

Data Link Monitor 2 (DLM2)

Installation and User Manual

Version 1.0

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1. Safety First

It is essential that the User read this document carefully before using the software with any hardware. DLM2 software is intended for the use by those trained in in-vehicle network communications supported by DG Technologies hardware.

The User is assumed to have a very good understanding of the electronic systems contained on the vehicles and the potential hazards related to working in that environment.

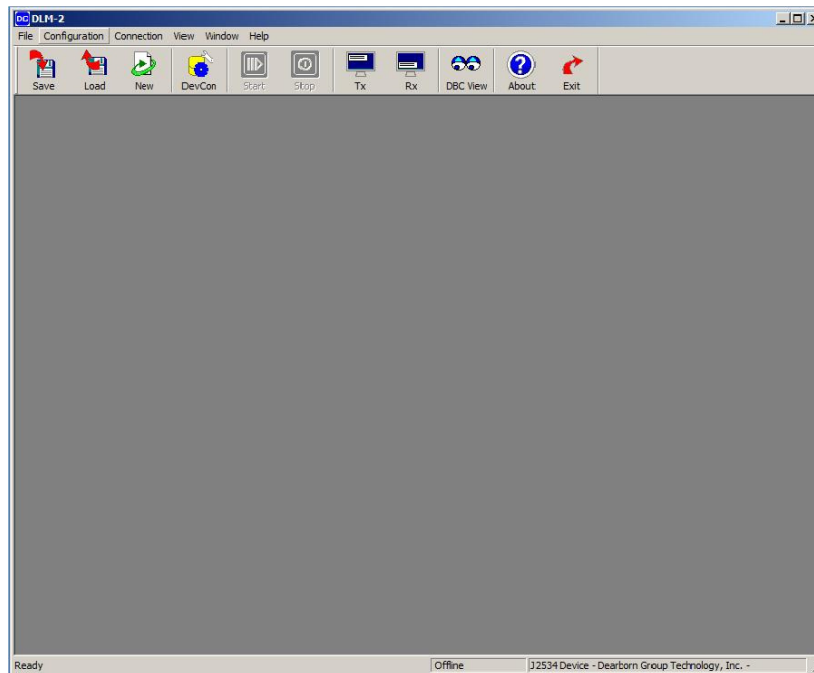
DG Technologies understands that there are numerous safety hazards that cannot be foreseen, so we recommend that the User read and follow all safety messages in this manual and the related DG Technologies hardware product manual, on all of your shop equipment, from your vehicle manuals, as well as internal shop documents and operating procedures.



- ✓ Always block drive and steer wheels both front and back when testing the vehicle.
- ✓ Use extreme caution when working around electricity. When diagnosing any vehicle, there is the risk of electric shock both from battery-level voltage, vehicle voltages, and from building voltage.
- ✓ Do not smoke or allow sparks or open flames near any part of the vehicle fueling system or vehicle batteries.
- ✓ Always work in an adequately ventilated area, and route vehicle exhaust outdoors.
- ✓ Do not use this system in an environment where fuel, fuel vapor, exhaust fumes, or other potentially hazardous liquids, solids, or gas/vapors could collect and/or possibly ignite, such as in an unventilated area or other confined space, including below-ground areas.

2. Introducing the DLM2

The DLM2 software product is a 32-bit Windows based application for network analysis and interaction with in-vehicle network systems. Using this software with a DG J2534 capable hardware interface, network communications for CAN frames can be monitored, transmitted, and received.



DLM2 provides enhanced interpretations of message content by allowing the association of a DBC file. An association of a DBC file provides the listed features.

- Decodes received messages to signal level
- Quick and easy selection of frames and signals for transmission by displaying frame names and signal definitions.
- Filtering of header ID and data on the viewing window.
- DBC Viewer displays details contained in a DBC file.

2.1 Hardware Compatibility

The DLM2 software communicates with the DG Technologies hardware listed below that is supported by a SAE J2534 compatible library. Any other device that may appear in this manual is meant for demonstration purposes only.

- VSI Family hardware

✓ VSI 2534



NOTE: Within this document Hardware interface refers to DG Technologies' family of hardware that is listed above

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2.2 Standards and Protocols Supported

The software provides the protocol and standards support listed below.

Operating System Supported

- ✓ Windows 2000
- ✓ Windows XP

Defined Protocols Supported with SAE J2534 interface

- ✓ CAN - SAE J2284

2.3 System Requirements

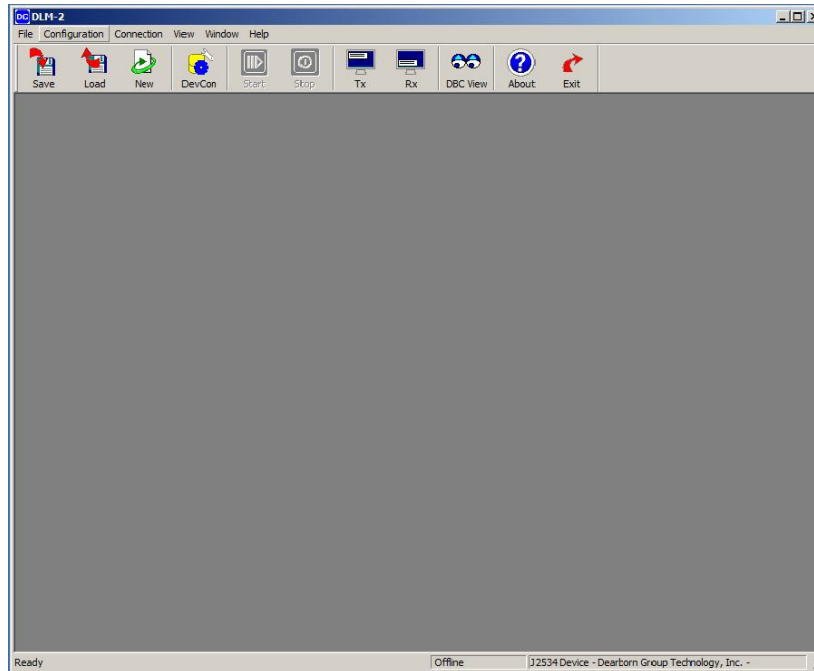
The minimum recommended operating environment consists of the following components:

Item	Requirement
PC	IBM-Compatible
PC	533 MHz or faster
Processor	1GHz or Faster
RAM	256MB (512MB Preferred)
USB Port	USB Version 1.1 or Higher
Operating System	Windows 2000/XP with latest service pack installed
Hardware interface	SAE J2534 compatible device VSI-2534 and related USB cables

3. Using the DLM2

3.1 Main Menu Overview

When you first start DLM2 a window appears with the menu bar at the top. The toolbar is immediately underneath the menu bar. The remainder of the window will be gray. As a first time DLM2 User, you should follow the procedures, in sequence, as outlined in the remaining pages of the manual.



The icons on the toolbar contain some of the same commands available in the menus. Keep in mind that some utilities within the software only work when in Online or Offline mode.

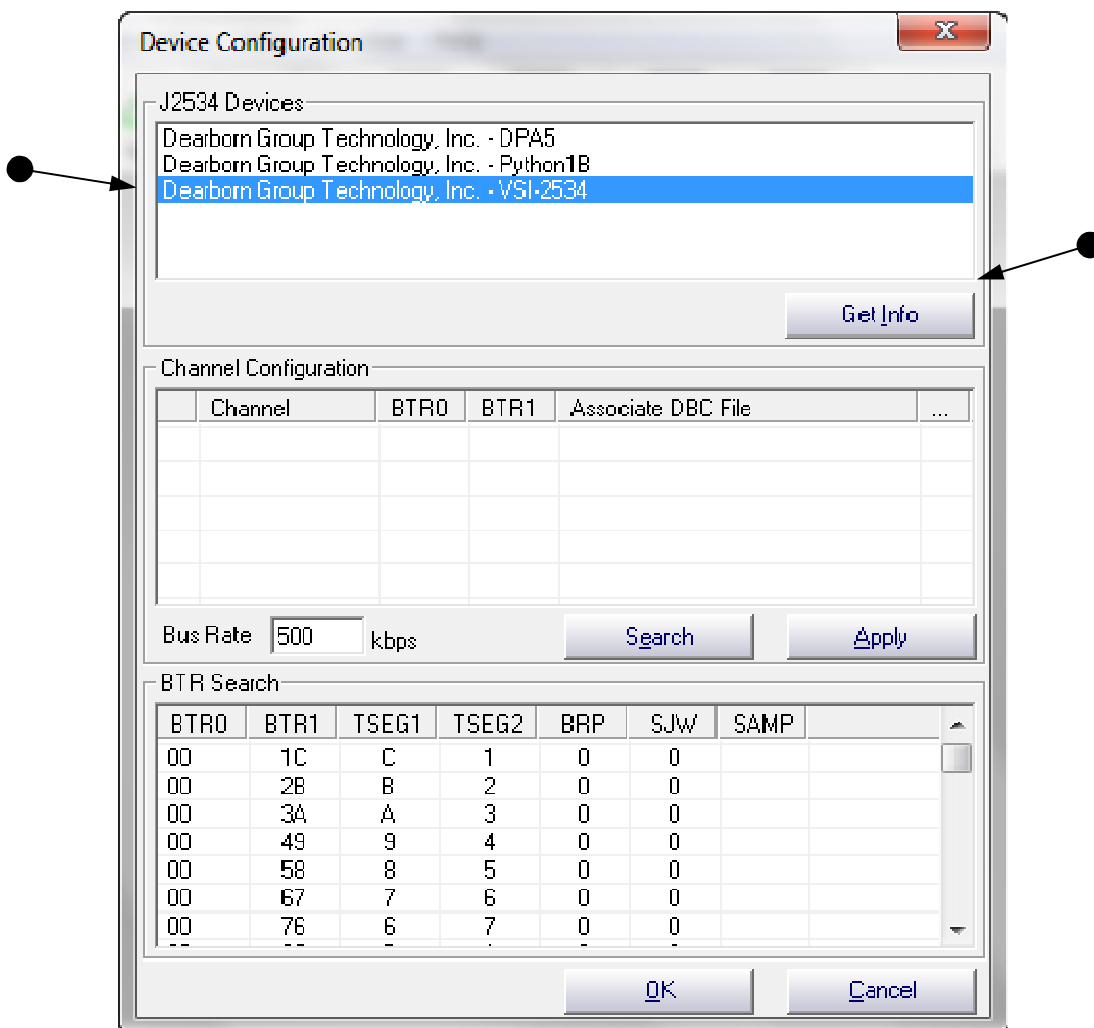
3.2 Configuring the hardware

Step 1: Ensure the hardware being used is installed and appropriate connections have been made to the PC and ECU/ vehicle.

Step 2: DLM2 Device Configuration: You will need to configure the DLM2 to recognize the J2534 device being used.

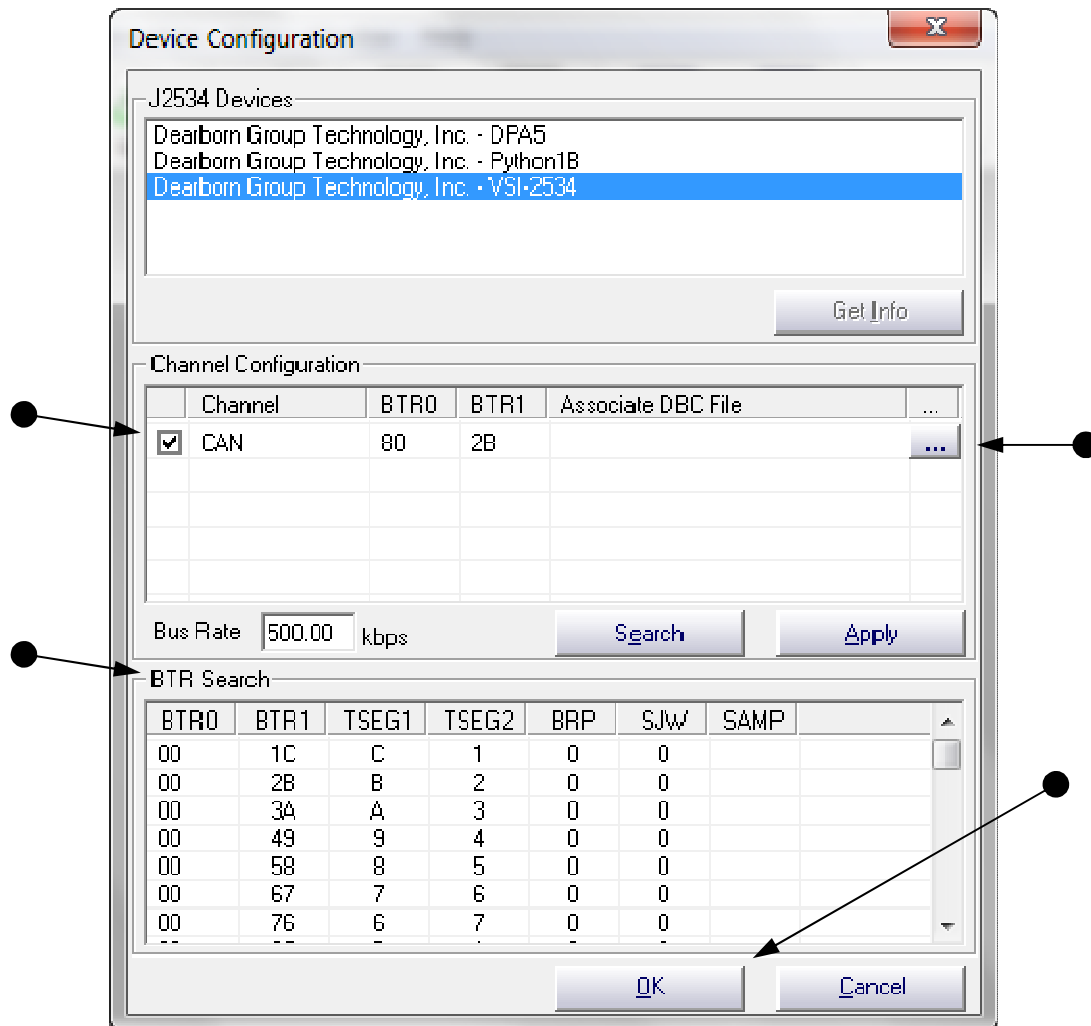


- Click on the icon shown.



