HERCULES

USER MANUAL

Version 4 Series



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Recent manual revision history for this version:

Mar. 28, 2005	(Minor updates)
Jan. 3, 2005	(Updated content to version 3.5.2)
Jan. 16, 2006	(Updated content to version 4.0)
June 10, 2006	(RM – Corrected content and formatting of version 4.0)

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1. Introduction

The software package is a 32-bit Windows based application for advanced network analysis and interaction with in-vehicle network system. Using this software with a GRYPHON[®] or S-CAT hardware interface, you can monitor, receive, filter, transmit and edit CAN frames, as well as frames from

other protocols (e.g., LIN, SJA1000, J1850, J1939) over a variety of communication links. You can also access the Hercules database for industry standard translation of these frames.

You interact with the translation database of Hercules, where frame definitions are stored and retrieved, in order to decode received frames and encode frames for transmission.

Hercules software currently supports up to six channels (only 4 channels are available when connecting to the S-CAT hardware) using a PC computer via a point-to-point connection.

1.1 Document organization and format

Section 1 – Introduction – Summarizes the contents of the manual and provides references to related documentation and technical support.

NOTE: The following chapters, if read sequentially, provide step-by-step а guide to preparing for executing, recording, and analyzing а monitoring session. Each chapter includes figures and illustrations to help you understand the procedures used with this software.

Section 2 – Installation – Covers the software and hardware necessary to successfully install and operate the Hercules tool, including the required operating environment, installation instructions, and main menu overview.

Section 3 – Getting Started – Describes the procedure to configure your hardware and databases.

Section 4 – Configuration Menu – Describes the procedure to properly set up and configure the Hercules software.

Section 5 – Display Menu – Presents the display formats (monitors/views) available for the viewing of CAN frames (as well as other protocols) and Hercules tool status.

Section 6 – Filter Mode Menu – Describes the function of filtering frames and how to enable and disable filters.

Section 7 – Monitoring Menu – Describes the procedure for initiating an online monitoring session and identifies the various features enabled and disabled by main-menu option selections.

Section 8 – Playback Menu – Describes the procedure for playing back a previous monitoring session.

Section 9 – Diagnostics Menu – Describes the procedure for accessing and utilizing services available to the Diagnostic View.

Section 10 – View Menu – Shows the Tool Bar and Status Bar options for work within the application.

Section 11 – Language/Window Menu – Describes the options for languages and types of views of monitors.

Section 12 – Help Menu – Has Hercules Help Topics, feature to update firmware, and also displays which version of the Hercules Software is installed in the computer.

1.2 Typographical convention

The following typographic convention is used in this document.

Arial bold	An option, button, check box or field – either in a table, window or dialog.
Arial bold-italic	The title of a window, dialog, menu or table.
Courier bold	A command or keyboard keystroke to be selected.

1.3 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:	886-6-275-3783
Fax:	886-6-237-5031
E-mail:	2business@microport.com.tw
Web site:	www.microport.com.tw

1.4 Supplemental documentation

The following documents contain additional Hercules-related information.

Dearborn Group (248) 488-2080

$GRYPHON^{\mathbb{R}}$ installation manual	Version 2.0
GRYPHUN* INSTALLATION MANUAL	VEISION 2.0

Diagnostic References

GMLAN ENHANCED DIAGNOSTIC TEST MODE SPECIFICATION - GMW 3110	Version 1.5
Communications between vehicle and external equipment for emissions-related diagnostics – Part 5: Emissions –related diagnostic services	ISO15031-5
Diagnostics on controller area network (CAN) – Part 3: Implementation of diagnostic services	ISO 15765-3

2. Installation

Before installing the Hercules software, verify that your computer has the minimum hardware specifications to permit using the program. See the following section for detail about the required operating environment.

2.1 Required operating environment

The minimum recommended operating environment for the Hercules software consists of the following components:

- Personal computer 533 MHz or faster
- 256 MB RAM (minimum)
- 1 GB of hard drive space (minimum)
- XP and Windows 2000 with latest Service pack installed
- Dearborn Group hardware interface
- Ethernet card capable of 10MB-per-second data transfer (or faster)
- Null Ethernet (crossed) cable

NOTE: Hardware interface refers to Dearborn Group's GRYPHON[®] family of hardware (including S-CAT)

2.2 Installation instructions

The Hercules installation program will ask you to uninstall a previous version of the Hercules or S-CAT software prior to installing a more recent version. When ready, follow these steps:

- 1. Start Windows.
- 2. Insert Hercules CD-ROM into your PC computer CD-ROM drive.
- 3. Click Start | Run.
- 4. Type D:\Hercules\INSTALL_Hercules.EXE
- 5. (If "D" is your PC's CD-ROM label; otherwise, replace "D" with the correct letter for your CD-ROM drive).
- 6. Follow the instructions that appear on the screen.

7. When prompted for a TCP/IP configuration, click **Next** to choose the default settings or

enter the IP address of the hardware to which you will connect. Section 3.2.1.2 describes how to change these settings.

IP Address:	192.168. 1. 1
Port No:	7000

Continue following the directions on the screen.

After installation, two icons will appear on the Windows desktop – *Hercules* and *Hercules Compiler*. To run the Hercules application, double-click the *Hercules* icon.

For point-to-point connections, apply power to the hardware prior to booting your laptop to guarantee proper IP assignment.

3. Getting Started

After installation, two icons are added to the Windows desktop – Hercules and Hercules *Compiler*. The Hercules icon launches the main application, while the Hercules *Compiler* starts the advanced programming and compiler program. The Hercules *Compiler* program is also accessible from within the Hercules program.

3.1 Main Menu Overview

When you first start Hercules, 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 Hercules user, you should follow the procedures outlined in the following sections of this manual.



The icons on the toolbar contain some of the same commands available in the menus. As you proceed through the manual, remember that right-clicking in boxes and columns will display menus

to make selections. Also keep in mind that some applications within the software only work when in ONLINE or OFFLINE mode.

NOTE: If you are a first-time Hercules user, follow this manual in the order the information is presented. The topics presented in this manual are not in the same sequence as the topics in the menu.

3.2 Initializing the hardware

Before beginning an online monitoring session, you need to prepare the hardware interface, as described in the hardware interface manual. Two areas need to be configured: the Ethernet

(TCP/IP) connection and the network interface(s). Select the **Configuration** menu, followed by the **Hardware Configuration** command to display the following dialog.

Available	Channels	Bus Rate (Kb	ops) Attached Database	Configuration
🔽 DG-CAN-82527	CH#A	500.00	M:\seminar\in-house\	Advanced Configuration
🔽 DG-CAN-82527	CH#B	95.24	M:\seminar\in-house\	Advanced Configuration
DG-CAN-82527sw	CH#C	33.33	M:\seminar\in-house\	Advanced Configuration
DG-CAN-82527sw	CH#D	33.33		Advanced Configuration
CH#5	CH#E	41.60		Advanced Configuration
🗖 СН#6	CH#F	0.00		Advanced Configuration

3.2.1 Configuring the Ethernet interface

3.2.1.1 Power up sequence

For the Ethernet connection to work properly, it is recommended that you first apply power to the hardware unit before powering up your PC. Here the recommended procedure:

- 1. Confirm that both your PC and hardware are off.
- 2. Apply power the hardware unit. Wait approximately one minute, during which time you should hear two "beeps" from the unit (one beep after about five seconds and a second beep after about 40 seconds).

NOTE: It is important to wait until you have heard both "beeps" from the hardware unit before attempting to enter ONLINE mode. The hardware unit is not ready for communication until its power has been fully cycled (as indicated by the second "beep") The newer S CAT2 does not been

"beep"). The newer S-CAT2 does not beep.

3. Apply power to your PC and start Hercules. Configure your hardware settings properly to support communication with the hardware unit. Set the Hercules tool to ONLINE mode by selecting **Start** from the **Monitoring** menu, or by clicking **Start** on the main toolbar. A message briefly appears stating that Hercules is trying to connect to the hardware.

When this message disappears, Hercules will be ONLINE (if your hardware is correctly configured). Proceed with your monitoring session, transmitting and viewing frames – and selecting various Hercules features.

If an error message appears, confirm that all hardware connections are secure, and that the hardware configuration of the hardware unit is correct, repeating steps 1 - 3. If the hardware unit still fails to respond, refer to the appropriate troubleshooting guide in the hardware installation manual.

3.2.1.2 TCP/IP Configuration

To configure the TCP/IP connection, select the **Configuration** menu, followed by the **Hardware Configuration** command to display the **Hercules Hardware & Protocol Configuration** dialog. Click **TCP/IP Configuration** to display the following dialog.

Gryphon TCP/IP Configuration	×
Zero Configuration	
Gryphon_192_168_23_205 <=> 192.168.23.205	
GRYPHON-FF:FF:FF <=> 192.168.23.185	
- Manual Configuration	1
Gryphon IP Address 192 168 1 1	
Gryphon Port No 7000	
<u>R</u> efresh OK Cancel	

Zero Configuration – scans the network for devices (Gryphon/S-CAT/S-CAT2) and displays the available devices. When a device is selected from the list, its IP address will be displayed next to **Gryphon IP Address** under *Manual Configuration*.

Zero Configuration scanning can occur under the following conditions:

- => Upon Opening the "Gryphon TCP/IP Configuration" dialog.
- => Upon clicking the "**Refresh**" button.

Gryphon IP Address – the IP Address of the Hardware to which Hercules will be connected. The IP Address will default to 192.168.1.1 if no device is online, otherwise it will communicate with a user specified IP Address.

Gryphon Port No – the Port No. of the Hardware in which Hercules communicates with devices. Currently the default value is 7000.

Refresh – scans the network to list the available devices (Gryphon, S-CAT and S-CAT2).

When all the correct values are entered, click "OK" Button. Hercules will attempt to connect to the user specific device and returns to the "Hardware Configuration" dialog. If successful it will enable the available channels, otherwise a warning message is displayed.

3.2.2 Configuring the network channels

Hercules provides up to six network channels and checks the hardware to verify how many and what types are available. To do this, click **Configuration | Hardware Configuration** to see the following dialog.

Available (Channels	Bus Rate (Kb	ps) Attached Database	Configuration
DG-CAN-82527	CH#A	500.00	M:\seminar\in-house\	Advanced Configuration
DG-CAN-82527	CH#B	95.24	M:\seminar\in-house\	Advanced Configuration
✓ DG-CAN-82527sw	CH#C	33.33	M:\seminar\in-house\	Advanced Configuration
DG-CAN-82527sw	CH#D	33.33		Advanced Configuration
CH#5	CH#E	41.60		Advanced Configuration
CH#6	CH#F	0.00		Advanced Configuration
	<u></u>		,	

If your software and hardware are properly installed, you will see the channels available for transmission. (The check boxes on the left will be available for selection.)

If the hardware is not properly connected, the dialog will appear as follows:

Av	vailable Channels	Bus Rate (Kbps) Attached	Database Configuration
CH#1	CH#A	0.00	Advanced Configuration
CH#2	CH#B	0.00	Advanced Configuration
CH#3	CH#C	0.00	Adyanced Configuration
CH#4	CH#D	0.00	Advanced Configuration
CH#5	CH#E	0.00	Advanced Configuration
CH#6	CH#F	0.00	Advanced Configuration

The check boxes on the left are not available for selection. If this is the case, you will need to check the TCP/IP configuration (see section 3.2.1.2).

In the **Hercules Hardware & Protocol Configuration** window, select the channels you wish to use by selecting or clearing each option.

Channel names can also be assigned by typing the name in the box that you wish to represent that channel (a maximum of 12 characters are permitted). This label will be used as reference in other applications in the software. Channel names can be edited only when no windows are open.

NOTE: Only the following characters are permitted for channel names: letters "a-z" or "A-Z", numeric digits "0-9", the ampersand "&", and the underscore "_".

He	ercules Hardware & Pro	tocol Configuratio	n			×
	Available (Channels	Bus Rate (Kbps)	Attached Database	Configuration	
	G-CAN-82527	CH#A	500.00		Advanced Configuration	
	DG-CAN-82527	СН#В	500.00		Advanced Configuration	
	🔽 DG-CAN-82527sw	CH#C	33.33		Advanced Configuration	1
	🔽 DG-CAN-82527sw	CH#D	33.33		Advanced Configuration	
	DG-CAN-SJA1000FT	CH#E	500.00		Advanced Configuration	
	DG-CAN-SJA1000FT	CH#F	500.00		Advanced Configuration	
				ICP/IP Configuration	OK Cance	el

The channel's current Bus Rate (in Kpbs) and Attached Database will be displayed. To change the database, refer to section 3.3.3, Associate Database. For *Bus Rate* changes, click **Advanced Configuration**. A specific **Advanced Configuration** dialog will appear for each Gryphon network module.

NOTE: Refer to appendix A for additional information on the network modules.

3.3 Database Menu

The Hercules program uses databases as the source of decoding messages transmitted and received on the networks. It also stores and retrieves frame definitions to decode received frames and encode frames for transmission. Once you have started Hercules, you may select a translation database that is used during your session. The database translates protocol frame data into user- defined views.

When you first start Hercules, a default database (default.mdb) file is loaded by the hardware. It is an empty, read-only database and will not let you work with specific frames. To enable the Hercules program features, you must open an existing database or create a new database.

Select a database (.mdb, or Microsoft Access Database) file by using one of the following *Database* menu commands:

Create New Database – allows you to set up and save a new (customized) database, by first defining a name, type (Intel, Motorola (backward) or GM-Monarch/Motorola (forward), and location

for your new database (.mdb) file, and then adding frames to that file.



See section 3.3.1 for definition of these types. Once selected, the type cannot be changed.

Associate Database – allows you to work with a previously created and saved database.

Merge Database – allows you to merge existing Hercules databases into a single Hercules database. This option also allows previous versions of Hercules/S-CAT to be converted to the current version.

Import Database – allows you to import customized UEF (*GM Universal Export Format*) databases and Vector Informatik databases (.txt or .dbc files) for use within Hercules applications.

Once you have a saved database active (opened), most of the features of Hercules are enabled. You can now configure Hercules to send and receive protocol frames, as well as select a monitor.

Below is a chart of the database formats and corresponding protocol(s), for reference. An example is included immediately following the chart.

If you wish to proceed from this point, refer to *section* 3.3.2 Create New Database, or one of the other options to select a database.

3.3.1 Database Formats and Protocol

Database Format	Translation Format	Protocol
GM-Monarch / Motorola (forward)	Big Endian, Start Bits 7-0	CAN, LIN, J1850
Motorola (backward)	Big Endian, Start Bits 0-7	CAN, LIN
Intel	Little Endian, Start Bits 7-0	CAN, LIN, J1939

Example:

Assume the following: zero referenced bits and bytes start byte=2 start bit=0 length=16

8 byte CAN Message with the following contents:

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
0x00	0x00	0xAA	0xBB	0x00	0x00	0x00	0x00

GM-Monarch Interpretation

	Bit #								
Byte#	7	6	5	4	3	2	1	0	
0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	Most Significant Dit
2	1	0	1	0	1	0	1	0 <	
3	1	0	1	1	1	0	1	1	
4	0	0	0	0	0	0	0	0	Loost Significant Bit
5	0	0	0	0	0	0	0	0	Least Significant Bit
6	0	0	0	0	0	0	0	0	
7	0	0	0	0	0	0	0	0	

Decoded Value:

Binary	Hex	Decimal
010111011 0000000	0x5B00	23296

Motorola Interpretation:

	Bit #								
Byte#	0	1	2	3	4	5	6	7	
0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	Mart Cianifianut Di
2	1	0	1	0	1	0	1	0	Most Significant Bi
3	1	0	1	1	1	0	1	1	east Significant Bit
4	0	0	0	0	0	0	0	0	Least Significant Dit
5	0	0	0	0	0	0	0	0	
6	0	0	0	0	0	0	0	0	
7	0	0	0	0	0	0	0	0	

Decoded Value:

Binary	Hex	Decimal
10101010 10111011	0xAABB	43707

Intel Interpretation:

	Bit#								
Byte#	7	6	5	4	3	2	1	0	
0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	Least Significant Bit
2	1	0	1	0	1	0	1	0	
3	1 🕈	0	1	1	1	0	1	-	
4	0	0	0	0	0	0	0	0	Most Significant Bit
5	0	0	0	0	0	0	0	0	
6	0	0	0	0	0	0	0	0	
7	0	0	0	0	0	0	0	0	

Decoded Value:

Binary	Hex	Decimal
10111011 10101010	0XBBAA	48042

3.3.2 Create New Database

You can create а new database by saving а new (customized) database either in GM- Monarch/Motorola (forward), Intel, or Motorola (backward) data format for CAN-STD (Standard) or CAN-EXT (Extended) frames. See section 3.3.1 for description. Other protocols, such as J1850, have their own formats and interpretations and will automatically be ready to use in Hercules format

via the Hercules software. To create a database, select the **Database** menu, followed by the

Create New Database command, as shown below.

Data <u>b</u> ase <u>V</u> iew La <u>n</u> guage <u>H</u> elp)
<u>C</u> reate New Database → <u>G</u> t	M-Monarch / Motorola (forward)
Associate Database(s)	itel
<u>M</u> erge Database <u>M</u> o	jotorola (backward)
Import Database	
Non-Diag. <u>F</u> rame Data	
Non-Diag <u>S</u> ignal Data	
Diag. Frame 🕨 🕨	
Unit Description	
Virtual Device(s)	

Once you have created a database and have saved it, you are ready to check your hardware configuration. You may also need to associate, merge, import, or convert previous-version databases, as described in the following sections.

3.3.3 Associate Database(s)

Associate Database(s) lets you work with a previously created and saved database to interpret frames on assigned channels. You may select different databases for each channel or a single database may be assigned to all the channels. You should associate a database to each channel to which it applies.

1. To access an associate database, select the **Database** menu, followed by the **Associate Database(s)** command to display the following dialog.

CH#A	C:\UEF files\testuef_1.mdb	
☑ CH#B	C:\UEF files\testuef_1_1.mdb	
Г СН#С		
厂 CH#D		
□ CH#E		
└ CH#F		

To ensure that you have the channels that you need for the monitoring session, please read through Section 3.2, Hardware Configuration.

2. To associate the database, click on the (...) button to the far right of a channel. A window will appear to choose a database(s) from the files. Make your selection, and it will appear in the long gray box, as displayed in the above window. To enable your selection, select the check box to the left of the channel name.

Once you have associated one or more database(s), you are now ready to check your hardware configuration, unless you also need to merge or import other databases for use in the monitoring session.

NOTE: An example J1939 database can be loaded from the following folder location:

```
C:\Program Files\Hercules\j1939.mdb
```

3.3.4 Merge Database

The Merge Database feature will join previously created Hercules databases into a single database file. To merge databases, follow the following steps:

1. Click the first unused field and a gray box (...) will appear. Click (...) and the Select

Database File box will open.

or

Select the first row in the **Merge Database** window and right-click to display the following menu. Click the select File(s) command to open the **Select Database File** dialog.

Database File Name	
Sglect File(s) Deselect File(s) Merge & Save As Merge Database Cancel	
erge and <u>S</u> ave As	

From here, you can select the files you wish to merge together.

2. Once you have selected the databases to be merged, click **Merge and Save As**. You will then be asked to enter the database name. Once the file name is saved, you will be returned to the **Merge Database** window.

1	
C:\UEF files\testuef_1	J.mdb
C:\UEF hiles\testuet_2	2.mdb
Merge and Save As	C:\UEF files\merge data base 1.mdb
ae Status	
rge Status	Building Hercules database
rge Status	Building Hercules database

3. The final step is to click **Merge Database** at the bottom of the window. The program will begin joining the databases you have selected, and the blue progress bar indicates the Merge Status is updating. Checkmarks will also appear next to each database to indicate whether each database was merged successfully.

Once the updating is complete. а message will appear to indicate if the database(s) were successfully merged. If an error occurs while merging databases (i.e., duplicate frames, signal overlaps, etc.), a message describing the error will appear and the merging process will terminate.

If two or more databases have duplicate frames, the software will only read one of the frames, so no duplication will be sent during transmission.

3.3.5 Import database

This feature is used to import several types of databases into Hercules. The following sections describe these database types.

3.3.5.1 Import database from UEF file

GMLAN's Universal Export Format (UEF) is an output file from their GMLAN Monarch database. Hercules imports this file type directly into a Hercules .mdb database file. The output will be one file for each network designated in the database. Use the following steps to import and convert a UEF database.

1. Select the UEF file name to import and click **Open**.

Select Uef File To Convert	? ×
Look in: 🔁 DB_3_02 🔽 🖛 🛍 📸 🖽	
GMX 380 (Rev 6cSDAT)repaired UEF Export.uef	
newsample.uef	
TestSample1.uef	
File name: File name: Ope	en
Files of type: Uet Files (*.uet)	

After parsing the information from the UEF file has completed, the *Import Options* dialog for UEF conversion is displayed. It also allows the user to configure an error log file.

Import Options	×
Data Format C Intel Motorola (forward) C Motorola (backward) Select form	Error Log Enable error log E:\test\test.TXT

2. The *Enter Hercules database name to save as* dialog appears. Enter the file name for the new imported Hercules database file and click **Save**.

Enter Hercules databa	se name to save as		<u>?</u> ×
Save in: 🔂 DB_3_02		- 🖬 🍅 🖃 -	
@@test-1_1.mdb @AllProtocol1.mdb @AllProtocol2.mdb @DBDIAGSETUP1.mdb @DBDIAGSETUP2.mdb @DBDIAGSETUP2.mdb @DBDIAGSETUP3.mdb	 dbDup1.mdb dbDup2.mdb dbGM1.mdb dbGM2.mdb dbGM2.mdb dbGM3.mdb dbGM4.mdb 	폐 dbGM5.mdb 폐 dbgmNonHer.MDB 폐 dbIntel1.mdb 폐 dbIntel2.mdb 폐 dbIntel3.mdb 폐 dbIntel4.mdb	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
•			▶
File name: <mark>*.mdb</mark>		Sav	e
Save as type: Hercules	Database Files (*.mdb)	Cano	el

3. Hercules will parse the UEF file and begin importing its information into the specified

Hercules database(s). If the file contains information for more than one network (i.e., LSCAN, HSCAN) multiple files will be created, one for each channel. (Typically for GMLAN applications, HSCAN messages will be saved as filename1.mdb and SWCAN messages as filename3.mdb.

When the importing process has finished, a prompt will inform you if the file(s) was generated successfully.

3.3.5.2 Import Database from Vector Database (DBC)

You can use a database from a Vector .dbc. file, but it first needs to be converted to Hercules

(.mdb) format. Use the following steps to import and convert a DBC file database.

1. Select the .dbc file name and click **Open**.

Select Vector Database File to convert	<u>?</u> ×
Look in: 🔂 DB_3_02 💌 🗲 🗈 📸 🗉	
hs_04_X380_8a.DBC	
im hs04_X380_1a.DBC	
File name: *.dbc	Open
Files of type: Vector Database Files (*.dbc)	ancel

2. The *Enter Hercules database name to save as* dialog appears. Enter the file name of the new Hercules database file to be created and click **Save**.

Enter Hercules databas	e name to save as		? ×
Save in: 🔁 DB_3_02		- 🖬 🍅 🖃	
 @test-1_1.mdb AllProtocol1.mdb AllProtocol2.mdb DBDIAGSETUP1.mdb DBDIAGSETUP2.mdb DBDIAGSETUP2.mdb DBDIAGSETUP3.mdb 	 dbDup1.mdb dbDup2.mdb dbGM1.mdb dbGM2.mdb dbGM2.mdb dbGM3.mdb dbGM4.mdb) dbGM5.mdb dbgmNonHer.MDB dbIntel1.mdb dbIntel2.mdb dbIntel3.mdb dbIntel4.mdb	3d 3d 3d 3d 3d 3d 3d
•			Þ
File name: <mark>*.mdb</mark>		Sav	e
Save as type: Hercules [Database Files (*.mdb)	▼ Canc	;el

3. An *Import Options* dialog appears.

Import Options	×
Data Format C Intel Motorola (forward) Motorola (backward) Do you wish to view F	Error Log ✓ Enable error log C:\IgnoredData.TXT rames / Signals information? <u>Yes</u> <u>No</u>

Choose the desired options for *Data Format* and *Error Log*. To import the file, click the appropriate button in the *Do you wish to view Frames / Signals information?* box. If you click **No**, Hercules automatically imports the database. If you click **Yes**, you will be required to confirm the data type for each item in the signal list by clicking **Next >>** to continue.

rame Id	280		Frame Nar	me [mWheSpe		Protocol
Repetition Rate	0	ms	Acronym	[mWheSpe	_280	C CAN - EXT C J1939
Byte Count Frame	8 1 of 37		Comment	[Motorola Format
ignal Information - Signals List				- Param	eters Inforn	nation	
WhAngVIcRRV				Signal	Name	WhAngVicRRV	
WhAngVicRR WhAngVicRLV				Signal	Acronym	WhAngVlcRRV_280	_00
WhAngVlcRL WhAngVlcFRV				Start B	Bit	55	
WhAngVIcFR WhAngVIcFLV				Signal	Length	1	
WhAngVlcFL				Data 1	Туре	, BLN V	nit 🗌
				Offset			1
				Resol	ution	,	
				Unner	Limit		
				Lower	Limit		
				Defeu	dt Value		
				Derau	ii value		
				Signe	d	No	
				Comm	ient		

When the importing process has finished, a window will appear to alert you if the process was successful.

3.3.5.3 Import Database from Vector database (TXT)

You can use a database from a Vector .txt file, but it first needs to be converted to Hercules (.mdb) format. Use the following steps to import and convert a TXT file database.

