

OBD 2007 - Installation Guide

Installation

The download of *OBD 2007* from www.glmsoftware.com is contained within a zip file. The zip file should be unzipped to any convenient directory – for example c:\downloads\obd2007.

The download contains a setup.exe that will install *OBD 2007* to your hard disk. The default install directory is c:\Program Files\GLM Software\OBD2007, although the default install directory can be changed during the installation if required.

OBD 2007 is written using Microsoft's .NET Framework 2.0 and consequently requires the runtime support of .Net Framework 2.0 to be installed on your computer. During the installation process, if Net Framework 2.0 is not already installed on your computer it will be automatically installed before the *OBD 2007* installation begins. In most cases .Net Framework 2.0 will already be installed if you have used the Windows Update recently. If any other Microsoft prerequisites are required, such as Sql Server Compact Edition, they will also be installed before the *OBD 2007* installation begins. The installation assumes that your computer has an internet connection at the time of installation. If you do receive an error during the installation because your computer is not connected to the internet, cancel the installation and try again later when you do have an internet connection. Of course you may download the redistributable of .Net Framework 2.0 before you begin the installation from the following link if you prefer to install *OBD 2007* while not connected to the internet. <http://www.microsoft.com/downloads/details.aspx?familyid=0856each-4362-4b0d-8edd-aab15c5e04f5&displaylang=en>.

Sql Server Compact Edition runtime can be downloaded from the following link:

<http://www.microsoft.com/downloads/details.aspx?FamilyId=%2085E0C3CE-3FA1-453A-8CE9-AF6CA20946C3&displaylang=en>

The installation will create an entry in Programs from your start menu *OBD 2007*. After installation, the installation folder "x:\Program Files\GLM Software\OBD 2007" will contain a number of files, including the executable *OBD 2007.exe* and the file *obd.sdf*. The *obd.sdf* file is the database file containing the definitions of the diagnostic trouble codes, which your vehicle may produce in conjunction with your scan tool and *OBD 2007* and must be present for the software to display the trouble codes.

Product Activation

When you start *OBD 2007* for the first time, it will immediately display the Product Activation Window. This applies whether you have downloaded *OBD 2007* to demo or you have purchased it. To allow potential users to demo *OBD 2007* it will run for 7 days with the complete feature set enabled – previous demo versions of *OBD 2007* had limited functionality. We feel the newer version will give our potential customers a far better experience of what *OBD 2007* can do if they can use all the features of the product. Therefore *OBD 2007* has to be first activated by our server. When you request a demo copy of *OBD 2007* from our website we will supply you with a link to the download plus an activation key. If you purchase the product we supply a similar link and the activation key, plus an additional registration code.

To activate or register the product you must have an **active internet connection**. To activate *OBD 2007* simply copy/paste the activation key from the GLM Software confirmation email in the textbox labelled *Enter Activation Key*. On pasting or typing a valid activation key the *Activate* button will be enabled. Click the *Activate* button and the activation process will begin with our server. A progress bar will appear to the left of the *Activate* button indicating the progress of the activation process. At the completion of the activation process a message will appear with an indication of success or failure. The only valid reasons for failure would be an invalid activation key or a fault at our server. If for some reason there is a fault with our server, the same activation key can be used at a later time. The activation key only becomes invalid after a successful activation.

It may be necessary to momentarily turn off any firewalls to allow the activation process to access the internet.