- Select the hardware device by clicking on one of the J2534 devices from the list. Then, click on "Get Info" for Channel Configuration.

Step 3 - Channel Configuration:



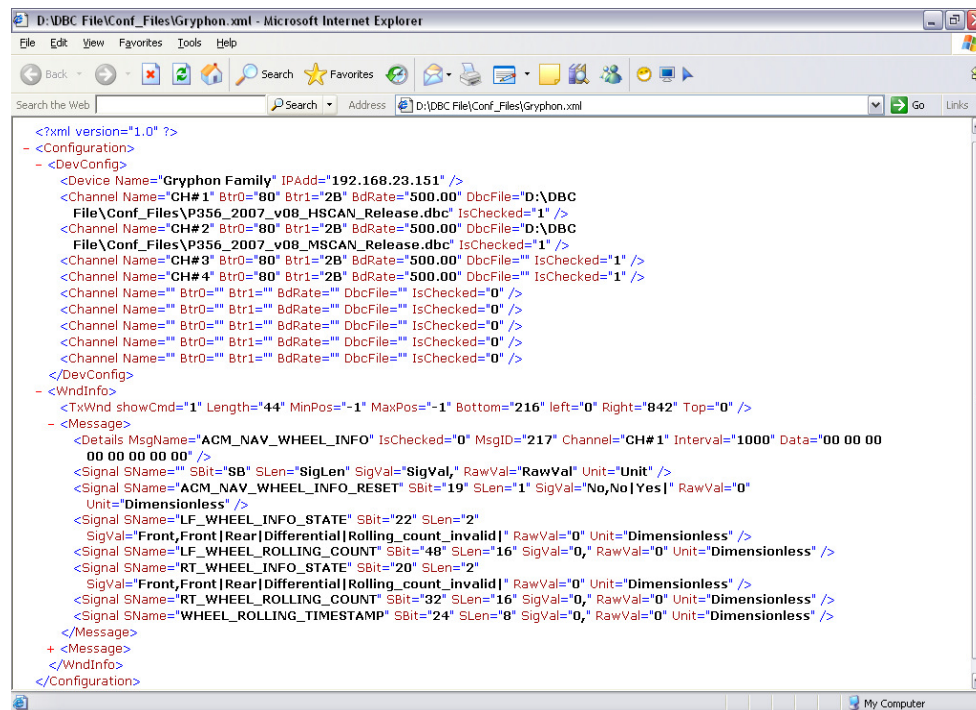
- Click on the available channel to place a check mark next to that channel. Channel configuration includes the following:
 - Optional:** Channel name assignment. Click on the current name shown, "CAN" in this case, and enter your own name. Limit: 20 characters, alpha/numeric and "&" and "_".
 - Required:** Assignment of valid BTR values for Bus Rate is required. DLM2 will list the channels available on the device with the default BTR values and Bus Rate. Either click on the current value and then enter the new value or use the "Search" feature. To use the "Search" feature, click on the "Search" button, scroll down and select the desired speed. This will highlight the line. Click on "Apply" to set the values.
 - Optional:** The DLM2 uses as DBC file as the source of decoding messages transmitted and received on the network. It also provides the capability to filter on message header or data. If a DBC is not associated to a channel raw hex data bytes will appear throughout the application rather than frame and signal definitions. Associate DBC files to the channels by clicking on . In the dialog box that appears, locate and select the applicable DBC file and click on "Open".

4. File Menu

4.1 Save Configuration



Click this icon and the current configuration of the application will be saved as an XML file. Saved information will include hardware details, currently opened window details which include number of windows opened, window positions and window contents (Messages and signals information) in case of Transmit Window. The saved configuration file can be viewed using a XML editor and will look similar to the image below. User can edit the Message/Signal information in the configuration file and when the same file is loaded in the application, the updated configuration will get loaded, but it is *recommended* that all edits occur within the application itself rather than through the XML file. Most users will not look at this file, but it is provided for investigating potential problems.



XML Format

4.2 Load Configuration

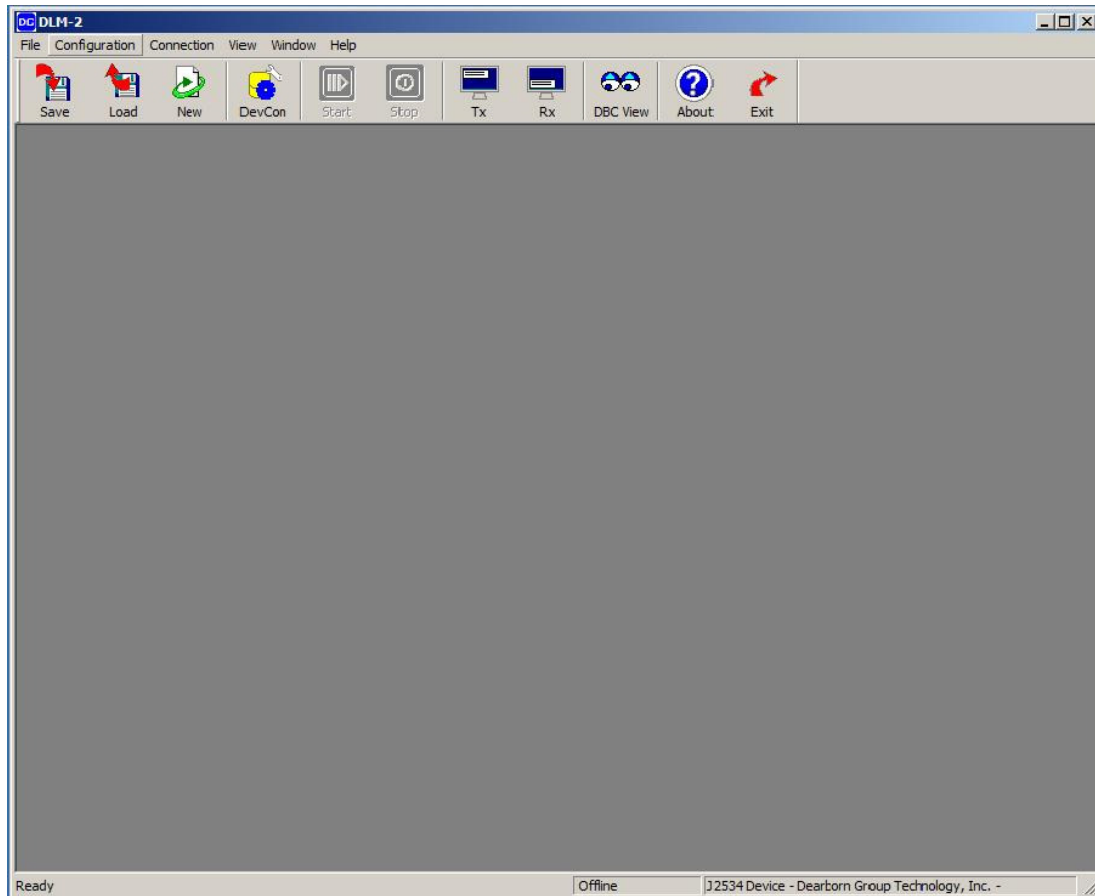


Click this icon to open the desired configuration (.xml) file. A message is displayed while loading the configuration. The device information, window information, Messages/Signals information to the Transmit Window will get loaded to the application on loading the configuration. The application is now ready with all the device and window configurations. User can now go Online and start working with DLM2.

4.3 New Configuration



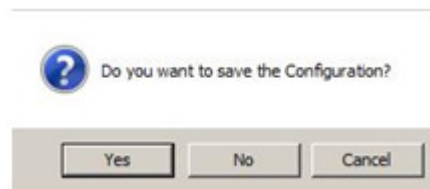
Click this icon to get new configuration. This selection will load a blank configuration to the DLM2 and prompts the User to save the current configuration.



4.4 Exit



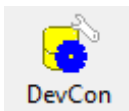
Click on this icon to exit from the application. If work has been done, the User will be prompted to save the current configuration before closing the application as shown in the figure below.



5. Configuration Menu

The **Configuration** menu lets you to configure the application to work with it. This describes each of the features accessed from the Configuration menu and lists the functions. This includes Device Configuration, Transmit Window, Receive Window, DBC Viewer, and IOCTL Configuration as shown below.

5.1 Device Configuration



Click on this icon for Device Configuration. Once you have started up DLM2 and selected a DBC file, and *before* you attempt to configure your *Transmit Window* or other DLM2 features, you should check to see that the appropriate channels have been enabled and configured properly in Device Configuration. Reference the Device Configuration portion of the manual.

5.2 Transmit Window



Click on this icon for Transmit Window. The *Transmit Window* is used to select and configure frames for transmission. User can view message details along with signals in single window. A maximum of five Transmit Windows can be opened.

Once User populates the window with the messages, a tree type of structure is provided for each message. A Plus/Minus mark is provided at the left side of a message to facilitate the expansion and collapse of message and signal content.

A (+) sign indicates a collapse message. Clicking the + sign will result in expanding the message.

A (-) sign indicates an expanded message. An expanded message shows the same content of a collapsed message along with a separate line for each signal. Above the first signal is a row of column header descriptions, which is highlighted in blue in the snapshot on the next page.

Transmit Window 1												
Message / Signal Name	Msg ID	Channel	Interval	D0	D1	D2	D3	D4	D5	D6	D7	
☒ DG_BSC	315	CAN	48	00	00	00	00	00	00	00	00	
☒ DG_CI	330	CAN	30	00	00	00	00	00	00	00	00	
☒ DG_TDEF	220	CAN	16	00	00	00	00	00	00	00	00	
	SB	SigLen	ByteOrder	SigVal	RawVal	Unit						
DGTDD	40	16	MotorolaForward	-10000	0	NM						
DGTNA	24	16	MotorolaForward	-10000	0	NM						
DGTOOCD	56	8	MotorolaForward	0	0	%						
DGASPA	52	1	MotorolaForward	No	0	SED						
DGCPA	53	1	MotorolaForward	No	0	SED						
DGTA	8	16	MotorolaForward	-10000	0	NM						
☒ DG_WS	225	CAN	18	00	00	00	00	00	00	00	00	
☒ DG_WSBS	226	CAN	30	00	00	00	00	00	00	00	00	

- A check in the box indicates a message will be transmitted during an Online session.
- The raw data bytes of a message (columns D0, D1, D2, D3, D4, D5, D6, D7) may be edited.
- The signal column descriptions (highlighted in blue above) are as defined below.

Column Header

SB

SigLen

ByteOrder

SigVal*

RawVal**

Unit

Description

Start Bit (0-63)

Signal Length (1 –64)

Selections are Motorola Forward, Motorola Backward, and Intel. Value of the signal. The SigVal may be calculated involving the Offset, Resolution, and RawVal of a signal.

Raw value without calculation

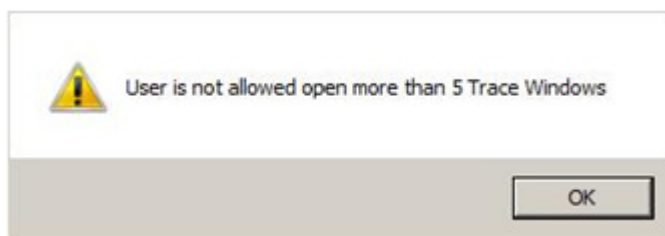
Unit description

*Signal Value (SigVal)

A SigVal field with a background color gray indicates it cannot be edited. A SigVal field with background color white indicates that the field is a selectable value. Click to view and select.

