Editor** window.



Click the **Add** button to display the **Trigger Identification** dialog box.





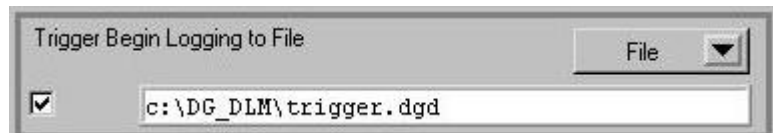
When selected, the following options will cause their corresponding events to occur.

Audible Prompt – When the specified message is received, an audible beep sounds, and a “T” appears on the screen, to the left of the message.

Rx/Tx	TimeStamp	MID	PID	Data	Total Trigger Messages							
T	RXJ1939	00069613	0419338779	032 034	032	034	032	034	032	034	032	034
	RXJ1939	00069996	0419355931	025 196	009	255	255	255	255	255	255	255
	RXJ1939	00069999	0486449691	032 159	032	034	032	034	032	034	032	034
T	RXJ1939	00070002	0419338779	032 034	032	034	032	034	032	034	032	034
	RXJ1939	00070842	0419355931	025 196	009	255	255	255	255	255	255	255
	RXJ1939	00070845	0486449691	032 159	032	034	032	034	032	034	032	034
T	RXJ1939	00070848	0419338779	032 034	032	034	032	034	032	034	032	034
	RXJ1939	00071646	0419355931	025 196	009	255	255	255	255	255	255	255
	RXJ1939	00071649	0486449691	032 159	032	034	032	034	032	034	032	034
T	RXJ1939	00071652	0419338779	032 034	032	034	032	034	032	034	032	034

Pause/Resume Display – The recording of messages in the Receive window stops when the specified message is received and resumes when the message is received again.

Trigger Begin Logging to File – When the specified message is received, the messages are logged to the named file. (Click **File** to specify the filename and location.) You can click the Down Arrow button to select between **Append** or **Overwrite** options for the file.



Trigger Start/Stop Playback – Starts or stops playback of the named file on the network after each receipt of the specified message.

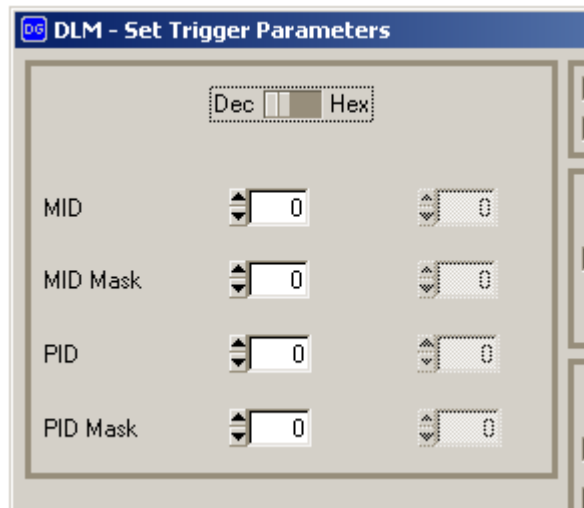


Trigger Transmit Message – Transmits a message on the network upon receipt of the specified message. You can opt to transmit a message over the same network or to another network supported by the connected DPA hardware. Click the **Create Message** button to add the message to the transmit list.



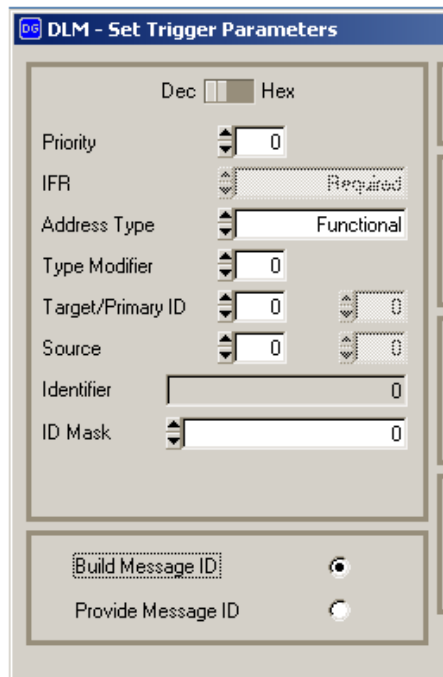
3.3.3.2 Trigger: J1708

To designate a trigger message, input the MID and MID Mask and/or PID and PID Mask.