1. Select the database text file (.txt) and click **Open**.

Select Vector Database File To Convert	? >
Look in: 🔁 DB_3_02	- 🔁 🖆 🎟
 Ins_04_X380_8a.TXT Ins04_X380_1a.TXT Sample1.txt sample2.txt sample3.txt sample4.txt 	
File name: Ktxt	Open
Files of type: Vector Database Files (*.txt)	▼ Cancel

2. The *Enter Hercules database name to save as* dialog appears. Enter the file name of the new Hercules database file to be created and click **Save**.

Enter Hercules databas	e name to save as		? ×
Save in: 🔁 DB_3_02		- 🖬 🍅 🖃	
 @test-1_1.mdb AllProtocol1.mdb AllProtocol2.mdb DBDIAGSETUP1.mdb DBDIAGSETUP2.mdb DBDIAGSETUP3.mdb 	 dbDup1.mdb dbDup2.mdb dbGM1.mdb dbGM2.mdb dbGM2.mdb dbGM3.mdb dbGM4.mdb 	 dbGM5.mdb dbgmNonHer.MDB dbIntel1.mdb dbIntel2.mdb dbIntel3.mdb dbIntel4.mdb 	
•			►
File name: <mark>*.mdb</mark>		Sav	e
Save as type: Hercules	Database Files (*.mdb)	▼ Cano	el

3. An Import Options dialog appears.

Data Format Error Log ○ Intel ✓ Enable error log ○ Motorola (forward) ✓ C:\IgnoredData.TXT ○ Motorola (backward) ✓ Do you wish to view Frames / Signals information?	Import Options X
	Data Format Error Log ○ Intel Image: Error Log ○ Motorola (forward) Image: Error Log ○ Motorola (backward) Image: Error Log ○ Motorola (backward)<

If the Vector Database File (*.txt or *.dbc) contains mixed signal data formats, you can select the *Data Format* as **Intel**, **Motorola (forward)** or **Motorola (backward)**.

Select the **Enable error log** box to view the import errors.

If you click **No**, Hercules automatically imports the database. If you click **Yes**, you will be required to confirm the data type for each item in the signal list by clicking **Next** >> to continue.

Frame Information-							Protocol
Frame Id	280]	Frame Nar	ne	mWheSpe	•	CAN - STD
Repetition Rate	0	ms	Acronym		mWheSpe	e_280	C CAN - EXT C J1939
Byte Count	8]	Comment				Motorola Format
Frame	1 of 37]					C forward
ignal Information-							
Signals List				Paran	neters Inforr	mation	
WhAngVicRRV WhAngVicRR				Signa	al Name	WhAngVlcRRV	
WhAngVIcRLV				Signa	al Acronym	WhAngVIcRRV_280_	_00
WhAngVicRL WhAngVicFRV				Start	Bit	55	
WhAngVIcFR				Signa	al Length	,	
WhAngVicFL					_		
				Data	Туре	BLN 🔽 U	nit
				Offse	et –		
				Reso	lution		
				Uppe	er Limit	, 	
					e Lincit	, 	
				LOWE	# L IIIII	J	
				Defa	ult Value		
				Signe	ed	No	
				Comr	nent		

When the importing process has finished, a window will appear to alert you if the process was successful.

3.3.5.4 Convert Database

To convert a previous-version database, simply select the database from the files, and the Hercules software will convert the file, from a previous Hercules version, to the current Hercules .mdb database format. Multiple databases will be created; one for each channel existing in the previous database.

3.3.6 Non-Diag Frame Data

The Non-Diagnostic Frame Data table lets you create new database frames, or to edit or delete existing frames. To view or create frames in this window, select a **Channel** and **Protocol** in the *Non-Diag Frame* dialog.



To delete a frame from the database, **select** it in the *Frame(s)* box and click **Delete Frame**. For frame creation and editing instructions, refer to the sections that follow.

3.3.6.1 Create a new frame

To add a new frame to the database, **select** a *Protocol* and *Channel* in the *Non-Diag Frame* window. Click **Create New Frame**. Enter the correct values for the following *Insert Frame* dialog. A diagnostic response *Frame ID* can also be entered into the database.

Insert Frame - [DB = M:\\s	cat_tra	ining_	HS.mdb] 🗙
Frame ID (in Hex)	123			Adyanced
ID - Field				
Protocol	CAN - STD			•
Frame Name	Engine RPM			
Acronym	EngRPM			
If transmit periodically default Transmission Rate (0-30 sec)	300		mSec	\$
Comment				
Data Count	8 💌	Bytes		
Uses Embedde	ed Id			<u>R</u> emote Frame
Add/ <u>E</u> dit S	iignals	Add	/ E dit E	imbedded (d
Savi	•		0	к

FIELD	DESCRIPTION			
Frame ID	Hexadecimal value of the Frame ID or header for the message. The diagnostic response frame ID can be entered in this field.			
Advanced	Becomes enabled for specific protocols to help create IDs. See further information in this section.			
Protocol	Click arrow to select: CAN-STD – standard (11-bit) CAN CAN-EXT – extended (29-bit) CAN J1850-1H (VPWM) – one-byte header, DCX J1850-3H (VPWM) – three-byte header, GM Class 2 J1850-3H (PWM) – three-byte header, Ford SCP J1939-250 Kbps (Truck & Bus)			
Frame Name	Message name.			
Acronym	Usually a shortened string of the <i>Frame Name</i> . It is used by the other applications in the software to identify the message to the user.			
Transmission Rate	Default message-sending rate for a periodic message.			
Comment	User defined information.			
Data Count	Number of data bytes.			
Uses Embedded (Secondary) ID	Dependent on application selected. It allows the user to define multiple first bytes with their specific definitions for the remaining data.			
Remote Frame	Enables CAN remote frame.			

Once you click **Save**, you will be able to access *Add/Edit Embedded (Secondary) Id* (if this option was selected) and/or *Add/Edit Signals*. See section 3.3.7 for information on how to edit signals.

Advanced Configu	ration			×
Header Computed ID	0C000003		Base • <u>H</u> ex	O <u>D</u> ec
Frame Details Priority	3 🔻			
PGN #	0000	Description		-
Destination Address	00 💌	Description		-
Source Address	03 💌	Description	transmission	-
			OK	Cancel

Advanced button (J1939 / J1850)

For CAN-EXT. the **Advanced** button will help configure the CAN ID for J1939 or GMLAN 29-bit CAN. (This is configurable under Global options, section 4.10). For J1939 protocol, an Advanced Configuration window will appear configure the Priority, PGN#. to Destination Address and Source Address separately. The *Computed* ID automatically and displayed in the box. gets constructed You can also save the descriptions for both Source and Destination Addresses in the database SO that you can select them in the future.

Advanced Config	uration		×
Computed ID	681B60		Base E Hex O Dec
- Frame Details		,	
Priority	3 💌	IFR (Bit K)	Not Required 💌
Msg Type (Bit = ZZ)	ZZ = 00 💌	Addressing (Bit Y)	Functional
Source Address	60 💌	Description	ICM 💌
Target Address	1B 💌	Description	EngRPM
			OK Cancel

For J1850-3H (PWM) J1850-3H or (VPWM) protocols, the Advanced Configuration dialog is used to configure Priority. Message Type, Source Address, Target Address, IFR Required (K bit) and Addressing (Y bit) separately. The Computed ID automatically gets constructed and displayed in the box. You can also save the descriptions for both Source and Destination Addresses.

Completing the Frame Details will generate the Computed ID for the Header.

When finished, click **OK** and the *Computed ID* will get updated to the *Frame ID* box of the *Insert Frame* window.

Add/Edit Embedded (Secondary) ID button

The *Add/Edit Embedded ID* option allows you to enter in interpretations based on the first byte in the data field. You will need to enter in Embedded (Secondary) IDs before entering signals.

Note: Embedded IDs is the term used for CAN, while J1850 uses the term Secondary ID.

- To enter an embedded or secondary ID, click Add/Edit Embedded Id to display the Add/Edit Embedded Id dialog.
- Next click Add. Enter the hex value for the *Embedded (Secondary) Id* along with a description, then click **Save**. The information will appear in the white box on the right.
- When finished, click **OK** to return to the *Insert Frame* box.

1	Add/Edit Em	bedded Id - [DB = M:\.	\j1939test.mdb] 🛛 🗙
			Embedded Id - Description List
	Frame Id	123	10 - EngineRPM
	Protocol	CAN - STD	
	Embedded Id	Hex	
	Description		
		Add Edit D	jelete <u>S</u> ave OK

3.3.6.2 Editing an Existing Frame

Select the desired frame in the *Frame(s)* window and click **Edit Frame**.

You may now edit the fields as shown. To Add or Edit Signals, see the next section.

Non-Diag Frame - [DB	Edit Frame - [DB	= C:\\testuef_	1.mdb]	×	×
Frame(s)	Frame ID (in Hex)	2E0		Ad <u>v</u> anced	Frame Name
All Nodes HS Diagno: Brake Pedal Status_1	ID - Field				
Chassis Control Dynai Chassis Control Dynai	Protocol	CAN - STD		V	
Chassis General Statu Chassis General Statu	Frame Name	Adaptive Cruise Ge	eneral Status_2	EO	STD
Engine General Statu Engine General Statu	Acronym	AdaCruGe_2E0			
Engine HVAC PTC ar Engine Sensor Data_ Engine Speed and Pe Engine Torque_120 [Engine Transmission	If transmit periodically default Transmission Rate (0-30 sec)	100	mSecs		C <u>R</u> emote
Head Light Levelling : OBD Diagnostic Requ	Comment				New Frame
UBD Diagnostic Req OBD Diagnostic Resp Platform General Stati	Data Count	8 💌 By	tes		t Frame
Platform General Stati Power Steering Gene Steering Wheel Angle	🔲 Uses Embedde	d ld		emote Frame	te Frame
Suspension System D Transmission General	Add/ <u>E</u> dit S	ignals	Add / Edit En	nbedded <u>I</u> d	ок
	<u>S</u> ava		OK		

3.3.7 Non-Diag. Signal Data

The **Non-Diagnostic Signal Data** feature allows you to view and modify frame information at the signal level. You may access the *Add/Edit Signal* window from the *Database* menu in two ways: select **Non-Diag Signal Data**, or select **Non-Diag Frame Data | Edit Frame | Add/Edit Signals**. The following dialog will appear.

Non Diag Add/Edit Signal - [DB =	C:\UEF files	\testuef_1.	mdb]					×
Channel	Protocol			Embedded Id				
CH#A	CAN - STD							~
Frame ID	Frame Name			- Er	ame Tupe —			
101	All Nodes HS Diagnostic Request_101 💌					emote		
Signal Information								
Signal		Start Byte	Start Bit	Length in	Bits	Data Type		
_DgnInf_101_01		0	7		64	UNM		
				E-R		Distan		~
		Add		Fair		Delete		N.

To view the signal list:

- Select the appropriate *Channel, Protocol* and *Frame Id* (*Name*) of the message. The *Frame Name and Frame ID* are associated in the database.
- If you entered in **Embedded (Secondary)** IDs (see section 3.2.8.1) that option will be enabled.
- If *Protocol* is a CAN variant, then the *Frame Type* option will be selectable between a *Normal* or *Remote* frame.
- If you entered Secondary IDs for *J1850-3H (PWM)* or *J1850-3H (VPWM)* networks, the Q and C bit will get created and saved as signals in the database.

To add / edit signals to the list:

- To Add: Click **Add** and the *Add Signal* box will appear.
- To Edit: Select the signal, and click **Edit**. The *Add Signal* box will appear.

Add Signal			×
Use Embedded Id	No		
Signal Name			
Signal Acronym			
Start Byte	0		
Start Bit	7		
Length of signal (bits)	8		
Data Type Description	ASC	•	
Comment			
Save		ОК	

You will be prompted to supply the following signal information. The format for the bottom portion of *Add Signal* dialog will vary, depending on the data type you have selected.

FIELD	DESCRIPTION				
Signal Name	Name of the information.				
Signal Acronym	A shortened description on the signal to be referenced in other applications in the software.				
Start Byte	The byte in which the signal information begins (see section 3.3.1 for more information).				
Start Bit	The bit in which the signal information begins (see <i>section 3.3.1</i> for more information).				
Length of signal (bits)	Number of bits.				
Data Type Description	The list of data types follows. Selection changes here will cause different boxes to appear, prompting for required information.				
Comment	User defined information.				

When you have made all your additions and changes, **Save** the signal configuration.

NOTE: After selecting **Save**, you may be prompted to provide more information (as in the case of a *State-Encoded Decimal* signal for which you need to specify and **Insert** appropriate values and interpretations).

Once you have returned to the **Non Diag Add/Edit Signal** window, you may repeat the procedure outlined above to work with other signals. You may also delete a particular signal by selecting it and clicking **Delete**.

Data Type D	Descriptions	
Value	Description	Example
ВМР	Bitmapped Picture - A packeted parameter type format in which the parameters have only two logic values.	None.
ASC	ASCII – one byte represents one text character	'A' = \$41
BLN	Boolean – encodes data that contains binary parameters, such as bits or flags	True = 1 False = 0
ENM	Enumerated – data can take one of several states, such as Day of week or Wiper mode.	\$0 = Neutral \$1 = Lift \$2 = Dive
BCD	Binary Coded – used to report decimal data in hexadecimal encoded bytes. Only 0-9 characters are used in the upper and lower nibble.	Typically - \$25 = 37; BCD - \$25 = 25 decimal
SNM	Signed Numeric – signals are represented in 2's complement. If the most significant bit is set to 1, then the value is negative and the absolute value of the number is found by taking the 2's complement.	Rear Right Door Anticipated Electrical Load (8 bits) Range = -128 to 127 A, E = N*1 If decimal value $100 = 64 If decimal value (-100): positive value 0110 0100 flip bits 1001 1011 add one 1001 1100 = \$9C
UNM	Unsigned Numeric – used for continuous range, such as temperature and speed. $E =$ engineering units, $N =$ number of bits to encode.	Accelerator Effective Position $E = N^* 100/255$ Chime Volume Request $E = N^*12.5 + 12.5$
SFP	Signed Floating Point – representation of floating point arithmetic always includes a leading sign value.	None.

3.3.8 Diag. Frame

You may enter diagnostic frame information at two levels by selecting one of the two available menu options: *Diag Frame Physical Address* or *Diag Frame Functional Address*.

3.3.8.1 Diag. Frame Physical Address

The *Diagnostic Frame Physical Address* option launches the following *Diag Frame* window. This utility is only used to create, edit, or delete the frame IDs used in physically addressed diagnostics. (The diagnostic services are configured under *Diagnostics | Setup Diagnostic Configuration*.)

Frame(s)	Sort by
Diagnostics (243) ecu tester (244)	C Frame ID Frame Name
20 20	Channel CH#C
	Protocol CAN - STD
	Frame Type © Normal C Bemore
	Create New Frame
	Edit Frame
	Delete Frame
	OK

To view or create frames in the *Diag Frame* dialog:

- First select a **Channel** then a **Protocol** to the right of the *Frame(s)* box. The Frame(s) box displays the frames sorted by *Frame ID* or by *Frame Name*.
- To delete a frame from the database, select it in the *Frame(s)* box and click **Delete Frame**.
- To Create and Edit frame IDs, click on the respective boxes in the *Diag Frame* dialog. Make your changes in those boxes and be sure to **Save** them.

Click the **Create New Frame** button to display the *Insert Frame* dialog.

Insert Frame - [[)B = C:\\TestDB1.	mdb] 🛛 🗶
Frame ID (in Hex)		Ad <u>v</u> anced
ID - Field		
Protocol	CAN - STD	•
Frame Name		
Acronym		
If transmit periodically default Transmission Rate (0-30 sec)	5000	mSecs
Comment		
Data Count	8 💌 Byte	s
		🔲 <u>R</u> emote Frame
Save		OK

This permits selecting a frame data count of zero when adding a new frame to the database.

3.3.8.2 Diag. Frame Functional Address

This menu option opens the following dialog.

unctional Address Data - [DB = C:\\testuef_1.mdb] 💦 🔀			
Functi	Extend	Extended_ID Desc	
101	FE	test	
<u> </u>			-1
			-1
		1	
Channel	CH#A	•	
Functional I	D 101		
(in Hex)	, <u> </u>		
Extended IL (in Hex)	FE		
Extended ID Description	test		
	1	1	-
Add		elete <u>E</u> dit <u>S</u> ave	
R R	<		
The *Functional ID* and *Extended ID* information listed in this window is used to configure and enable diagnostic services. The table lists all available functional and extended IDs. In the bottom portion of the window, you may *Add, Delete*, or *Edit* entries, (using the corresponding command buttons). You may use the following buttons to move through the entry list.

- |< moves to the first (top) entry in the list.</pre>
- < moves backward (up) one entry.
- > moves forward (down) one entry.
- > moves to the last (bottom) entry in the list.

The editing boxes in the middle portion of the window list *Functional ID* and *Extended ID / Description* values for the entry currently selected. To change these values, click **Edit** and type the new values into the appropriate editing boxes. To save the new values to the database, click **Save**.

To close the window without saving your changes, click **OK** and return to the main Hercules screen.

3.3.9 Unit Description

You may customize a menu of unit types from which to select units for individual signals. To do so, select **Unit Description** and the following dialog will appear, listing all available unit types.

Unit Description Data - [DB = C	:\\testuef_1.mdb]
Unit Description	Channel
×.	CH#A 🔹
% / ms % full	Unit Name
deg	
deg L dea/sec	,
g's	<u>Add</u>
km/h kPa	
liters	Edit
m m/s^2	Delete
mm	
N NA	<u>S</u> ave
Nm	04
None	

To add a new unit type to the list, click **Add**, supplying a *Unit Name* in the box provided, and then click **Save** (or you may click **OK** to exit the window without saving your changes). You may edit or delete a listed unit type by selecting it and clicking **Edit** or **Delete**. Click **Save** to activate your new list configuration and save it to the database. Click **OK** to exit.

3.3.10 Virtual Device(s)

Virtual Devices are a GMLAN specific application. This option allows you to view all the signals associated with a specific virtual network in one location. During a UEF import (see section 3.3.5) these signals will be imported to this application as well. Once located here, these signals also become selectable in other applications in the software. The following is the main configuration box

for virtual devices.

/irtual Device(s) List	Channel
Security	
PowerMode	
	Add Virtual Device
	<u>E</u> dit Virtual Device
	Delete Virtual Device
	Add / Edit <u>S</u> ignal(s)
	OK

To create a new virtual device:

Select the Channel to associate with the Virtual Device(s) chosen. You can add, edit, or delete virtual devices, as well as add and edit signals. Once you have made any changes, click **OK** to continue the set-up. When a listed virtual device is selected, the *Edit Virtual Device* button, *Delete Virtual Device* button and *Add/Edit Signal(s)* button will be available for use.

To add / edit signals:

• Select the desired Virtual Device in the Virtual Device(s) List and click Add/Edit Signal(s) to display the following dialog.

Virtual Device	One			_
Channel	CH#A	Protocol	CAN - STD V Frame Type	
Frame ID	280	Embedded ID	C Djag Frame © Non Diag I	'ram
Available Signal(a) (Sigr Wh4ngVelFLValid Wh4ngVelFR Wh4ngVelFR Wh4ngVelFRValid Wh4ngVelFLValid Wh4ngVelFLValid Wh4ngVelRL Wh4ngVelRRValid Wh4ngVelRR	nal Acronym)	Select >> << Deselect	Attached Signal(a) [France AccorymSignal Accorym Eng/Speed_cost_page WhSpeed_White/PickRLVaid	

- Select the *Protocol* and *Frame ID* to display the list of signals available for the message.
- Select the desired signal in the *Available Signal(s)* list on the left, and click **Select>>**. The signal name is copied to the *Attached Signal(s)* list on the right.
- To delete signals from the list, select the signal name in the *Attached Signal(s)* list on the right and click **<<Deselect**. The signal name is removed from the list.
- Click **OK** when finished.

4. Configuration Menu

The Configuration menu lets you select and store configurations for all major Hercules settings and functions. This includes message transmission, reception, filtering, triggering, and hardware settings.

The commands and options in this menu will let you set, modify, and save all Hercules hardware and frame format configurations. If you wish to use a previously saved configuration, you may load it at this time. Select the **File** menu, followed by the **Load Configuration** command to open the appropriate configuration (.her) file. You may create a new set of configurations by following the instructions provided in the sections below.

This section describes each of the features accessed from the *Configuration* menu and lists the steps to set their configurations.

Once all configurations are set, proceed to Section 5 where you will select Monitors.

4.1 Transmit Frame Table (TFT)

The *Transmit Frame Table* (TFT) is a list of messages that you may want to send on the network. Many of the other functions utilize the messages listed on the table. It supports two methods of frame transmission: manual and triggered. Manual transmissions (either one-shot or periodic) are initiated by pressing "**hot-key**" combinations on your computer keyboard that are assigned to frames in the *Transmit Frame Table* (TFT). Triggered transmissions occur in response to conditions specified in other Hercules software features, such as the *Frame Responder*.

The *Transmit Frame Table* is used to select and configure database frames for transmission (up to 400 per table).

NOTE: Only one Transmit Frame Table may be open at one time.

To access the *Transmit Frame Table*, select the **Configuration** menu, followed by the **Transmit Frame Table** command. When you select this table, a *TxFm* menu item is added to the menu bar, directly to the right of the *Display* menu. It lists the commands needed to format and use the table. You may also right-click in the **Transmit Frame Table** window to access the menu.

🔡 Tra	nsmit Frame	Table - Co	onfiguration =	= scat_train	ing_3.0.her - [1	<pre>[FT= scat_training.tft]</pre>				<u>_ ×</u>
97	Line, No.	Frame Id	Header Details	Protocol	Frame Acronym	Data	Channel	Hot Key	Type (Interval (0
	1 2	110 670		CAN - STD CAN - STD	EngSpPedPos VIN2_9HS	20 38 40 00 00 00 00 00 00 33 33 34 35 35 36 36 00	CH#A CH#A	Ctrl F2 Ctrl F2	One Shot One Shot	
						Add New Frame Select Frame Deselect Frame				
						Edit Data W/Database Edit Data Manually	2			
						Transmit X				
						Configure Associate F Associate Frame	rame			
						Open Save Clear				
						Update Refresh F5				
						Cut Ct Copy Ctr Paste Ctr	rl+X l+C l+V			

The other options that are available in the menu are *Cut, Copy*, and *Paste*.

4.1.1 Selecting frames for transmission

On the *TxFm Table* menu, you may **Open** a previously saved table (.tft file) or **Select** frames for a new table of frames you wish to transmit.

There are two ways to add messages to the *Transmit Frame Table – Add New Frame* and *Select Frame*. Add New Frame lets you construct messages from raw hex, while **Select Frame** lets you select messages from the databases associated in Hercules.

e Table	- Cor	figuration = te	st1.her - [1	FT= N				
Fran	ne Id	Header Details	Protocol	Fra				
	<u>A</u> <u>S</u> D	dd New Frame elect Frame eselect Frame						
	Edit Data <u>W</u> /Database Edit Data <u>M</u> anually							
	Ţ	ransmit >	:					
	C) A:	o <u>n</u> figure Associate ssociate <u>F</u> rame	Frame					
	<u>0</u> S C	pen a <u>v</u> e ear						
	U	pdate						

Use the following steps to Add New Frame.

1. Right-click your mouse on a **blank cell** in the table, or click **Add New Frame** on the *TxFm Table* menu to display the *Add New Frame* dialog.

Add New Frame										×
- Frame Name		Frame T	ype I	•	Prot	ocol	•	Base <u>H</u> ex <u>D</u> ec	Color R G	Reference – ed - Zero reen - One
Data Count	•									
Frame ID	Advar	iced	25	; 	21	17	13	9	5	
	23	21	23	45	55					
Data Byte	0	1	2	3	4					
								0	K	Cancel

2. Select the appropriate **Protocol** and, if supported, select the **Frame Type**. *Frame Type* is dependent on the module type, and most will only display "**Normal**". A few exceptions are:

DG-CAN-SJA1000 – Normal or Remote message selected as "Remote" will have a flag designator in the left-most column.

DG-CAN-82527SW – Normal or High Voltage.

For the LIN protocol, a box will appear prompting for *Master*, Master-Data or *Slave*. The *Frame ID* will designate the *Data Count*.

ld New Frame			
Frame Name —	Frame Type	Protocol	Base Color Reference ○ Hex Red - Zero ○ Dec Green - One
Data Count	Master / Slave C Master C Master - Data C Slave	BF	
-Frame ID			5 1
	23 21 23 45	5 55	
Data Byte	0 1 2 3	3 4 5	6 7
			OK Cancel

3. Type in the *Data Count*, *Frame ID* and *Data* and click **OK**. You should be returned to the *Transmit Frame Table* window and see your frame added to the list, as shown below. For J1850, CAN-EXT, and J1939 protocols, the **Advanced** button provides assistance in programming the Frame ID (or Header).

門 Tr	ansmit Fram	ie Table - Co	onfiguration =	= scat_train	ing_3.0.her - [T	FT= scat_training.tft]				
97	Line, No.	Frame Id	Header Details	Protocol	Frame Acronym	Data	Channel	Hot Key	Type (Interval (0
	1	110		CAN - STD	EngSpPedPos	20 38 40 00 00 00 00 00 00	CH#A	Ctrl F2	One Shot	
	2	670		CAN - STD	VIN2_9HS	33 33 34 35 35 36 36 00	CH#A	Ctrl F2	One Shot	
	3	123		CAN - STD	123	11 22 33 44 55 66	CH#A	Ctrl F2	One Shot	
┸										

Repeat steps 1 - 3 for each frame you wish to add to the list. If you wish to delete a particular frame from the table, select that frame's entry; click **Deselect** (on the *Transmit Frame Table* menu). Standard Windows commands – *Cut, Copy* and *Paste* are all available.