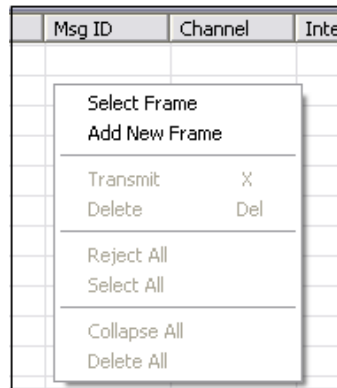
**Raw Value (RawVal) can be edited. Once edited the calculated SigVal will be automatically modified based on the pre-defined Offset and Resolution fields previously defined in the signal or in the DBC.

NOTE: User can open up to **5** Transmit Windows at one time. If the User tries to open more than 5 Transmit Windows, DLM2 will display an error message as shown in the next diagram.



Each Transmit Window offers the following features for the User. A right click on the Transmit Window will display the available features.

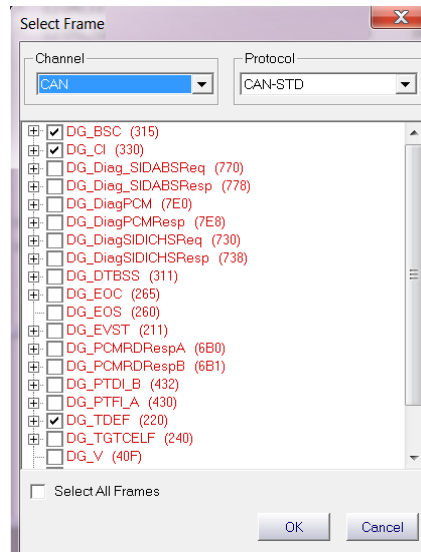
- **Select Frame** lets the User select frames to the Transmit Window from an associated DBC file.
- **Add New Frame** lets you construct messages



- The other features, **Transmit**, **Delete**, **Reject All**, **Select All**, **Collapse All** and **Delete All** become available after Frames have been added to the Transmit Window.

5.2.1 Select Frame

In the Select Frame dialog box, the message/frame(s) are displayed from the associated DBC. The name of the channel appears from the Device Configuration and the Protocol selections are those obtained from the DBC file. Selecting a different protocol will show the appropriate frames.



A check box is provided next to each frame and at the bottom of the dialog is a selection.

Follow the following procedure to select individual frames,

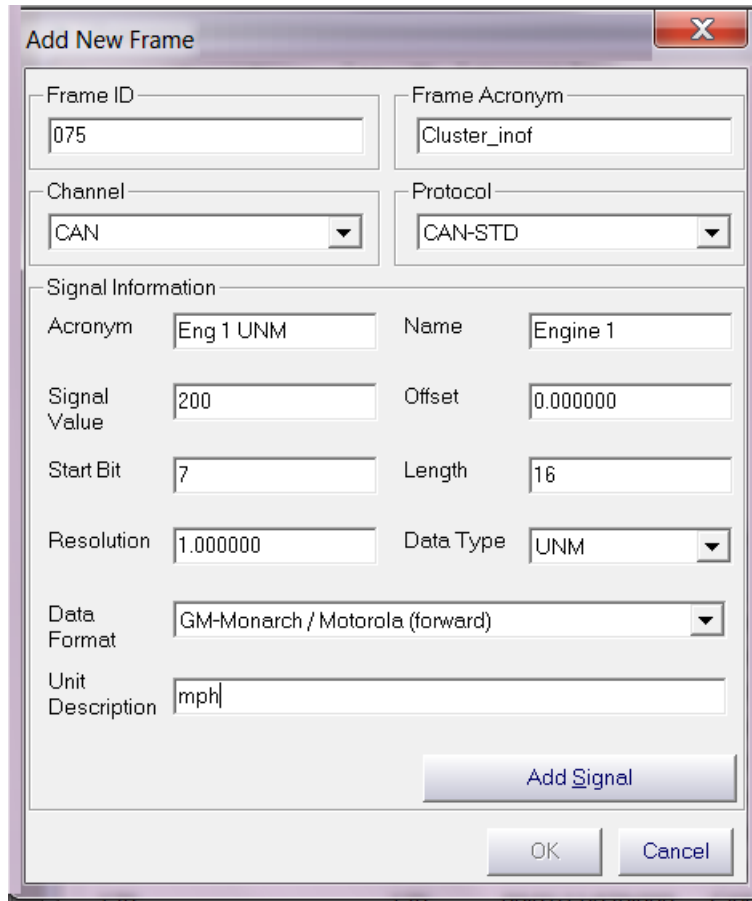
- Right-click on the Transmit Window, and click Select Frame to display the Select Frame dialog.
- First select the Channel and Protocol, then select the messages by checking the check boxes provided beside each message or besides the Select All Frames.
- After selecting the messages click OK. You are returned to the Transmit Window with your frame added to the list as shown below.

For a quick selection of all Frames enter a check in the ☐ Select All Frames box. Click OK to return to the Transmit Window, and then all frames will appear on the Transmit Window.

Transmit Window 1												
Message / Signal Name	Msg ID	Channel	Interval	D0	D1	D2	D...	D...	D...	D...	D...	D...
☐ DG_BSC	315	CAN	48	00	00	00	00	00	00	00	00	00
☐ DG_CI	330	CAN	30	00	00	00	00	00	00	00	00	00
☐ DG_TDEF	220	CAN	16	00	00	00	00	00	00	00	00	00
	SB	SigLen	ByteOrder	SigVal	RawVal	Unit						
DGTDD	40	16	MotorolaForward	-10000	0	NM						
DGTNA	24	16	MotorolaForward	-10000	0	NM						
DGTOOCD	56	8	MotorolaForward	0	0	%						
DGASPA	52	1	MotorolaForward	No	0	SED						
DGCPA	53	1	MotorolaForward	No	0	SED						
DGTA	8	16	MotorolaForward	-10000	0	NM						
☐ DG_WS	225	CAN	18	00	00	00	00	00	00	00	00	00
☐ DG_WSBS	226	CAN	30	00	00	00	00	00	00	00	00	00

5.2.2 Add New Frame

Add New Frame is the method where the User can configure a frame of his choice. The Channel is displayed. The Protocol and the Data Type can be selected. The User must add the Frame ID, Frame Acronym and Signal Information.



Follow the below sequence to construct a frame using add new frame,

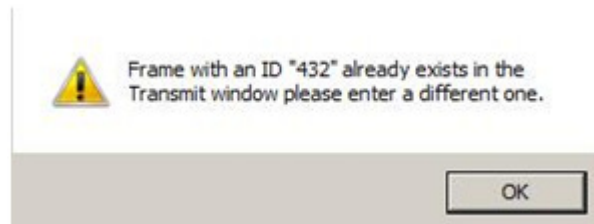
- Right-click your mouse on the window, and click Add New Frame command to display the Add New Frame dialog.
- Select the appropriate Protocol, Channel, Data Type, and Data Format.
- Type in the Frame ID, Frame Acronym and enter signal information of Length, Signal Value and Start Bit.
- Click . Now the signal is added to the message and the dialog is ready to take next message.
- Repeat step 3 to add any number of signals you want. And click  once you are done. A message pops up as shown below,

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- Click “Yes” and repeat steps 3,4 to add more signals if you wish. Otherwise click “No”, You are returned to the *Transmit Window* with your frame added to the list as shown below.
- Repeat steps 1 - 5 for each frame you wish to add to the list

While adding a new frame to the Transmit Window through this feature, if the User tries to add a frame with an ID already present in the window, DLM2 throws an error message as shown with an example below,



- 5.2.2.1 Protocol supported by DLM2 is STD CAN. EXT CAN may be viewed.
- 5.2.2.2 Channel selection is displayed. J2534 supports one channel only.
- 5.2.2.3 Data Type: defines the layout of the bits of the message. The three options are listed below.
- Motorola Forward (Big-Endian) Most Significant Byte is stored first in the lowest memory location. Bit progression from start bit is Bit-wise left and Byte-wise left
- Motorola Backward (Big-Endian) Most Significant Byte is stored in the lowest memory location. Bit progression from start bit is Bit-wise left and Byte-wise left. Start bit is counted from the right most byte.
- Intel: (Little-Endian) Most Significant Byte is stored in the lowest memory location. Start bit is least significant bit of least significant byte. Bit progression is from. the start bit is bit-wise to the left and byte-wise to the right.

5.2.2.4 Signal layout start bit positions by Data Type. Signals added to DLM2 as physical bit positions will actually display the start bit as the Bit Index number.

1. Motorola Forward DLM2 Add Frame Signal with length 8 bit and Start bit position is 7

DLM TX Window displays Start bit pos 0

Physical Bit	0	1	2	3	4	5	6	7
msb	1	0	0	0	0	0	0	lsb
Bit Index	7	6	5	4	3	2	1	0

= h80

- Motorola Forward DLM2 Add Frame Signal with length 16 bit and Start bit position is 7

DLM TX Window displays Start bit pos 8

Physical Bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
250 d	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0
0x00	7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8
0xFA																
Bit Index																

Signal Value 250 = Raw Val 250 = 0x00 0xFA

- Motorola Forward DLM2 Add Frame-Signal with length 64 bit and Start bit position is 7

DLM2 TX Window displays Start bit pos 56

Physical Bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
msb	7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8
Bit Index																

Physical Bit	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Bit Index	23	22	21	20	19	18	17	16	31	30	29	28	27	26	25	24

Physical Bit	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
Bit Index	39	38	37	36	35	34	33	32	47	46	45	44	43	42	41	40

Physical Bit	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
Bit Index	55	54	53	52	51	50	49	48	63	62	61	60	59	58	57	lsb
																56

- 2) Motorola Backward Ex:- Add Frame UNM Signal with length 16 bit and Start bit position **0**

DLM2 Add Frame Start bit pos **0** Displays as DLM2 TX Window: Start bit pos **15**

Physical Bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
250 d 00 5F	msb																lsb
	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	
Bit Index	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

Signal Value 250 = Raw Val 250 = 0x00 0x5F

- 3) Intel Ex:- Signal with length 16 bit and Start bit position is **0**

DLM2 Add Frame: Start bit pos **0** Displays as DLM TX Window: Start bit position - **0**

DLM2 **TX Window** displays Start bit **pos 0**

Physical Bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
250 d	msb																lsb
FA 00	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	
Bit Index	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	

Signal Value 250 = Raw Val 250 = 0xFA 0x00

Note: DLM2 - Add Frame follows "Hercules" for adding frames. It. The TX Window displays the start bit position in a general format.

5.2.2.5 Signal Value (SigVal) Calculations by Data Types are listed below.

1. BLN / ENM:

BLN length is 1: Signal value (SigVal) is displayed as decimal value

BLN

Add New Frame

Frame ID: 201
Frame Acronym: 201

Channel: CAN
Protocol: CAN-STD

Signal Information:
Acronym: BLN start bit 7
Name: BLN start bit 7

Signal Value: 1
Offset: 0

Start Bit: 7
Length: 1

Resolution: 1
Data Type: BLN

Data Format: GM-Monarch / Motorola (forward)

Unit Description:

Buttons: Add Signal, OK, Cancel

Add New Frame:
Boolean Signal (BLN)

Offset is 0, default
Resolution is 1, default
Length 1, default

User selectable or added fields:

Motorola Forward Data Format, default
Signal values (0 or 1), default 0
CAN-STD is an 11 bit header Identifier
Signal Acronym
Frame Acronym
Start bit 7, (default appears as 0)

1000 0000 = 0x80

Transmit Window 1											
Message / Signal Name	Msg ID	Channel	Interval	D0	D1	D2	D3	D4	D5	D6	D7
201	201	CAN	1000	80	00	00	00	00	00	00	00
	SB	SigLen	ByteOrder	SigVal	RawVal	Unit					
BLN start bit 7	7	1	MotorolaForward	1	1						

ENM length default is 8, Signal Value (SigVal) displayed as a decimal.

ENM

Add New Frame

Frame ID: 2E1
Frame Acronym: 2E1 ENM 8 bit start 7

Channel: CAN
Protocol: CAN-STD

Signal Information:
Acronym: 1 ENM 8 bit start 7
Name: 1 ENM 8 bit start 7

Signal Value: 250
Offset: 0

Start Bit: 7
Length: 8

Resolution: 1
Data Type: ENM

Data Format: GM-Monarch / Motorola (forward)

Unit Description:

Buttons: Add Signal, OK, Cancel

Add New Frame ENM

Offset 0, default
Resolution 1, default
Length 8, default, (range 1 - 8)

Protocol: Standard CAN 11 bit identifier
Data Format: Motorola Forward default
Signal Value for 8 bits default 0, range (0 to 250)
Frame ID and Acronym
Signal Acronym and Signal Value
Start bit 0 default, range (0 to 7)

Transmit Window shows RawVal of 250 and the SigVal shows 8, but once the RawVal is edited, the SigVal shows the correct calculated decimal value.