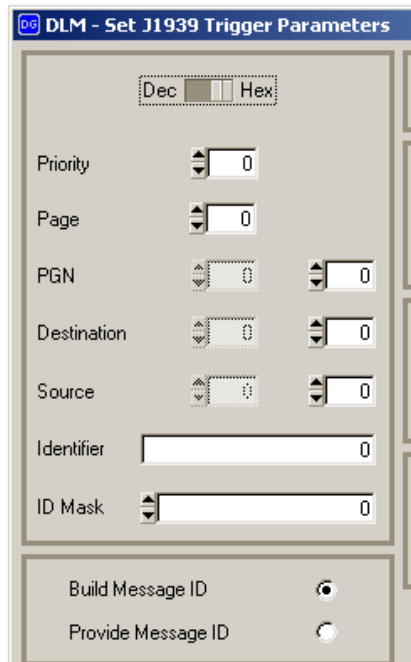
3.3.3.3 Trigger: J1850

To designate a trigger message, select either 3-Byte Identifier or 1-byte Identifier, then input the 7-Bit Identifier, Priority, IFR (In Frame Response), Address Type, Type Modifier, Target/Primary ID, and Source Address, or the entire J1850 identifier and ID Mask.



3.3.3.4 Trigger: J1939/CAN

To designate a trigger message, input the PGN, Destination, and Source values, or the entire CAN identifier.



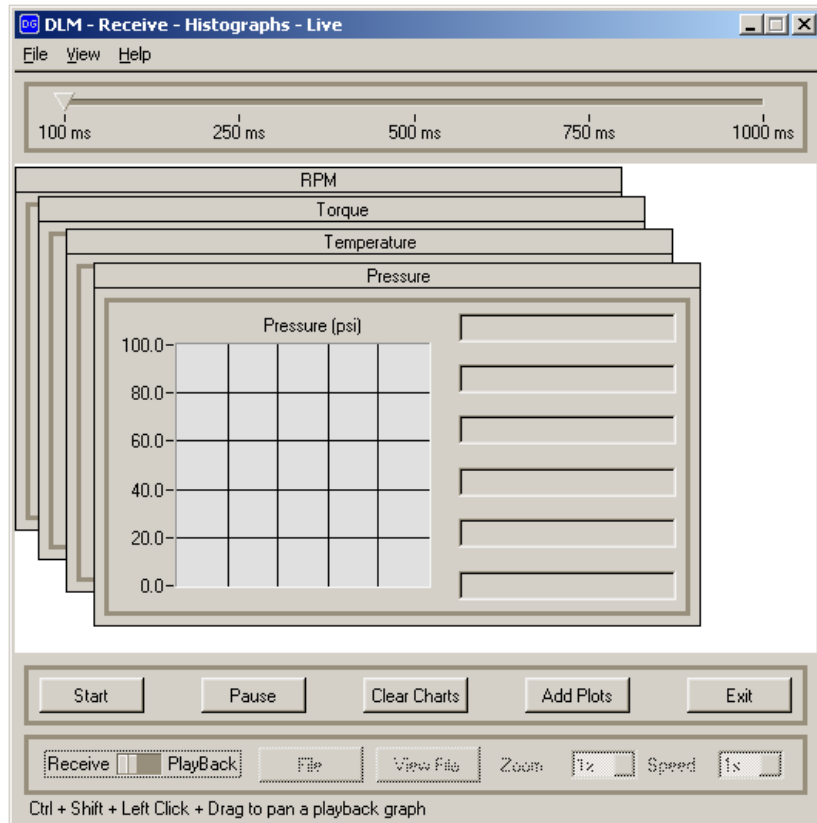
3.3.4 Receive Histogram window

The Receive Histogram window is a graphical display of message parameters translated into engineering units.

The Histogram retrieves messages from a **Receive** window (see *Section 3.3*) or a Message Spy window (see *Section 3.4*). This allows incoming data to be filtered. Either the Receive window or the Message Spy window must be set to receive messages and the start button on the Histogram pressed in order for the Histogram to plot messages.