To use Select Frame, perform the following steps:



1. Right-click in a blank cell of the table, or click **Select Frame** on the *Transmit Frame Table* menu to display the *Select Frame* dialog. The user can sort content by clicking on the *ID* or *Acronym* column header.

	Header De	Acropum	Channel
543 🔺	Treader De	1 Actorym	CH#A
544		444	
7FF		GenFS1	Protocol
000		GenFS3	CAN - STD 🔻

2. First select the *Channel* and *Protocol*, then select the appropriate message and click **OK**. You are returned to the *Transmit Frame Table* window with your frame added to the list, as shown below.

🚆 Tra	ansmit Fram	ie Table - Co	onfiguration =	= scat_train	ing_3.0.her - [1	"FT= scat_training.tft]				
07	Line, No.	Frame Id	Header Details	Protocol	Frame Acronym	Data	Channel	Hot Key	Type (Interval (0
	1	110		CAN - STD	EngSpPedPos	20 38 40 00 00 00 00 00 00	CH#A	Ctrl F2	One Shot	
	2	670		CAN - STD	VIN2_9HS	33 33 34 35 35 36 36 00	CH#A	Ctrl F2	One Shot	
	3	123		CAN - STD	123	11 22 33 44 55 66	CH#A	Ctrl F2	One Shot	
┛				·	•	•				•

3. Repeat steps 1 and 2 for each frame you wish to add to the list. If you wish to delete a

particular frame from the table, select that frame's entry then click **Deselect** on the *Transmit Frame Table* menu.

4.1.2 Editing data in frames

Once your message is in the *Transmit Frame Table*, you may specify or edit data values for a particular frame. (If you used the *Add New Frame* option the data may already be complete.) There are two commands to access the data: **Edit Data W/DataBase**, and **Edit Data Manually**.

To access either screen type, select the message, right-click and select the appropriate command. *Edit Data Manually* utilizes the same *Edit Manually* dialogs described in the previous section. *Edit Data W/DataBase* will display the following dialog.

Edit W/Database		×
Frame ID 110 Fra Na	me Engine Speed and Pedal Position	Channel
Acronym EngSpPedPos	Transmit 5000. Rate	Embedded Id
Comment		
Name Throttle Position Validity Accelerator Actual Position Validity Accelerator Effective Position Validity Engine Speed Validity Engine Speed Accelerator Effective Position	Data Valid Invalid Valid Valid 3600.00000000 rpm 0.00000000 %	Frame Type ⓒ Normal ⓒ Wakeup ↓ Close
Value	3600.00000000	
Lower Limit	0.00000000	ок
Upper Limit	16383.75000000	
Unit Description	rpm	Cancel

To update data, select the data line and double-click the signal. This will expand the lower part of the dialog with a prompt to enter a new value. Click **OK** to update the field with the new value. Once complete, click **Close** to return to the *Transmit Frame Table*. The data values you just provided will now appear in the *Data* field.

4.1.3 Assigning Transmission Channels, Hot Keys, Types

The Transmit Frame Table has two types of information: non-configurable from this screen, and configurable. The non-configurable information was supplied from the previous sections:

- Line no a sequential count of the number of frames
- Frame Id the hex value supplied in set up
- Header Details a breakdown of the Frame Id, dependent on protocol type
- **Protocol** the network message type
- Frame Acronym translated from the database or a repeat of the Frame Id
- **Data** see section 4.1.2 and section 4.1.3 for configuration

🚆 Tra	🚆 Transmit Frame Table - Configuration = scat_training_3.0.her - [TFT= scat_training.tft]									
97	Line, No.	Frame Id	Header Details	Protocol	Frame Acronym	Data	Channel	Hot Key	Type (Interval (0
	1	110		CAN - STD	EngSpPedPos	20 38 40 00 00 00 00 00 00	CH#A	Ctrl F2	One Shot	
	2	670		CAN - STD	VIN2_9HS	33 33 34 35 35 36 36 00	CH#A	Ctrl F3	One Shot	
	3	ЗF		LIN	3F	11 22 33 44 22 00 00 00	CH#D	Ctrl F5	Periodic	500
	4	601B10	P/T = 60 : Trg = 1B : Src = 10	J1850 - 3	601B10	20 33 20 22 00 00	CH#C	Ctrl F8	Periodic	250
	5	0C68A060	P/T = 3 : ParID = 0345 : Src	CAN - EXT	0C68A060	DD EE 22	CH#A	Ctrl F11	One Shot	

The remaining fields may be edited from this screen by clicking on the field and scrolling down to select your preference.

Channel – The default Channel setting for frames in this table is CH#A. To change this

setting to another channel, click on the Channel cell for the frame entry you wish to edit. The cell will become a drop box that allows you to select any of the configured channels.

Hot Key – A hot-key is a key or key combination on your computer keyboard that you press to initiate some type of functionality, such as using the Start command (F9) to initiate the transmission of a particular frame from the active Transmit Frame Table. You may assign each frame, or a particular group of up to 16 frames, its own hot-key. To do so, select the desired frame in the Transmit Frame Table and select one of the 36 predefined hot-key combinations in the drop box that appears. Frames can also be transmitted by left-clicking the mouse on the selected frame from the Transmit Frame Table during an ONLINE monitoring session.

The default hot-key setting for all frames is Ctrl-F2. The following are other available hot-key combinations: Ctrl-F3 through Ctrl-F12, and Ctrl-A through Ctrl-Z (either uppercase or lowercase letters produce the same action). The hot-key combinations Ctrl-B, Ctrl-C and *Ctrl-T* are reserved; they have already been assigned to Hercules' "clear buffer", "copy" and "trigger on" functions, respectively. The combination Ctrl-F4 is also reserved.

The following table contains a list of the hot keys used in Hercules.

No	Hot Keys	Functionality		
1.	Р	Pause		
2.	Ctrl + B	Clear Buffer		
3.	Ctrl + C	Сору		
4.	Ctrl + T	Trigger On		
5.	Ctrl + V	Paste		
6.	Ctrl + X	Cut		
7.	F1	Help		
8.	F9	Start (go online)		
9.	ESC	Stop (go offline)		
10.	Ctrl + F4	Close Window		
11.	X (on TFT)	Transmit		
12.	F5	Refresh		
13.	Alt + F4	Close Application		
14.	Ctrl + F2	TFT Hot Keys		
15.	Ctrl + F3	TFT Hot Keys		
16.	Ctrl + F5	TFT Hot Keys		
17.	Ctrl + F6	TFT Hot Keys		
18.	Ctrl + F7	TFT Hot Keys		
19.	Ctrl + F8	TFT Hot Keys		
20.	Ctrl + F9	TFT Hot Keys		
21.	Ctrl + F10	TFT Hot Keys		
22.	Ctrl + F11	TFT Hot Keys		
23.	Ctrl + F12	TFT Hot Keys		
24.	Ctrl + A	TFT Hot Keys		
25.	Ctrl + D	TFT Hot Keys		
26.	Ctrl + E	TFT Hot Keys		
27.	Ctrl + F	TFT Hot Keys		
28.	Ctrl + G	TFT Hot Keys		
29.	Ctrl + H	TFT Hot Keys		
30.	Ctrl + I	TFT Hot Keys		
31.	Ctrl + J	TFT Hot Keys		
32.	Ctrl + K	TFT Hot Keys		
33.	Ctrl + L	TFT Hot Keys		
34.	Ctrl + M	TFT Hot Keys		
35.	Ctrl + N	TFT Hot Keys		
36.	Ctrl + O	TFT Hot Keys		
37.	Ctrl + P	TFT Hot Keys		
38.	Ctrl + Q	TFT Hot Keys		
39.	Ctrl + R	TFT Hot Keys		
40.	Ctrl + S	TFT Hot Keys		
41.	Ctrl + U	TFT Hot Keys		
42.	Ctrl + V	TFT Hot Keys		
43.	Ctrl + W	TFT Hot Keys		
44.	Ctrl + X	TFT Hot Keys		
45.	Ctrl + Y	TFT Hot Keys		
46.	Ctrl + Z	TFT Hot Keys		

TFT Hot Keys Type (Periodic/One Shot) / Interval – Each frame in the *Transmit Frame Table* is identified as a *One Shot* frame or a *Periodic* frame. A *One Shot* frame is transmitted one time when you press its hot-key combination in online mode. Several one-shot frames may be assigned to a particular hot-key combination, in which case all of those frames will be sent when the assigned hot-key combination is pressed.

A *Periodic* frame transmission is initiated the same way, but the frame is sent continuously at a user-specified interval. Successive pressing of that hot-key combination will alternately enable and disable the periodic transmission that frame. the of In corresponding Interval cell a pre-defined value from the database will appear. Therefore, click on that value to change it to the interval (in milliseconds) at which you would like the frame to be transmitted. The interval rate must be between 1 and 30,000 milliseconds (30 seconds).

At any point while online, double clicking on a message will transmit it one shot on the network

(regardless of its designation as periodic or one shot).

4.1.4 Associate Frame

Associate Frame is a function that will let you define a single message that can then be

"associated" to a message(s) in the *Transmit Frame Table*. The *Associate Message* is sent on the network before the message listed in the *Transmit Frame Table*. To use this function:

1. Right-click on your frame choice, and select the **Configure Associate Frame** command to display the following dialog.

Configure Associate Frame		×
Channel CH#B	CAN - STD	ms
Frame Id	Frame Name EngSpean_110	
Data Count Data		
	OK	Cancel

2. Select the *Channel* and *Protocol* on which to send the *Associate Frame*. Select the **Frame ID**, **Frame Name** and **Data Count**. You can also delay the time in which the second message is sent by entering in a value for the *Time Delay*. Click **OK**.

3. Next after selecting the message in the Transmit Frame Table, right-click and select the **Associate Frame** command. Once associated, this frame will appear in the *Transmit Frame Table* with a "**paperclip**" icon in its far-left column (see below: the last message has an associated frame). Now whenever the *Transmit Frame Table* message is sent on the network, it will be preceded by the *Associate Frame*.

👺 Transmit Frame Table - Configuration = scat_training_3.0.her - [TFT= scat_training.tft]										
07	Line, No.	Frame Id	Header Details	Protocol	Frame Acronym	Data	Channel	Hot Key	Type (Interval (0
	1	110		CAN - STD	EngSpPedPos	20 38 40 00 00 00 00 00 00	CH#A	Ctrl F2	One Shot	
	2	670		CAN - STD	VIN2_9HS	33 33 34 35 35 36 36 00	CH#A	Ctrl F3	One Shot	
	3	3F		LIN	3F	11 22 33 44 22 00 00 00	CH#D	Ctrl F5	Periodic	500
	4	601B10	P/T = 60 : Trg = 1B : Src = 10	J1850 - 3	601B10	20 33 20 22 00 00	CH#C	Ctrl F8	Periodic	250
0	5	0C68A060	P/T = 3 : ParID = 0345 : Src	CAN - EXT	0C68A060	DD EE 22	CH#A	Ctrl F11	One Shot	

4.1.5 Saving Transmit Frame Table Configurations

Once you have set up your *Transmit Frame Table*, you may save it (under its current file name or as a new file) for future use. To do so, select the **Save** command from the *TxFm Table* menu and specify the desired location for your file. The table configuration will be saved as a .tft file.

4.1.6 Transmitting frames

Once in online mode (i.e., once you have pressed the **F9** or clicked **Start** in the *Monitoring* menu), you can initiate a transmission of frames from the Transmit Frame Table by doubleclicking that frame's entry in the *Transmit Frame Table*, or by pressing the hot-key combination for the frame(s) you wish to transmit. To do so, hold down the **Ctrl** key and press the other key designated in the hot-key combination of the frame. 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 *TxFm Table* menu (or simply **double-click** the message).

To halt all frame transmission activity and return to offline mode, select the **Stop** command from the *Monitoring* menu, or press the **Esc** key. To halt transmission of one particular frame only, toggle its hot-key combination. This toggling will alternately initiate and halt transmission of that *particular frame*. To resume frame transmission, select the **Start** command from the *Monitoring* menu (or press the F9 key), and press the hot-key combination for the frames you wish to transmit.

4.1.7 Transmit Frame Table Online Editing

If you wish to specify or edit data values for a particular frame while online, select the entry of that frame. By selecting the **Edit Data Manually** option, editing of the selected frame data byte will be available. Editing of Frame IDs can be for one-shot frames as well as for the periodic frames provided they are not currently being transmitted. After editing Frame data for a periodic frame that

is currently being transmitted, select the **Update** option from the *TxFm Table* menu to update the data values being transmitted.

4.2 Buffer Configuration

Once you have initiated frame transmission, Hercules uses a buffer to store incoming protocol frames it receives. Several storage modes can be accessed in the *Buffer Configuration* dialog that appears when you select the **Buffer Configuration** command in the *Configuration* menu.

uffer Configuration	×
Buffer Size 5 💌 K Frames Storage Mode O Fill Once 💿 Co <u>n</u> tinuous O Trigger <u>e</u> d	Captured Mode Filtered All
Clear Prompt to save buffer when s O Append Diffline mode to Online mode?	witching from (Clear mode only)
Irigger Configuration	Cancel

Buffer Size – By selecting the appropriate value in this list, you can select the number of frames (between 1K and 999K) from which the buffer will capture its data.

Captured Mode – The capture mode determines which frame data is captured for storage in the buffer. You may select one of two modes to capture data during your session:

Filteredfills the buffer with data according to conditions specified in the Filter Table;Allcaptures all buffer data, regardless of Filter Table settings.

Storage Mode – One of the following three methods may be used to store data in the buffer once it has been captured:

- **Fill Once** stores frames in the buffer until it is full and then returns the program to off- line mode. (This mode is based upon the buffer size setting.)
- **Continuous** stores frames on a FIFO (first in, first out) basis until frame transmission is stopped, providing you with the most recent data received on the bus.
- **Triggered** stores frames continuously (see *Continuous*, above) until a trigger occurs, at which point frames are stored according to the trigger configuration (see section 4.3).

Trigger Configuration – This button will be enabled if you have selected the *Triggered* buffer storage mode; it moves you to the *Trigger Configuration* window (see section 4.3, below), for setting parameters specific to the Triggered buffer storage mode.

NOTE: In ONLINE mode, the "hot-key" combination Ctrl-T can be used to (manually) trigger the logging of information in the buffer.

Clear / Append options – These options allow you to dictate what happens to the buffer's contents once you have viewed them and wish to return to online mode. By default, this feature is set to **Clear** mode, which means that the buffer is cleared each time you return to ONLINE mode and initiate a new monitoring / transmission session.

You may save a buffer's contents to a .txt file for later viewing, by clicking **Save** in the Offline Buffer View. If you select **Clear** mode, you may also request that you be prompted to save current buffer contents any time you attempt to return from the offline to the online mode. By selecting $[\sqrt{}]$ the box beside this option (next to "Clear" in the Buffer Configuration window), you ensure that you will be reminded to save the current buffer contents before returning to the online mode.

If you prefer that the buffer contents NOT be deleted when you return to online mode, you may request that buffer information from subsequent monitoring (online) sessions be appended to the current buffer contents. In *Append* mode, the buffer's contents are not automatically deleted when you return to online mode. Instead, any information recorded to the buffer once you return to online mode is appended to the end of the *Offline Buffer View* display.

You may also clear the buffer manually by selecting the **Clear Buffer** (CTRL-B) command in the *Monitoring* menu, or click **Clear Buffer** on the main toolbar.

4.3 Trigger Configuration

The *Trigger Configuration* menu is only accessible if you have selected the **Triggered** buffer storage mode (see section 4.2, above). Once you have selected the *Triggered* mode, you will need

to define the conditions that will trigger the storage of information in the buffer. If, in online mode, a received frame's pattern matches what is defined by the trigger configuration you have specified, the trigger will occur and initiate the storage of information to the buffer or transmit a command on a specified channel.

Once triggers occur based on the sequence specified, and the buffer has captured the frames according to the *pre* and *post* percentage values, the software automatically switches into offline mode.

You may access the *Trigger Configuration* dialog by selecting the **Trigger Configuration** command from the *Configuration* menu or in the *Buffer Configuration* window. The following dialog will appear:



Trigger Type

- **Frame Trigger** stores frames continuously until a specified frame occurs, at which point frames are stored according to the pre and post trigger percentages.
- **Trigger on Engineering Value –** stores frames continuously until a specified frame, set at engineering values or range specified for a signal, occurs, at which point frames are stored according to the pre and post trigger percentages.
- **Frame Trigger On TimeOut** stores frames continuously until a trigger occurs. Once the trigger occurs, the trigger waits for the specified amount of time. If another message occurs on the bus, which fits the trigger configuration, then the trigger timer is reset and the buffer will continue to fill. Once the frame has not appeared within the timeout value then the frame trigger on timeout will occur.
- **Event Trigger** stores frames continuously until a specified Event occurs, at which point frames are stored according to the pre and post trigger percentages.

Trigger Sequence

You can specify *Strict Order / Any Order / Any Trigger* condition for the set of triggers that are configured. You can change the order of the configured triggers by using the **Cut**, **Copy**, and **Paste** commands provided through the short-cut menu.

- **NOTE:** Paste occurs above the selected item.
- Strict Order If selected, all the trigger conditions in the trigger list must satisfy the order they have been specified, then only Hercules should indicate the trigger. It is an AND condition for all triggers with the order specified.

- Any Order If selected, the trigger conditions for all the configured triggers must satisfy in any order. Then, Hercules should trigger. This is an AND condition for all triggers, but no order is specified.
- **Any Trigger** If selected, Hercules should trigger if any one of the trigger conditions is satisfied. It is an OR condition for all triggers.

Buffer Storage

In triggered storage mode, buffer storage space is apportioned according to the following parameters:

- **Pre Trigger % –** percentage of the buffer to be reserved for storage of frames received before a trigger occurrence.
- **Post Trigger % –** percentage of the buffer to be reserved for storage of frames received after a trigger occurrence.

Trigger Action

When the **Send Command** option has been selected, Hercules will extend the dialog to display additional data entry fields so you can specify which Gryphon command to send to the hardware. The following Gryphon commands are supported (for more information on these commands, see the *Gryphon Hardware and Communication Manual*):

CMD_INIT - used to initialize the specified channel.

CMD_CARD_IOCTL - used to access generic I/O functions and channel specific I/O

functions.

- **CMD_CARD_SET_SPEED** used to establish the speed characteristics of the specified channel.
- **OTHER –** used to specify a command ID other than one of those listed above. Specify the *Command Number* and *Channel* on which the COMMAND has to be sent. Add data to the COMMAND in the *Data* section (refer to Gryphon Manual for COMMANDS) by first specifying the *Data Length* in the combo box. Data Length varies from 0 to 32 bytes with respect to the COMMAND that is selected for transmission.

4.3.1 Frame Trigger (On TimeOut) Configuration

Ingger Configuration
Trigger List
EngVal Trigger 1 C Erame Trigger
Trigger On Engineering Value
C Frame Trigger On LimeOut
C Event Trigger
Trigger Sequence
C Any Order
C Any Trigger 8 50
Trigger Action
Add Edit Delete Send Command OK
C Send Command
Command Data Count
Command No 01 Initialize
Data
17 32

Frame Trigger and *Frame Trigger on TimeOut* have the same configuration screen, except one field – *TimeOut Trigger Value*. Triggers occur on the specified Frame ID or have the ability to identify specific bits or nibbles in a selected signal and determine whether they meet the user-specified conditions (=, <, >, <>, <=, >=) necessary for the trigger to occur.

For *Frame Trigger on TimeOut*, the trigger does not occur as long as the defined trigger message is continuously received with the specified timeout. Once the frame does not arrive during the time specified, then the trigger is set.

Frame Trigger Configuration				×
Name Channel Channel	Protoco	XT	Color Referen	nce Don't Care
Frame ID - Name	TimeOut Trigger Value	Base Type	– Trigger Value Typ)e
	0	● <u>H</u> ex		Nibble Level
	55 - 15000 msecs	C <u>D</u> ec	C Byte Level	
Frame ID				
Advanced				
	28 24 20) 16	12 8	4 0
Show Data >>		Clear Fields	ОК	Cancel

- **Name** user defined name for the trigger.
- **Channel** designated trigger-causing-frame channel, must be currently configured.
- **Protocol** the supported protocols as supported by the Channel type.
- Frame ID-Name selects identifier from the database.
- **TimeOut Trigger Value** the time in milliseconds to set the trigger if the trigger message does not re-appear. This is enabled only for Frame Trigger On TimeOut.
- **Base Type** specify hexadecimal (HEX) or decimal (DEC) format for window information.
- **Trigger Value Type** within this function there are three types of trigger for the data: Bit Level, Nibble Level and Byte Level. They are explained below.
- Frame ID / Advanced allows you to specify a frame ID value (for a trigger-causing frame) manually, either by entering a number into the (white) boxes on the left, or by shading (clicking) the corresponding bit boxes to their right. The *Advanced* button is made available to construct the identifier / header for specific network types.
- Show Data / Hide Data clicking this button expands the window to include data boxes to specify data values in manually, allowing you to define triggering conditions. The display will vary depending on the *Trigger Value Type* selected.

For the LED-type boxes, red indicates a '0', green indicates a '1', and yellow indicates a 'don't care'.

Bit Level - allows you to select values for individual bits

rame Trigger Configuration		X
Name Frame Trigger 1	Protocol CAN - STD	Color Reference
Frame ID - Name	TimeOut Trigger Value Base Typ 0 © <u>Н</u> ех 55 - 15000 msecs С <u>D</u> ес	Trigger Value Type
Frame ID		8 4 0
<u>H</u> ide Data <<	Clear Fiel	ds OK Cancel
Byte 0	Byte 1	4 0
Byte 2	Byte 3	4 0
Byte 4	Byte 5	4 0
Byte 6	Byte 7	4 0

Nibble Level – allows you to determine whether data meets user-specified conditions (=, <, >, <>, <=, >=) necessary for causing the trigger to occur. Individual operators are available for each nibble.

Frame Trigger Configurati	on			×
Name Frame Trigger 2	hannel Pr 1#A 💽 🖸	rotocol AN - EXT	Color Referen	nce Don't Care
Frame ID - Name	TimeOut Trigger	rValue Base Type ● <u>H</u> ex secs ● <u>D</u> ec	Trigger Value Typ C <u>B</u> it Level C Byte Level	e Nibble Level
Frame ID Advanced	28 24	20 16	12 8	4 0
<u>H</u> ide Data <<		Clear Fields	OK	Cancel
Byte 0 High N/A V X Low N/A V X Byte 4 High N/A V X Low N/A V X	Byte 1 High N/A V X Low N/A V X Byte 5 High N/A V X Low N/A V X	Byte 2 High N/A V Low N/A V Byte 6 High N/A V Low N/A V	Byte 3 High N. Low N. Byte 7 High N. Low N. Low N.	

Byte Level – allows you to determine whether data meets user-specified conditions (=, <, >, <>, <=, <=, >=) necessary for causing the trigger to occur. Individual operators are available for each byte.

Frame Trigger Configuration				×
Name Channel		tocol I - EXT	Color Refere	nce 1 Don't Care
Frame ID - Name	TimeOut Trigger V 0 55 - 15000 mse	Value Base Type	Trigger Value Typ C <u>B</u> it Level C Byte Level	© <u>N</u> ibble Level
Frame ID Advanced	28 24	20 16	12 8	4 0
<u>H</u> ide Data <<		Clear Fields	ОК	Cancel
Byte 0 N/A Byte Byte 4 N/A Byte	1 • 44 5 • 34	Byte 2 N/A Byte 6 N/A K	Byte 3	• 💌

4.3.2 Trigger On Engineering Value Configuration

Trigger On Engineering Value lets you enter engineering values to set the trigger. The values can be accessed from the database or added manually. If this trigger type is selected the following dialog is displayed.

Trigger On Engineering Value		×
Trigger Name EngVal Trigger 2	Channel CH#A	Protocol CAN - STD
Frame ID - Name	- Signal Information	
000	Acronym	
Embedded Id	Name	
Makes Tura	Resolution 0.000000	Start Byte 0
 Trigger On Single Value 	Offset 0.000000	Start Bit 0
N/A 🗹 0.000000	Lower Limit 0.000000	Length 0
C Trigger On <u>R</u> ange	Upper Limit 0.000000	Data Type 🗛 🔽
Lower Limit 0.000000	Unit Description	
Upper Limit 0.000000	Data Format GM-Monarch / M	otorola (forward)
Use <u>D</u> atabase		OK Cancel

- Enter in the *Trigger name*, *Channel* and *Protocol*.
- In the bottom left corner select **Use Database** for **on** (selected) or **off** (not selected).

Use Database

rigger On Engineering Value						
Trigger Name	Channel		Protocol			
EngVal Trigger 2	CH#4		CAN - STD			
Frame ID - Name	- Signal Inform	nation				
110 - EngSpPedPos 💌	Acronym	EngSpeed				
Embedded Id	Name	Engine Speed				
	Resolution	0.250000	Start Byte 1			
 Trigger On Single Value 	Offset	0.000000	Start Bit 7			
N/A 💌 0.000000	Lower Limit	0.000000	Length 16			
🔿 Trigger On <u>R</u> ange	Upper Limit	16383.750000	Data Type 🔲 🖂			
Lower Limit 0.000000	Unit Descript	tion _{rpm}				
Upper Limit 0.000000	Data Format	GM-Monarch / Mo	otorola (forward)			
✓ Use <u>D</u> atabase		[OK Cancel			

• Select the **Frame ID – Name** and **Acronym** (under *Signal Information*). Most of the

information under *Signal Information* will not be accessible, but displays the information about that signal.