1111 010 = 0xFA = 250d

Message / Signal Name	Msg ID	Channel	Interval	D0	D1	D2	D3	D4	D5	D6	D7
2E1 ENM 8 bit start 7	2E1	CAN	1000	FA	00	00	00	00	00	00	00
2E1 ENM 8 bit start 7	0	8	MotorolaForward	8	250						

2. SNM / UNM: $\text{signal value} = (\text{raw value} * \text{resolution}) + \text{offset}$

Add New Frame

Frame ID: 120 Frame Acronym: BM 120 DG

Channel: CAN Protocol: CAN-STD

Signal Information

Acronym: BM 120 dps A7 Name: BM 120 dps N7

Signal Value: 250 Offset: 0.000000

Start Bit: 7 Length: 16

Resolution: 1.000000 Data Type: UNM

Data Format: GM-Monarch / Motorola (forward)

Unit Description: BM dps

Add Signal

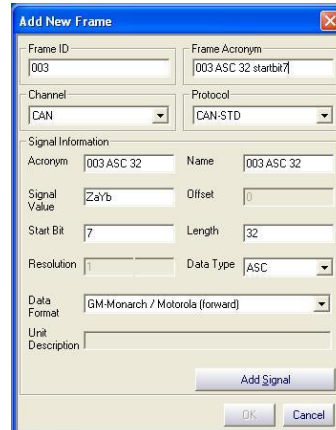
OK Cancel

Transmit Window Signal Value (SigVal) field is grayed out and cannot be edited. Changes to the RawVal field will result in the calculated Signal Value.

Transmit Window 2											
Message / Signal Name	Msg ID	Channel	Interval	D0	D1	D2	D3	D4	D5	D6	D7
Add New Signal as UNM Motorola Forward with Start Bit set as 7, 16 bit length. This shows the Transmit Window results. An edit to the RawVal will result in calculated SigVal.											
BM-arm 110 N	8	16	MotorolaForward	250	250	rpw12					
☐ BM 120 DG	120	CAN	1000	00	FA	00	00	00	00	00	00
	SB	SigLen	ByteOrder	SigVal	RawVal	Unit					
BM 120 dps N7	8	16	MotorolaForward	250	250	BM dps					
16 bit UNM; zero offset, 1.0 resolution SigVal 250;											
☐ DG UNM neg 100 offse	111	CAN	1000	01	5E	00	00	00	00	00	00
	SB	SigLen	ByteOrder	SigVal	RawVal	Unit					
DG UNM neg 100 offse	8	16	MotorolaForward	250	350	BM dps					
16 bit UNM; -100 offset, 1.0 resolution SigVal 250;											
☐ DG UNM 01 resolution	113	CAN	1000	61	A8	00	00	00	00	00	00
	SB	SigLen	ByteOrder	SigVal	RawVal	Unit					
UNM 01 resolution	8	16	MotorolaForward	249.999994	25000	BM dps					
16 bit UNM; zero offset, .01 resolution SigVal 250;											

3. ASCII:

Add New Frame Signal Value depends on the length of the signal. Values can be ascii characters.



Add New Frame

Frame ID: 003 Frame Acronym: 003 ASC 32 startbit7

Channel: CAN Protocol: CAN-STD

Signal Information

Acronym: 003 ASC 32 Name: 003 ASC 32

Signal Value: ZaYb Offset: 0

Start Bit: 7 Length: 32

Resolution: 1 Data Type: ASC

Data Format: GM-Monarch / Motorola (forward)

Unit Description:

Buttons: Add Signal, OK, Cancel

Add New Frame ASCII signal

Offset 0, default
Resolution 1, default

Signal Value ASCII Examples:
 8 bit signal (a to z and A to Z)
 16 bit signal (aa to zz and AA to ZZ)
 24 bit signal (aaa to zzz and AAA to ZZZ)
 32 bit signal (aaaa to zzzz and AAAA to ZZZZ)
 etc.

Frame ID and Frame Acronym
 Signal Acronym and Signal Name
 Motorola Forward Data Format defaults.
 Start bit defaults to 0, (range 0-7)

After the signal is added, change of Raw Hex
 Values will result in edits instead of Raw Val.
 Change to SigVal and RawVal are not editable.

Transmit Window 1 - Configuration - C:\VBC config.xml

Message / Signal Name	Msg ID	Channel	Interval	D0	D1	D2	D3	D4	D5	D6	D7
02A ASC sb7	2A	CAN	1000	61	00	00	00	00	00	00	00
	SB	SigLen	ByteOrder	SigVal	RawVal	Unit					
02A ASC sb7	0	8	Motorol...	a	61						
2B ASC sb7	2B	CAN	1000	00	84	00	00	00	00	00	00
	SB	SigLen	ByteOrder	SigVal	RawVal	Unit					
2B ASC sb7	9	8	Motorol...	B	42						
035 ASC sb7	35	CAN	1000	00	B4	00	00	00	00	00	00
	SB	SigLen	ByteOrder	SigVal	RawVal	Unit					
035 ASC sb7	9	8	Motorol...	Z	5A						
003 ASC 32 startbit7	3	CAN	1000	5A	61	59	62	00	00	00	00
	SB	SigLen	ByteOrder	SigVal	RawVal	Unit					
003 ASC 32	24	32	Motorol...	ZaYb	5A 61 59 62						

8 bit signal (a to Z)
 16 bit signal (aa to ZZ)
 24 bit signal (aaa to ZZZ)
 32 bit signal (aaa to ZZZ)

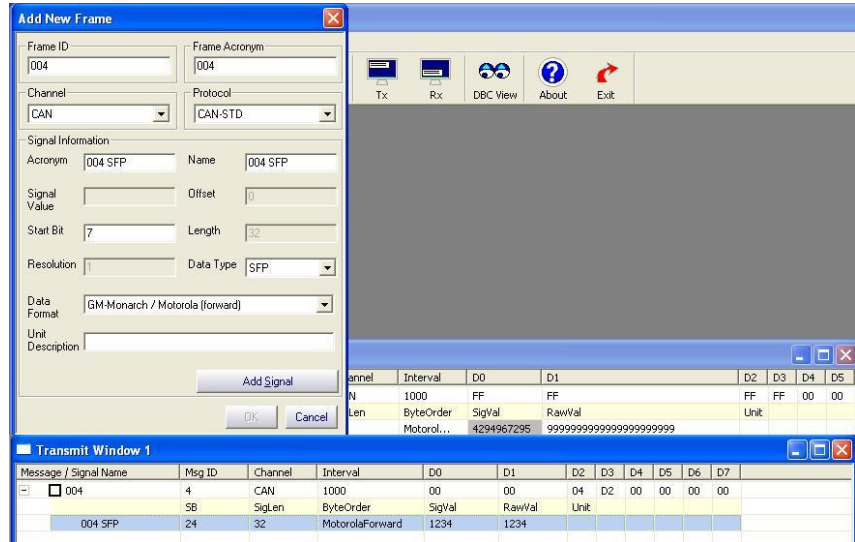
Transmit Window Signal Value (SigVal) field is grayed out and displays the ascii characters in Signal value and ascii values as hex in raw value. Raw Value field is not editable.

Ex: RawVal = 31 32 33 34 : sig val = 1234

Ex: RawVal = 5A 61 59 62 results as ZaYb results in SigVal

If edit of this value is required, the data byte values can be edited and successfully transmitted. It is noted that SigVal and RawVal will not be recalculated.

4. SFP: The Add New Frame SFP signal defaults to Length 32 and SigVal and RawVal defaults to zero.



The screenshot shows the 'Add New Frame' dialog box with the following fields:

- Frame ID: 004
- Frame Acronym: 004
- Channel: CAN
- Protocol: CAN-STD
- Signal Information:
 - Acronym: 004 SFP
 - Name: 004 SFP
 - Signal Value: (empty)
 - Offset: 0
 - Start Bit: 7
 - Length: 32
 - Resolution: 1
 - Data Type: SFP
 - Data Format: GM-Monarch / Motorola (forward)
 - Unit Description: (empty)

Buttons: Add Signal, OK, Cancel.

The 'Transmit Window 1' table shows the following data:

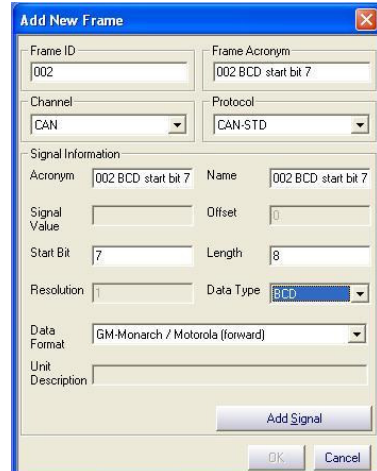
Message / Signal Name	Msg ID	Channel	Interval	D0	D1	D2	D3	D4	D5	D6	D7
004	4	CAN	1000	00	00	04	D2	00	00	00	00
004 SFP	24	32	MotorolaForward	1234	1234						

The Transmit Window Signal Value field is grayed out and displays the same value as raw value. Offset defaults to zero and Resolution defaults to 1. The RawVal can be edited and as a result calculates and updates the SigVal..

Ex:- raw val = 1234 : sig val = 1234

5) BCD:

Add New Frame Signal Value field is not editable and displays the raw value in BCD format. Length 8 is default, No SigVal is entered,



Add New Frame

Frame ID: 002
 Frame Acronym: 002 BCD start bit 7
 Channel: CAN
 Protocol: CAN-STD

Signal Information:
 Acronym: 002 BCD start bit 7
 Name: 002 BCD start bit 7
 Signal Value: [Not Editable]
 Offset: 0
 Start Bit: 7
 Length: 8
 Resolution: 1
 Data Type: BCD
 Data Format: GM-Monarch / Motorola (forward)
 Unit Description: [Empty]
 Add Signal
 OK Cancel

Add New Frame BCD signal

Offset 0, default
 Resolution 1, default
 Length default 8

Protocol: Standard CAN 11 bit identifier
 Data Format: Motorola Forward default
 Signal Value is not defined here.
 Frame ID and Frame Acronym
 Signal Acronym
 Start bit 0 is default

Transmit Window RawVal can be edited to values based on length of signal. Edited values result in updated calculated SigVal.

Transmit Window 1

Message / Signal Name	Msg ID	Channel	Interval	D0	D1	D2	D3	D4	D5	D6
16	16	CAN	1000	01	FF	FE	00	00	00	00
	5B	SigLen	ByteOrder	SigVal	RawVal	Unit				
16	17	16	Motorol...	0110 0101 0101 0011 0101	65535					
002 BCD start bit 7	2	CAN	1000	FF	00	00	00	00	00	00
	5B	SigLen	ByteOrder	SigVal	RawVal	Unit				
002 BCD start bit 7	0	8	Motorol...	0010 0101 0101	255					

The Transmit Window RawVal can be edited

RawVal (8 bits) default, Range is (0 - 255)

RawVal (16 bits) Range is (0 - 65535)

When the RawVal is edited the SigVal is automatically calculated.

Ex: raw val = 123 : sig val = 0001 0010 0011;

Ex: RawVal of 255 = SigVal 0010 0101 0101

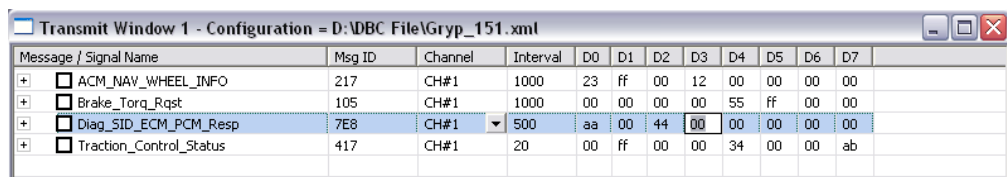
Ex: RawVal of 65535 = 0110 0101 0101 0011 0101

5.2.3 Editing Transmit Window Message data

User can edit some of the Transmit Window information of a message both in Online and Offline. The message data and interval may be edited. If the tool is in Online mode and if the message is already transmitting while an edit is performed to the data, the updated message will not be transmitted until the original transmitted message is stopped and the updated message is transmitted. This will occur the check is removed from the transmit box and the check is placed back in the box.