If the Histogram window is in *Receive mode*, the time slide at the top of the Histogram window refers to how often the display graphs are updated (in milliseconds). DLM uses a timer to update the current values and this lets you modify how often the Histograms are updated.

Note: Slide is ignored in *Playback mode*.



The **Receive Histogram** window contains the following items:

Start/Stop	Click to begin plotting messages to the graph. (This will change to a Stop button.)
Pause	For use in the Playback mode only. This button is disabled in the Receive mode.
Clear Charts	Deletes the current data plotted on the charts.
Add Plots	Adds J1587/J1939 messages for display on charts.
Exit	Closes the Histogram window.
Receive/Playback	Toggles between plotting messages currently being received and plotting message that are stored in a file of previously recorded messages.

File	Loads a file of previously recorded messages to be plotted on the charts.
View File	Displays the messages from a previously recorded session's save file.
Zoom	Sets time scale. This can be manually controlled by holding Ctrl and Left or Right clicking.
Speed	Controls plot speed with respect to the real time speed of the original messages. This is how fast the computer will attempt to plot the graph, but even on very fast machines (2 GHz+ as of this writing) the graph can only go at a rate of about 5x (not selectable).

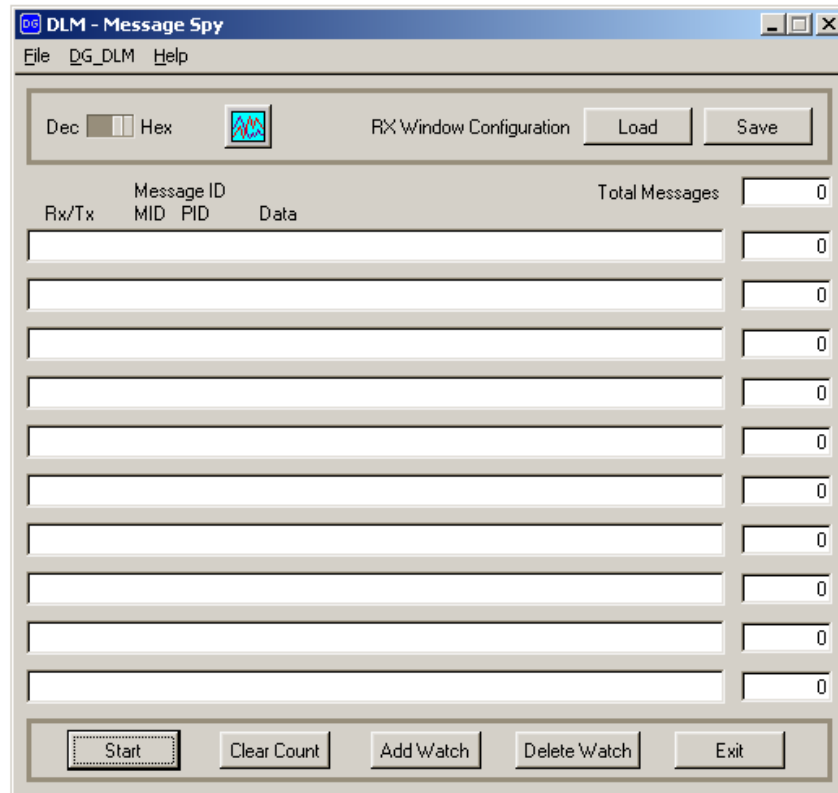
3.3.4.1 Plotting from a playback file

To plot from a playback file:

1. Add the data dictionary plots and open the desired playback file.
2. Select zoom level and plot speed.
3. Open the file to playback and click start. The matching data messages will be plotted out on the graphs.

3.4 Message Spy

The Message Spy feature allows the user to input a message identifier and then monitor the data coming in for that message identifier.