• Under Value Type select **Trigger On Single Value** or **Trigger On Range**. If *Trigger On Single Value* is selected, choose your operand and enter the value. If *Trigger On Range* is selected, enter the values for the **Lower Limit** and **Upper Limit**.

Use Database Unchecked (not selected)

Trigger On Engineering Value						
Trigger Name	Channel		Protocol			
EngVal Trigger 2	CH#A 💌		CAN - STD 💌			
Frame ID - Name	- Signal Inform	Signal Information				
110	Acronym	EngSpeed				
Embedded Id	Name	Engine Speed				
	Resolution	0.250000	Start Byte 1			
 Trigger On Single Value 	Offset	0.000000	Start Bit 7			
N/A 💌 0.000000	Lower Limit	0.000000	Length 16			
C Trigger On <u>R</u> ange	Upper Limit	16383.750000	Data Type UNM 💌			
Lower Limit 0.000000	Unit Descripti	ion rpm				
Upper Limit 0.000000	Data Format	GM-Monarch / Mo	otorola (forward)			
Use <u>D</u> atabase		[OK Cancel			

• Select the **Frame ID – Name** and choose your **Data Type** (under *Signal Information*).

Depending on the *Data Type* selected, different options will become available. Enter appropriate information for the data type.

• Under Value Type select **Trigger On Single Value** or **Trigger on Range**. If *Trigger On Single Value* is selected, choose your operand and enter the value. If *Trigger On Range* is selected, enter the values for the **Lower Limit** and **Upper Limit**.

4.3.3 Event Trigger

For *Event Trigger*, you can select one of several events to use for your event trigger. The following dialog is the configuration screen for this trigger. You need to create a user defined *Name*, select the *Event to Trigger On*, then select the *Channel*.

Trigger On Ev	ent		×
Name			
Event Trigger	2		
Event To Trig	ger On		
Event Name	OTHER		•
Channel	CH#A	•	Event No 00
		OK	Cancel

The following events are supported:

- Bus OFF
- Bus WARN
- Bus OK
- Bus Form Error
- Wakeup mode
- CRC Error
- RX Overflow
- ACK Error
- Bit-1 Error
- Bit-0 Error
- OTHER
- ANY

If **OTHER** is selected, an event number must be supplied in the *Event Number* box.

4.4 Hardware Configuration

Once you have started up the Hercules program and selected a database, and before you attempt to configure your *Transmit Frame Table* or other Hercules features, you should check to see that the appropriate channels have been enabled and configured properly – Hardware Configuration is located in section 3.2. This step is assumed to already have been completed by the time you get to this point.

4.5 Filter Table

When you are in filter mode (i.e., when you have selected **Filter ON** from the *Filter Mode* menu), the *Filter Table* governs frame traffic in Hercules. All features of Hercules are dependent on the passage and blockage of received frames as dictated in this table. Up to 50 frames per channel can

be listed in the table; selection and configuration of these frames are described in the following sections. The *Filter Table* allows you to add, delete and edit filters, along with opening and saving *Filter Table* files. By selecting the **Configuration** menu, followed by the **Filter Table** command, the following table is displayed.

0	Name	Туре	Frame ID	Data	State	Protocol	Add Filter >>
	Frame Filter 1	Pass		******	Active	CAN - STD	
							<u>D</u> elete Filter
							<u>E</u> dit Filter
							Ope <u>n</u>
						· · · · · · · · · · · · · · · · · · ·	<u>S</u> ave
							Cjear
							ОК
							Cancel
							Map Channe
							🔲 Ena <u>b</u> le Filto
hanne	I Selection			Unfiltered Frame	s Action		Ena <u>b</u> l

4.5.1 Adding to the Filter Table

Once in the *Filter Table* dialog, you have the option of opening a previously saved table configuration (click **Open**), or creating one manually.

To add filters to the table, first make your Channel Selection (in the lower left-hand corner of the window). Then click Add Filter (in the upper right-hand corner of the window). The following popup menu will appear.

F	nditet Iter T	able - [DB = C:\UEF f	iles\merge d	lata base 1.mdb)	- [FT = None]	1 X 1		×
	No	Name	Туре	Frame ID	Data	State	Protocol	Add Filter >>
								Frame Filter
								Filter On Engineering Value

Selecting *Frame Filter* will prompt you to put the information in raw hex value, while *Filter on Engineering Value* allows selection of information from the database. If *Frame Filter* is selected the following dialog will appear.

Filter Configuration - [DB = C:\UEF file	s\merge d	ata base	1.mdb]				×
Filter No Filter Name				Color R	eference		
1 Frame Filter 1				0	1	Don't	Care
Frame ID / Name	Protocol -			election Le	vel	Base Type	
	CAN - STE)		E <u>B</u> it O	<u>N</u> ibble	• Н <u>е</u> х •	<u>D</u> ec
Frame ID							
XXX Advanced							
ID - Field 28	24	20	16	12	8	4	0
Hide Data << Clear Fields 01		Cancel	1	Channel 🛛	CH#A		7
Data Byte 0] _ Data	a Byte 1 -				
		X	X				
4 0					4	0	
Data Byte 2] [^{Data}	a Byte 3-				
		X	X				
4 0					4	0	
Data Byte 4		Data	a Byte 5-				
		X	X		L. L.	<u> </u>	
4 0					4	0	
Data Byte 6			a Byte /-	_			
		X	X				
4 0					4	0	

- Filter Name user defined name for the trigger.
- Frame ID / Name selects identifier from the database.
- **Protocol** the supported protocols as supported by the Channel type.
- Selection Level selects how data is filtered bit or nibble.
- **Base Type** specify hexadecimal (HEX) or decimal (DEC) format for window information.

• Frame ID / Advanced – lets you specify a frame ID value (for a trigger-causing frame)

manually, either by entering a number into the (white) boxes on the left, or by shading

(clicking) the corresponding bit boxes to their right. The Advanced button is made available to construct the identifier / header for specific network types.

 Show Data / Hide Data – clicking this button expands the window to include data boxes to specify data values in manually, allowing you to define triggering conditions. The display will vary depending on the Base Type selected.

For the LED-type boxes, red indicates a '0', green indicates a '1', and yellow indicates a 'don't care'.

For *Filter on Engineering Value*, the following dialog will appear. You will have the option of using the database for quick access to the information, or to enter in the encoding data manually.

Filter Name	Channel	Protocol
Frame ID - Name	Signal Information	
000	Acronym	
Embedded Id	Name	
· <u> </u>	Resolution 0.000000	Start Byte 0
Value Type Filter On Single Value	Offset 0.000000	Start Bit 0
N/A 🔽 0.000000	Lower Limit 0.000000	Length 0
O Filter On Range	Upper Limit 0.000000	Data Type ASC
Lower Limit 0.000000	Unit Description	
Upper Limit 0.000000	Data Format GM-Monard	ch / Motorola (forward)

Use Database

Filter On Engineering Value				×
Filter Name	Chann	nel	Protocol	
EngVal Filter 2	CH#4		CAN - STD	-
Frame ID - Name	- Signal Inform	ation		
110 - EngSpPedPos	Acronym	EngSpeed		•
Embedded Id	Name	Engine Speed		
- Valua Turca	Resolution	0.250000	Start Byte 1	
 Filter On Single Value 	Offset	0.000000	Start Bit 7	
N/A 💌 3000	Lower Limit	0.000000	Length 16	
C Filter On Range	Upper Limit	16383.750000	Data Type UNM	~
Lower Limit 0.000000	Unit Descript	tion _{rpm}		
Upper Limit 0.000000	Data Format	GM-Monarch / Moto	orola (forward)	-
✓ Use <u>D</u> atabase			OK Cance	:

- Label the filter under Filter Name. Select the Protocol.
- Select the Frame ID Name and Acronym (under Signal Information). Most of the information under Signal Information will not be accessible, but displays the information about that signal.
- Under *Value Type*, **Filter On Single Value** should be selected. Choose your operand and enter the value. Click **OK** to return to the Filter Table.

Use Database Unchecked (not selected)

Filter On Engineering Value			×
Filter Name	Chanr		Protocol
EngVal Filter 2	JCH#4	× •	CAN - STD
Frame ID - Name	Signal Inform	nation	
110	Acronym	EngSpeed	
Embedded Id	Name	Engine Speed	
- Maha Tupa	Resolution	0.250000	Start Byte 1
 Filter On Single Value 	Offset	0.000000	Start Bit 7
N/A - 3000	Lower Limit	0.000000	Length 16
C Filter On Range	Upper Limit	16383.750000	Data Type UNM 💌
Lower Limit 0.000000	Unit Descrip	tion rpm	
Upper Limit 0.000000	Data Format	GM-Monarch / Mo	torola (forward) 💌
Use Database			OK Cancel

- Label the filter under Filter Name. Select the Protocol.
- Select the **Frame ID Name** and choose your **Data Type** (under *Signal Information*). Depending on the *Data Type* selected, different options will become available. Enter the appropriate information for the data type.
- Under Value Type **Filter On Single Value** should be selected. Choose your operand and enter the value. Click **OK** to return to the *Filter Table*.

4.5.2 Other Filter Table Configurations

10	Name	Туре	Frame ID	Data	State	Protocol	Add Filter >>
	Frame Filter 2	Pass	110	XX 2X XX XX XX XX XX XX	Active	CAN - STD	
	EngVal Filter 2	Pass	110	X 2E E0 X X X X X	Active	CAN - STD	Delete Filter
							Edit Filter
							Ope <u>n</u>
							<u>S</u> ave
							Cļear
							ОК
							Cancel
							Map Channe
							🔲 Ena <u>b</u> le Filte

Use this window to delete or edit any entered filters, open filters, save filters, clear filters, or **Map Channels**. Once you have generated a list of filters in the *Filter Table*, specify if you want the table to **Block** or **Pass** any frames not meeting conditions specified in your *Filter Table* entries.

In addition, you should verify the information in the following fields, for each filter you have entered in the table.

Туре

Click on an entry in this column and select your preferences on the list that appears to identify the filter as a **Pass** filter or a **Block** filter. If you identify the filter as a **Pass** filter, all frames that meet the criteria you have specified in that table entry will have permission to pass through the filter. If you identify the filter as a **Block** filter, all frames meeting the criteria will be blocked by the filter and not allowed to pass through for display or analysis.

(The default *Filter Type* setting for individual frames is **Pass**.)

State

The default setting for the state of frames listed in the *Filter Table* is always *Active*. However, if you wish to deactivate any frame filter(s) for a particular monitoring session, you may do so by clicking each relevant frame's *State* column entry and selecting **Inactive** in the list that appears. If you have deactivated a particular filter, it will be ignored once you are performing monitoring in **On Filter** mode; all *Active* filters will be honored.

If you wish to delete a filter from your *Filter Table*, you may do so by selecting it and clicking **Delete Filter**. Only ONE filter table may be active at any given time.

For each filter, the values for both the *Type* and *State* fields can be changed. Click on the Filter and field you wish to configure:

The *Map Channels* dialog realigns filters to channel types, only after opening a filter file (whereas Buffer Maps only work after opening buffer (.rft) files). You can choose this option if you want to work with either a filter table file that has been created with different hardware configuration or to modify your filter table if you have chosen different hardware configuration.

Map Channe	ls		×
	-		
Channel	Protocol	Mapped Channel	
1	CAN - EXT		
		OK Cance	

4.5.3 Saving and Loading Filter Table Configurations

Once you have opened or created a Filter Table, you can save it (under its current file name or as a new file) for future use. To do so, click Save in the far right portion of the screen, and specify the desired name and location for your table. The table configuration is saved as an .rft file. The Open button will load that table for use in future monitoring sessions.

4.5.4 Enabling and disabling the filter mechanism

During a monitoring session, you can turn the filtering mechanism **ON** or **OFF**. You may select (;) or clear (†) the *Enable Filtering* box in the *Receive Frame Filter Table* window, or you may click the appropriate selection on *the Filter Mode* menu.

When the *Filter Table* is enabled (i.e., in **Filter ON** mode) any other monitor screens will receive frames only after being processed by the filter table. This means that certain database frames, although available for selection in particular monitoring modes, will not appear in those monitors if they are subject to blocking by active filters.

The Filters may be activated or deactivated while online, by selecting **Filter Mode** menu, followed by the **Filter ON/Filter OFF** command or clicking **Filter Enable** on the main toolbar.

4.6 Frame Responder

The Frame Responder triggers a single or multiple frame transmission(s) in response to a received frame meeting certain user-specified criteria. When the conditions (up to 32) specified for a particular received frame are met, any associated response frames are transmitted through their respective Configuration hot-key combinations. Select the menu, followed by the **Frame Responder** command to display the *Frame Responder* dialog.

rame No 📋	Frame Id	Frame Name	Data	Protocol	Channel	Link to TFT	Line/Hot Key	Delay
	110	EngSpPedPos	XXXXXX	CAN - STD	CH#A	Line#	3	0

1. You can create a hot-key or line-number link to any frame listed in the active *Transmit Frame Table*. To do so, identify desired receive frame conditions in the *Frame Responder* table by clicking **Add Frame** and configuring the following items.

Frame Responder - [DB = M:\seminar\in-l	house\FreeSCAT\3_0\scat_training_HS.mdb] 🛛 🔀
Frame No	Color Reference
2	0 📕 0 🔜 1 📃 Don't Care
Frame ID / Name Protoc	colBase Type
	STD Bit O Nibble O Hex O Dec
Frame ID	
XXX <u>A</u> dvanced	
ID - Field 28 24	20 16 12 8 4 0
Hide Data << Clear Fields OK	Cancel Channel CH#A
Data Byte 0	Data Byte 1
Data Byte 2	Data Byte 3
4 0	
Data Byte 4	Data Byte 5
4 0	4 0
Data Byte 6	Data Byte 7
4 0	4 0

- **Protocol** the supported protocols as supported by the Channel type.
- Section Level selects how data is filtered bit or nibble.
- Base Type specify HEX (hexadecimal) or DEC (decimal) format for window information.
- Frame ID / Advanced allows you to specify a frame ID value (for a trigger-causing frame) manually, either by entering a number into the (white) boxes on the left, or by shading (clicking) the corresponding bit boxes to their right. The *Advanced* button is made available to construct the identifier / header for specific network types.
- Show Data / Hide Data clicking this button expands the window to include data boxes to specify data values in manually, allowing you to define triggering conditions. The display will vary depending on the *Base Type* selected.

For the LED-type boxes, red indicates a '0', green indicates a '1', and yellow indicates a 'don't care'.

2. In the Frame Responder Table, select the **Channel** to receive the message on by clicking in the *Channel* field and scrolling down to your selection.

3. Click in the **Link to TFT** field. Your choices are: **Line#** or **HotKey**. If you select *Line#*, only one message will be sent as a response. If you select *HotKey* then all messages on the TFT linked to that hotkey will be sent as a response.

NOTE: Frames designated as "periodic" will transmit as periodic.

4. To enter the designated hot-key or line number of the response message for transmission, select frame and click Response Frame. This will display the following dialog.

rame No	Frame Id	Frame Name	Data	Protocol	Channel	Link to TFT	Line/Hot Key	Delay (ms)
ĺ	AB	AB	23 33 98 BB	J1850 · 1H (VPWM)	CH#A			6

Select the desired item and click **OK** to return to the *Frame Responder* dialog.

- 5. If desired, you may enter a delay from 0 to 30,000 ms. The delay value is internally converted into an integer multiple value and rounded up in multiples of 10. For example, entering a '7' is internally converted to '10'. An '11' is converted to a '20', and so on.
- 6. To activate the configured Frame Responder for an online monitoring session, you must enable it by selecting the **Enable Frame Responder** check box in this window or in the *Global Options* window (accessed from the bottom of the *Configuration* menu).

4.7 UCS (User-Configured Scheduler)

The User Configured Scheduler (UCS) is a feature that transmits frames from the active Transmit Frame Table (TFT) as instructed by a user-defined sequence of commands. Up to 300 command lines can be included in a UCS file. The following operations are supported by the UCS.

	LINESS DOLLARS		10110-0010-0010	I Klas I		
User Configured Sc	heduler - [No	ne]				×
UCS Command Output Wait Jump End Comment Add Command Delete Command Edit Command	UCS Script					
File Name						
Comments	T					× ×
Enable UCS	Open	<u>N</u> ew	<u>S</u> ave	Save <u>A</u> s	Cancel	OK

Output – Used to identify a frame for transmission, specifying the number of times you

would like it sent and specify a transmission rate (in milliseconds). See section 4.7.1.

Wait – Used to define a delay between preceding and subsequent operations (command lines). See section 4.7.2.

Jump – Used to specify a jump to another command line (Output, Wait, Jump, or End)

identified by the symbolic JUMP name you have assigned it. See section 4.7.3.

End – Used to specify the last line of a UCS command sequence. See section 4.7.4.

Comment – Used to insert a personal reminder of up to 50 characters. See section 4.7.5.

To create a UCS command sequence, first make sure you have an active *Transmit Frame Table* loaded. Then select the **User Configured Scheduler** command from the *Configuration* menu. This will open a *User Configured Scheduler* (UCS) dialog that lets you configure a UCS sequence using the commands described in the following sections.

4.7.1 Output command

The *Output* command instructs the scheduler to transmit a specified frame from the active *Transmit Frame* Table. To insert an output command in a UCS script, select **Output** in the UCS Command list box, and click **Add Command** below the box. A UCS: Output window (shown below) will appear.

NOTE: If you assign an OUTPUT command a count of 1, you must immediately follow the OUTPUT command with a WAIT command (see section 4.7.2).

User Configured Sc	heduler - [None]	×
Output Wait Jump End Comment	UCS: Output	
Add Command Delete Command	TFT Line #, Frame Name [#1, AllNodHS_101(0x101)	
Edit Command	Count 1 Interval (1ms to 30000ms) 1 OK	
Comments	Name of current line	<u>_</u>

From the TFT Line #, *Frame Name* drop box at the top of this window, select a TFT frame (frames that have been added to the TFT) from the options listed. Once you have selected a frame, enter the following values in the appropriate boxes.

FIELD	DESCRIPTION
Count	The number of times you would like the specified frame to be sent (a <i>Count</i> value of 1 disables the Interval box below).
Interval	The desired interval, in milliseconds, between transmissions of the specified frame (<i>Interval</i> box disabled if <i>Count</i> = 1).
Name of Current Line	A user-specified name (two characters) for this command line in the UCS sequence, to be used by any "Jump" commands referring to it, (e.g., "_A" in this example).

Click **OK**. The output command you just defined will be inserted just below the currently selected script line in the *UCS Script* window (or as the first command there if you have not yet inserted any other command lines).

4.7.2 Wait command

The *Wait* command instructs the scheduler to insert a time delay between preceding and subsequent operations. To create a delay between the execution of two commands, select the script line just above the place you would like to insert the delay.

Select **Wait** in the UCS Command list box, and click **Add Command** below the box. A UCS: Wait window (shown below) will appear.

Jser Configured S	cheduler - [None]	X
UCS Command	UCS Script	
Output Wait Jump End Comment	1 [] Output Frame AllNodHS_101(0x101), 1 times @1ms interval (TFT #1)	
Add Command	UCS: Wait	
Delete Co <u>m</u> mant	Interval in 1ms to 30000ms	
Edit Command	Define symbolic JUMP Cancel	
File Name		
- Comments		A
	T	Þ
Enable <u>U</u> CS	Ogen <u>N</u> ew <u>S</u> ave Save <u>A</u> s Cancel	OK

NOTE: A **WAIT** command must follow any **OUTPUT** command with a count of **1**. There must be at least one *WAIT* command between an *OUTPUT* command and a *JUMP* command (see section 4.7.3).

Enter the following values in the appropriate boxes:

FIELD	DESCRIPTION
Interval	The desired interval, in milliseconds, between execution of the last operation specified and the next operation.
Symbolic JUMP name	A user-specified name (two characters) for this command line in the UCS sequence, to be used by any "Jump" commands referring to it, (e.g., "_B" in this example).

4.7.3 Jump command

The Jump command instructs the scheduler to jump to another command line (identified by the symbolic JUMP name you have assigned it). To insert a jump in your UCS command sequence, select the script line just above the place you would like to insert the jump.

Select **Jump** in the UCS Command box, and click **Add Command** below the box. A UCS: Jump dialog (shown below) will appear.

User Configured Scl	neduler - [None]	×
UCS Command Output Wait Jump End Comment	UCS Script 1 [_] Output Frame AllNodHS_101(0x101), 1 times @1ms interval (TFT #1) 2 [_] Wait 1000ms	
Add Command Delete Command Edit Command File Name	UCS: Jump X Enter symbolic JUMP name for JUMP statement Jump to 00 0K Define symbolic JUMP Cancel	
Comments		A V V
Enable <u>U</u> CS	Open New Save Save Cancel	ОК

Enter the following values in the appropriate boxes:

FIELD	DESCRIPTION	
Jump to	The user-assigned <i>Symbolic JUMP name</i> of the command line to which you wish the scheduler to jump (e.g., "_A," the number assigned to the first line in our current example).	
Symbolic JUMP name	A user-specified name for this <i>Jump</i> command line in the UCS sequence, to be used by any "Jump" commands referring to it, (e.g., "_C" in the current example). NOTE: COMMENT commands are not assigned Symbolic Jump names; therefore, a COMMENT line may NOT be the destination of a UIMP command	

4.7.4 End command

The End command signifies the final line of a UCS command sequence. To indicate the end of

UCS sequence, select the last line of script in the UCS Script box.

NOTE: Every UCS sequence must include an END command.

Select End in the UCS Command box, and click Add Command.
Jser Configured Sch	eduler - [None]	(HIHHI KI)	•	x
UCS Command Output Wait Jump End Comment	UCS Script 1 [] Output Frame AllNodHS_101 2 [_] Wait 1000ms 3 [] Jump to (00)	(0x101), 1 times @1ms	interval [TFT #1]	
Agd Command Delete Command Edit Command File Name	UCS: End Command Symbolic current line label for End Command OK	Cancel	×	
Comments	x			× ×
Enable <u>U</u> CS	Ogen <u>N</u> ew <u>S</u> ave	Save <u>A</u> s	Cancel	ОК

Specify a line label for your *End* command, and click **OK**. An *End* line with the label you have

specified will be added to the end of your UCS Script command sequence.

4.7.5 Comment command

The *Comment* command lets you insert a personal reminder (or a blank line) as a line of script in your sequence. To insert a comment into your command sequence, select the script line just above the place you would like the comment line to appear.

Select **Comment** in the UCS Command list box, and click **Add Command**. A **UCS: Comment/Insert a blank line** dialog (shown below) will appear.

UCS Command UCS Script Output 1	User Configured Sch	eduler - [None]
Add Command UCS: Comment/Insert a Blank Line X Delete Command Enter comments up to 50 maximum characters Edit Command Define symbolics JUMP File Name Cancel	UCS Command Output Wait Jump End Comment	UCS Script 1 1 Output Frame AllNodHS_101(0x101), 1 times @1ms interval [TFT #1] 2 Wait 1000ms 3 Jump to [00] 4 End
Delete Command Enter comments upto 50 maximum characters Edit Command enter comments up to 50 maximum characters File Name OK Comments Cancel	Add Command	UCS: Comment/Insert a Blank Line
Edit Command Define symbolic JUMP OK File Name Cancel Comments I	Delete Co <u>m</u> mand	Enter comments upto 50 maximum characters enter comments up to 50 maximum characters
File Name Comments	Edit Command	Define symbolic JUMP
Comments	File Name	name for current line Cancel
	Comments	N N N N N N N N N N N N N N N N N N N

You may leave the comment line blank or enter a message up to 50 characters in length. Click **OK** and the comment line will be inserted in the *UCS Script* window as a personal note. The comment is ignored by the scheduler.

4.7.6 Editing UCS Script commands

Once a command line has been added to the *UCS Script* window, you may delete it by selecting the line and clicking **Delete Command**. To change the values listed in a command line, select the line and click **Edit Command**. A configuration window appropriate to that particular command type (e.g., "*UCS: Output*") will appear. (See preceding sections for descriptions of the values required for each command type.) Make the desired changes to the values listed, and click **OK** to save these changes.

4.7.7 Opening, creating, and saving .ucs files

You may load a previously saved .ucs file by clicking the **Open** button in the lower left corner of the *User Configured Scheduler* window and selecting the file you wish to open. To create a new UCS file, click **New**.

Once you have created or opened a .ucs file, you may add, edit, and delete the contents, as described in the previous sections. Click **Save** to save changes to an existing file, or click **Save As**

to create a new .ucs file at your specified location. Click **OK** to return to the main Hercules screen.

Note: Always save your script files to a hard drive on your PC computer.

4.7.8 Enabling the UCS

To activate a configured UCS for an online monitoring session, you must enable it by selecting (;) the *Enable UCS* check box in the bottom of this window, or in the *Global Options* window (accessed from the bottom of the Configuration menu). Then click **OK**.

4.7.9 UCS example

The UCS script shown below instructs the UCS to transmit frame 101 one time, at a one-millisecond interval, and to wait an additional second. It then instructs the UCS to transmit frame

110 one time, at a one-millisecond interval, and to wait an additional second. The "jump" command instructs the UCS to jump to the first line (_A), thus creating a transmission loop which will continue until monitoring is halted (i.e., until the user returns the Hercules tool to offline mode).