The Activation window is shown below

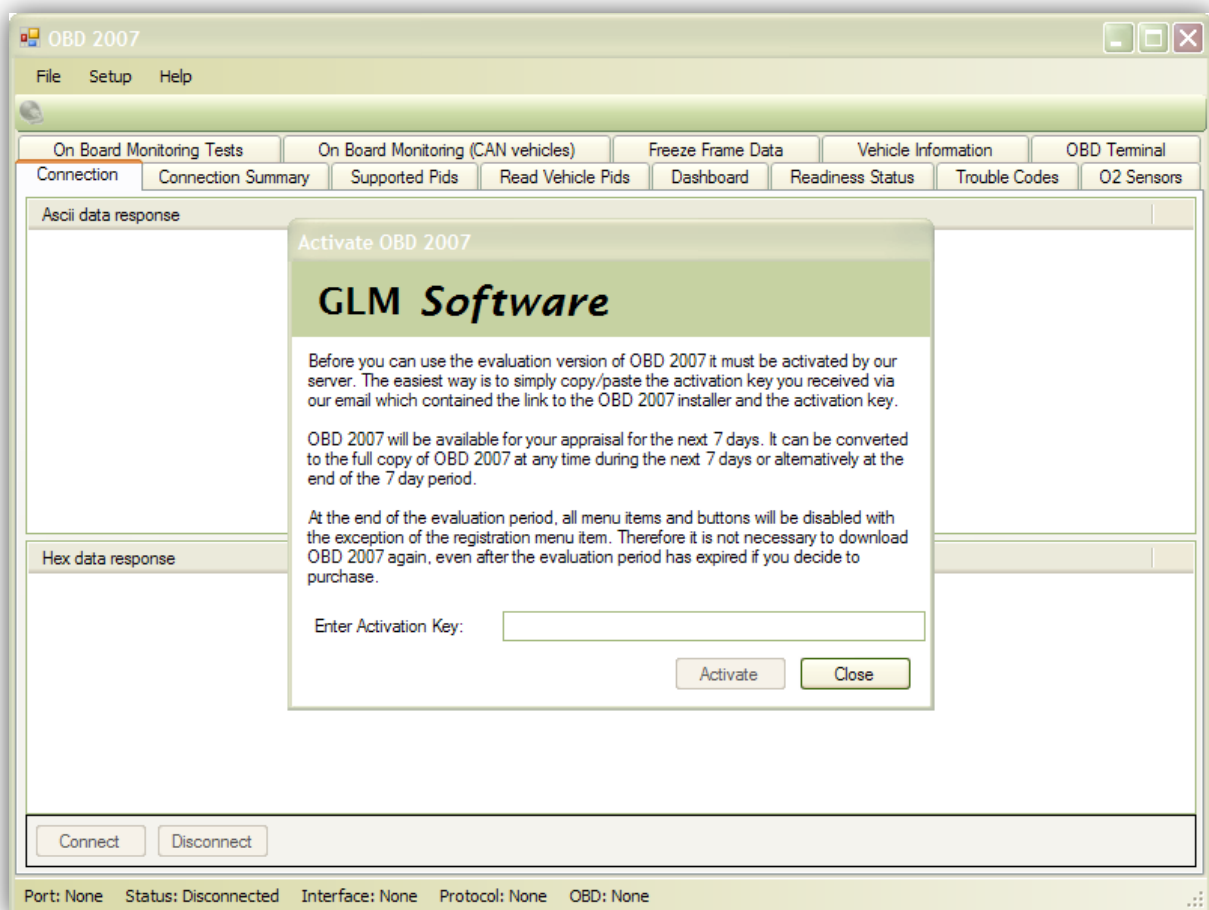


Figure 1 - Activation Window

At the completion of the activation process *OBD 2007* is ready to run and the caption of the screen will display *OBD 2007 - Evaluation mode – 7 days remaining*. Demo users are now free to explore the program for the next 7 days. The caption at the top of the screen will count down each day as a reminder until the evaluation copy expires. *OBD 2007* can be converted to an unrestricted copy at any time during the 7 days or even at the end of the period, by purchasing from our web site and registering the product. There is no need to download any additional copies.

If you are an evaluation user, you can skip the next section regarding Product Registration and proceed directly to our Program Guide.

Product Registration

The registration process is almost identical to the activation process, which you have already performed. However the registration process uses a registration code which is supplied via the GLM Software email you received when you completed your purchase of OBD 2007.

As an owner of the product, you may complete the registration process at any time during the next 7 days or you can even wait until the evaluation period expires. The registration button is not disabled when the evaluation period expires.

Please note that the registration of the product limits the use of the product to the computer that the product is installed on. If you haven't installed the product to the computer you wish to use it on, please ensure that you do install it again to the correct machine before attempting to register the product.

To register *OBD 2007*, the product must be first purchased from our web site www.glmsoftware.com. On receipt of payment a registration code will be sent to the email address you entered during the purchase procedure. To register your product, please use the registration window as shown below.