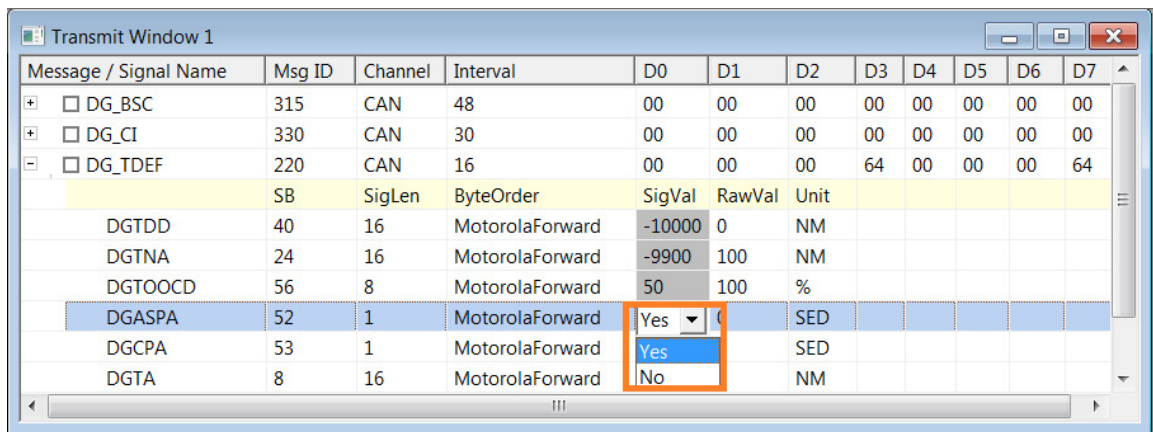
The information of a frame can be edited in several ways as shown below,

- Click on any of the data fields (D0, D1, D2, D3, D4, D5, D6, D7) of the collapsed (+) frame, and the space for editing appears. Edit the data and hit enter to make the change. The first line of an expanded (-) frame is also editable in the same manner.



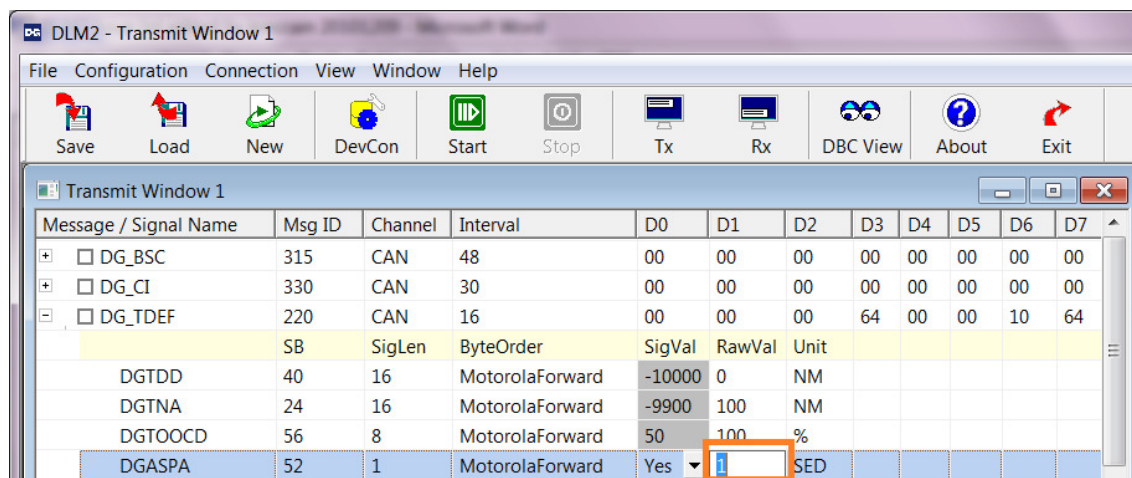
Message / Signal Name	Msg ID	Channel	Interval	D0	D1	D2	D3	D4	D5	D6	D7
+ ☐ ACM_NAV_WHEEL_INFO	217	CH#1	1000	23	ff	00	12	00	00	00	00
+ ☐ Brake_Torq_Rqst	105	CH#1	1000	00	00	00	00	55	ff	00	00
+ ☐ Diag_SID_ECM_PCM_Resp	7E8	CH#1	500	aa	00	44	00	00	00	00	00
+ ☐ Traction_Control_Status	417	CH#1	20	00	ff	00	00	34	00	00	ab

- Expand the message to display the signals with signal information. Click on the SigVal field that has a white background to see the drop down selections of the combo box. Scroll down to select the signal interpretation.



Message / Signal Name	Msg ID	Channel	Interval	D0	D1	D2	D3	D4	D5	D6	D7
+ ☐ DG_BSC	315	CAN	48	00	00	00	00	00	00	00	00
+ ☐ DG_CI	330	CAN	30	00	00	00	00	00	00	00	00
- ☐ DG_TDEF	220	CAN	16	00	00	00	64	00	00	00	64
	SB	SigLen	ByteOrder	SigVal	RawVal	Unit					
DGTDD	40	16	MotorolaForward	-10000	0	NM					
DGTNA	24	16	MotorolaForward	-9900	100	NM					
DGTOOCD	56	8	MotorolaForward	50	100	%					
DGASPA	52	1	MotorolaForward	Yes		SED					
DGCPA	53	1	MotorolaForward	Yes		SED					
DGTA	8	16	MotorolaForward	No		NM					

- Data can also be changed by editing the RawVal of the signal.



The RawVal field can be edited for any signal. The SigVal will change value automatically depending on the calculated value for the signal. The calculated value for the signal is dependent on the RawVal entered, the Resolution and the Offset that is defined from the DBC file or that was manually added via Add New Frame.

5.2.4 Transmitting frames

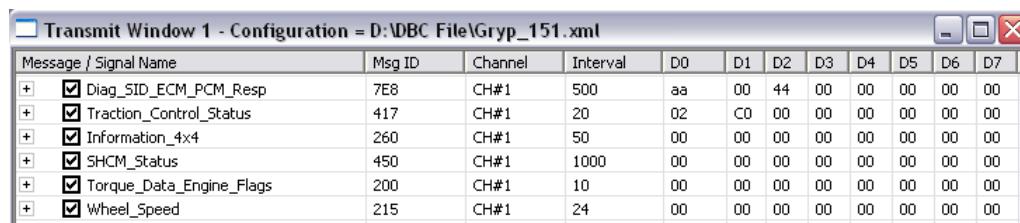
Once DLM2 is in Online mode (i.e. once you have pressed the F9 or clicked **Start** in the **Connection** menu), you can initiate a transmission of frames from the *Transmit Window*. It supports two ways of frame transmission: one-shot and periodic.

One-shot transmission can be initiated by pressing "X" on frame's entry in the Transmit Window. Another way to transmit a one-shot frame is by selecting the frame in the Transmit Frame Table and selecting the **Transmit** command from the Transmit Window's context menu. A third method involves setting the Interval to zero. Then when a check is entered in the box on Transmit Window the message is sent out one time.

Periodic frame transmission activity is achieved by checking the check boxes provided in the far left end of each frame in the Transmit Window. If you want to transmit all frames present in the Transmit Window at once, you have to select **Select All** command from the context menu. Selection of all messages is an accepted function, but there may be hardware physical limits related to the number of messages that can be transmitted periodically at one time.

To halt transmission of one particular frame only, click the check box beside the frame you wish to stop or select **Reject All** command from the context menu to stop all the frames in the window. And User can directly go to the Offline mode by selecting **Stop** option and leaving the frames checked. When User goes Online again, the periodic transmission gets initiated for all the checked frames.

To return to Offline mode, select the **Stop** command from the Connection menu, or press the Esc key. To resume frame transmission, select the Start command from the Connection menu (or press the F9 key).



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5.2.5. Options in Transmit Window

Select Frame	
Add New Frame	
Transmit	X
Delete	Del
✓ Reject All	
Select All	
Collapse All	
Delete All	

Listed are the options provided for the Transmit Window

Select Frame: To select frames for transmission as explained in the sections above.

Add New Frame: To configure a new frame as explained above.

Transmit: To transmit a frame in One-shot mode.

Delete: The option provided for deleting a frame. The periodic transmission of the particular frame is stopped before deleting in Online mode.

Select All: To select all frames and to initiate transmission in Online mode.

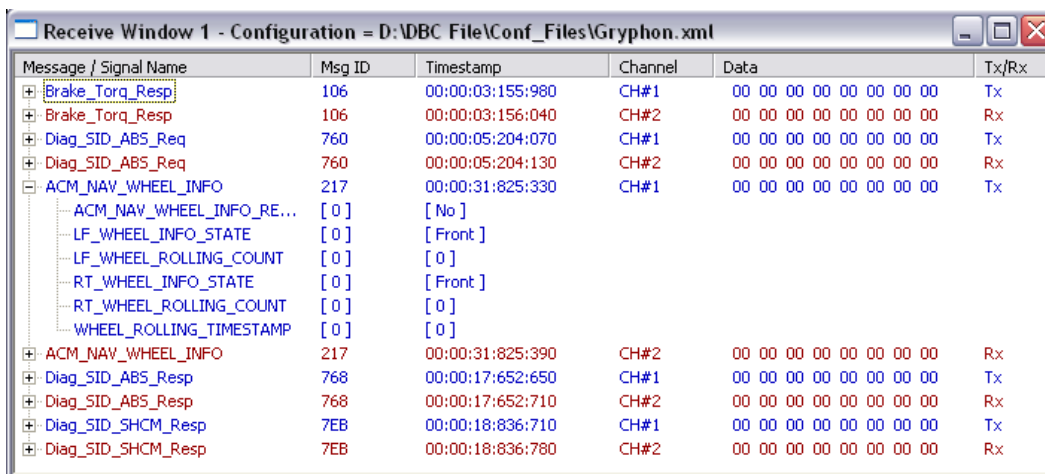
Reject All: To unselect all frames and to stop transmission in Online mode.

Collapse All: To collapse all the expanded nodes of the frames in the Transmit Window.

Delete All: To delete all frames present in the window. In Online, the periodic transmission of all the frames is stopped before clearing the window.

5.3 Receive Window

Select the Configuration menu, followed by the **Receive Window** command or click  in toolbar for Receive Window. The *Receive Window* shows all bus traffic and displays frames continuously in a chronological order, scrolling them on a “first-in, first-out” (FIFO) basis or in a fixed order. The monitor displays the following fields:

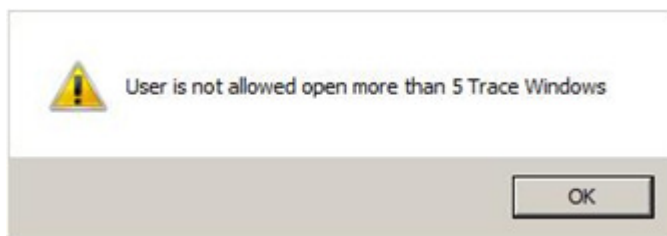


Message / Signal Name	Msg ID	Timestamp	Channel	Data	Tx/Rx
Brake_Torq_Resp	106	00:00:03:155:980	CH#1	00 00 00 00 00 00 00 00	Tx
Brake_Torq_Resp	106	00:00:03:156:040	CH#2	00 00 00 00 00 00 00 00	Rx
Diag_SID_ABS_Req	760	00:00:05:204:070	CH#1	00 00 00 00 00 00 00 00	Tx
Diag_SID_ABS_Req	760	00:00:05:204:130	CH#2	00 00 00 00 00 00 00 00	Rx
ACM_NAV_WHEEL_INFO	217	00:00:31:825:330	CH#1	00 00 00 00 00 00 00 00	Tx
ACM_NAV_WHEEL_INFO_RE...	[0]	[No]			
LF_WHEEL_INFO_STATE	[0]	[Front]			
LF_WHEEL_ROLLING_COUNT	[0]	[0]			
RT_WHEEL_INFO_STATE	[0]	[Front]			
RT_WHEEL_ROLLING_COUNT	[0]	[0]			
WHEEL_ROLLING_TIMESTAMP	[0]	[0]			
ACM_NAV_WHEEL_INFO	217	00:00:31:825:390	CH#2	00 00 00 00 00 00 00 00	Rx
Diag_SID_ABS_Resp	768	00:00:17:652:650	CH#1	00 00 00 00 00 00 00 00	Tx
Diag_SID_ABS_Resp	768	00:00:17:652:710	CH#2	00 00 00 00 00 00 00 00	Rx
Diag_SID_SHCM_Resp	7EB	00:00:18:836:710	CH#1	00 00 00 00 00 00 00 00	Tx
Diag_SID_SHCM_Resp	7EB	00:00:18:836:780	CH#2	00 00 00 00 00 00 00 00	Rx

- **Message / Signal Name** displays the message name or signal name depending on the level of the display tree. On the main node level where a ‘+’ mark appears at the left of the message the Message Name is displayed. On expanding the node (by clicking + mark) the remaining lines of the message represent signals; therefore, the Signal Name is displayed.
- **MsgID** (CAN Message Identifier)
- **Timestamp (μs)** is displayed in *absolute* or *relative* time format. Format changes go into effect only after monitoring has been stopped and re-started
- **Channel** (Channel ID)
- **Data** (Message data for bytes D0, D1, D2, D3, D4, D5, D6, D7)
- **Tx/Rx** (Frame type: *Receive*, *Transmit*)

NOTE: User can open up to 5 Receive Windows. All the options are provided for each Receive Window separately.