- 1.1.1.1.++ A	LINKE PILLS I STRUCTURE HER IS I	
User Configured Sch	eduler - [None]	×
UCS Command Output Wait Jump End Comment Add Commend Delete Command Edit Command	UCS Script 1 [A] Output Frame AllNodHS_101(0x101), 1 times @1ms interval [TFT #1] 2 [] Wait 1000ms 3 [] Output Frame EngSpean_110(0x110), 1 times @1ms interval [TFT #2] 4 [] Wait 1000ms 5 [] Jump to [A] 6 [] End 7 [] ; enter comments up to 50 maximum characters	
File Name		
Comments	comments	A A
Enable UCS	Ogen New Save Save As Cancel O	

4.8 Program Blocks

Hercules has a program editor and compiler that you can use to develop and compile custom event handler applications for use with the tool. These applications are ANSI C code and are executed in response to seven specific events. Program blocks are created in the *Hercules Program Block Editor and Compiler*. For complete instructions for creating, compiling, and saving program block applications, refer to the *Hercules Program Block Editor and Compiler*.

Once compiled and saved as a Hercules binary (.*out*) file, a program block can be downloaded to the hardware interface. To download a saved .out file, select the **Program Blocks** option on the *Configuration* menu to open the following dialog.

Program Blocks	×
Select Program Block	
Select Open Editor	Download
	1
Block	

Click **Select** to display the *Open* dialog. Locate and **select** the .out program file you wish to download, and click **Open**. Click **Download** in the *Program Blocks* window.

The progress bar will fill as the file is downloaded. When the download is finished, click **OK**. Enable the program block by **selecting** (;) the *Enable Programming Block* check box in the bottom of this window. You can also make this selection later in the *Global Options* dialog accessed from the *Configuration* menu (see section 4.10). Click **OK**.

Open an **Information View** (from the *Display* menu) so that you will be able to view the status of your program block. Messages will show based on keys or events chosen in the dialog from "Select".

Once you have initiated an ONLINE monitoring session, i.e., selected **Start** from the *Monitoring* menu or the main toolbar, the *Information View* should indicate the successful execution of your program block.

4.9 Serial Port Configuration

The Serial Port Configuration command in the Configuration menu lets you set the following parameters for communication with modules connected to the COM ports of Hercules. Serial Port Configuration is used with Program Blocks.

S	erial Port Configura	tion	×
	<u>C</u> OM Port	COM1	
	<u>B</u> its per Second	9600	
	<u>D</u> ata Bits	8	
	<u>P</u> arity	None	
	<u>S</u> top Bits	1	
	Elow Control	Hardware	
	<u>0</u> K	<u>C</u> ancel	

FIELD	DESCRIPTION
<u>C</u> OM Port	The communication port to which the window's settings apply
<u>B</u> its per Second	The baud rate for the selected COM port: 9600, 19200, 38400, 57600, or 115200 bits per second.
<u>D</u> ata Bits	The number of data bits (4, 5, 6, 7, or 8) in frames sent over the selected COM channel.
<u>P</u> arity	The parity setting for the selected COM channel: Even, Odd, None, Mark, or Space.
<u>S</u> top Bits	The stop bits set for the selected channel: 1, 1.5, or 2.
<u>F</u> low Control	The method of flow control for the selected COM port: Hardware, Xon/Xoff, or None.

Once you have finished configuring the settings of a COM port, you may activate it by clicking **OK**.

4.10 Global Options

Global Options lets you **enable** or **disable** the filtering, frame responder, UCS, and program block features for a monitoring session. The default setting for menu options is *disabled* (box cleared: †). To enable a feature from this list, **select** (;) the appropriate box. A feature is only available for selection if it has been configured for the current monitoring session.

Global Options				×
	····}	- Diagnostics -		
	<u>)</u> g		D :	C 100 D:
Enable <u>U</u> CS		GMLAN	<u>D</u> iagnostics	O ISO Diagnostics
Enable <u>P</u> rogra	amming Block			
🔲 🔲 Enable Frame	<u>R</u> esponder	Tasta Dias		Clabel Deddine
Error Beportin	in			Cilobal Facoling
			ester Present	None
		Time Interva	il 3000 ms	
Enable Warni	ng Message			
Statistics Update Interval (Sec) Default path for c	1 configuration file	8		
Database				
Channel	Database		Data Interpretati	on Format
CH#A	None			
	None			
	None			
CH#E	None			
CH#F	None			
	1			
			<u>C</u> onfigur	e Frame Color OK

By selecting **Error Reporting**, any errors in transmission will appear in the *Information View* (see section 5.2.2).

If you select **GM Version**, you need to exit and restart Hercules to activate the format. This will allow 29-bit CAN IDs to be translated with the GLMLAN interpretation. GM uses the data in a different manner and will actually split it up into parts, as can be seen in the *Header Details* column.

By selecting the **Enable Warning Message** check box, you will be informed of values that are changing in the hardware for communication between users.

Statistics Update Interval (Sec) will update the bus values every "nnn" seconds (where "nnn" is the vale you type into this field).

NOTE: only integer values are permitted in the range 1-999.

The *Default path for configuration files*, if **selected**, will save all files to a common location. It also displays the current Database format if a database is open. (The format cannot be modified from this dialog screen.)

For Diagnostics, you can select between *GMLAN Diagnostics* or *ISO Diagnostics*. This will change the services available in the *Diagnostic* menu.

By selecting the **Enable Tester Present** check box, you are selecting the tester present message to be sent with all services. Selections will be enabled for all services globally (by referring to Global Options, you can enable all of the actions above in one window, rather than going to each window software and enabling the actions there). On CAN, Global Padding is in the selectable for the frames being sent. The software will automatically add 00, FF or nothing when sending the message.

Database paths (if any databases are selected) are display only path(s), they cannot be edited.

At the bottom of the *Global Options* dialog is a button to **Configure Frame Colo**r. This dialog lets you choose the colors for each of the frame types that are displayed in the *Scrolling Monitor* and *Offline Buffer View*.



5. DISPLAY Menu

The *Display* menu lets you select a monitor or viewing format to view protocol frame traffic and (in the case of the listed "views") to access various special monitoring functions.



Once you have activated a database and completed all configurations for your session, you are ready to select from the available display formats for the viewing of protocol message traffic. Message traffic from all active channels will be displayed on the selected monitor(s), although frames displayed – and the information provided for those received frames – will vary, depending

on the settings selected for each active monitor/view.

Once monitors and views have been selected, you may either begin the monitoring session, or you may proceed to Section 6 if you wish to set the Filter Mode.

Each of these monitor window types (*Scrolling, InPlace, and Signal*) is illustrated and described in section 5.1.

NOTE: Most menu options are accessible only when Hercules is in OFFLINE mode, (i.e., when the STOP option has been selected from the *Monitoring* menu).

The following four special views are also available:

Offline Buffer View	(for offline viewing of frames captured in the Hercules buffer).
Information View	(for the viewing of login and hardware status).
Statistics View	(for analysis of busloading and frame transmission statistics).
Diagnostic View	(for analysis of functions executed from the <i>Diagnostics</i> menu).

These views are shown and described in section 5.2.

5.1 Selecting a Monitor

There are three different monitor types that are available for displaying frame information: *Scrolling Monitor, In-place Monitor, and Signal Monitor.* These monitors can operate simultaneously. When you select a monitor, a menu appears directly to the right of the *Display* menu. It lists the commands needed to format and use the monitor. You may also **right-click** in the table to access the menus. Also appearing will be a *Window* menu with two arrangement options (*Cascade* and *Tile*) for the simultaneous display of multiple monitors.

The *Scrolling Monitor* records all bus traffic, where as the *In-place Monitor* displays only the messages with certain frame ID and the *Signal Monitor* displays signals specific to certain frames.

5.1.1 Scrolling Monitor

The *Scrolling Monitor* captures all bus traffic and displays frames continuously, scrolling them on a "first-in, first-out" (FIFO) basis. The monitor displays the following fields:

Scrolling	Scrolling Monitor - Configuration = test1.her								<u>- 🗆 ×</u>		
Line.No	TimeStam	Channel	Frame ID	Header Details	Frame Acronym	Protocol	Data	Bx/Tx	1		
									-		
									-		
									-		
			1	1	1						

- Line No (line number)
- **TimeStamp (µs)** in *absolute* or *relative* time format (in 10 ms resolution). Format changes go into effect only after monitoring has been stopped and re-started.
- Channel (channel ID)
- Frame ID (CAN/protocol identifier)
- Header Details shows frame details of GMLAN EXT-CAN, J1939 and J1850 frames
- Frame Acronym (predefined frame acronym from database, appears only if listed in an active database)

- **Protocol** (frame type: if using CAN frames, Standard or Extended CAN, respectively)
- **Data** (data bytes)
- **Rx/Tx** (frame type: <u>*Receive*</u>, <u>*Transmit*</u>, <u>*Trigger*</u> <u>*Frame*</u>, <u>*High*-<u>*Voltage*</u> <u>*Receive**, <u>*High*-<u>*Voltage*</u> <u>*Transmit*</u>*, or <u>*Remote*</u> <u>*Transmit*</u>, <u>*Remote*</u> <u>*Receive*</u> respectively)</u></u></u>

NOTE: High-voltage, wake-up frames are used only in single-wire CAN.



You can use this monitor with or without grid lines. To access this option select the **Display** menu, followed by the **Scrolling Monitor** command. Choose either the **With Grid** or **No Grid** Option.

Once the monitor is open, you can enable or disable the grid lines by toggling the **Grids** button on the main toolbar. Here are examples with and without grids.

With Grids example

DG	Hercule	es - Scrolling Mc	onitor - Configuration	= sc_69.h	er				
File	Displa	ay Scroll Monito	r Configuration Filteri	Mode Mon	itoring Playł	back Diagnos	stics Database View 1	Nindow Help	1
Sta	nt Stop	Scroll Grids Frame	∧y ⑦ F Signal Info Filter Enable	Save Load	🌗 😚 Pl Bak Diag C	🚧 💽 👯	BUP ?		
	Scrolli	ng Monitor - Co	onfiguration = sc_69.h	ner					
	_ine	TimeStamp (Channel	Frame ID	Header D	Frame Acr	Protocol	Data	Rx
	1	00:00:01:80	CH#B	001		CH2F1	CAN - STD	00 28 FF	TX
	2	00:00:02:26	CH#B	001		CH2F1	CAN - STD	00 28 FF	TX
	3	00:00:02:75	CH#B	001		CH2F1	CAN - STD	00 28 FF	TX
4	1	00:00:03:15	CH#B	001		CH2F1	CAN - STD	00 28 FF	Tx
5	5	00:00:04:93	CH#C	007		CH2_Sfra	CAN - STD	01 00 00	TX
(5	00:00:05:43	CH#C	007		CH2_Sfra	CAN - STD	01 00 00	TX
	7	00:00:05:87	CH#C	007		CH2_Sfra	CAN - STD	01 00 00	TX
8	3	00:00:06:35	CH#C	007		CH2_Sfra	CAN - STD	01 00 00	TX
4)	00:00:07:95	CH#D	111		CH3F111	CAN - STD	00 00 00	TX
	10	00:00:08:43	CH#D	111		CH3F111	CAN - STD	00 00 00	TX
	11	00:00:08:90	CH#D	111		CH3F111	CAN - STD	00 00 00	TX
									▼

Without Grids example

DG	Hercule	es - Scrolling Mo	onitor - Configura	ition = sc_69.her				
Fik	e Displa	iy Scroll Monito	r Configuration	FilterMode Monitoring P	ayback Diagnos	stics Database View V	Nindow Help)
S	tart Stop	Scroll Grids Frame	∧ ⑦ ♥ Signal Info Filter :	F 📫 🛍 👘 😚 Enable Save Load PlBak Dia	Comm Clear Fr R	B. U. P. ? es Enable Enable Help		
	Scrolli	ng Monitor - Co	onfiguration = sc_	_69.her				
	Line	TimeStamp (Channel	Frame ID Header D	Frame Acr	Protocol	Data	Rx
	1	00:00:01:80	CH#B	001	CH2F1	CAN - STD	00 28 FF	TX
	2	00:00:02:26	CH#B	001	CH2F1	CAN - STD	00 28 FF	TX
	3	00:00:02:75	CH#B	001	CH2F1	CAN - STD	00 28 FF	TX
	4	00:00:03:15	CH#B	001	CH2F1	CAN - STD	00 28 FF	TX
	5	00:00:04:93	CH#C	007	CH2_Sfra	CAN - STD	01 00 00	TX
	6	00:00:05:43	CH#C	007	CH2_Sfra	CAN - STD	01 00 00	TX 🗖
	7	00:00:05:87	CH#C	007	CH2_Sfra	CAN - STD	01 00 00	Tx
	8	00:00:06:35	CH#C	007	CH2_Sfra	CAN - STD	01 00 00	TX
	9	00:00:07:95	CH#D	111	CH3F111	CAN - STD	00 00 00	Tx
	10	00:00:08:43	CH#D	111	CH3F111	CAN - STD	00 00 00	Tx
	11	00:00:08:90	CH#D	111	CH3F111	CAN - STD	00 00 00	TX
								•

When you have established a connection to the hardware and it is exchanging frames with

Hercules, you can begin viewing the frames by clicking the **Start** command on the *Monitoring* menu (or by pressing the **F9** key on the keyboard).

To halt the monitoring of these frames and return to OFFLINE mode, click the **Stop** command on the *Monitoring* menu, or press the **Esc** key. You may then use the Scrolling Monitor's scroll bar or your keyboard's **Page Up** and **Page Down** keys to navigate the display.

The Scroll Monitor menu displays the following options:

ile Displ	ay s	croll Monite	r Con	figura	ation	Filteri	Mode
Start Stop	s ,	Absolute Relative		© Info	💎 Filter	F. Enable	∎ <mark>∎</mark> Save
🚆 Scroll	ing	Pause	Ρ	itior	n = so	:_69.h	ier
Line	1IT	Save		el			Fram
1	OC	Find Fram	e				Ì
2	OC	Signal Info	>				
3	00:0	0:00:37	CH#A				
4	00:0	0:00:39	CH#A				
5	00:0	0:00:37	CH#A				
6	00:0	0:00:39	CH#A				
7	00:0	0:00:37	CH#A				
8	00:0	0:00:38	CH#A				
9	00:0	0:00:65	CH#A				
L							

• Absolute or Relative - Absolute timestamp is with respect to

the start of the online monitoring. *Relative* timestamp is with respect to the previous message.

- **Pause** Stops messages from scrolling in the monitor, but continues to log in the background.
- **Save** In OFFLINE mode the messages in the monitor can be saved to a file.
- Find Frame Searches the monitor for specified message IDs and / or data.
- **Signal Info** Decodes the selected message into engineering units if defined in the database.

5.1.2 InPlace Monitor

InPlace Monitor allows you to choose particular frames (up to 50) for viewing by selecting their frame IDs from the database. While offline, you may enable or disable each frame for update. Each frame selected will appear in a fixed position in the window.

NOTE: To make changes to the InPlace Monitor table, you must be in OFFLINE mode.

	InPlace Frame Monitor - Configuration = Test.her										
I	TimeStamp (µs)	Chan	Frame	Header Details	Frame Acro	Protocol	Data	Livi	Tx/Bx		
I		CH#C	243		tedt GenES3	CAN - STD					
		CH#C CH#A	001 444		1 GmFS3	CAN • STD CAN • STD	<u>S</u> elect Frame				
I							<u>B</u> efresh (F	5)			
Į							Cut	Ctrl+>	<		
							Pa <u>s</u> te	Ctrl+V			

- TimeStamp (µs)
- Channel (channel ID)
- **Frame ID** (CAN identifier)
- Header Details shows frame details of GMLAN EXT-CAN, J1939 and J1850 frames.
- Frame Acronym predefined frame acronym from database, appears only if listed in the active database.
- **Protocol** frame type, if using CAN frames: *Standard* or *Extended* CAN, respectively.
- **Data** (data bytes)
- Living Sign animated: toggles between "/" and "\" each time the frame is received
- Tx/Rx frame type: Transmit, Receive, Trigger Frame, High-Voltage Transmit* High- Voltage Receive*, Remote Receive, or Remote Transmit, respectively.

* High-voltage, wake-up frames are used only in single-wire CAN

То access the InPlace Monitor, select Display followed the menu, by the **InPlace Monitor** command. When you select this view, an *InPlaceView* menu appears directly to the right of the Display menu. It lists the commands to format and use the table. You may also right-click in the table to access the commands. To select database frames for viewing, perform the following steps:

1. Double-click a blank line in the *InPlace Frame Monitor* table, or click **Select Frame** on the *InPlaceView* menu. A **Select Frame** dialog displays frame IDs and frame acronyms from the database. To sort content, click on the **ID** or **Acronym** column header.

Stamp (µ	is) Channel Fra	me Id Header Detail	s Frame Acror	nym Protoco	l Data	Living Sign
ect Fra	me - [DB = C:\Pr	ogram Files\Hercul	es\DB_3_02\	DiagItlTest	.mdb]	
rame						
ID	Header Details	Acronym			Channel	
242 🛧	•	HSF2 ·	↑		CH#A	-
243		DCH2F243			1	
246		DCH2F246			Protocol	
24F		DCH2F24f			CAN . ST	
					TORNEST	

- 2. Select a *CAN/protocol* channel. If using CAN, select a *CAN* type: Standard (CAN-STD) CAN or Extended (CAN-EXT) CAN.
- 3. Select one of the frames you would like to add to the monitor list, and click **OK**. You are returned to the *InPlace Monitor* table with an entry for the selected frame.
- 4. Repeat steps 1 through 3 for each frame (up to a total of ten) that you wish to add to the monitor. To remove a frame from your list, select the frame's entry in the *InPlace Frame Monitor* window; click **DeSelect Frame** in the *InPlaceView* menu, or on the menu that appears when you **right-click** in the **InPlace Monitor** window.

Reminder: frame list changes must be made in OFFLINE mode.

When you have established a connection to protocol modules exchanging frames with Hercules, you may begin viewing these frames by clicking *start* (or pressing the **F9** key on the keyboard). To halt the monitoring of these frames and return to OFFLINE mode, click **Stop** or press the **Esc** key on the keyboard.

👺 InPlace Fram	InPlace Frame Monitor - Configuration = test1.her									
TimeStamp (μs)	Chan	Frame	Header Details	Frame Acro	Protocol	Data	Livi	Tx/Bx		
00:00:00:000:	CH#A	101		AllNodHS_1	CAN STD	7F FF FF FF F	1	Τx		
00:00:00:000:	CH#A	110		EngSpean	CAN STD	00 80 00 7F 7	- \	Tx		
00:00:00:000:	CH#A	120		EngTor_120	CAN - STD	08 00 08 00 0	- N -	Tx		
00:00:00:000:	CH#A	124		EngTraTo	CAN STD	08 00 08 00	- V -	Τx		
00:00:00:000:	CH#A	128		BraPedSt_1	CAN STD	02 7F 02	- V -	Tx		
P						1			1	

5.1.3 Signal Monitor

The **Signal Monitor** lets you select and display individual signals from the tool database. (A signal is a predefined interpretation of one or more bytes of protocol frame data. This monitor displays up to 50 signals from various received frames. The *Signal Monitor* window displays the following information for each selected signal:

NOTE: In the FILTER ON mode, the *InPlace Monitor* and *Signal Monitor* will not process any frames or signals that do not pass through the active filters, even though the database allows the selection of these frames and signals.

🛒 Signal Monitor - Configuratio	>		
Signal	ignal Channel P		Data
Sig2Ascii16<>GenFS1 Sig3SNM8<>GenFS1 Sig4SNM16<>GenFS1 Sig5UNM8<>GenFS1 Sig7ENM6<>GenFS1 Sig6ENM2<>GenFS1	CH#A CH#A CH#A CH#A CH#A CH#A	CAN - STD CAN - STD CAN - STD CAN - STD CAN - STD CAN - STD	Display <u>F</u> ormat <u>S</u> elect Signal <u>D</u> elete Signal <u>A</u> dd New Signal <u>E</u> dit Signal
		1	<u>R</u> efresh (F5) Cut Ctrl+X Copy Ctrl+C Pagte Ctrl+V

- **Signal** the name of the signal
- Channel Channel ID
- **Protocol** frame type in use; if using CAN frames, STD or EXT, *Standard* and *Extended* frames, respectively
- Data in specified format: Hexadecimal, Decimal, Binary, Engineering Units, Interpretations or Strings
- Living Sign animated character: toggles between "/" and "\" each time the signal is received

When you select the **Signal Monitor**, a *Signal Monitor* menu is added beside the *Display* menu, and a *Signal Monitor* window appears on your screen. To select database signals for monitoring, use the following steps.

1. Double-click a blank line in the *Signal Monitor* table, or click the **Select Signal** command on the *Signal Monitor* menu (or on the menu that appears when you **right-click** in a blank line on the table) to display the *Signal Database* dialog.

2. Select a *Protocol Type*: If using CAN frames, Standard (STD) CAN or Extended (EXT) CAN; and a *Channel*. Also, select either **Frame** or **Virtual Device**, depending upon the source from which the signals are retrieved.

Select Signal from Frame Virtual Device	Select © <u>F</u> rame ID © Frame <u>N</u> ame	Frame Type © N <u>o</u> n-Diag Frame © <u>D</u> iag Frame	Frame ID / Name 3BE	•
Channel	Protocol CAN - STD	Virtua	I Device	Embedded Id
Signal List Fuel Operated Heater Modi Fuel Operated Heater Modi	ule Diagnostic Stat_3BE_02 ule Diagnostic Stat_3BE_01	Select ≥> Deselect ≤< Aut Brai Brai Brai Brai Brai Brai Brai	Displayed Signals eel to Body Relative Position Rear Left _5 eel to Body Relative Position Rear Right _ eel to Body Relative Position Right Front_9 eel to Body Relative Position Right Front_5 eel to Body Relative Position Left Front_55 eel to Body Relative Position Left Front_55 eel to Body Relative Position Alive Rolli_55 omatic Transmission Gear Shift Direction_10 omatic Transmission Commanded Gear_1F ke Pedal Moderate Travel Achieved Validi ke Pedal Moderate Travel Achieved_0F1_ inte Intake Air Temperature Validity_4C1_0	24_01 124_02 524_03 124_04 124_05 14_06 14_08 14_08 14_09 14_08 155_02 15_01 _0F1_03 02 16 ▲
Enable Log To File			ОК	Cancel

3. To select a database frame from which to choose your signal, first click the radio button

beside **Frame ID** or **Frame Name**, identifying the format in which you can view the frame list. (The *Frame ID/Name* box to the right of this option should show database frame options in the format you have selected, by name or by ID).

- 4. Specify a *Frame Type*: **Non-Diag Frame** (non-diagnostic) or **Diag Frame** (diagnostic). For diagnostic frames, you will also need to select the appropriate *Embedded IDs*.
- 5. Scroll through the frames listed in the *Frame ID/Name* drop box until you find the desired item. **Click** on it. The signals for that frame will appear in the *Signal List* box in the left portion of the window.
- 6. Select the name of the signal you would like displayed on the signal monitor, and click **Select** (>>). That signal name will be copied to the *Displayed Signals* box (your list of selected signals *from all channels*) to the right. To remove a signal from your list, select that signal, and click **Deselect** (<<). That signal name is removed from the *Displayed Signals* box.

NOTE: Only 50 signals may be saved to a *Signal Monitor* window. If the *Displayed Signals* box contains more than 50 signals, a warning message "More than 50 signals cannot be selected for Signal Monitor" appears.

7. Repeat step 6 for any other signals you wish to add to your *Displayed Signals* list. Once you have selected all your desired signals for the frame listed, you may return to the *Frame ID/Name* drop box to select another frame from the database. Repeat step 6 for each of the frame signals you would like displayed on the *Signal Monitor*. By checking the "Enable Log

to File" check box, you allow the application to store data for future review. Signals from the *Signal Monitor* will be saved in decoded engineering units.

8. To add a signal manually, **right-click** in the *Signal Monitor* window and select the **Add New Signal** command to display the following dialog.

Add New Signal				2
Frame ID				
Frame Acronym				
Signal Acronym	[
Channel	CH#A	Protocol	CAN - STD	•
Data Type	ASC	Length in Bits	8	
Start Byte	0	Start Bit	0	
Offset	0.000000	Resolution	1.000000	
Upper Limit	0.000000	Lower Limit	0.000000	
Unit Description				
Data Format	GM-Monarch / Motoro	la (forward)		•
		Add Interpretations	3	
			ОК	Cancel

Enter all necessary data into the dialog and click **OK**. Your new signal will appear in the *Signal Monitor* window.

9. When the *Displayed Signals* list box contains all the signals to be displayed, click **OK** to exit and return to the *Signal Monitor* window. Once a signal appears in the *Signal Monitor* window, you may confirm or change its display format. Select the signal's entry and select the **Display Format** command on the *Signal Monitor* menu (or the menu that appears when you **right-click** in the *Signal Monitor* window).

Signal Monitor - Configuration = test1.her									
Signal	Channel	Protocol	Data	Livi					
AllNodHS_101_DgnInf_101_01	CH#A	CAN - STD	9223372036854775800 N/A	N					
EngSpean_110_DrvThrottlOvrrdDet_110_07	CH#A	CAN - STD	FALSE	- N					
EngTor_120_EngTrqAct_120_05	CH#A	CAN - STD	312.000000 Nm	N					
EngTraTo_124_EngAirFloTorqStedS_124_05	CH#A	CAN - STD	312.000000 Nm	N					
BraPedSt_128_BrkPdIPsRC_128_05	CH#A	CAN - STD	2.000000 N/A	N					
	1								

A Signal Display Format dialog appears, providing you with these options. The options enabled depend on the data type of the selected signal. You can also vary the number of digits displayed after the period with the Number of fractional digits to display option.