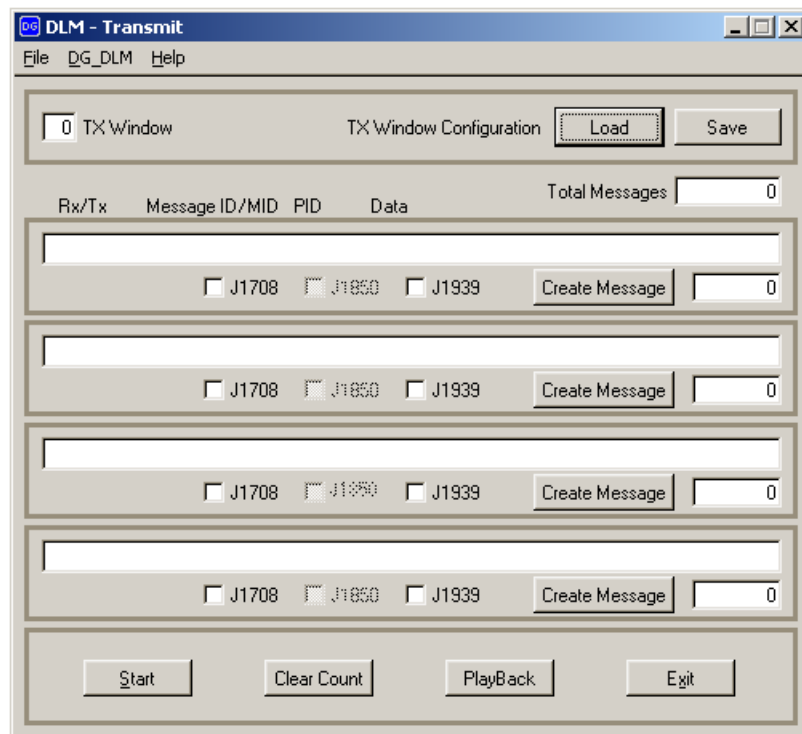
The **Message Spy** window contains the following items:

Start/Stop	Click to begin receiving messages in the window. (This will change to a Stop button.)
Clear Count	Deletes the current data in the window.
Add Watch	Opens a message builder window.
Delete Watch	Opens a delete watch window.
Exit	Closes the Message Spy window.

3.5 Transmit window

The *Transmit* feature allows the user to send messages over the network by setting up one to four separate messages per *Transmit* window. Up to four *Transmit* windows may be opened at a time; they are each identified by a number in the **TX Window** box (in the upper left corner).

The *Total Message* box tallies the number of messages sent from the Transmit window. The individual message counts are each kept in the box to the right of their respective **Create Message** button.



The **Transmit** window contains the following items:

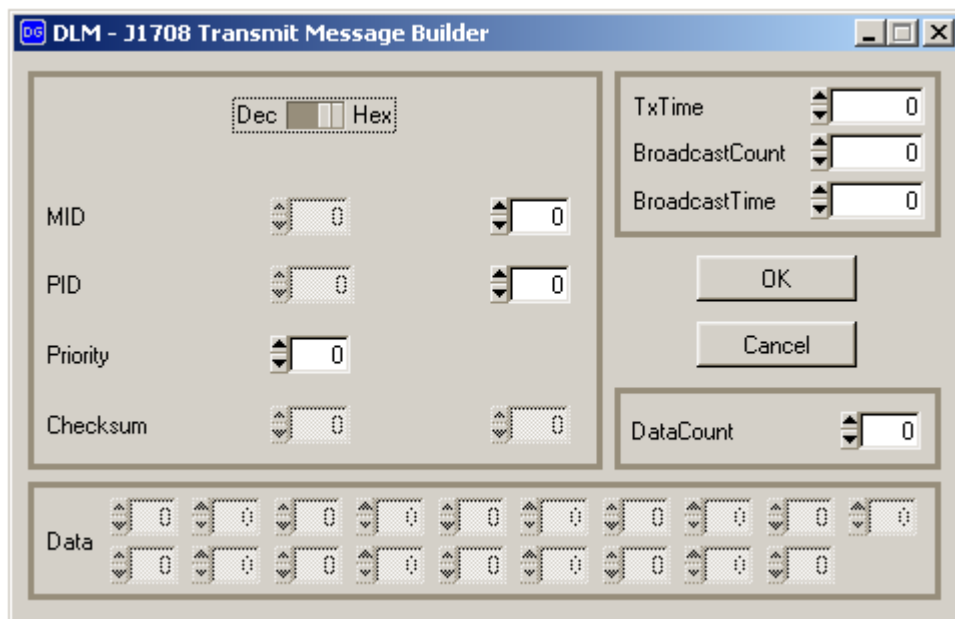
TX Window	Transmit window identifier (number 1, 2, 3, or 4).
TX Window Configuration	Load previous configuration or Save the current configuration.
Start/Stop	Begin transmitting messages in the window and changes to a Stop button.