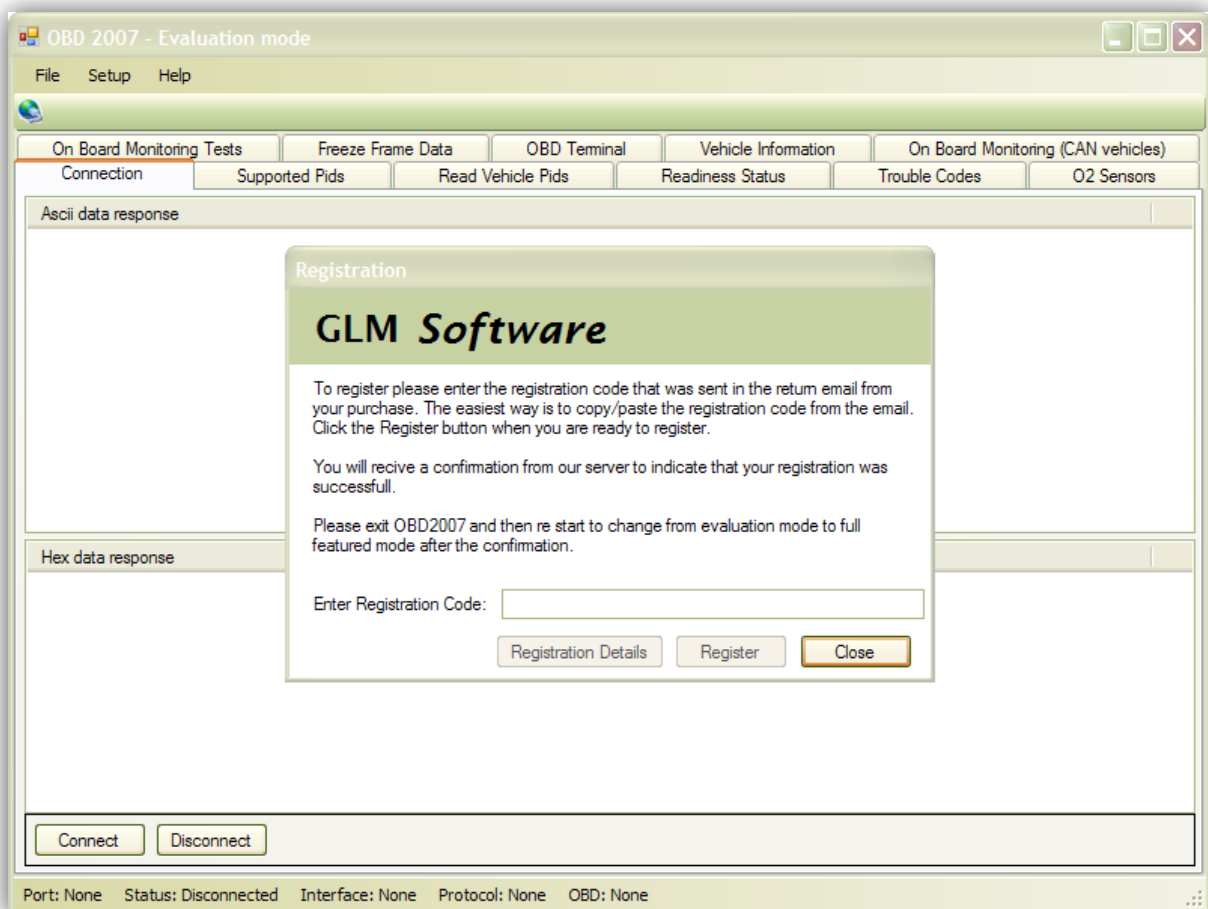


Figure 2 – Registration

Copy and paste the registration code from the GLM Software confirmation email into the textbox labeled *Enter Registration Code*. On pasting a valid registration code the *Register* button will be enabled. Click the *Register* button and the registration process will begin with our server. A progress bar will appear to the left of the *Registration Details* button indicating the progress of the registration process. At the completion of the registration process a message will appear with an indication of success or failure. The only valid reasons for failure would be an invalid registration code or a fault at our server. If for some reason there is a fault with our server, the same registration code can be used at a later time. The registration code only becomes invalid after a successful registration.

It may be necessary to momentarily turn off any firewalls to allow the registration process to access the internet.

OBD 2007 - Program Guide

Introduction

This guide presumes you have already connected your scan tool to your vehicle. For details on how to connect your scan tool to your vehicle please see the scan tool manufacturer's instructions. For trouble shooting your connection please see our guide **Connection Trouble Shooting** at the end of this document.

When you start OBD 2007 the following screen is displayed.