Si	ignal Display Format 🛛 🔀					
	Select the Display Format					
	C <u>H</u> exadecimal					
	C <u>D</u> ecimal					
	C Binary					
	Engineering Units					
	O Interpretations					
	O String					
	Number of fractional 6					
[OK Cancel					

You can log the signal engineering data to a file by selecting the **Enable Log to File** check box. Click **Browse** (...) and select a text file (with .txt extension). This file logs the signal data along with the timestamp.

When you have established a connection with the hardware exchanging frames with Hercules, you may begin viewing these signals by clicking the **Start** command in the *Monitoring* menu (or by pressing the **F9** key on the keyboard). To halt monitoring these frames and return to OFFLINE mode, click the **Stop** command in the *Monitoring* menu, or press the **Esc** key. You may also use the *Start* and *Stop* buttons on the main toolbar.

5.2 Selecting Special Views

In addition to the three standard online monitors, Hercules is equipped with four additional views to information: buffer contents (Offline monitor special Buffer View). hardware status/traffic (Information *View*), busload statistics (Statistics *View*), and diagnostic information (Diagnostic View).

5.2.1 Offline Buffer View

Offline Buffer View is available only in the OFFLINE mode. It is used after a monitoring session to save, review and playback the buffer's contents. Select the **Playback** menu, followed by the **Select Buffer** command to display the *OfflineBuffer View* window. For each frame recorded, the following information appears in the *Offline Buffer View* table.

Lin	Time	Channel	Frame	Header Details	Frame	Proto	Data	Bx/T)	E. LE
1	00:00	CH#C	6C10F0	P/T = 6C : Trg	6C10F0	J1850	13	Bx	Eind Frame
2	00:00	CH#D	6C10F0	P/T = 6C : Trg	6C10F0	J1850	13	Bx	
3	00:00	CH#C	6C10F1	P/T = 6C : Trg	6C10F1	J1850	13	Bx	<u>S</u> ave
4	00:00	CH#D	6C10F1	P/T = 6C : Trg	6C10F1	J1850	13	Bx	
5	00:00	CH#C	6C10F0	P/T = 6C : Trg	6C10F0	J1850	13	Bx	Open
6	00:00	CH#D	6C10F0	P/T = 6C : Trg	6C10F0	J1850	13	Bx	
7	00:00	CH#C	6C10F2	P/T = 6C : Trg	6C10F2	J1850	13	Bx	Time Channel
8	00:00	CH#D	6C10F2	P/T = 6C : Trg	6C10F2	J1850	13	Bx	- Time Stamp-
Э	00:00	CH#E	613311	P/T = 61 : Trg	613311	J1850	77	Bx	Absolute
10	00:00	CH#E	613311	P/T = 61 : Trg	613311	J1850	77	Bx	C Relative
11	00:00	CH#E	613311	P/T = 61 : Trg	613311	J1850	77	Bx	
12	00:00	CH#C	6C10F0	P/T = 6C : Trg	6C10F0	J1850	13	Bx	
13	00:00	CH#D	6C10F0	P/T = 6C : Trg	6C10F0	J1850	13	Bx	
14	00:00	CH#C	6C10F1	P/T = 6C : Trg	6C10F1	J1850	13	Bx	
(1							► -	Map Channels
Close									
	TL		LE0 2002		Thur		0.40.0000	-	

- **TimeStamp** (µs) (1 ms resolution)
- Channel (channel ID)
- Frame Acronym (predefined frame acronym from database, appears only if listed in the active database)
- Header shows frame details of GMLAN EXT-CAN, J1939 and J1850 frames
- **Frame ID** (Protocol identifier)
- **Protocol** (identifies frames)
- **Data** (data bytes)
- **Tx/Rx** (frame type: Transmit, Receive, Trigger Frame, High-Voltage Transmit* High- Voltage Receive*, Remote Transmit, or Remote Receive respectively)
 - * High-voltage, wake-up frames are used only in single-wire CAN.

The storage of frames in the buffer starts automatically each time you select the **Start** command in the *Monitoring* menu, overwriting any information present in the buffer. Therefore, if you wish to view the content of a monitoring session's buffer later and/or to send them back out over the bus, you must first save them. To save the contents in an *OfflineBuffer View* table, add any personal reminders you would like to include in the white *Comment* box; then click **Save**.

Select a file type: Text or ASCII (.TXT), Binary (.BIN), or Data (.CSV: comma-separated-variable). TXT and CSV files are ideal for offline analysis of buffer information—they are easily imported into applications such as Excel, or other spreadsheet programs. BIN files are designed for the playback of a buffer's contents over connected networks.

NOTE: To import Vector files (.asc) and CAT files, type {*.*} in the file name box and press **Enter** to display all files. Select the desired import file and click **Open**. The Hercules dialog is displayed. Click **Yes** to import the file.

Hercules 🔀
File is of different format. Do you want to convert to Hercules Format?
<u>Y</u> es <u>N</u> o

Specify a name and location for your file, and click **Save**. Once you have saved your file, it is ready for export to other applications (in the case of TXT and CSV files) or for playback over the network (in the case of BIN files). You can also view the file contents later by using **Open** in this view. When you open a previously saved buffer file, with *Map Channels* option, you can load the frames on to a different channel of the same protocol.

To clear the current buffer, select the **Clear Buffer** command from the *Monitoring* menu, or click **Clear Buffer** on the main toolbar.

NOTE: Timestamps may be displayed in *Absolute* or *Relative* values. **Absolute** or **Relative** – *Absolute* timestamp is with respect to the start of the online monitoring. *Relative* timestamp is with respect to the previous message.

5.2.2 Information View

The *Information View* window contains current login status and hardware activity (e.g., mode, trigger status, transmission status, error messages, etc.)

👺 Information View - Configuration	= test1.her 📃 🗆 🗙
IP Address	Channel
192.168.1.32	CH#A
Current Status	Frame Id's on Network
Offline	
Trigger Status	
Transmission Status	
Error Report Level	
00 - No Error	
Communication Successful	<u> </u>
Logging In 14: 29: 41 Thursday January	23 2003
Hardware connected	
Logged Out 14: 29: 46 Thursday Januar	y 23 2003
Communication Successful	
Logging In 14: 30: 07 Thursday January	23 2003
Hardware connected	
Logged Out 14: 30: 29 Thursday Januar	y 23 2003
Communication Successful	
Logging In 14: 31: 58 Thursday January	23 2003
Hardware connected	
Logged Out 14: 32: 12 Thursday Januar	y 23 2003 📃 🔽

This window can receive information from any combination of active channels. It displays all

information sent from any active program blocks. It also provides the IP address of a connected Gryphon, error level set on SJA1000 CAN card, and IDs of the frames that are transmitted/received on each channel. This window also displays available channels and frames selected for transmission.

5.2.3 Statistics View

The Statistics View is only available in the ONLINE mode and will only display the statistics for the configured channels. To reset all the values in the window to zero and begin a new tally of statistics, **right-click** on the *Statistics* window, then click **Reset**. This view updates itself periodically

to display the latest statistics information as long as Hercules is connected to the hardware interface. The default update interval time is 1 second. **Right-click** in the window below and select the *Log File* command to save the average busloads for future use. With Hercules OFFLINE, the log file can be viewed in a text editor such as Windows Notepad only after you go back and **right click** in the *Statistics View* window, select **Log File** and then **uncheck** *Select Log File* box.

NOTE: This feature is not available for the DCX (J1850) module.

DG Hercules - Statis	tics Monitor	- Configuratio	on = test1.her		
<u>File D</u> isplay <u>C</u> onfigu	aration FilterM	lode <u>M</u> onitorir	ng <u>P</u> layback	Diagnostics	Data <u>b</u> ase ⊻iew <u>W</u> ind
Start Stop Scroll	Grids Frame	∧y	Filter Enable	Save Load	Pi Bak Diag Comm C
🚆 Statistics Monit	or - Configur	ation = test1.	.her		
Average Bus Load % Peak Load % Transmitted Frames Received Frames Transmitted Frames Lost Received Frames Lost Transmitted Frames Error Count Received Frames Error Count Log File	CH#A 0.00 0.00 0 0 0 0 0 0	CH#B 0.00 0 0 0 0 0 0 0 0 0 0	CH#C 3.88 4.23 0 18 0 0 0 0 0	CH#D 3.88 4.23 0 18 0 0 0 0 0 0 0	CH#E 0.58 1.06 0 15 0 0 0 0 0 0 0 0

FIELD	DESCRIPTION
Average Bus Load %	The average bus load on the channel over a specific period of time.
Peak Load %	The highest bus load during the averaging period.
Transmitted frames	The total frames transmitted on a channel by the device driver since Hercules monitoring was enabled.
Received frames	The total frames received on a channel by the device driver since Hercules monitoring was enabled.
Transmitted Frames Lost	The total transmitted frames dropped by the device driver since Hercules monitoring was enabled.
Received Frames Lost	The total received frames dropped by the device driver since Hercules monitoring was enabled.
Transmitted Frames Error Count	The total transmit frame errors since Hercules monitoring was enabled.
Received Frames Error Count	The total receive frame errors since Hercules monitoring was enabled.
Log File	The file used to store information. Right-click slightly above the Log File text box to display an options menu.

5.2.3.1 Log File

You can save the Statistics Monitor data to a Log File.

1. **Right-click** slightly above the *Log File* text box to display a Pop-up menu containing the *Log File* and *Reset* options.

Transmitted Error Count	Frames	0	0		
Received Fr	ames	0	0		
Log File					
	Log Fil	le			
ļ <u> </u>	Reset				

2. Click the **Log File** option to display the *Configure Log File* dialog.

Configure Log File		×
Select Log File		
	ОК	Cancel

3. Click the **Browse** button (...) to display the *Log File* dialog.

Log File	<u>? ×</u>
Save in: 🔁 DB_3_02 💌 🖛 🖻 💣 🛙	⊞ -
<pre> hs_04_X380_8a.TXT hs_04_X380_1a.TXT Sample1.txt sample2.txt sample3.txt sample4.txt </pre>	
File name: *.txt Save as type: Text or ASCII Files (*.TXT) Text or ASCII Files (*.TXT)	Save
Data Files (*.CSV)	

4. Select the desired file type (TXT or CSV) and folder location. Enter the desired file name and click **Save**.

5.2.4 Signal Graph

This is a graphic representation of the signals that are defined in the *Signal Monitor* window. To display this graph, select the **Display** menu, followed by the **Signal Graph** command. The *Signal Graphs* window is displayed. The data used in this graph is automatically converted into, and displayed in, engineering units. The resolution of this scale is set at 5 divisions for each grid value

to permit identifying a 1 unit signal value change. A maximum of 5 signals for each channel are permitted. Four graphs with five signals per graph are the maximum amount when in a monitoring session. The number of graphs permitted will depend on your hardware set-up and how many channels have been selected.

NOTE: This feature is not available for the DCX (J1850) module.



To move the visible graph area, position the mouse pointer in the graph window. **Press** and **hold** both the *Shift key* + *Left mouse button* while moving mouse to move the graph on both the horizontal and the vertical axes.

To Zoom into an area, position the mouse pointer in the graph window. Click and hold the left mouse button while dragging to create a bounding box that represents the zoomed area. This zoom box is used to identify both the location and the extent of an enlarged (or zoomed) view. The selected zoom view will fill the graph window content, with the x, y axes appropriately scaled. Zoom

is applied as soon as the zoom area is selected. You can click the **Back** button to undo the zoom.

The following buttons are available in the *Signal Graph* window. The following is a description of each button and its purpose.

Select – Used to select signals graphed by the Signal Graph window. Click Signal Graphs **Select** to display the Configure window. Select the desired Signal Monitor Signals list and click Select>>. signals in the Complete all applicable fields in this window and click OK.

<== - Incrementally shift the entire Signal Graph window horizontally to display previous time based graph data. This action occurs each time this button is selected but ceases when the beginning of the time scale (zero) appears. To automatically repeat this action, **press** and **hold** the left arrow key on the computer keyboard.

==> - Incrementally shift the entire Signal Graph window horizontally to display subsequent based araph data. This action occurs each time this button time is To automatically repeat this action, **press** and **hold** the **right** arrow key on selected. the computer keyboard.

Up – Incrementally shift the entire *Signal Graph* window vertically to display higher engineering unit axis based graph data. This action occurs each time this button is selected but ceases when the beginning of the time scale (zero) appears. To automatically repeat this action, **press** and **hold** the v key on the computer keyboard.

Down – Incrementally shift the entire *Signal Graph* window vertically to display lower engineering unit axis based graph data. This action occurs each time this button is selected but ceases when the beginning of the time scale (zero) appears. To automatically repeat this action, **press** and **hold** the **D** key on the computer keyboard.

Z-In – Incrementally compresses both the time and engineering units scale in the *Signal Graph* window. This action occurs each time this button is selected. To automatically repeat this action, **press** and **hold** the letter **I** key on the computer keyboard.

Z-Out – Incrementally expands both the time and engineering units scale in the *Signal Graph* window. This action occurs each time this button is selected. To automatically repeat this action, **press** and **hold** the letter o key on the computer keyboard.

Back – Discards recent change and restores previous changes made to the *Signal Graph*. Stores the last 200 changes made to the Graph.

5.2.4.1 **Options**:

In addition to the buttons, several options are available. **Right-click** in the *Signal Graph* window and this will display the following options menu.

Point marks	
Scatter graph	
Trace mouse coordinates	
Grid	
Fit	۲
Configure Graph	
View	•

The following options are available and are described below.

Point marks – When selected (i.e., checked), the *Signal Graph* window will display points in the graph line where each signal occurred. When not selected, no points will display. Point marks are not shown by default.

Scatter graph – When selected, the *Signal Graph* window will display points only. The graph line connecting the points will not be visible. When not selected, the *Signal Graph* window will display data as dictated by any other selected option.

Trace mouse coordinates – When selected, the mouse pointer will include a constantly visible mouse pointer status box which will display the current mouse pointer position in x, y axis format and in engineering units. When not selected, no mouse pointer status box will be visible. This tool is useful to precisely identify where the item of interest appears on the signal graph.

Grid – When selected, the *Signal Graph* window will display grid lines that correspond to major x, y axis points in the window. When not selected, no grid lines are displayed. Grid lines are not shown by default.

Fit – When selected, three choices are available: *Width, Height,* and *Page.* When *Width* is selected, the existing graph data is scaled to fit into the entire horizontal width of the available *Signal Graph* window. When *Height* is selected, the existing graph data is scaled

to fit into the entire vertical height of the available *Signal Graph* window. When *Page* is selected, the existing graph data is scaled to fit into the entire *Signal Graph* window and is the equivalent to selecting both the Width and Height choices.

Configure Graph – When selected, the *Configure Graph* window is displayed and contains two tabs: the *General* tab and the *Graphs* tab. The *General* tab is used to define the range of the graph coordinates (where x1 and y1 are in the lower left corner, x2 is the lower right corner, and y2 is in the upper right left corner). It also provides the following selections: *Point Marks* (previously described), *Mouse coordinates* (previously described in Trace Mouse Coordinates) and *Axis* (previously described in Grid). The *Graphs* tab provides a list

of the signal sources and three buttons: *Color, Show/Hide* and *Show all.* To change the color graphed by a signal source, **click** the signal source to select it and **click** the Color button to display the *Color* window. Choose the desired color for the selected signal source then click **OK**. To hide a signal currently visible on the graph, **click** the signal source to select it and click **Hide**. To show a signal currently not visible on the graph, **click** the signal source to select it and click **Show**. To show all signal sources which are currently not visible

on the graph, click Show all.

View – This option lets you display or hide the graph list in the left side of the window. **Unselecting** the *Graph List* choice will hide the list and allow more graphic data to be displayed. **Selecting** the *Graph List* choice will display the list of signals with reduced graphic data visible in the window. When visible, the Graph List can be undocked and moved to another area. Move the mouse pointer to the two horizontal lines at the top of the Graph list. **Press** and **hold** the left mouse button and drag it to the desired location. To dock the Graph List, move it to the left side of the *Signal Graph* window.

5.2.4.2 Configuring and using the Signal Graph

Here are the steps to configure and use the Signal Graph feature.

- 1. Check the hardware configuration. Select the *Configuration* menu, followed by the **Hardware Configuration** command. Verify that the applicable channels are selected and properly configured. Verify that the correct Gryphon IP address and port number are specified in the *TCP/IP Configuration*. Verify that the correct bus rate is selected.
- 2. Associate the desired database. Select the *Database* menu, followed by the **Associate Database** command. Verify that the desired databases are associated with the selected channels.
- 3. Display a *Scrolling Monitor* window. Select the **Display** menu, followed by the **Scrolling**

Monitor command (either With Grid or with No Grid).

- 4. Display a *Signal Monitor* window. Select the **Display** menu, followed by the **Signal Monitor** command.
- 5. While in the *Signal Monitor* window, select one or more signals to add to the *Signal Monitor* window. The signal source can be from an existing database or from a signal that you manually create.

To select one or more signals from an existing database, **right-click** in this window and select the **Select Signal** command. This displays the *Signal Database* dialog. Complete all applicable fields in this dialog to display the available signals in the *Signal List*. From the *Signal List*, select the desired signals to be displayed (for a maximum of 20 signals) and click **Select>>**. Click **OK** to close this dialog.

To manually add one or more signals (for a maximum of 20 signals), **rightclick** in this window and select the **Add New Signal** command. This displays the *Add New Signal* dialog. Complete all applicable fields in this window to define the signal and click **OK**.

- 6. Display the **Signal Graphs** window. Select the **Display** menu, followed by the **Signal Graph** command. Click **Select** to display the *Configure Signal Graphs* window. Confirm that the correct channel and protocol are selected. From the *Signal Monitor Signals* list, select the desired signals to be graphed and click **Select.** Click **OK** to close this window.
- 7. Click **Start**. Also refer to previous topics that describe the buttons and options available for the *Signal Graph* window.

5.2.5 Statistics Graph

This graph shows the average busload on each channel. It plots values from the *Scrolling Monitor* window. This graph is only available in ONLINE mode. To display this graph, select the **Display** menu, followed by the **Statistics Graph** option. The resolution of this scale is set at 5 divisions for each grid value to permit identifying a 1 unit signal value change. *The Graph for Average Bus Load* % window is displayed. You must be transmitting or receiving frames to see activity in the *Statistics Monitor* window.



To move the visible graph area, position the mouse pointer in the graph window. **Press** and **hold** both the **Shift key + Left** mouse button while using the mouse to move the graph on both horizontal and vertical axes.

To Zoom into an area, position the mouse pointer in the graph window. **Click** and **hold** the *Left* mouse button while dragging to create a bounding box that represents the zoomed area. This zoom box is used to identify both the location and the extent of an enlarged (or zoomed) view. The selected zoom view will fill the graph window content, with the x, y axes appropriately scaled. Zoom

is applied as soon as the zoom area is selected. You can click the **Back** button to undo the zoom.

The following buttons are available in the *Statistics Graph* window. The following is a description of each button and its purpose.

<== – Incrementally shift the entire Statistics Graph window horizontally to display previous time based graph data. This action occurs each time this button is selected but ceases when the beginning of the time scale (zero) appears. To automatically repeat this action, **press** and **hold** the left arrow key on the computer keyboard.

==> - Incrementally shift the entire *Statistics Graph* window horizontally to display subsequent time based graph data. This action occurs each time this button is selected. To automatically repeat this action, **press** and **hold** the **right arrow** key on the computer keyboard.

Up – Incrementally shift the entire Statistics Graph window vertically to display higher

engineering unit axis based graph data. This action occurs each time this button is selected but ceases when the beginning of the time scale (zero) appears. To automatically repeat this action, press and hold the U key on the computer keyboard.

Down – Incrementally shift the entire *Statistics Graph* window vertically to display lower engineering unit axis based graph data. This action occurs each time this button is selected but ceases when the beginning of the time scale (zero) appears. To automatically repeat this action, **press** and **hold** the **D** key on the computer keyboard.

Z-In – Incrementally compresses both the time and ABL (%) scale in the *Statistics Graph* window. This action occurs each time this button is selected. To automatically repeat this action, **press** and **hold** the letter **I** key on the computer keyboard.

Z-Out – Incrementally expands both the time and ABL (%) scale in the Statistics Graph window. This action occurs each time this button is selected. To automatically repeat this action, **press** and **hold** the letter o key on the computer keyboard.

Back – Discards recent change and restores previous changes made to the Signal Graph. Stores the last 200 changes made to the Graph.

5.2.5.1 Options:

In addition to the buttons, several options are available. **Right-click** in the *Statistics Graph* window to display the options menu.

Point marks	
Scatter graph	
Trace mouse coordinates	
Grid	
Fit I	
Configure Graph	
View	

The following options are available. A description of each option and its purpose follows.

Point marks – When selected (checked), the *Statistics Graph* window will display points in the graph line where each signal occurred. When not selected, no points will display. Point marks are not shown by default.

Scatter graph – When selected, the *Statistics Graph* window will display points only. The graph line connecting the points will not be visible. When **not** selected, the window will display data as dictated by any other selected option.

Trace mouse coordinates – When selected, the mouse pointer will include a constantly visible mouse pointer status box which will display the current mouse pointer position in x, y axis format and in ABL (%). When not selected, no mouse pointer status box will be visible. This tool is useful to precisely identify where the item of interest appears on the *Statistics Graph* window.

Grid – When selected, the *Statistics Graph* window will display grid lines that correspond to major x, y axis points in the window. When not selected, no grid lines are displayed. Grid lines are not shown by default.

Fit – When selected, three choices are available: *Width, Height*, and *Page*. When **Width** is selected, the existing graph data is scaled to fit into the entire horizontal width of the available *Statistics Graph* window. When **Height** is selected, the existing graph data is scaled to fit into the entire vertical height of the available *Statistics Graph* window. When **Page** is selected, the existing graph data is scaled to fit into the entire *Statistics Graph* window and is the equivalent to selecting both the **Width** and **Height** choices.

Configure the Configure Graph Graph _ When selected. window is displayed and contains two tabs: the General tab and the Graphs tab. The General tab is used to define the range of the graph coordinates (from x1, y1: lower left hand corner to x2, y2: upper right hand corner). It also provides the following selections: Point Marks (previously described), Mouse coordinates (previously described in Trace Mouse Coordinates) and Axis (previously described in Grid). The Graphs tab provides a list of the signal sources and three buttons: Color, Show/Hide and Show all. To change the color graphed by a signal source, **click** the signal source to select it and click the **Color** button to display the Color window. Choose the desired color for the selected signal source then click OK. To hide a signal currently visible on the graph, **click** the signal source to select it and click Hide. To show a signal currently not visible on the graph, click the signal source to select it and click **Show**. To show all signal sources that are currently not visible on the graph, click Show all.

View – This option lets you display or hide the graph list in the graph window. **Unselecting** the *Graph List* choice will hide the list and allow more graphic data to be displayed horizontally. **Selecting** the *Graph List* choice will display the list of signals with horizontally reduced graphic data visible in the window. When visible, the *Graph List* can be undocked and moved to another area. Move the mouse pointer to the two horizontal lines at the top of the *Graph List*. **Press** and **hold** the *Left* mouse button and drag it to the desired location. To dock the *Graph List*, move it to the left side of the *Signal Graph* window.

5.2.5.2 Configuring and using the Statistics Graph

Here are the steps to configure and use the Statistics Graph feature.

1. Check the hardware configuration. Select the **Configuration** menu, followed by the

Hardware Configuration command. Verify that the applicable channels are selected and properly configured. Verify that the correct Gryphon IP address and port number are specified in the *TCP/IP Configuration*. Verify that the correct bus rate is selected.

2. Associate the desired database. Select the **Database** menu, followed by the **Associate Database** command. Verify that the desired databases are associated with the selected channels.

3. Display a *Scrolling Monitor* window by selecting the **Display** menu, followed by the

Scrolling Monitor command (either With Grid or No Grid).

4. Display the Statistics Graph window. Select the **Display** menu, followed by the Signal

Graph command.

- 5. Click **Start**.
- 6. Display the *Statistics Monitor* window. Select the **Display** menu, followed by the **Statistics View** command.
- 7. **NOTE:** You must be ONLINE to access the *Statistics View* command. Also refer to the previous topics that describe the buttons and options available for the *Statistics Graph* window.

5.2.6 Diagnostic View

The Diagnostic *View* can be used during or after а diagnostic session to interpret packet information exchanged during execution of diagnostic services or during a diagnostic session. Select the **Display** menu, followed by the **Diagnostic View** command to display the following window.

🔲 Diagno:	stic View	- Configuration = t	est1.her				
Service Nar	me:			Service			
Request Tir	me Stamp	:		Respon	ise Time Stamp 💠		
Channels :							
_	ld	Data		Description / Err	rors		
Request Response							
	•						Þ
Raw Data		HEX		ASCII			
	•						Þ
	Nex	t <u>P</u> reviou	8	Display	<u>S</u> ave	Close	Respone: 0 / 0

This view displays the diagnostic service information (request packets and response packets) for diagnostic services executed via the *Diagnostics* menu. Based on the menu option selected, the appropriate protocol diagnostics service will be executed. A dialog displays the diagnostic service information, the request packets, and the response packets. Based on the request and response packet information, appropriate text and errors are displayed. *Diagnostic* services must first be specified and enabled in an active *Diagnostic Configuration* (see Section 9: *Diagnostics Menu*). The interpretation of packet information for each diagnostic service is available only in the OFFLINE mode.

To select a frame ready for transmit, **right-click** on the blank **Request Response** box in the *Diagnostic View* window. Responses from the ECUs will be sent back in bytes in this same box. You can now **Save** this configuration, and all information will be saved under your named (.txt file), appearing in Notepad format. A Hex and ASCII dump of the raw data is also displayed in the *Raw Data* box in the *Diagnostic View* window.