If the User tries to open more than 5 *Receive Windows*, DLM2 will display an error message as shown below.



5.3.1. View modes in Receive Window

In DLM2, the User can decide how the lines in the Receive Window should be displayed. Available modes in the DLM2 are Fixed and Chronological.

- In the **Fixed mode** each message is assigned to an available line the first time it occurs, and all further messages of the same message ID are over written to the same line.
- The **Chronological mode** adds each new line under the previous one, and when the window is full it scrolls upward. This representation shows the time sequence of messages very well.

5.3.2 Time stamp formats in Receive Window

There are two timestamp formats in DLM2, Absolute and Relative. **Absolute timestamp** is with respect to the start of the Online monitoring. **Relative timestamp** is with respect to the previous message. Below are two snapshots showing absolute and relative timestamps.

Msg ID	Timestamp	Channel	Data
106	00:00:08:377:150	1-DG-CAN-82527	00
106	00:00:08:377:210	2-DG-CAN-82527	00
430	00:00:09:134:180	1-DG-CAN-82527	00
430	00:00:09:134:250	2-DG-CAN-82527	00
211	00:00:14:346:420	1-DG-CAN-82527	00
211	00:00:14:346:490	2-DG-CAN-82527	00
106	00:00:15:183:130	1-DG-CAN-82527	00
106	00:00:15:183:190	2-DG-CAN-82527	00
430	00:00:15:708:160	1-DG-CAN-82527	00

Snapshot to demonstrate absolute timestamp.

Msg ID	Timestamp	Channel	Data
106	00:00:08:377:150	1-DG-CAN...	00
106	00:00:00:000:060	2-DG-CAN...	00
430	00:00:00:756:970	1-DG-CAN...	00
430	00:00:00:000:070	2-DG-CAN...	00
211	00:00:05:212:170	1-DG-CAN...	00
211	00:00:00:000:070	2-DG-CAN...	00
106	00:00:00:836:640	1-DG-CAN...	00
106	00:00:00:000:060	2-DG-CAN...	00
430	00:00:00:614:970	1-DG-CAN...	00

Snapshot to demonstrate relative timestamp.

5.3.3 Save

Save is the option provided in the Receive Window to capture all frames into a .txt file in Online mode for the next Online session. When the User selects this option, a text file gets created in the path "C:\Program Files\Dearborn Group Products\DLM2" with the name of the current Receive Window as the file name. The name of the file can be modified. All the frames captured by the application from bus traffic are added to this file. Only one file can be saved during an Online session and it will be listed in Chronological Absolute Timestamp order.

Dearborn Group Technology.

Created on :- June 28, 2011 (Tuesday) at 05: 44: 42

Timestamp Format : Absolute

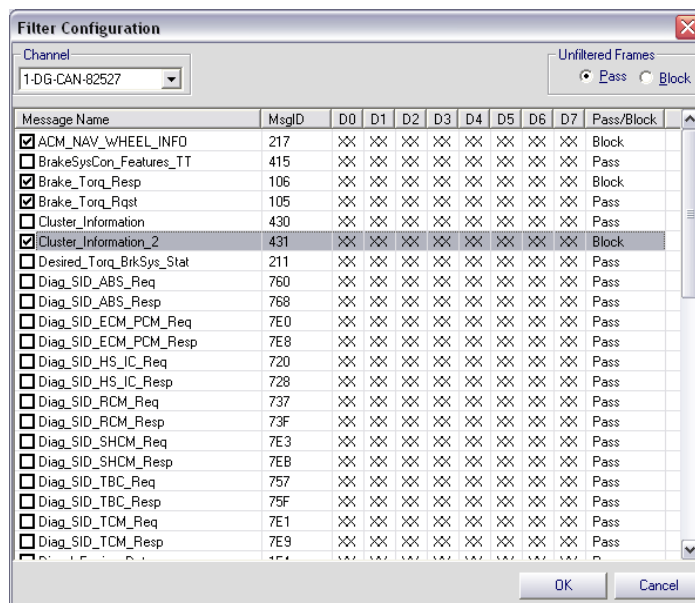
Msg ID	Time Stamp	Channel	DLC	Data	Tx/Rx
110	00:00:00:000:000	CH#1	8	60 00 00 00 00 00 00 00	RX
124	00:00:00:001:000	CH#1	5	00 06 A6 06 39	RX
110	00:00:00:010:000	CH#1	8	60 00 00 00 00 00 00 00	RX
120	00:00:00:019:000	CH#1	8	46 39 23 A4 65 81 03 A4	RX
124	00:00:00:020:000	CH#1	5	00 06 A6 06 39	RX
110	00:00:00:029:000	CH#1	8	60 00 00 00 00 00 00 00	RX
124	00:00:00:030:000	CH#1	5	00 06 A6 06 39	RX

The saved file looks like above. Saved with all necessary message information like Organization name, Date of file creation, timestamp format selected, Message ID, Timestamp, and channel, DLC, Data and Tx/Rx.

NOTE: If User continues with the next Online session without un-checking the Rx Save feature and redefining a new file name, the next buffer capture will overwrite the contents of the first file. To store the data permanently rename the file prior to the next Online session.

5.3.4 Filter Configuration

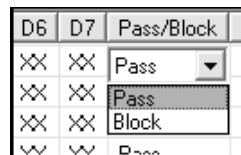
The *Filter Configuration* governs frame traffic in DLM2. Frames from the DBC file associated with the channel are listed in the table; selection and configuration of these frames are described in the following sections. The following **Filter Configuration Dialog** is obtained in Offline by selecting *Filter Configuration* command from the context menu of Receive Window. No filters can be defined if a DBC file is not associated.



To configure filter, first make your Channel Selection (in the upper left-hand corner of the window). Then a list of frames from DBC file associated with that channel will be displayed. Now choose the messages from the list to configure filter.

Follow the procedure below to configure the filter.

- Select frames by clicking on the check box that appears to the left of the frame.
- Edit the data fields to get the required 8 byte data to filter. Filter can be set in nibble level. By default, all the nibbles will be 'X' which means don't care. User can leave all the nibbles as X if he is not interested in the data of the frame.
- Select filter type as **Pass** or **Block** from the drop down box provided in the Pass/Block column of the list



- Now set the filter for unchecked frames by selecting filter type in the Unfiltered Frames part.



- Repeat the steps to configure filters for each channel.
- Click **OK** to continue.

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5.3.5 Other options in Receive Window

In addition to the features explained in above sections, Receive Window provides few more options for the ease of use.

Collapse All:

It is the option provided to collapse all expanded nodes in the Receive Window.

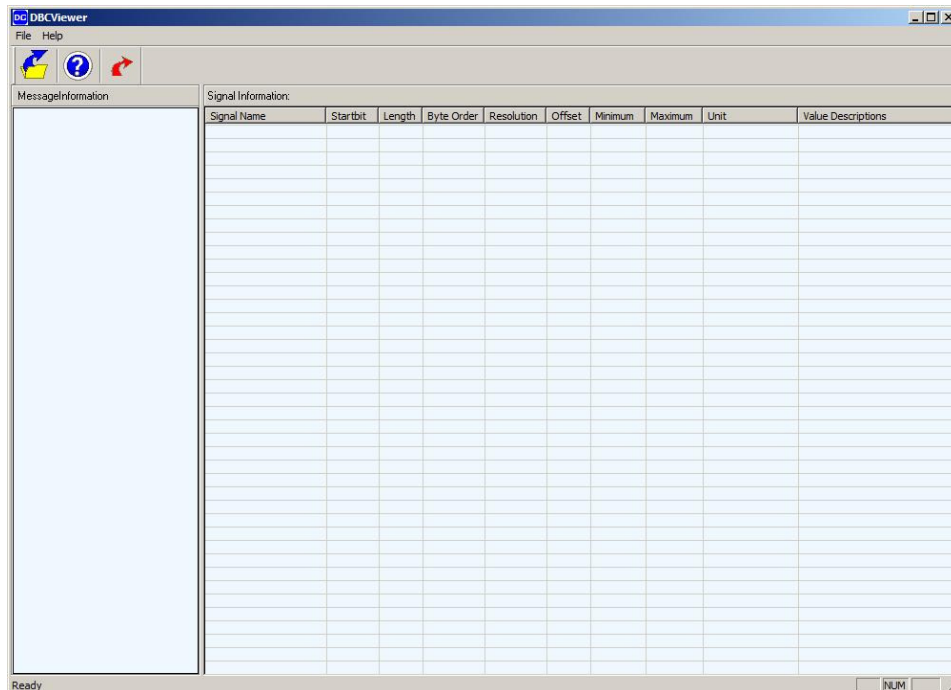
Expand All:

This will expand all the collapsed frames in the Receive Window to visualize the signal information of the frames. Rest all options are explained in the sections above.

5.4 DBC Viewer

The DBC Viewer will display Device, Message, and Signal Information obtained from a DBC file.

Select the **Configuration** menu, followed by the **DBC Viewer** command or click  directly from toolbar to open DBC Viewer. *DBC Viewer* is a stand-alone application. DBC Viewer can be opened in any of the modes (Online or Offline) of DLM2 with or without having the hardware connections.

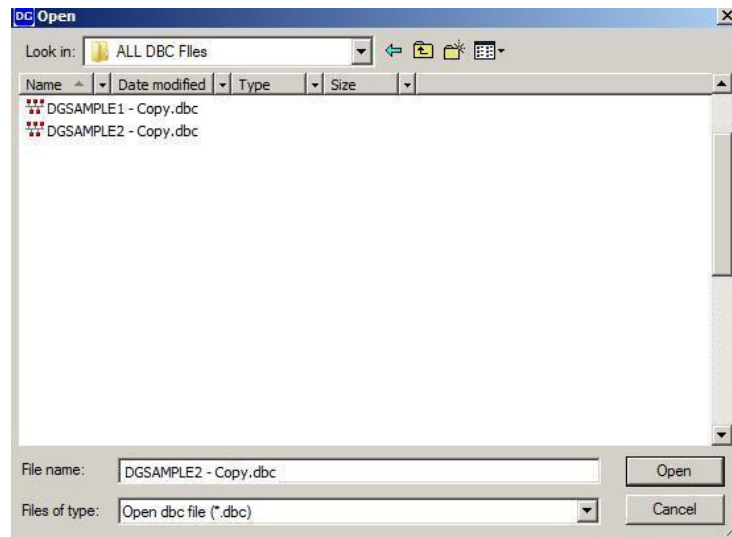


Follow the procedure below to open a file in the DBC Viewer.

- Go to Configuration menu, select **DBC Viewer** command.
- That opens an application as shown above.
- In the *DBC Viewer* window, go to **File** menu and choose **Open** command to open a desired dbc file for viewing or a click the File folder on the Task bar to produce an Open file selection window.



- Select a file by searching through the folder system and then click to highlight and select the file. Click the Open button to open the file.

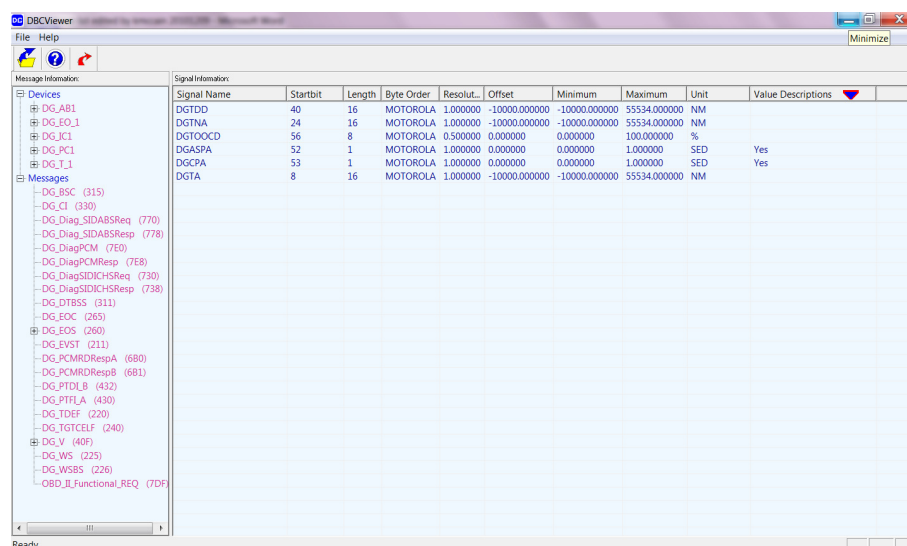


Once the DBC file is opened, the User can view the messages and signals through the DBC Viewer. The left pane of the main window displays the list of devices and messages.