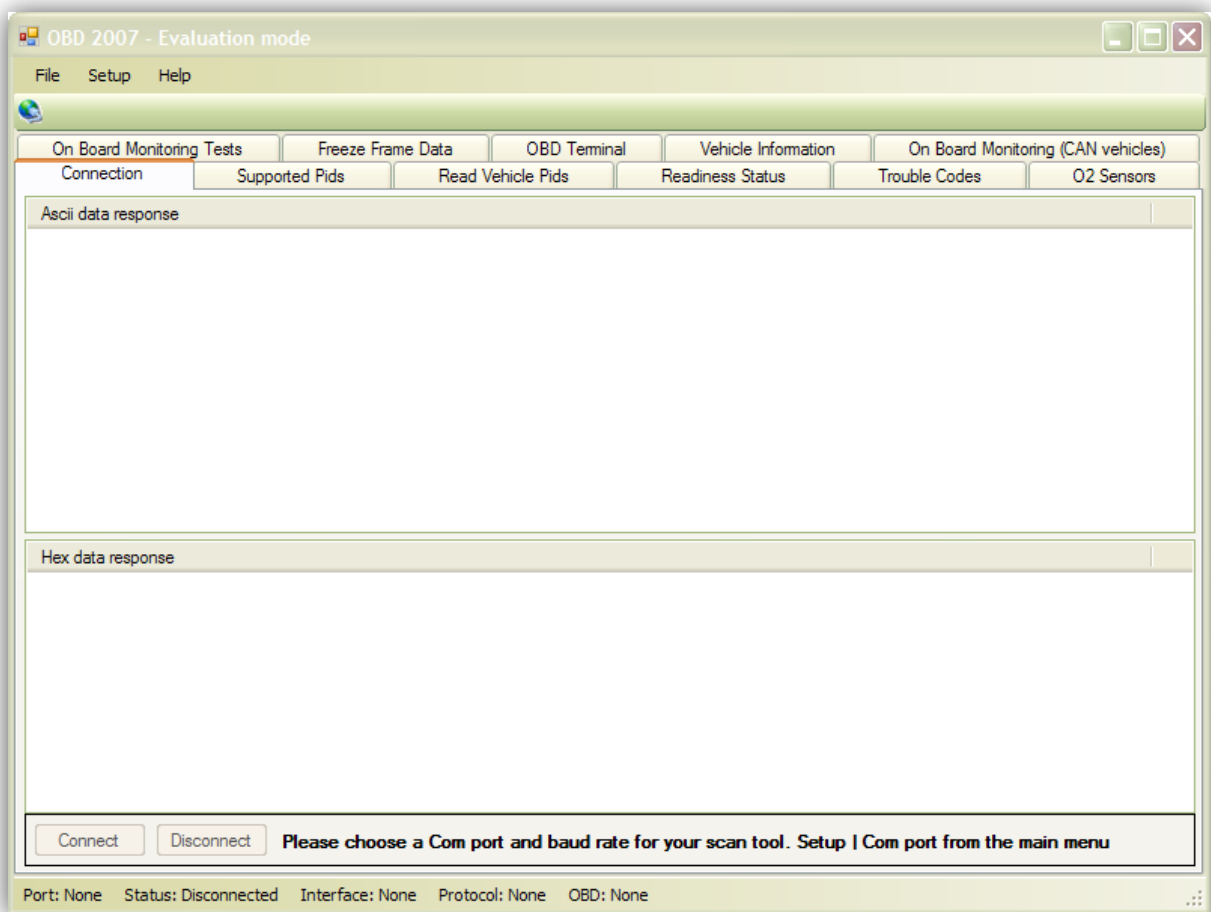


Figure 3 – Vehicle not connected

You will notice that as you move through the various tabs that most buttons are disabled. This is because at this point the program has not yet made a connection with the scan tool. Before you can make a connection you must choose an appropriate Com port for your computer. Most newer laptop computers do not have a Com port, instead they utilize a USB port to make a connection with a cable known as a USB/Serial cable or USB to Serial converter cable. These cables are normally supplied when you purchase your scan tool, but can be purchased separately. The USB/Serial cable comes with a CD containing a driver. The driver must be installed to enable your virtual Com port to work. Please follow the instructions that accompany the CD. Note this can be done without the scan tool being connected, but the USB Serial cable must be connected to the USB port. Once the driver is installed you should be able to view your new serial port as follows.

Control Panel/System which will bring up the dialog System Properties. Choose the Hardware tab and then Device Manager. Your screen should look similar to the one below.