6. Filter Mode Menu

DG Hercules - Configuration = test1.her																		
<u>F</u> ile	<u>D</u> isplay	<u>C</u> onfigu	Iration	FijterMode	<u>M</u> onit	oring	<u>P</u> layback	Diagno	ostics	Data <u>b</u> ase	. <u>V</u> ie	w Laj	nguage	<u>H</u> elp				
	0	8		Filter <u>O</u> N	1 [1	P F	ı,	Ē	1	60	- 🏞	C	23	B,	U,	P	?
Sta	art Stop	Scroll	Grids	Filter O <u>F</u>	F	Fil	ter Enable	Save	Load	Pl Bak	Diag	Comm	Clear	Fr Res	Enable	Enable	Enable	Help

The *FilterMode* lets you activate (**select** the **Filter On** command) or deactivate (**select** the **Filter Off** command) the filtering mechanism for a monitoring session, once filtering has been enabled in the *Filter Table* or the *Global Options* window (accessed from the **Configuration** menu). The filtering mechanism will let you pass or block certain frames, based on conditions you specify in the *Filter Table*.

The filtering mechanism governs frame traffic throughout Hercules. Therefore, if filtering has been enabled, a monitor will receive frames once the *Filter Table* has processed them. Further, any frames blocked by the active filters will not be received.

Information about how to set up filters is described in Section 4.5.

7. Monitoring Menu

<mark>DG</mark> He	rcules -	- Config	uratio	n = te	st1.h	er														_ 🗆 ×
<u>F</u> ile [<u>)</u> isplay	<u>C</u> onfigur	ation	FilterM	ode	<u>M</u> onitoring	<u>P</u> layback	Diagnostics	Database	e ⊻iev	w La <u>r</u>	nguage	<u>H</u> elp							
	6	8		9	Λ_{\emptyset}	<u>S</u> tart F	9		1	60	5	C	<mark>2</mark> 5	B,	U,	P,	8			
Start	Stop	Scroll	Grids	Frame	Signa	Stop E			PIBak	Diag	Comm	Clear	Fr Res	Enable	Enable E	Enable	Help			
						<u>C</u> heck C	Communicati	on												
						Clear <u>B</u> u	ífer	Ctrl B												
						Liear <u>B</u> u	irrer	Cttl B												

The *Monitoring* menu lets you put Hercules in ONLINE or OFFLINE mode (i.e., to **Start** or **Stop** the monitoring of frames). Monitor types for the viewing of received frames can be selected from the *Display* menu. Most configuration tasks require that you put Hercules into OFFLINE mode (i.e., **Stop** frame monitoring) before you can perform them. The Hercules current mode (ONLINE or OFFLINE) is indicated in the bottom boxes of the main Hercules screen.

If you wish to enable the Hercules filtering mechanism, frame responder, or user-configured scheduler – or a program block application – for a monitoring session, you must first configure the feature for use. Then you must enable the feature by selecting (;) its box in the **Global Options** window (accessed from the *Configuration* menu).

The remaining commands in the *Monitoring* menu, **Check Communication** and **Clear Buffer**, let you test communication with Hercules and clear the current buffer of its contents. To view these operations, you must have an *Information View* or *Offline Buffer View* open, respectively.

8. Playback Menu

The *Playback* feature lets you recreate a frame transmission session by "playing" a saved buffer content back onto the bus, with respect to frame timestamps. Frames from a loaded buffer file are transmitted at an interval equivalent to those marked by the timestamps from the original session, and the *Playback* window lists the number of frames transmitted. You may play back the contents of a current buffer or a previously saved buffer file by following the directions in this section.

NOTE: Transmit and receive message playback works for all protocols. But the J1850-3H PWM (HBCC card) only plays back transmit messages.

To open a saved buffer file, select the **Display** menu, followed by the **Offline Buffer View** command to display the *OfflineBuffer View* window. Click **Open** in the *Offline Buffer View* window, and **select** your previously saved (.txt, .csv, or .bin) buffer file. To import Vector files

(.asc) and CAT files, type "*.*" into the file name box and press **Enter** to display all files. Select the desired import file and click **Open**. The Hercules dialog is displayed. Click **Yes** to import the file.



You can also use the **Select Buffer** option to directly open the *OfflineBuffer View*. The content of the file should now appear in the *OfflineBuffer View*, where you may view *Absolute* or *Relative* timestamps by selecting the appropriate options to the right of the view. A description of the *Offline Buffer View* is in Section 5.2.1.



Select the **Playback** menu, followed by the **Start Playback** command to display the *Playback* window. You can choose either **Play Continuous**

(playback will continue until you click **Stop Playback**) or **Play Once** option (buffer will be played back only once) for buffer playback. Once you select a playback method, playback occurs, but is not seen on a monitor. However, it will tell you how many frames were transmitted.

You will see the number of frames that are being transmitted as *Start Playback* toggles to *Stop Playback* and then returns to **Start Playback** when the playback is complete. The number that appears in the *FramesTransmitted* box should be equal to the number of frames stored in the original buffer file.

NOTE: An error message will appear beside the *Playback* window if you have no information stored in the active buffer. Click **OK** in this Hercules window and open a saved buffer.

8.1 Editing Playback Files in Excel (CSV) format

If the .CSV file is imported into Microsoft Excel and then saved, the required specific formatting is lost. However, this can be corrected using a text editor. The following illustrations show details about the required file format. Specifically, in the required file format, the first six lines do not contain extra commas. Also, a comma is at the end of each message line (TX or RX).

8.1.1 Required File Format

🕱 Crimson Editor - [M:\products\hercules\technical stuff\replay\test3.CSV]											
🔗 Eile Edit Search View Document Tools	Macros <u>W</u> indow <u>H</u> elp										
D 📽 💺 🖆 日 🕼 🎒 🖓 🗽 🐁	으 요 🏘 🏥 삶 삶 🚡 📴 🔊 🖉 😻 🔸 🔹 🕨 🕨 🕨 😕										
🤏 test1_edit.csv 🍳 test2_csv 🍳 test1_edit.txt 🍳 test2_edit2.txt 🍳 test1.CSV 🧉 test2_edit.csv 🔌 test2_edit2_1.csv 🔌 test2_edit2_ms.csv 🍳 test3.CSV 🚳 test3.TXT											
😰 🖻 🛅 🗙 👘 🍫 🗴	1 Dearborn Group Format x15										
[M:] Network Drive	2 3 Mon Oct 86 18:35-81 2883										
🗄 💼 dpa 💽											
🕀 🧰 falcon	5 Mon Oct 06 18:35:09 2003										
Ford Tools											
E-gryphon	8 Tringer Frame										
	9 Absolute										
	10Timestamp,Channel,Frame ID,Frame Acronųm,Protocol,DataCount,Data,Tx/Rx										
I manual	1 10 00:00:00:000,1,120,ECM 120h,CAN - STD,8,00 00 00 078 E0 00 00,TX,										
🗄 🛅 NewVersionSpec	12 00:00:00:000:080,2,120,120,120,10H - 510,8,00 00 00 00 78 E0 00 00,KX, 13 00:00:00:043-830 1 120 FCM 1206 FCA - STD 8 00 00 00 55 FG 00 00 Ty										
主 💼 release	14 00:00:0043:9102.12D.12D.Com - STD.8.00 00 00 05 F0 00 00.8x.										
i software	15 00:00:075:150,1,12D,ECM_12Dh,CAN - STD,8,00 00 00 03 3E 80 00 00,Tx,										
E	16 00:00:075:250,2,12D,12D,CAN - STD,8,00 00 00 3E 80 00 00,Rx,										
tional database	17 00:00:00:075:5500,1,12D,ECM 12Dh,CAN - STD,8,00 00 00 00 2E E0 00 00,Tx,										
	10 00:00:00:00:5:5:90,2,1/20,1/0,000 = 310,8,00 00 00 00 20 20 20 00 00,0%, 10 00:00:00:07:5:50 1 120 FCM 1206 FCM - STD 8 00 00 00 00 20 00 00 00 00 TV										
test1.CSV	26 00:00:075:910.2.120.120.CAN STD.8.00 00 00 00 20 00 00 08.X.										
test1_edit.csv	21 00:00:01:005:550,1,12D,ECM_12Dh,CAN - STD,8,00 00 00 00 78 E0 00 00,Tx,										
test1_edit.txt	22 00:00:01:005:640,2,12D,12D,CAN - STD,8,00 00 00 78 E0 00 00,Rx,										
test2.csv	23 00:00:01:025:450,1,12D,ECM_12Dh,CAN - STD,8,00 00 00 00 55 F0 00 00,TX, 34 00:04:00-01-07-570, 130 130 00, TX, 00,00 00,00 00,00 00,00 00,00 00,00 00,00 00,00 00,00 00,00 00,00 00,00										
test2_edit.csv	25 00.00.01.025.530,2,120,120,000 - 310,0,00 00 00 00 00 55 F0 00 00,000,00 25 00.00.01.035.550 1 120 FCM 1200 CON - STD 8 00 00 00 36 86 00 00 Ty										
test2_edit2.csv	26 00:00:01:035:630,2,120,120,CAN - STD,8,00 00 00 3E 80 00 00,Rx,										
test2_edit2.txt	27 00:00:01:045:540,1,12D,ECM_12Dh,CAN - STD,8,00 00 00 00 2E E0 00 00,Tx,										
	28 00:00:01:045:620,2,12D,12D,CAN - STD,8,00 00 00 00 2E E0 00 00,Rx,										

8.1.2 File Format saved by Excel (CSV)

The saved Excel file in CSV format contains the following differences:

- 1. Extra commas at the end of the first six lines.
- 2. Missing comma after each message line (TX or RX).

Srimson-Editor- [M:\products\hercules\technical stuff\replay\test3_1.CSV]											
🔗 File Edit Search. View Document Tools Macros Window- Help											
Cr 🛩 🐁 🗃 🖬 🎒 🚑 📐 👗 🗈	💼 🗠 🗠 🛤 🏥 🛱 - 🏊 🚾 🗩 🖊 💖 🕨 🕨 🕨 🛃										
🤏 test1_edit.csv 🍳 test2.csv 🤏 test1_edit.	txt 🕼 test2_edit2.txt 🛛 🍳 test1:CSV 🗍 🧉 test2_edit.csv 🗋 🍳 test2_edit2_i7.csv 🗍 🧳 test2_edit2_ms.csv 🗍 🗳 test3.CSV 🗍 🚳 test3.TXT 🖉 te										
🗊 🖻 📴 🗙 📔 🛛 🗳	x 1 Dearborn Group Format x15,,,,,,										
IM-1 Network Drive											
the second secon	3 MON UCE 00 18:35:01 2003,,,,,,										
Filen	5 Mon Oct 06 18:35:09 2003										
Ford Tools	6										
🕀 🧰 gryphon	7 35,,,,,,										
🖃 🧰 hercules	8 Trigger Frame,,,,,,										
Elver ⊡ Flyer	9 HUSUIULE,,,,,,, 10 Timostamo (hannol Frame IN Frame Acronum Protocol NataCount Nata Ty/Ry										
i helpfile	1 99:00:00:075:259.2.12D.12D.CAN - STD.8.00 00 00 3E 80 00 00.Rx										
IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	12. AR. AR. AR. A.Z. S. SAR 1. 12. F.C.N. 12. Dr. CAN STA & AR AR AR AR AR AR AR AR. T.X.										
	13 W: W: W: Y/5:574,2', 120', 120', 13N' - STU, S, W W W W W 2E EV W W, K										
	14 00:00:00:075:850,1,12D,ECM_12Dh,CAN - STD,8,00 00 00 20 00 00 00,Tx										
	15 00:00:00:00/5:970,2,720,720,720,000 - 510,8,00 00 00 00 20 00 00 00,00										
	17 88-88-81-885-5-548 2.12D.12D.CAN - STD 8.88 88 88 78 F8 88 88 82										
	18 09:00:01:025:450,1,120,ECM 12Dh,CAN - STD,8,00 00 00 00 55 F0 00 00,Tx										
🖃 🧰 replay	19 00:00:01:025:530,2,12D,12D,CAN - STD,8,00 00 00 00 55 F0 00 00,Rx										
test1.CSV	20 00:00:01:035:550,1,12D,ECM_12Dh,CAN - STD,8,00 00 00 00 3E 80 00 00,Tx										
test1edit.csv.	2100:00:01:035:630,2,120,120,CAN - STD.8.00 00 00 00 3E 80 00 00, X										
test1_edit.txt	22 99:99:91:91:945:549,1,120,LCH 1200,LCH - 510,8,99 99 99 22 19 99 99 21 19 19 19 19 19 19 19 19 19 19 19 19 19										
test2.csv	24 98:00:01:05:5549.1.120.ECM 120b.CAN - STD.8.00 80 80 80 80 80 80 80.Tx										
test2_edit.csv	25 99:00:01:055:620,2,12D,12D,CAN - STD,8,00 00 00 20 00 00,Rx										
Taj test2_euit2.csv	26 00:00:02:015:470,1,12D,ECM_12Dh,CAN - STD,8,00 00 00 78 E0 00 00,Tx										
test2 edit2 1 csv	27 00:00:02:015:550,2,12D,12D,CAN - STD,8,00 00 00 00 78 E0 00 00,Rx										
test2 edit2 mac.csv	22 AR. AR. AZ. ARS. AAA, J. J.2D. F.D. J.2D. J. RAN CJD. & AA AR AR AR AR AR S. F.A. AR AR J.X.										
test2_edit2_ms.csv	279959595252055520572,120,120,120,140 - 510,80 89 89 89 55 19 89 303,42										
test3.CSV	31 60:00:02:045-530.2.120.120.100. STD.8.00.00.00 55 80.00.00 84										
test3.TXT	32 00:00:02:055:5540,1,120,ECM 12Dh,CAN - STD,8,00 00 00 02 E E0 00 00.Tx										
1 Incl 1 Incl	10 00-00-00-00-00-01 400 400 CON STD 0 00 00 00 00 00 00 DE F0 00 00 D.										

Once changed, the file will work. The editing must be done in an editor program using a Search/Replace (Tx with Tx, and Rx with Rx,) to correct.

8.1.3 Creating New Files within Excel and saving as (CSV)

The file needs to contain the above information. Frame Acronym is a required column that will repeat the Frame ID information.

🔀 Microsoft Excel - test3_1.CSV											
📳 Eile Edit View Insert Format Tools Data Window Help Acrobat											
🗋 🚔 🔚 🎒 🔃 🖤 👗 🗈 🛍 🗳 🗠 τ 🗠 τ 🌺 Σ 🏂 🛃 🛍 🦑 100% 🔻 😰 🔭											
	Δ	- B	C C	П	F	F	G	н			
1	Dearborn Group For	nat x15									
2							1				
3	Mon Oct 06 18:35:01	2003									
4											
5	Mon Oct 06 18:35:09	2003									
6											
7	35										
8	Trigger Frame										
9	Absolute										
10	Timestamp	Channel	Frame ID	Frame Acronym	Protocol	DataCount	Data	Tx/Rx			
11	00:00:00:075:250	2	12D	12D	CAN - STD	8	00 00 00 0	RX			
12	00:00:00:075:500	1	12D	ECM_12Dh	CAN - STD	8	00 00 00 0	Tx			
13	00:00:00:075:590	2	12D	12D	CAN - STD	8	00 00 00 0	RX			
1/4	101/01/01/05/8501	1,	1722	F2CM1_1722h1	1049-97D	၊ <u>ရ</u>	NNNNN				
15	00:00:00:075:910	2	12D	12D	CAN - STD	8					
אין דין	08/38/34/385/558	- ₁ 1	12 <i>0</i> 7 120	1207P	CAN- 340	ی م	080808080				
17	00:00:01:005:640	2	12D	12D	CAN - STD	8		RX			
18	00:00:01:025:450	1	12D 49D	ECM_12DN	CAN - STD	8		TX DV			
19	00.00.01.020.030	2	12D	TZU FOM 19Db	CAN STD	8					
20	00.00.01.030.000	ו ר	120		CAN STD	0					
22	00:00:01:035:530	∠ 1	120	ECM 12Db	CAN - STD	0 0		Tv			
23	00:00:01:045:620	2	120	120	CAN - STD	8		RX			
20	00:00:01:055:540		120	ECM 12Dh	CAN - STD	8		Tx			
24	00:00:01:055:620		120	190	CAN STD	0					

9. Diagnostics Menu

Diagnostic services are supported for two CAN specifications - ISO 15765 and GMLAN 3110

(version 1.5) – as well as J1979 support for J1850 networks. Only one version is available at a time. To view the current diagnostics type chosen (GMLAN Diagnostics or ISO Diagnostics), select the **Configuration** menu, followed by the **Global Options** command.

To use the diagnostic functions on this menu, you must have *Diagnostic* frames available in the active database.
9.1 Setting up or Loading a Diagnostic Configuration

The first step in accessing diagnostic functions for use during a monitoring session is to load a previously saved Diagnostic Configuration or to set up a new one.

When you first start Hercules, a default *Diagnostic Configuration* file (default.cfg) is loaded. It is an empty, read-only file, and you must use the **Save Diagnostic Configuration** command in the *Diagnostics* menu in order to save any changes you wish to make. Each subsequent time Hercules

is loaded, it uses the last saved configuration (.cfg) file.

To load a previously saved configuration for use, select the **Diagnostics** menu, followed by the **Load Diagnostic Configuration** command and select the appropriate saved .cfg file. Diagnostic files are also saved and loaded with the **.her** configuration.

A blank configuration file called "new.her" is available. This file can be loaded using the **Load Configuration** option. This file is located under the Hercules folder where Hercules is installed. If the Hercules software program is installed in C:\Program files, this file is installed in C:\Program Files\Hercules.

9.1.1 Setting up a GMLAN Diagnostic Configuration

To set up a new diagnostic configuration for GMLAN, use these steps.

 Select the Diagnostics menu, followed by the Setup Diagnostic Configuration command to display the following dialog. (Assumes GMLAN Diagnostics is selected in Global Options).

Address Type / Addressing Channel Channel CH#A Protocol CAN - STD Extended Address	har\in-house Physical Functional UUDT Resp ID	FreeSCAT\Ford_ 7EA 7EA - 0 7EA - Diag_In_INS	hercules\x4+	10can_r	mot 🗙
Use Ext. Add. 0:0	USDT Resp ID	7EA - Diag_In_INS	T	-	
01 - Request current powertrain diagnostic data 02 - Request powertrain freeze frame data 03 - Request powertrain freeze frame data 03 - Request powertrain freeze frame data 03 - Request emission-related diagnostic trouble codes 04 - Clear Diagnostic Information 06 - Request on-board monitoring test results for specific monitor 07 - Request control of on-board system, test or component 08 - Request control of on-board system, test or component 09 - Request vehicle information 10 - Initiate Diagnostic Information 11 - Read Failure Record Data 1A - Read Data By Identifier 20 - Recurr To Normal Mode 23 - Read Memory By Address 27 - Security Access 28 - Disable Normal Communication 20 - Dynamically Define Message 34 - Request Download 36 - Transfer Data 31 - Write Data By Identifier 32 - Reord Memory By Address 27 - Security Access 28 - Disable Normal Communication 29 - Disable Normal Communication 20 - Areard Pata 38 - Write Data By Identifier 32 - Report Programmed State A5 - Programming Mode	Size of Memor Memor	Memory Address y Address (Hex) y Size (Dec) nd Tester Present	2 0	0	0

- 2. Select the appropriate **Channel** for the diagnostic frame you wish to reference.
- Setup up the *Tester Present* by entering the ID and Interval. (The *Time Interval* may have also been specified under *Configurations* > *Global Options*.) If Send Tester Present is checked (;) in the Service Configuration area, the Tester Present message will be sent with the specified ID at the given interval.
- 4. To set up the *Functional* or *Physical* identifier used, you can do one of two things use the drop down arrow for those IDs previously entered (see section 3.3.8) or **right-click** on the mouse while on the field to enter new values. Please note that 01 through 09 are ODBII services and therefore only Physical addressing is allowed. The *UUDT Response ID* and *USDT Response ID* are pre-determined by GMLAN and do not need to be configured.

243 - DefaultID	•	Advanced
101 - DefaultID 543	 Add Frame Edit Frame	A <u>d</u> vanced
643	Ţ	-

5. If Extended Address is used, click the box to enable. You can select only those Identifiers that were previously setup. Please see section 3.3.8 for details on how to do this.

6. Now by clicking on each individual service in the List of Services, the Service Configuration area will change. For detailed information about specific services, please consult the GMLAN ENHANCE DIAGNOTICS TEST MODE SPECIFICATION – GMW3110 or the ISO 15765 specification.

9.1.1.1 GMLAN Implementations for Select Services

Timeouts, for both physically and functionally addressed services, have been implemented for the following diagnostic services:

- 1A (Read Data By Identifier)
- 3B (Write Data By Identifier)
- A9 (Read Diagnostics Information)

The Diagnostics view will stop updating responses for these services on time out and display the message "Diagnostic Service Timeout" in the Diagnostic View window.

The initial time out value is set to 10000 milliseconds (10 seconds) and is user configurable. This value is located in the 'DGHERCULES.INI' file (located in the Windows or WINNT folder) on your computer. Users can modify this value by modifying the parameter "TimeOutValue" under the section [DIAGNOSTICS] in the "DGHercules.ini" file.

For further diagnostics configuration in the '.INI' file, contact DG Technical Support.

9.1.1.2 New GMLAN Service Implementations

The following GMLAN services have been implemented as described in GMLAN Enhanced

Diagnostic Test Mode Specification GMW 3110 (version 1.5):

ReadDataByParameterIdentifier (\$22) service

The purpose of the ReadDataByParameterIdentifier service is to allow a tester access to ECU data by requesting one or multiple Parameter Identifier(s) (PID). This service is to be used during the development of a device and for special test conditions. It is not intended to be used in lieu of service \$AA for manufacturing and/or field service diagnostics.

The PID interpretation is ONLY applicable for OBD PID ranges. The enhanced PID interpretation will not decode in the ASCII window.

DefinePIDByAddress (\$2D) service

The purpose of the \$2D DefinePIDbyAddress service is to provide the ability to map ECU variables to a dynamic Parameter Identifier (PID) using ECU memory addresses. The resulting PID defined by this service can then be requested via diagnostic service \$22 or diagnostic service \$AA.

This service (\$2D) supports defining a single PID per request (multiple PIDs can be defined in a given ECU, using multiple requests).

This service is intended for use during the development cycle of a device in order to allow access to data that may not be available via another diagnostic service. This service is only intended for use in engineering development. It will not be used in field service applications.

GMLAN diagnostics ID ranges

The following GMLAN diagnostic ID ranges are supported.

\$241 – \$25F – USDT Request \$541 – \$55F – UUDT Response \$641 – \$65F – USDT Response

Recommended BTR settings for Hercules and S-CAT

BTR0	BTR1
\$80	\$2B
\$4F	\$1B
\$47	\$18
	BTR0 \$80 \$4F \$47

9.1.2 Setting up an ISO Diagnostic Configuration

To set up a new diagnostics configuration for ISO15765, perform the following steps.

1. Select the **Diagnostics** menu, followed by the **Setup Diagnostic Configuration** command to display the following dialog. (Assumes **ISO Diagnostics** is selected in **Global Options**).

R Setup Diagnostic Configuration : 01 - Request curre	ent powertrain diagnostic data 🛛 🔀
Address Type / Addressing Channel CH#A Protocol CAN - EXT Extended Address Tuse Ext. Add.	Physical18DAFDF1 · PHYSICALAdvancedFunctional1B1117FF · PUNCTIONALAdvancedUUDT Resp ID18DAFDF2 · UUDT_RESPAdvancedUSDT Resp ID18DAF1FD · USDT_RESPAdvanced
List of Services 01 - Request current powertrain diagnostic data 02 - Request powertrain freeze frame data 03 - Request powertrain freeze frame data 03 - Request emission-related diagnostic trouble codes 04 - Clear/reset emission-related diagnostic trouble codes 05 - Request emission-related diagnostic trouble codes detected 08 - Request control of on-board system, test or component 09 - Request vehicle information 10 - DiagnosticSessionControl 11 - ECUReset 14 - ClearDiagnosticInformation 19 - ReadD TCInformation 19 - ReadD TCInformation 21 - ReadD TCInformation 22 - ReadD ataByldentifier 23 - ReadMemoryByAddress 24 - ReadScalingD ataByldentifier 27 - SecurityAccess 28 - CommunicationControl 24 - ReadD ataByPeriodicIdentifier 27 - DynamicallyDefineD ataIdentifier 28 - WriteD ataByldentifier 29 - InputDutputControlByldentifier 29 - ReadD ataByldentifier 29 - ReadD ataByldentifier	▲ Launch Selected Request ③ Step1 : <u>R</u> ead Supported PIDs ③ Step2 : Read PID Value Supported PIDs PID Value Supported PIDs supported (\$01 ▲ 20 · PIDs supported (\$01 ▲ 20 · PIDs supported (\$1 ▲ 20 · PIDs supported (\$2 ↓ 3 ▲ 20 · PIDs supported (\$2 ↓ 4 ⊕ PIDs supported (\$6 80 · PIDs supported (\$6 80 · PIDs supported (\$6 80 · PIDs supported (\$8 ↓ 4 ⊕ PIDs supported (\$2 ↓

General Diagnostic Configuration Screen

- 2. Select the appropriate **Channel** and **Protocol** for the diagnostic frame that you wish to reference.
- Setup up the *Tester Present* by entering the ID and Interval. (The Time Interval may have also been specified under *Configurations* > *Global Options*.) If **Send Tester Present** is checked in the Service Configuration area, the Tester Present message will be sent with the specified ID at the given interval.
- 4. To set up the *Functional* or *Physical* identifier used, you can do one of two things use the drop down arrow for those IDs previously entered (see section 3.3.8) or right mouse click while in the field to enter new values. Please note that 01 through 09 are ODBII services and therefore only Physical addressing is allowed. The

therefore only Physical addressing is allowed. The UUDT Response ID and USDT Response ID are configured in the same manner.