Devices: Expanding the Devices section by clicking the (+) sign displays all of the devices. Expanding an individual device displays the messages related to the device. Highlighting a message by clicking on it in the Device section will display its related signal information in the right pane of the window.

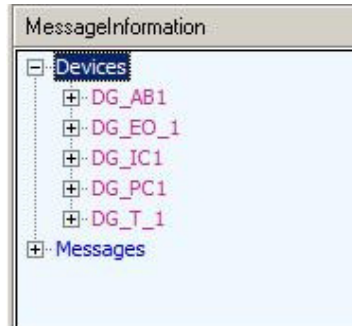
Messages: Expanding the Messages section displays all of the Messages. Highlighting a message by clicking on it in the Messages section will display its related signal information in the right pane of the window. A (+) sign next to a message indicates a Multiplexor message. This message can be expanded to show the list of related signals.

All Signal information displayed in the right pane includes Signal Name, Start Bit, Length, Byte Order, Resolution, Offset, Minimum, Maximum, Unit description and the Value Descriptions of the signal. Value descriptions are viewable in a drop down selection box.

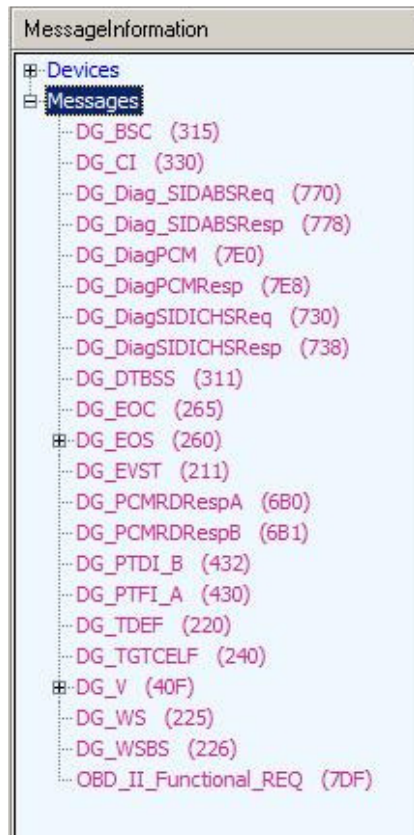


The left pane of the DBC Viewer displays the Message Information. Initially the Devices and Message heading appears.

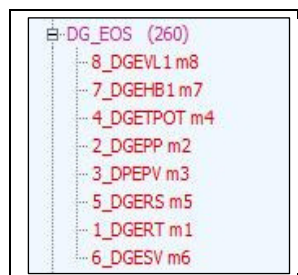
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A click on the "+" sign for Devices heading will display all of the devices in the DBC file.

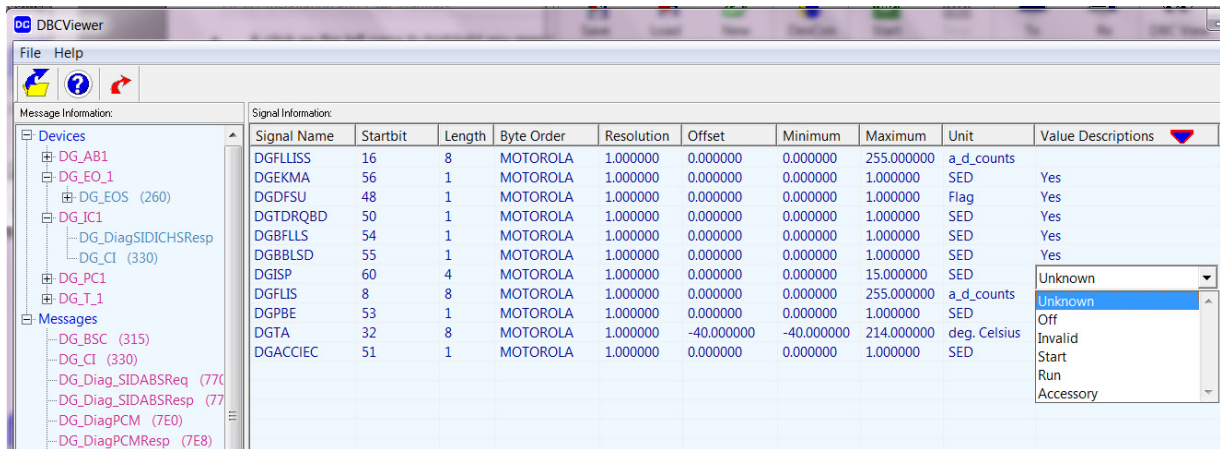


A click on the "+" sign for the Message heading will display all of the messages in the DBC file.

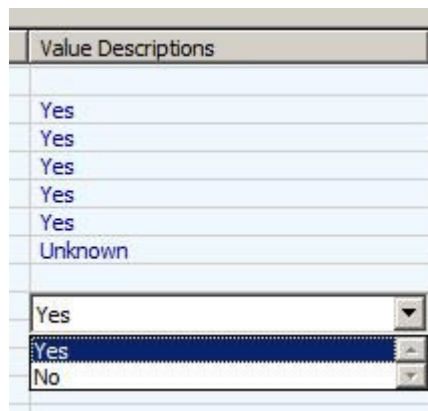


A message that appears with a "+" sign contains messages considered to have embedded IDs or Multiplexer/ed signals. A click on the "+" will expand the message to display all of the Embedded IDs

A click on the left pane to highlight any message, in the Devices or Messages section, will display the signal content on the right pane as Signal Information.



The Value Descriptions column displays descriptions for signals of length 8 bits or less that can be obtained from the DBC file. The descriptions are viewable when the field is clicked and the drop down box allows the User to scroll through all of the descriptions.



To Exit from the DBC Viewer click on the red arrow on the Task bar or select File, then Exit.

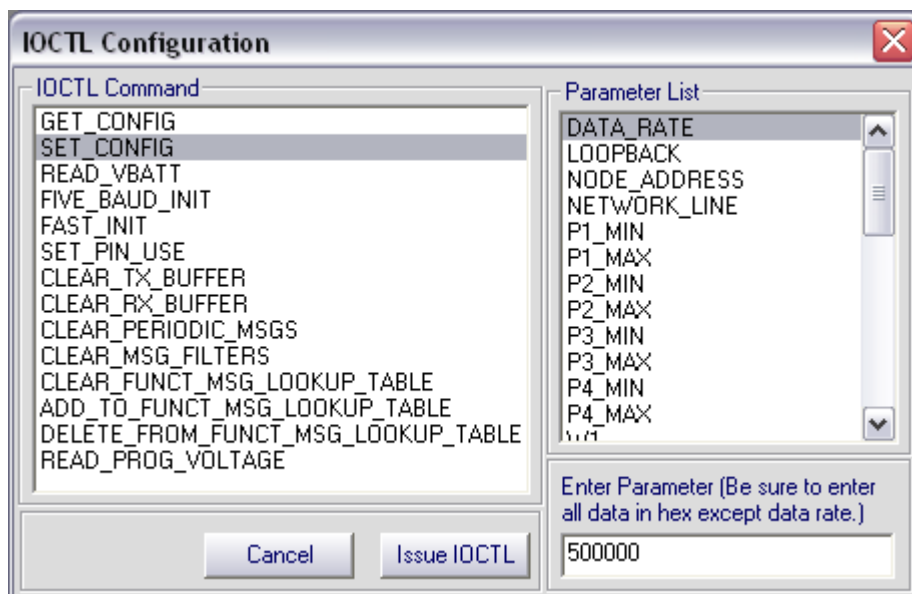


The Question Mark on the Task bar will produce a window that shows the version number of the DBC Viewer.

5.5 IOCTL Configuration

Select the **Configuration** menu, followed by the **IOCTL** Configuration command to open the dialog. IOCTL Configuration is used to issue IOCTL commands in case of J2534 devices in Online mode. Go to Configuration menu, select IOCTL Configuration command to get the dialog below,

NOTE: This feature is available only for J2534 devices.



IOCTL commands are general I/O control functions for reading and writing protocol configuration parameters (e.g. initialization, baud rates, programming voltages, etc.). These are used to read and write all the protocol hardware and software configuration parameters. All commands are listed in **IOCTL Command** list. Below is the description for the commands,

GET_CONFIG:

This is used to obtain the vehicle network configuration of the pass-thru device.

SET_CONFIG:

This is used to set the vehicle network configuration of the pass-thru device.

READ_VBATT:

This is used to obtain the voltage measured on pin 16 of the SAE J1962 connector from the pass-thru device.

READ_PROG_VOLTAGE:

This is used to obtain the programming voltage of the pass-thru device.

FIVE_BAUD_INIT:

This is used to initiate a five-baud initialization sequence from the pass-thru device.

FAST_INIT:

This is used to initiate a fast initialization sequence from the pass-thru device.

CLEAR_TX_BUFFER:

This is used to direct the pass-thru device to clear its transmit queue.

CLEAR_RX_BUFFER:

This is used to direct the pass-thru device to clear its receive queue.

CLEAR_MSG_FILTERS:

This is used to direct the pass-thru device to clear its message filters on the specified channel.

CLEAR_FUNCT_MSG_LOOKUP_TABLE:

This is used to direct the pass-thru device to clear its functional message look-up table.

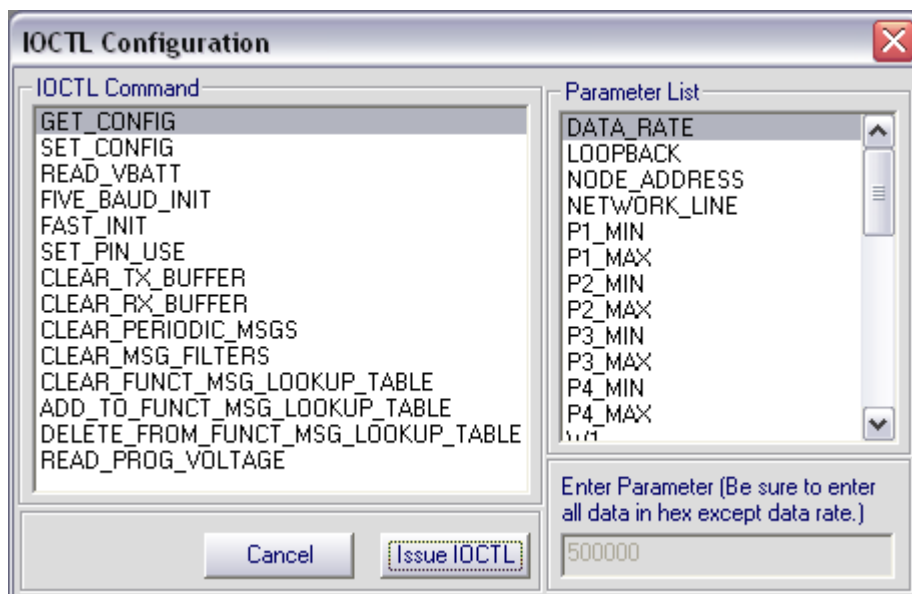
ADD_TO_FUNCT_MSG_LOOKUP_TABLE:

This is used to add functional address (es) to the functional message look-up table in the physical layer of the vehicle network on the pass-thru device.

DELETE_FROM_FUNCT_MSG_LOOKUP_TABLE:

This is used to delete functional address (es) from the functional message look-up table in the physical layer of the vehicle network on the pass-thru device.

Depending on the *IOCTL Command* selected, *Parameter list* will be enabled or disabled. Select a parameter from the *Parameter list*. Enter the *Parameter* in the edit box below if required, (depending on the IOCTL command selected), and press **Issue IOCTL**. The selected command will get issued and the returned value will be displayed in the *Parameter* edit box.

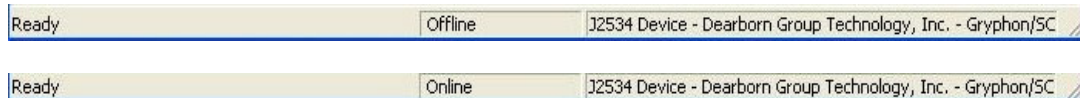


An error message will be displayed if the current protocol does not support the selected IOCTL command.



6. Connection Menu

The *Connection menu* lets you put DLM2 in Online or Offline mode (i.e., to start or stop the monitoring of frames). The DLM2 current mode (Online or Offline) is indicated in the Status bar which appears at the bottom of the main DLM2 screen if selected with a check in the *View* menu item.



6.1. Start

This is the option which begins the Online mode. Start can be selected by clicking on Start on the Toolbar, selecting Start after the *Connection menu*, or by pressing F9.



Once the Online mode session has started the *Status bar* will indicate the state of the application as Online as shown below.