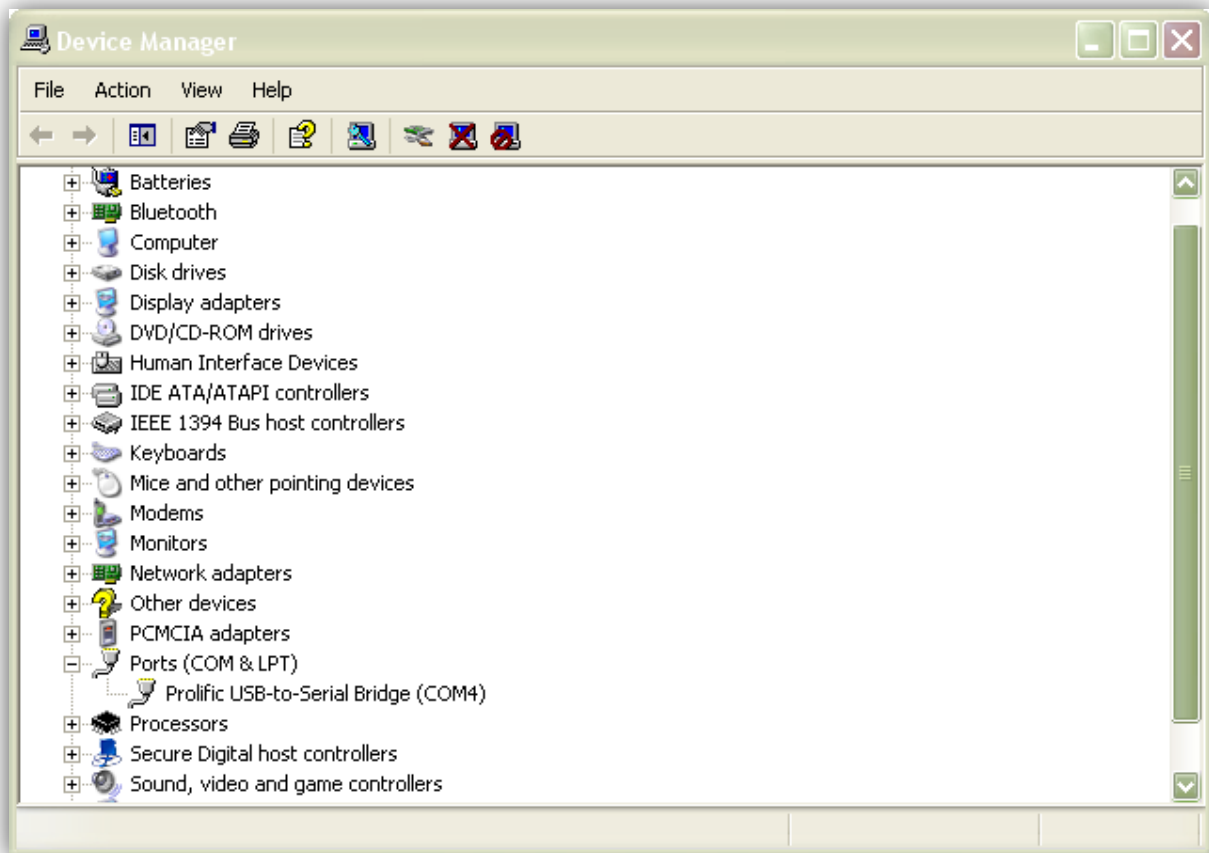


Figure 4 - Device manager ports

Note under Ports (COM & LPT) the new Com port – COM4 in this case. Your screen may not have the identical wording, but the important information is the Port number as in COM4. You need to remember this setting so that you can apply that to *OBD 2007*.

Return to the *OBD 2007* program, and select Setup|Com port from the main menu. The Com port setup window will appear with a similar appearance to the following window. The top combo box will contain one or more serial ports, select the serial port previously selected above. The second combo box contains baud rate settings. The usual setting is 9600 baud. Please note that some manufacturers allow you to change that setting to 38400. For instance to change it to 38400 on the ElmScan5 the unit has to be opened and a jumper added to the middle pin. Please see the manufacturer's instructions for changing baud rates. A baud rate of 9600 is fine for operating *OBD 2007*. The only time we would suggest changing baud rates is if you have trouble connecting to the vehicle. See our guide **Connection Trouble Shooting** at the end of this document. When you close this window the program will remember the settings, so this task shouldn't have to be performed again, unless you change the USB/Serial cable. We are now ready to connect to the vehicle.

Please see Appendix A, and C for alterations to the selection procedure of baud rate to comply with the new higher baud rate features of the Elm327 1.2 chip and OBDPro. Please also see Appendix B for the new section on Auto Discovery of the Com port.