Clear Count	Deletes the current data in the window.
Playback	Opens the Playback window. (see <i>Section 3.6</i>).
Exit	Closes the Transmit window.

To add a message for transmission, select its network type (J1708, J1850, or J1939) and click the **Create Message** button. Proceed as described in the appropriate section that follows.

3.5.1 J1708 Transmit

After J1708 has been selected and the Create Message button has been clicked the following view will appear:

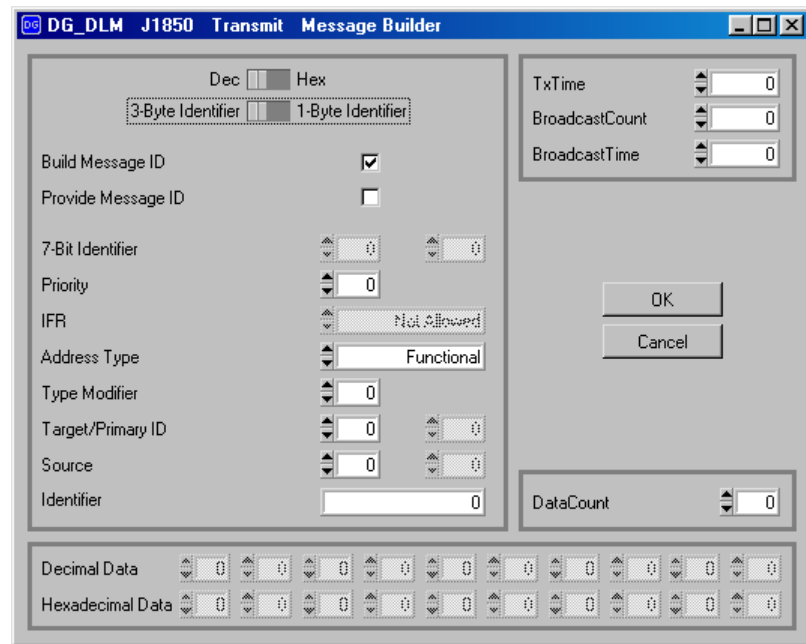


The **J1708 Transmit** window contains the following items:

Dec/Hex	Lets you select data format: hexadecimal or decimal. (Alternate boxes are <i>grayed out</i> .)
TXTime	Specify a time delay to precede the sending of the message.

Broadcast Count	Indicates the number of times the message should be transmitted. A value of -1 causes the message to be broadcast continuously.
Broadcast Time	Specifies a time delay between message broadcasts. (Sometimes referred to as the periodic rate.)
MID	J1708 Message ID.
PID	J1708 Parameter ID.
Priority	J1708 Priority byte.
Checksum	J1708 checksum. (This feature is disabled if the AutoChecksum feature is on. The AutoChecksum is configured in the Communications > Initialize links menu.)
Data Count	Indicates the number of data bytes in the message
Data	Input boxes to enter the data byte values and are displayed in hexadecimal or decimal, based on the <i>Dec/Hex</i> setting.

3.5.2 J1850 Transmit

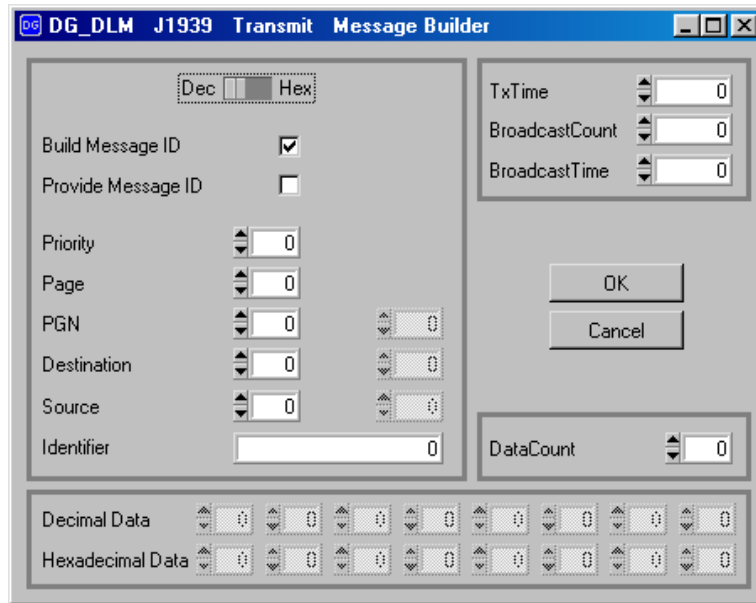


The **J1850 Transmit** window contains the following items:

Dec/Hex	Lets you select data format: hexadecimal or decimal. (Alternate boxes will be <i>grayed</i> out.)
Build message ID	Lets you insert Priority, Address Type, Type Modifier, Target/Primary ID, and Source values for automatic construction of a J1850 identifier.
Provide message ID	Lets you provide a J1850 identifier value.
3-Byte Identifier/1-Byte Identifier	Select between 3-Byte Identifier and 1-Byte Identifier.
7-Bit Identifier	ID used with 1-Byte header.
Priority	J1850 Priority byte.
IFR (In Frame Response)	J1850 In-Frame Response.

Address Type	J1850 Address type.
Type Modifier	J1850 Type Modifier.
Target/Primary ID	J1850 Target/Primary ID.
Source	J1850 Source Address.
Identifier	CAN identifier, either constructed or provided.
TXTime	Specifies a time delay to precede the transmission of the message.
Broadcast Count	Indicates the number of times the message should be transmitted. A value of -1 will cause the message to be broadcast continuously.
Broadcast Time	Indicates a delay between the message broadcasts. (Sometimes referred to as the periodic rate.)
Data Count	Indicates the number of data bytes in the message.
Hex Data/Dec Data	Enables either the decimal input boxes or the hexadecimal input boxes for the data byte values.

3.5.3 J1939 Transmit



The **J1939 Transmit** window contains the following items:

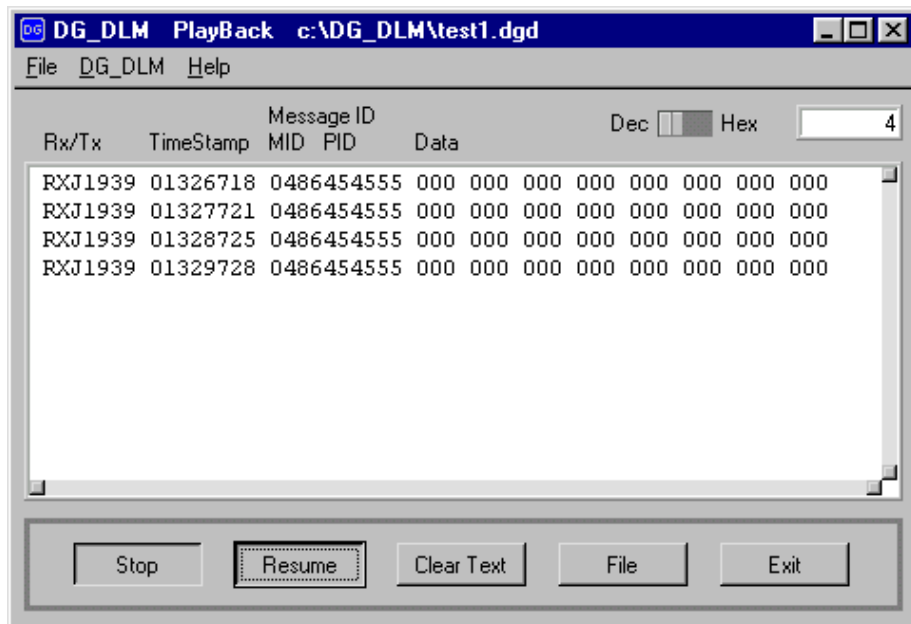
Dec/Hex	Allows for selection of a data format: hexadecimal or decimal. (Alternate boxes will be <i>grayed out</i> .)
Build message ID	Allows the user to insert Priority, Page, PGN, Destination, and Source values for automatic construction of a CAN identifier.
Provide message ID	Allows the user to provide a CAN identifier value.
Priority	Defined by J1939/21.
Page	Defined by J1939/21.
PGN	Parameter Group Number, as defined by J1939/21.
Destination	Defined by J1939/21.
Identifier	CAN identifier, either constructed or provided.