4-0		_	Add Era	Adva me	ĥ
A - Diag_In_IN	IST		Edit Fra	ime	

- 5. If Extended Address is used, click the box to enable. You can select only those Identifiers that were previously setup. See section 3.3.8 for details on how to do this.
- 6. Click **Advanced** to display the *Advanced Configuration* dialog. Either of two dialogs may appear a 29-bit CAN dialog or a *J1850* dialog.

Advanced Configuration 29 Bit 🗙	Advanced Configuration J1850 🗙
Computed ID Diagnostic Type 18DAF1FD C Legislated C Enhanced	Computed ID Diagnostic Type 616AF1 © Legislated © Enhanced
ID Settings Priority 6	ID Settings Priority 3
Destination Address F1	Destination Address 6A
Source Address FD	Source Address F1

 Now by clicking on each individual service in the List of Services, the Service Configuration area will change. For detailed information about specific services, please consult the ISO 15765 or ISO 14229 specifications.

9.1.3 Setting up J1979 Diagnostics

To set up a new configuration for J1979 diagnostics, perform the following steps.

1. Select the **Diagnostics** menu, followed by the **Setup Diagnostic Configuration** command to display the following dialog. (Assumes *ISO Diagnostics* is selected in *Global Options*).

Setup Diagnostic Configuration - [DB = None] : 01	- Request current powertrain diagnostic data 🛛 🗶
Address Type / Addressing Channel CHHC Protocol J1850 - 3H (PWM) Extended Address U List to 5 continue U U List to 5 continue U U U U U U U U U U U U U	hysical 7EA Advanced unctional 616AF1 · Default ID Advanced UDT Resp ID SDT Resp ID SDT Resp ID
11 - Request current powertrain diagnostic data 21 - Request current powertrain freeze frame data 23 - Request powertrain freeze frame data 43 - Clear/reset emission-related diagnostic trouble codes 44 - Clear/reset emission-related diagnostic information 55 - Request on-board monitoring test results for specific monitored s 07 - Request on-board monitoring test results for specific monitored s 07 - Request control of on-board system, test or component 09 - Request vehicle information	Launch Selected Request Step1 : Read Supported PIDs Step2 : Read PID Values Supported PIDs PID Value Supported PIDs 00-PIDs supported (\$01 20 - PIDs supported (\$21 40 - PIDs supported (\$24 60 - PIDs supported (\$38 80 - PIDs supported (\$38 A0 - PIDs supported (\$48 A0 - PID s su
	ОК

2. Select the appropriate Channel and Protocol for the diagnostic frame that you wish to

reference.

- 3. To select the **Functional** identifier use the drop down arrow for those lds previously entered (see section 3.3.8).
- 4. Now by clicking on each individual service in the *List of Services*, the Service Configuration area will change. For detailed information about specific services, consult the SAE J1979 specification.

9.2 Launch Diagnostic Services

To setup or load a configuration, you must be in the ONLINE mode. To send diagnostic requests, select the **Diagnostic** menu, followed by the **Launch Diagnostic Services** command to display the following window.

Η.	ID	Name	Phy	Fun	▲
1	01	RequestCurrentPowertrainDiagnostic	Х		
2	02	RequestPowertrainFreezeFrameData	X		
3	03	RequestEmission-RelatedDiagnosticT	X		
A	04	ClearDiagnosticInformation	X		
6	06	RequestOn-boardMonitoringTestResu	X		
7	07	RequestEmission-RelatedDiagnosticT	X		
8	08	RequestControlOfOn-boardSystem,Te	X		
9	09	RequestVehicleInformation	X		
В	10	InitiateDiagnosticOperation	X		
С	12	ReadFailureRecordData	X		
D	1A	ReadDataByIdentifier	X		
E	20	ReturnToNormalMode	X		
F	23	ReadMemoryByAddress	X		
G	27	SecurityAccess	X		
Н	28	DisableNormalCommunication	X		
I	2C	DynamicallyDefineMessage	X		
J	34	RequestDownload	X		
K	36	TransferData	X		
L	ЗB	WriteDataByIdentifier	X		
R	Δ2	ReportProgrammedState	×		
				Launch	Service

This window lists all available services that can be sent on the bus for transmission. Frames can be transmitted *physically* or *functionally*, by clicking the desired field next to the service. If sent physically, the transmission will be addressed to one node (one receiver). If sent functionally, the transmission will send the same message to all nodes present on the network.

To send the service, **select** the service and either **click** Launch Service, or **doubleclick** the

message, or **press** the *hotkey* listed in the left most column.

9.3 Utilizing diagnostic services

The results of the diagnostic services can be seen (and saved) in the *Diagnostic View* or DPIDs can be viewed in the *Signal Monitor*.

To start an online session, click **Start** in the toolbar. Select the **Diagnostics** menu. The service(s) you configured should be enabled on this menu. Click on the *name* of the service you wish to activate.

Select the **Display** menu, followed by the **Diagnostic View** command. This view displays the packets exchanged during online execution of the selected diagnostic service.

To save all the service sent with their responses in a simple text file, click **SAVE** and enter your desired file name.

A Special Note Regarding Errors: In a multi-frame response, if the ECU request is delayed 200 ms or more, the hardware will generate a USDT: TIMEOUT ERROR. If the ECU sends a response in improper sequence, the hardware generates a USDT: SEQUENCE ERROR.

9.4 Simple Diagnostic Tutorial

Hercules diagnostics is comprised of services. These services are request messages sent by tools for responses from devices. Basically, the tools make requests and ECUs send responses. Sometimes these requests are generically sent on the bus with "technically" no destination, but some device is programmed to respond. These are called a *functionally addressed message*. Other requests are sent on the bus to a specific ECU (or address). These are *physically addressed messages*. The result is requests/responses that are formatted as either functionally or physically addressed messages.

There are two types of diagnostics – *Legislated* and *Enhanced*. The Legislated diagnostics are those services which are specified by governments and must be present. Enhanced diagnostics are not required and are used mainly for repair or service functions. Typically, Legislated services are functionally addressed, while Enhanced are physically addressed. However, there may be exceptions.

For some services, it is required that the ECUs remain in the diagnostic mode. This is done by sending a **Tester Present** message on the network at a given time interval. The ECU looks for that message to be present in order to remain in the diagnostic mode The ECU will timeout (revert to normal mode) if the message is not present on the bus.

For Diagnostics on CAN (ISO 15765), there is a way to break up large chunks of data into CAN size frames. This process is called *Unacknowledged Segmented Data Transfer* (USDT). After the message is split up, the last frame may not fill up the entire eight bytes. So padding is required – that means to fill all unused bytes. This padding could be all 00's, all FF's, or random values. This is very important, because ECU designers will program those devices to only consume 8 byte messages and ignore shorter messages. So even if the data is valid, that ECU might ignore it simply because of the data length.

9.4.1 Hercules Support

Hercules currently contains support for:

CAN

- SO 15765 with ISO 14229 services
- GMLAN 3110 with ODBII legislated services

J1850

• J1979 Services

Under the Configuration *Global Options*, Hercules supports:

- Enabling Tester Present message for all services
- Setting the Tester Present message time interval
- Global Padding: None, All 00s, All FFs

Global Options	×
Enable Filtering	Diagnostics Type • GMLAN <u>D</u> iagnostics ISO Diagnostics
 Enable Programming Block Enable Frame Responder Error Reporting GM Version Enable Warning Message 	Tester Present Global Padding Enable Iester Present None Time Interval 3000 ms
Statistics Update Interval (Sec) 1 Default path for configuration file C:\Program Files\Hercules	
Database	
Channel Database	Data Interpretation Format
CH#A None CH#B None	
CH#C None	
CH#D None	
CH#E None CH#F None	
	<u>C</u> onfigure Frame Color OK

Hercules supports decoding P-codes, C-codes, PIDs, etc. from the appropriate diagnostic services. (All of this information is held in a Windows INI file, so it is quickly editable if needed.)

Setup Diagnostic Configuration - [DB = None] : 01 Address Type / Addressing Channel Dratic Dratic	Request current powertrain diagnostic data ysical 7EA Advanced Advanced JDT Resp ID SDT Resp ID Y
Or I - Request current powertrain diagnostic data O2 - Request powertrain freeze frame data O3 - Request powertrain freeze frame data O3 - Request emission-related diagnostic trouble codes O4 - Clear/reset emission-related diagnostic for specific monitored s O7 - Request emission-related diagnostic for specific monitored s O7 - Request emission-related diagnostic trouble codes detected dur O8 - Request control of on-board system, test or component O9 - Request vehicle information	Launch Selected Request Supported PIDs PID Value Supported PIDs PID Value Supported PIDs OO-PIDs supported (\$01 - \$; 40 - PIDs supported (\$4 C0 - PIDs supported (\$4
•	ОК

The Display for the Diagnostics services is the *Diagnostic View*. Requests will be listed along with their matched response. Errors are also displayed. This information can be saved in a text file.

📰 Diagno	stic View		-	
Service Na	ime :		Service Number :	
Request Ti	me Stamp	:	Response Time Stamp :	
Channels :				
	ld	Data	Description / Errors	
Request				_
nesponse				- 11
				F
Raw Data		HEX	ASCII	_
	I			
	Ne	st <u>P</u> revious	<u>D</u> isplay	
	-			

10. View Menu

DGH	DG Hercules - Configuration = test1.her										
<u>F</u> ile	<u>D</u> isplay	<u>Configuration</u>	FilterMode	<u>M</u> onitoring	<u>P</u> layback	Diagnostics	Data <u>b</u> ase	View Language	<u>H</u> elp		
Sta	art Stop	Scroll Grids	👳 🗛 Frame Signa	🕣 Il Info I	💎 F, Filter Enable	🔂 🗳 Save Load	Pi Bak - I	✓ <u>T</u> oolbar ✓ Status Bar	Fr Res Enable	U, P, Enable Enable	🢡 Help

The View menu lets you select the following screen options: *toolbar* and/or the *status bar*. A check mark appears beside the selected option. If one or more monitors have been selected, a *Window* menu will also appear next to the *View* menu (which toggles from *Language Menu*), and you can select either a **Cascade** or **Tile** view, as shown below.

DG Hercules - S	ignal Monitor - Configuration	= test1.her				
<u>File Display Si</u>	gnal Monitor <u>C</u> onfiguration Filte	rMode <u>M</u> onitoring <u>P</u> layb	ack Diagnostics Da	ta <u>b</u> ase ⊻iew <u>W</u> indow <u>H</u> elp		
Start Stop S	croll Grids Frame Signal Info	🐨 🗗 🛍 🕅 Filter Enable Save Lo	🖌 🌗 😚 🏓 ad PlBak Diag Com	m Clear FrRes Enable Enable En	P ? Bie Help	
📴 Scrolling M	onitor - Configuration = test1	.her				
InPlace	Frame Monitor - Configuration	on = test1.her			_ 🗆 🗵	
📕 🔳 🕎 Sigi	nal Monitor - Configuration =	test1.her				I
Signal		Channel	Protocol	Data	Livi	

"Cascade" View of Monitors

DG Hercules	s - Sig	nal Mon	itor - Co	onfigur	ation =	test1.	her	DL	L L D'	e.	D.1.1		5.7 I	11									_ 0
File Display	, <u>S</u> ign	al Monito		guration Ay	FijterM		E i	Pia 1	ayback Diagn		Data <u>b</u> as	:e <u>v</u> iew € <mark>₹</mark>	<u>w</u> inac	<u>ж н</u> е Л [eip D) [7	?						
Start Stop	Sore	oll Grids	Frame	Signal	Inéo	Filter I	Snable Sa	ave	Load PlBak	Diag	Comm C	lear Fr R	es Enal	ble En	able En	ble B	ehp						 1-1
Signal I	Monita	or - Conf	iguratio	n = tes	st1.her			1.0		_		D			1								
Signal					10	nannei		Pro	DIOCOI	_		Data			LIVI			 					
								_															
								-															
👺 InPlace	e Fram	e Monite	or - Con	figurat	tion = te	est1.h	er													ž.			_ []]
TimeStamp	o (µs)	Chan	Frame.	Hea	ader Deta	ails	Frame Acr	0	Protocol	Data		Livi	Tx/R	x									
				_																			
P Scrollin	a Mor	nitor - Cr	onfigura	tion =	test1.h	er														X			_ [0]
Line.No	Time	eStam	Channe	:I	Frame II) Hea	ader Detail	ls F	Frame Acronym	Pro	tocol	Data	[Bx/Tx	(ŀ
								-															
						-		-															
							_																ŀ
J Taul Cama	in atta	_			_		_	_			_				D.C.				0.84				
rest Lommun	ication				_	1.								_	JOMine))	10 %		10	ne	

"Tile" View of Monitors

11. Language Menu

DG H	ercules	- Configurat	ion = Tft.I	er												_ 🗆 ×
<u>F</u> ile	<u>D</u> isplay	<u>Configuration</u>	FilterMode	: <u>M</u> onitorir	ng <u>P</u> laj	yback	Diagn	ostics	Data <u>b</u> ase	e <u>V</u> ie	w <u>W</u> i	ndow	Language	<u>H</u> elp		
ID Star	stop	Scroll Grids	🕎 🖊 Frame Sig	al 🕤	💎 Filter	F. Enable	∎ <mark>∎</mark> Save	Load	T Pl Bak	670 Diag	Comm	Clear	✓ English German		U, P nable Enal) 🧖
													Japane	se		

The Language menu lets you select English, German or Japanese as the language for menu

option viewing. It is only accessible when no other windows (e.g., monitors, views, tables, etc.) are opened. If any of these windows are opened, the Language menu will not be visible.

12. HELP Menu

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

	<mark>DG</mark> He	ercules -	Configuratio	n = None						
	File	Display	Configuration	FilterMode	Monitoring Playback	Diagnostics Databa	ase View Window	Language	Help	
I		6		👳 🗛	🐨 🔻 F.	🖧 🗳 🐴	👸 🚧 🖸	25	Help Topics	Γ
r	Star	t Stop	Scroll Grids	Frame Signal	Info Filter Enable	Save Load PIBa	L Diag Comm Clear	Fr Res En	About Hercules	μ

12.1 Help Topics

Select the **Help Topics** option to start the Adobe Acrobat reader and display the Hercules documentation in PDF format.

NOTE: Both the Adobe Acrobat reader and the Hercules documentation PDF files must be available.

Context-sensitive help is also available for most Hercules operations. For example, with focus on an open Transmit Frame Table, pressing **F1** will display the Transmit Frame Table topic.

12.2 About Hercules

Selecting the **About Hercules** option displays a window that identifies the version number of Hercules, the Gryphon firmware version, and lists any database and configuration files currently loaded.

A. Appendix A: Supported Hardware Modules

NOTE: The following hardware modules must be installed to display their corresponding dialog screen.

A.1 CAN 82527 modules

DG-CAN-82527 uses an ISO 11878-2 physical layer, while DG-CAN-82527sw has a single wire

(J2411) physical layer.

The DG-CAN-82527 and DG-CAN-82527sw (single-wire physical layer) modules have the same configuration box. Click **Advanced Configuration** to display the following dialog.

Advanced Configuration	×
CAN Bus Configuration BTRD B BTR1 AA 33.33333333333333 K Bits/se	Base Protocol Pec CAN - EXT Dec J1939 Cancel
Current Settings Output Control Register Error Reporting Level	4A.
Transceiver Selection Termination	Internal 🔽
Turn On Load Resistance	

To change a channel's bus speed, you can provide the proper *BTR0* and *BTR1* values for the rate you desire or click **Advanced** to have Hercules help you select BTR values. (BTR = Bit Timing Register – See CAN Specification for details or Intel's 82527 specification). Click **Advanced** to display the **Bit Timing Search** dialog.

Bi	t Timing 9	Search					×
E	nter CH#A	Bus Rate		500	kbp:	s <u>s</u>	earch
		Tolera	ince	0.1			
	BTRO	BTR1	TSEG1	TSEG2	BRP	SJW	SAM 🔺
	1	32	2	3	1	0	
	1	94	4	1	1	0	
	1	A3	3	2	1	0	
	1	B2	2	3	1	0	
	40	1C	С	1	0	1	
	40	2B	В	2	0	1	
	40	3A	A	3	0	1	
	1	40	0		0	1	
		OK				Cancel	

Type the desired bus speed in the *Enter CH#X Bus Rate* box, along with the *Tolerance*, then click **Search**. Then scroll down and select the desired speed. Click **OK** to return to the **Advanced**

Configuration dialog. The new bus speed will appear in the *K Bits/Sec* box (below the *BTR* box).

- The Base section lets you view the values in hexadecimal (HEX) or decimal (DEC).
- The *Protocol* section lets you decide how to interpret 29-bit CAN messages defined in the database. If you select *J1939*, then all 29-bit message IDs will be decoded as per the SAE standard. If *CAN-EXT* is selected, then message ID will be decoded only if the GMLAN option is selected under **Global Options** (see section 4.10).
- The Current The Settings section is specific to the physical interface. Output Control Register is the value to put in the 82527 bus configuration register. This value should not be changed, unless you are using an external transceiver or have a clear understanding of the interface. The Error Reporting Level section is currently not configurable. The Transceiver Selection lets you choose between using the Internal (onboard) transceiver or an External transceiver. Consult the hardware manual for details on this application. *Termination* lets you choose between internal and external termination resistor. The Turn On Load Resistance check box is only available when the Single Wire CAN channel is selected.

NOTE: Selection of CAN or SW CAN is achieved by enabling the channel (see section 3.2, *Initializing the hardware*).

A.2 CAN SJA1000 modules

The DG-CAN-SJA1000 (ISO 11892-2 physical layer), GM Single Wire CAN (SAE J2411) and the DG-CAN-SJA1000FT (fault tolerant physical layer) modules have the same configuration box. Click **Advanced Configuration** to display the Advanced Configuration dialog.

Advanced Configuration
CAN Bus Configuration
Base Protocol
BTRO 👭 BTR1 3A 💽 Hex O CAN-EXT
C Dec ● J1939
500 K Bits/sec
Advanced OK Cancel
Current Settings
Output Control Register DA
Error Reporting Level 0
Transceiver Selection
Termination External 💌
SJA1000 Configuration
Mode
Normal O Listen Only
C Self - Test C No Retry for Transmit

To change a channel's bus speed, you can manually enter the proper *BTR0* and *BTR1* values for the rate you desire or click **Advanced** to have Hercules help select BTR values. Click **Advanced** to display the following dialog.

Bi	t Timing S	Search					X
E	nter CH#A	Bus Rate		500	kbp:	s <u>s</u>	earch
		Tolera	ince	0.1	_		
	BTRO	BTR1	TSEG1	TSEG2	BRP	SJW	SAM 🔺
	1	32	2	3	1	0	
	1	94	4	1	1	0	
	1	A3	3	2	1	0	
	1	B2	2	3	1	0	
	40	1C	С	1	0	1	
	40	2B	В	2	0	1	
	40	34	A	3	0	1	_
	1	40			0	- 1	
		OK				Cancel	

Type the desired bus speed in the *Enter CH#X Bus Rate* box, along with the *Tolerance*, and then click **Search**. Then scroll down and select the desired speed. Click **OK** to return to the **Advanced Configuration** dialog. The new bus speed will appear in the *K Bits/Sec* box (below the *BTR* boxes).

dvanced Configuration	2
CAN Bus Configuration	
	Base Protocol
BTRO 💶 BTR1 3A	🖲 Hex ု 🔿 CAN - EXT
	C Dec 📀 J1939
500 K Bits/s	ec
Advanced 04	Cancel
Current Settings	
Output Control Register	DA
Error Reporting Level	0
Transceiver Selection	Internal 💌
Termination	External
- SJA1000 Configuration	
Mode	
Normal O	Listen Only
O Self - Test O	No Retry for Transmit

- The Base section lets you view the values in Hex (hexadecimal) or Dec (decimal).
- The *Protocol* section lets you decide how to interpret 29-bit CAN messages defined in the database. If you select *J1939*, then all 29-bit message IDs will be decoded as per that SAE standard. If *CAN-EXT* is selected, then message ID will be decoded only if the GMLAN option is selected under **Global Options** (see section 4.10).
- The *Current Settings* section is specific to the physical interface.
- The *Output Control Register* is the value to put in the Phillips SJA1000 output control register. This value should not be changed unless you are using an external transceiver or clearly understand the interface.
- *Error Report Level* will let you select what level you want to see errors displayed in the Hercules **Information View**. The *Error Reporting Level* is configurable. One data byte is used and the values may be logical Ored. The following error reporting values are supported:
 - 0 No error reporting
 - 1 Report bus warning and bus error (all other error types)
 - 2 Report data overrun
 - 4 Report arbitration lost
- *Transceiver Selection* list box lets you choose between using the *Internal* (on-board) transceiver or an *External* transceiver. Consult the hardware manual for details on this application.
- The SJA1000 module has an on-board termination of 120 ohms. This is selectable on / off via the *Termination* option.

• The SJA1000 Configuration lets you select one of four modes:

Normal – the regular configuration.

 ${\it Self-Test}$ – the channel sends an ACK after each messages it transmits on the CAN

bus. This allows the channel to be the only device on a CAN network.

Listen Only – no data is transmitted and now ACKs are sent in response to received messages. All other data on the bus is received as normal.

No Retry for Transmit – all subsequent message transmissions are attempted only once. If arbitration is lost or if a bus error occurs, the message is not transmitted.

A.3 HBCC (Ford SCP) module

The DG-HBCC module is a single channel SAE J1850 PWM interface that supports the Ford SCP network. Hercules supports configuring the module to send Physical, Functional and Functional Read IFRs. Click **Advanced Configuration** to display the following dialog.

Advanced Configura	ation 🔀
Bus Rate	Channel Mode
O 10.4 (Kbps)	O Monitor
 20.8 (Kbps) 41.6 (Kbps) 	Node
© 83.2 (Kbps)	Node Id F0
- Functional ID	- Functional Read
Add ID 3C	ID 1A Add
Delete 1B 3C	Data 10 Delete
	ld Data
	1A 10
	OK Cancel

- The *Bus Rate* section can be configured to 10.4, 20.8, 41.6, or 83.2 Kbps. The default is 41.6 Kbps.
- The *Channel Mode* section lets you select Monitor (no IFRs will be sent), or *Node*. If *Node* is selected, the *Node Id* field will contain the Source ID Hercules is using. The module will automatically send IFRs to physically addressed messages to the displayed ID.

• If *Node* is selected, the *Functional ID* and *Functional Read* sections become available. To set up *Functional IDs*, simply type the ID in the first box, click **Add ID**, and the value will appear in the box. For *Functional Read*, type the *ID* and *Data* in the fields, and then click **Add**. The values will appear in the box.

A.4 DLC (GM Class 2 / J1850 VPW) module

The DG-DLC module is an SAE J1850 VPW interface that supports GM's Class 2 and SAE J1979 VPW. Hercules supports the *Bus Rate* of 10.4 or 41.6 Kbps. The standard rate is 10.4 Kbps. The Protocol can be configured to be viewed as one-byte (*1H*) or three-byte (*3H*) headers.

Advanced Configuration to display the following dialog.

Advanced Configuration					
Bus Rate • 10.4 (Kbps) • 41.6 (Kbps)	Protocol ○ J1850 - 1H (VPWM) ④ J1850 - 3H (VPWM)				
-	OK Cancel				

A.5 DCX (J1850 VPW) module

The Dearborn Group DCX module is an SAE J1850 VPW interface that supports DaimlerChrysler and GM J1850 networks. The Hercules software supports configuring the module to send IFRs to pre-configured messages. Click **Advanced Configuration** to display the following dialog.

Advanced Configuration								
Bus Rate © 10.4 (Kbps) © 41.6 (Kbps)	Protocol IFR ● J1850 - 1H / VPWM (IFR ● J1850 - 3H (VPWM) Image: Configure IFR							
- IFR Configuration								
IFR Filter Data 3 💌	24 80 22							
IFR Filter Mask 3 💌								
IFR Data 1 💌								
Message Length 3 💌	Normalization Bit 🔽							
	OK Cancel							

- The Bus Rate can be configured for 10.4 or 41.6 Kbps. The default speed is 10.4 Kbps.
- The messages can be displayed as one-byte (1H) or three-byte (3H) headers in the monitors.
- If you select the **Configure IFR** check box, the *IFR Configuration* options will become available. *IFR Filter Data* are ANDed with the *IFR Filter Mask* to decide what bits should be set in order to send the IFR Data. *IFR Data* are the number of bytes that the module should wait to receive before sending the *IFR Data*. The *Normalization Bit* must be used. Select the *Normalization Bit* box to enable.

A.6 LIN 1.2 module

The Dearborn Group LIN module is a Local Interconnect Network (LIN) interface. The Hercules software supports auto-configuring or manual selection of the *Bus Rate*. Click **Advanced Configuration** to display the following dialog.

Advanced Configuration		
Channel Mode	-Bus Rate (Kbps)	
C Master	5.21	
C <u>S</u> lave		
	OK Cancel	

A.7 LIN 2.0 module

The Dearborn Group LIN module is a Local Interconnect Network (LIN) interface. The Hercules software supports auto-configuring or manual selection of the *Bus Rate*. Click **Advanced Configuration** to display the following dialog.

Advanced Configuration		X
Channel Mode	Monitoring Mode	1
C <u>M</u> aster		
C <u>S</u> lave	Bus Rate	
	10.42 💌 Kbps	
Select LDF File-		
Emulation —		
Configuration		