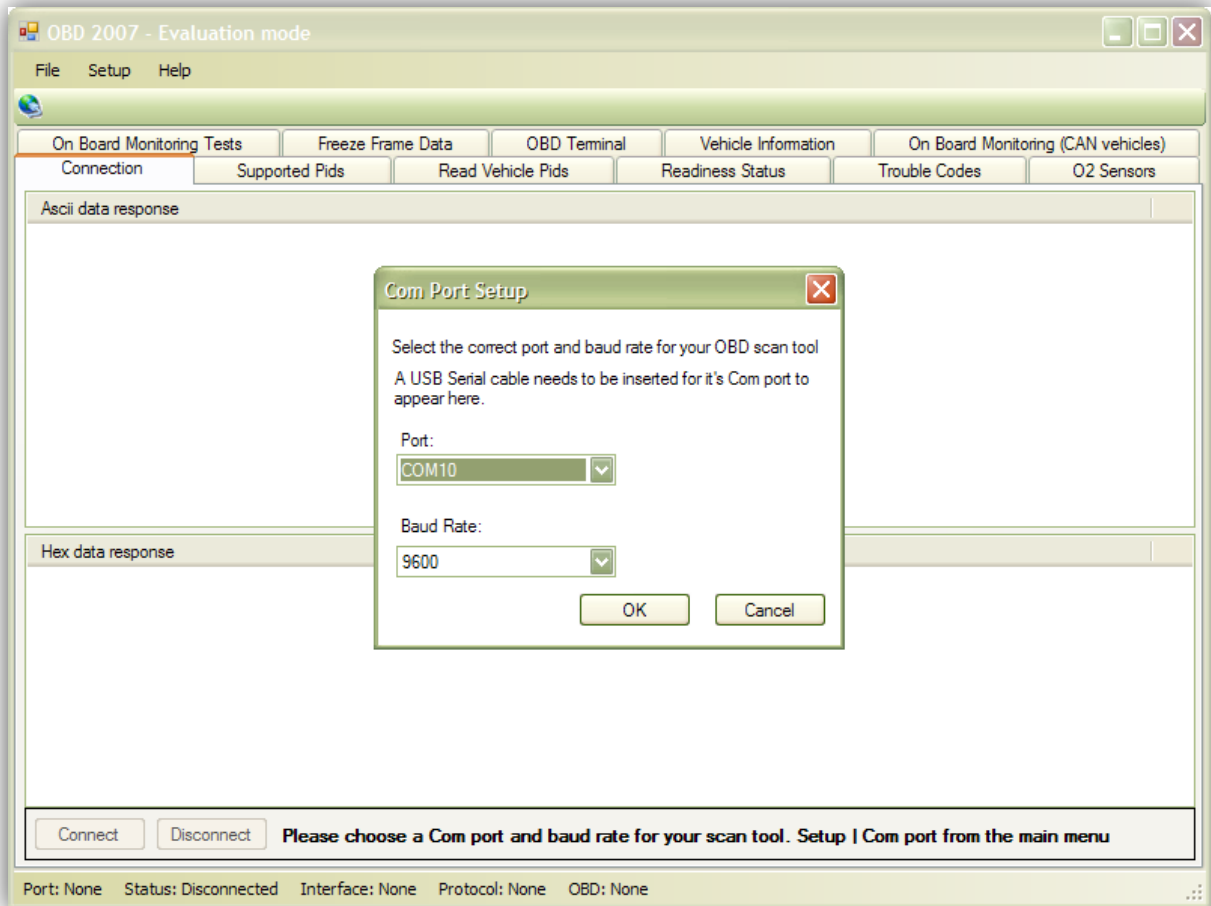


Figure 5 - Com port setup

Tip: If you are using a USB Serial cable and have made your Com port selection, the Com port number is automatically saved. If however at a later stage you happen to open the Com Port Setup window, when your USB Serial cable is not available (you may have disconnected the USB Serial cable and left it connected to the scan tool), the Com port number will still show up in the Port combo box, however it will now read “COM 4 – not available”. The “not available” is a reminder that the setup has previously been performed. The setting will revert to the normal display when you next connect the USB Serial cable.

Connect to Vehicle

When you are sure that the scan tool is properly connected to the OBD plug and your computer. Switch the ignition to the ON position – do not start the engine at this stage.

On the Connection tab click the Connect button and the window should then look similar to the following after a couple of seconds. The information displayed will depend on the protocol of the vehicle.

When you click the Connect button *OBd 2007* goes through an initialization sequence, searching automatically for the correct protocol for the vehicle. When it connects successfully, it also builds a list of information about the particular vehicle. This window is split into two panels, the top panel is known as Ascii data. Most of the information there is in English and describes the various initialization steps. The bottom panel is the raw data with English like prefixes where appropriate. This raw data is hexadecimal data received back from the vehicle. This is very useful information

for those of you who know how to read this data. It is not essential that you understand this data because the program will translate it into meaningful data on the other tabs, but for those of you who are conversant with ISO 15031-5, the hex data can be very useful in understanding the information presented on each tab.