TXTime	Specifies a time delay to precede the transmission of the message.
Broadcast Count	Indicates the number of times the message should be transmitted. A value of -1 will cause the message to be broadcast continuously.
Broadcast Time	Indicates a delay between the message broadcasts. (Sometimes referred to as the periodic rate.)
Data Count	Indicates the number of data bytes in the message.
Hex Data/Dec Data	Enables either the decimal input boxes or the hexadecimal input boxes for the data byte values.

3.6 Playback function

The playback feature replays messages from a saved file over the network. Timestamps are honored in the calculation of the transmit times.

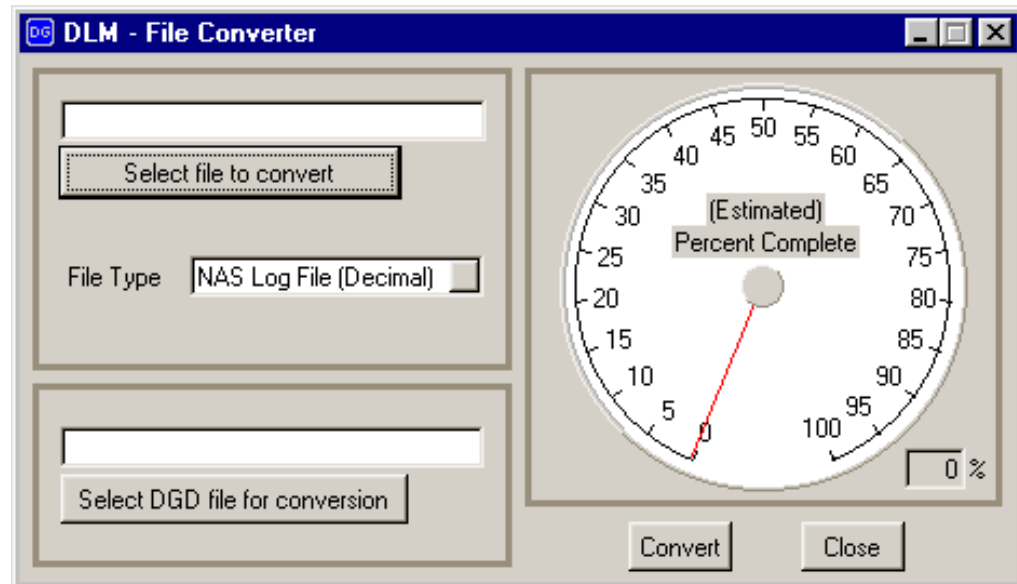
To activate message Playback, click the **File** button, and load a file into the window. Click **Start**, and the messages should appear in the window, indicating that they are being transmitted over the network. The number of messages sent is displayed in the upper right corner.



The **Playback** window contains the following items:

Start/Stop	Click to begin transmitting messages in the window. This button will change to a Stop button.
Pause/Resume	Temporarily pauses and then resumes message playback.
Clear Text	Deletes the current data in the window.
File	Prompts you to select the file containing the messages to play back.
Exit	Closes the <i>Playback</i> window.

3.7 File Converter function



The File Converter function translates *.log* and *.msg* files from Dearborn Group's Network Analyzer Software (NAS) or *.csv* files from Dearborn Group's Vehicle Link Tester (VLT) software (used with the VSI hardware) format into *.dgd* format, for use within DLM.

To activate the File Converter function, click **Select file to convert**. Enter the appropriate filename. Then select the file type in the drop down menu. Options include: **NAS Log File (Decimal)**, **NAS Log File (Hexadecimal)**, **NAS Msg file**, **VSI CVS** . Next click **Select DGD file for conversion** to specify a name and location for the translated (*.dgd*) file. Click **Convert** to complete the translation. The percentage of completion will be displayed throughout the conversion. Finally, you will be notified that the conversion was completed successfully or unsuccessfully.

3.8 Communicator

The communicator feature allows chat-like messages to be communicated between DLM and the DG Remote application. In order for the Communicator to function, the PC running DLM must be connected to a remote DPA via the DG Remote application. For detailed instructions regarding DG Remote, please consult the *DG Remote User's Manual*.

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