Receive Window for the viewing of received frames can be selected from the *Configuration* menu.

The available features during the Online mode, as shown below, are highlighted as soon as User presses Start. Disabled features appear in the color of gray.

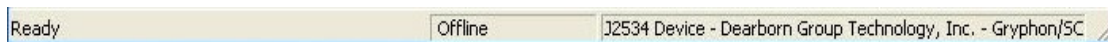


6.2. Stop

This is the option which stops the active Online session and sets the application in Offline mode. Stop can be selected by clicking on Stop from the Connection menu.



Stop can be selected on the Tool bar. or by pressing the Esc key on the keyboard. The state of the application, Offline mode, will be as shown below in the *Status bar*.



The available features during the Offline mode, as shown below, are highlighted as soon as User presses Stop. Disabled features appear without any color except gray.



7. View Menu

The View menu lets you select the following screen options: *toolbar* and/or the *status bar*. A check mark appears beside the selected option. Depending on the status of the check mark, the Toolbar and Status Bar will be shown or hidden in the application. A



The Toolbar will appear below the Menu selections when a check appears next to the View -Toolbar item.



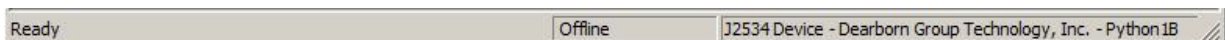
Toolbar

The Status Bar will appear at the bottom of the application's main window when a check mark appears next to the View – Status Bar item.

The most left portion of the Status Bar shows the name of the Toolbar item that the cursor is moving over.

The center portion of the Status Bar shows the state of the application. The State is Offline or Online.

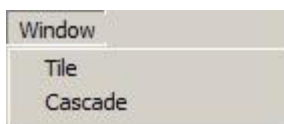
The most right section of the Status Bar shows the type of hardware device the DLM2 software is connected to.



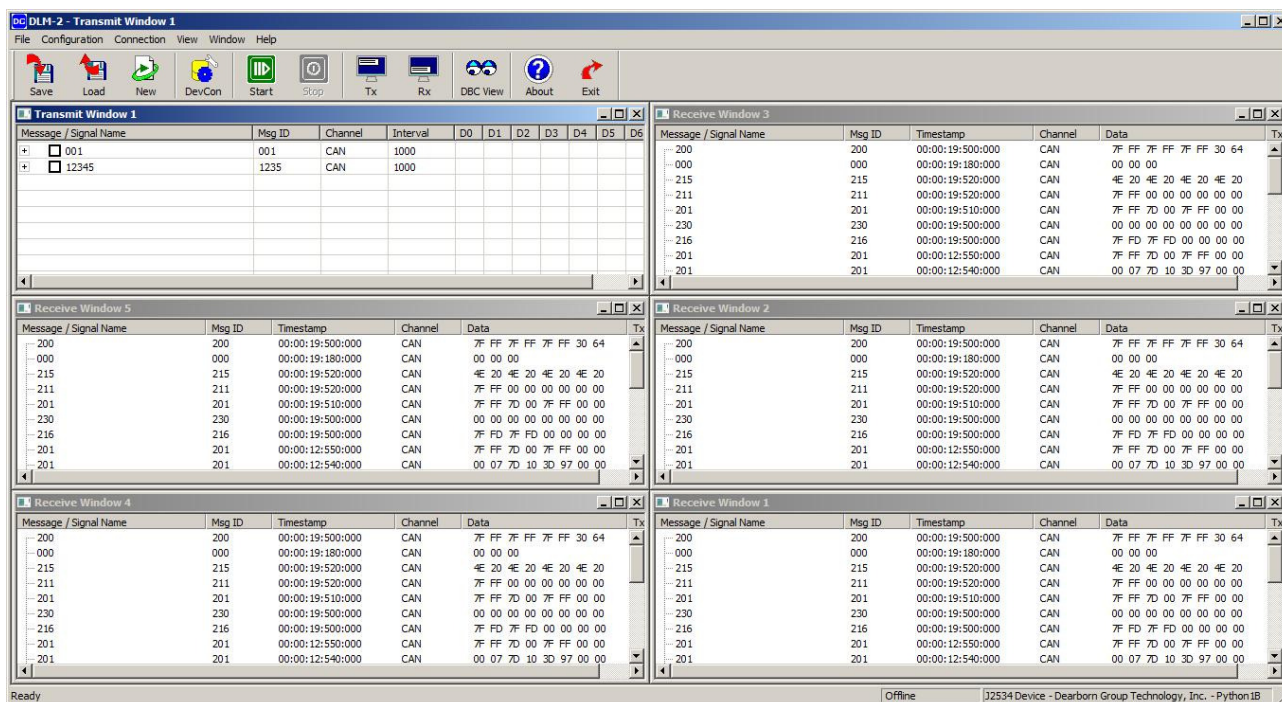
Status Bar

8. Window Menu

If one or more windows have been selected, a *Window menu* will appear next to the *View menu*. Tile or Cascade can be selected to sort the windows



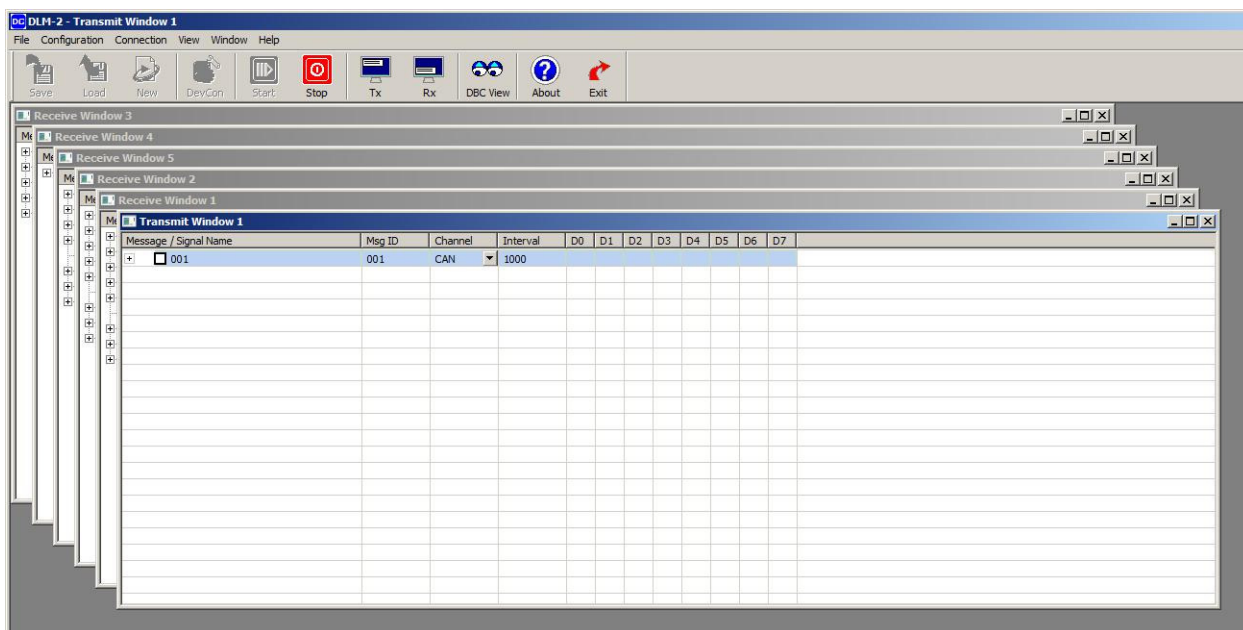
Selecting the Tile option will cause the windows to sort in a Tiled format.



“Tile” View of Monitors

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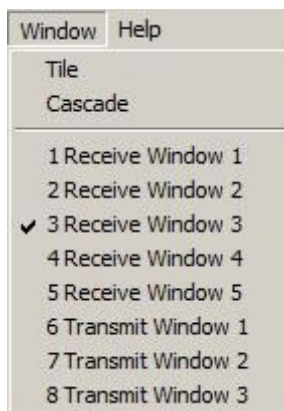
Selecting the Cascade option will cause the windows to sort in a cascade format.



“Cascade” View of Monitors

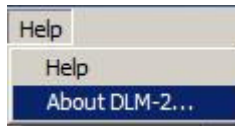
The list of windows appears below the two options. A check appears next to the window that maintains the current focus.

Scrolling down the list of windows and clicking on a particular window will cause that window to move forward in the views and gain focus of the application.



9. Help Menu

The Help menu gives you access to DLM2-specific information. The following options are available; *Help Topics* and *About DLM2*.



9.1 Help

Selecting the Help option provides access to a PDF viewer and opens the manual.

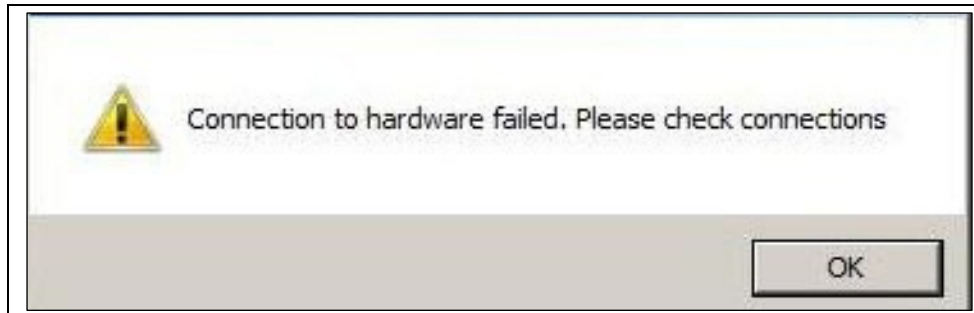
9.2 About DLM2

Selecting the About DLM2 option displays a window that identifies the version number of DLM2 and information about company.



10 Troubleshooting

Once the User selects a device from the Device Configuration screen and clicks **Get Info**, The network channels are listed in the channel configuration list. If DLM2 is not able to get the channel information from the device, it displays a warning message and leaves the channel list blank.



If this is the case, you will need to check the device connections.

- In case of Gryphon, follow the section 3.4.1 to ensure the proper device connections and verify that the Gryphon Config utility has been set to the correct IP address.
- In case of other DG J2534 devices, the connections depend on the particular device you want to connect. User has to ensure that the device configuration application is installed in his computer to detect the particular device. Refer to hardware manual

11 Warranty Information & Limitation Statements

11.1 Warranty Information

The DG Technologies DLM2 is distributed at no charge and is not subject to any warranty.

i. General Limitation and Risk Assignment

To the maximum extent permitted by applicable law, DG Technologies and its suppliers provide support services on an “as-is” basis and disclaim all other warranties and conditions not specifically stated herein, whether express, implied or statutory, including, but not limited to, any warranties of merchantability or fitness for a particular purpose, lack of viruses, accuracy or completeness of responses, results, lack of negligence or lack of workmanlike effort, and correspondence to description. The User assumes the entire risk arising out of the use or performance of the device, its operating system components, and any support services.

ii. Exclusion of Incidental, Consequential and Certain Other Damages

To the maximum extent permitted by applicable law, in no event shall DG Technologies or its suppliers be liable for any special, incidental, indirect or consequential damages whatsoever, including but not limited to: damages for loss of profit, loss of confidential or other information; business interruption; personal injury; loss of privacy, failure to meet any duty (including good faith or of reasonable care); negligence; and any other pecuniary or other loss related to the use of or the inability to use the device, components or support services or the provision of or failure to provide support services or otherwise in connection with any provision, even if DG Technologies, or any supplier has been advised of the possibility of such damages.

iii. Limitation of Liability and Remedies

Notwithstanding any damages that you might incur for any reason whatsoever (including, without limitation, all damages referenced above and all direct or general damages), in no event shall the liability of DG Technologies, and any of its suppliers exceed the price paid for the device. The User assumes the entire risk and liability from the use of this device.

iv. Right to Revise or Update without Notice

DG Technologies reserves the right to revise or update its products, software and/or any or all documentation without obligation to notify any individual or entity.

v. Governance

The User agrees to be governed by the laws of the State of Michigan, USA, and consents to the jurisdiction of the state court of Michigan in all disputes arising out of or relating to the use of this device.

vi. Contact

Please direct all inquiries to:

DG Technologies
33604 West Eight Mile Road
Farmington Hills, MI 48335 USA

Phone: (248) 888-2000
E-mail: techsupp@dgtech.com

12 Product Specifications

Feature	Data
Software	Version 1.1.0
Installation and Get Started Manual	Version 1.0

13 Technical Support

Technical support is available from 9 a.m. to 5 p.m. Eastern Time. You may also fax or e-mail your questions to us. For prompt assistance, please include your voice telephone number.

Users not residing in the United States may also contact your local DG Technologies representative.

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Web site: www.dgtech.com