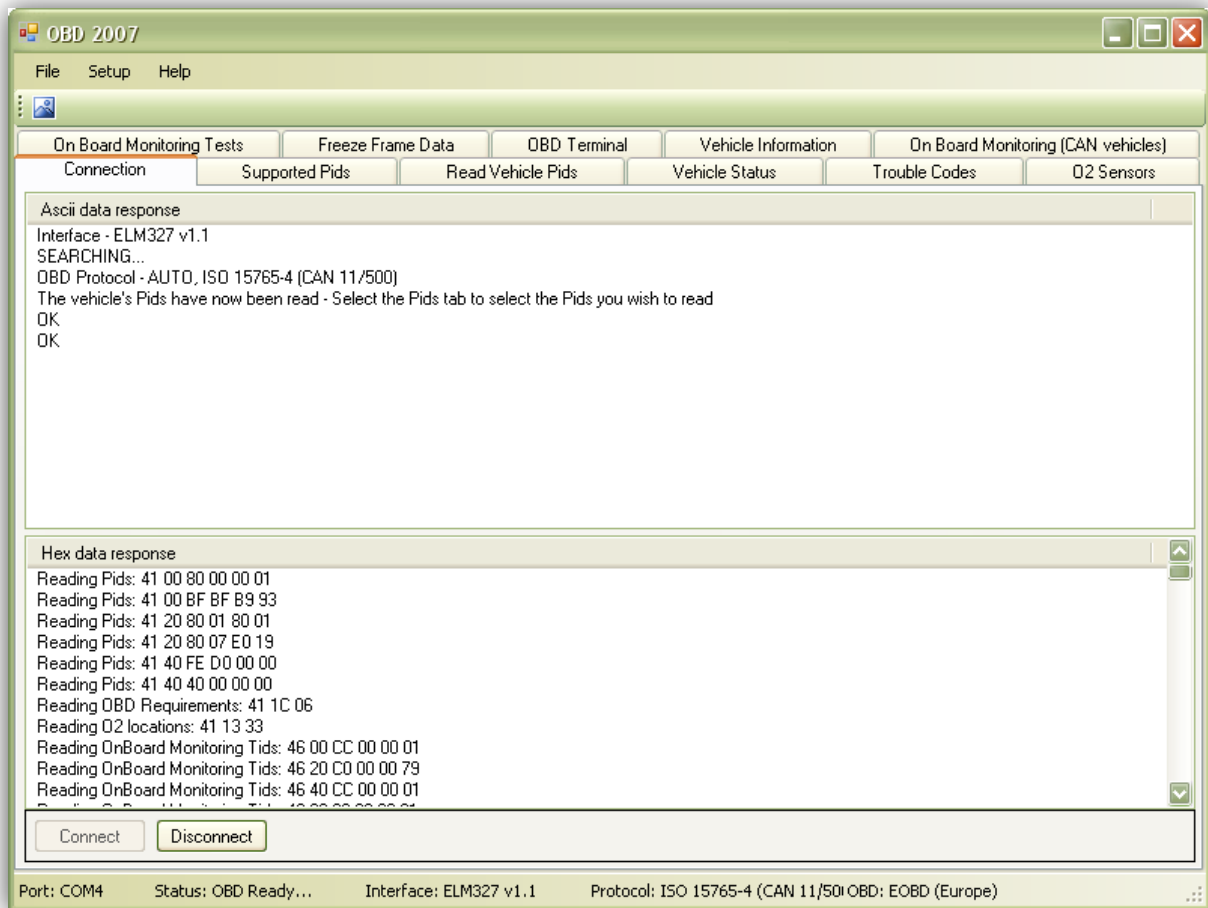


Figure 6 - Initial connection

When the initialization is complete, *OBD 2007* will report back the protocol of the vehicle and its OBD requirements in the status bar at the bottom of the window. Both Protocol and OBD Requirement contain tool tips for when the information is too long for the available space.

During the initialization process *OBD 2007* builds a list of Parameter Identifications (PIDs) for the particular vehicle. The tab "**Supported Pids**" presents a list of PIDs that this vehicle supports. This list is built from a master list of 90 PIDs. These are known as Pids, 0x00 through 0x5A in hexadecimal notation or 0 through 90 in decimal notation. If you would like a further understanding of Parameter Identifications download www.elmelectronics.com/DSheets/ELM327DS.pdf for a complete description.

If you are unable to connect to your vehicle please read our guide **Connection Trouble Shooting**.

Tip: Some older OBD-II complaint vehicles can have connection issues, or even let go of the connection during a session. OBD 2007 has a timeout procedure, which will automatically try to re-establish the connection after approximately 8 seconds. When reading Pids for example on the "Read Vehicles Pids" tab, if you notice the lights are flashing on your scan tool, but no data is being displayed, check that the OBD Rx light is flashing. If it is not, then after approximately 8 seconds OBD

2007 will perform the initialization process again and automatically start displaying data from the Pids without further intervention from you.

A similar circumstance can arise with these older vehicles when you cancel a continuous read by clicking the Cancel Read button. If you then attempt to restart by clicking the Read button, it is possible that the connection has been lost and no data will appear. Again the timeout procedure will be activated and the connection should automatically be obtained again. Another common problem is that some of the older vehicles will require more than one attempt to connect. You may see a message "CANNOT CONNECT", immediately followed by another message "SEARCHING...". Under normal circumstances the connection will succeed on the second attempt. If you have one of these vehicles, you can eliminate the two attempt connections, by removing the OBD-II plug connection and reinserting before clicking the Connect button for each connection session.

OBD 2007 Reset time out value

OBD 2007 Reset timeout value is the number of seconds elapsed before OBD 2007 will automatically reset the Elm327 chip and re attempt to make connection with the vehicle's ECU.

Some older protocols require longer than others to make the initial connection. During the OBD 2007 initialization procedure the Elm scan tool will search all the possible protocols to establish the correct protocol for a particular vehicle. If this setting is set too low, then it is possible that OBD 2007 may re issue its reset procedure before the correct protocol can be established. If this appears to be the case as evidenced by repeated "UNABLE TO CONNECT" messages on the Connection tab try increasing this figure by a couple of seconds until you are able to obtain a connection. The default value is 14 seconds.

Note it is not unusual for an ISO9141-2 vehicle to give one UNABLE TO CONNECT message before completing a successful connection. The rule of thumb here is to watch the lights on your scan tool. If they become inactive, wait the required OBD 2007 Reset timeout period and you should then observe the lights flashing as the initialization sequence is triggered.

This reset timeout value is also used when in continuous read mode if the vehicle's connection to the ECU ever lets go. Some protocols require a wake up message be sent every couple of seconds to keep the connection alive with the ECU if no commands are being sent during idle periods. If the Elm327 automatic wake message fails to keep the connection to the ECU alive, then the OBD 2007 Reset Timeout will automatically be triggered and you will notice that the lights of your scan tool will automatically start flashing again as the connection is re established.

ELM327 time out value

OBD 2007 defaults the time out value of the ELM327 chip to 50 milliseconds. This default value is usually ok for most vehicles. If you do have connection problems and are experiencing NO DATA values as shown as a response to many of the values on the Connection tab, you can attempt to increase the time out value.

After sending a request, the ELM327 waits a preset time before declaring that there was no response from the vehicle i.e. a NO DATA response.

Even if there was a response the ELM327 will still wait this time to be sure that there are no more responses. By setting this time out value we can cause the ELM327 to wait longer or shorter times.

If you appear to be not getting data, increase the time out amount. However a too high value will unnecessarily slow the application for no benefit. Try the default value of 50 milliseconds and gradually increase it, if you suspect that you are not getting data.

Select a higher value, disconnect and connect again to use the new value. The value will be saved and persisted until it is changed again.

The Elm327 adjust time out value window displayed below can be accessed from main menu - Setup | Adjust Elm327 time out value.

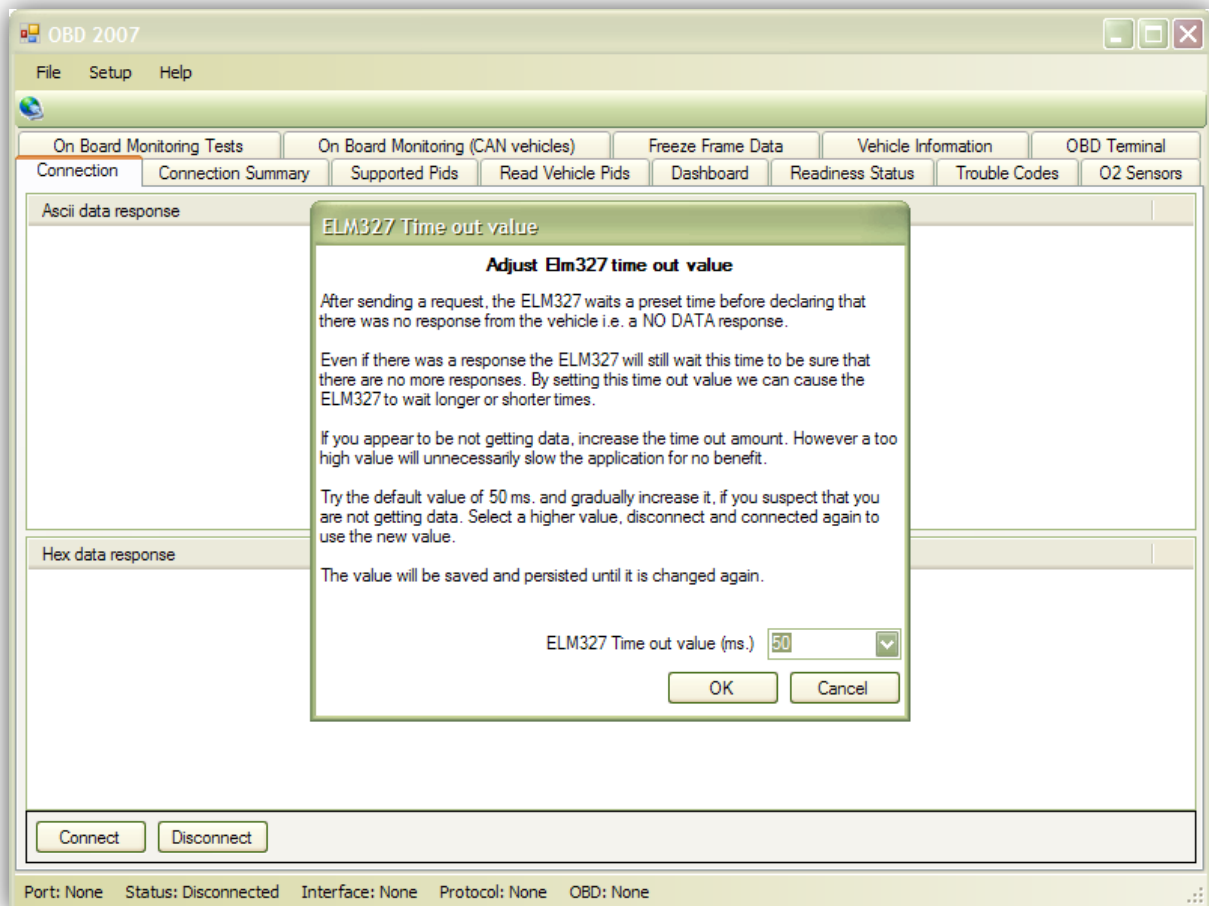


Figure 7 - ELM327 time out

Connection Information Summary

This tab gives a brief overall summary of the result of the connection for the particular vehicle. An important piece of information is the Region Information as this setting determines the units (either metric or imperial) of the data that will be displayed on the various tabs of *OBD 2007*. This setting is controlled by Windows from the Control Panel via the “Regional and Language Options” applet of the control panel. Please make sure that your computer is set to match your region and language. A typical Connection Information Summary window is displayed below.

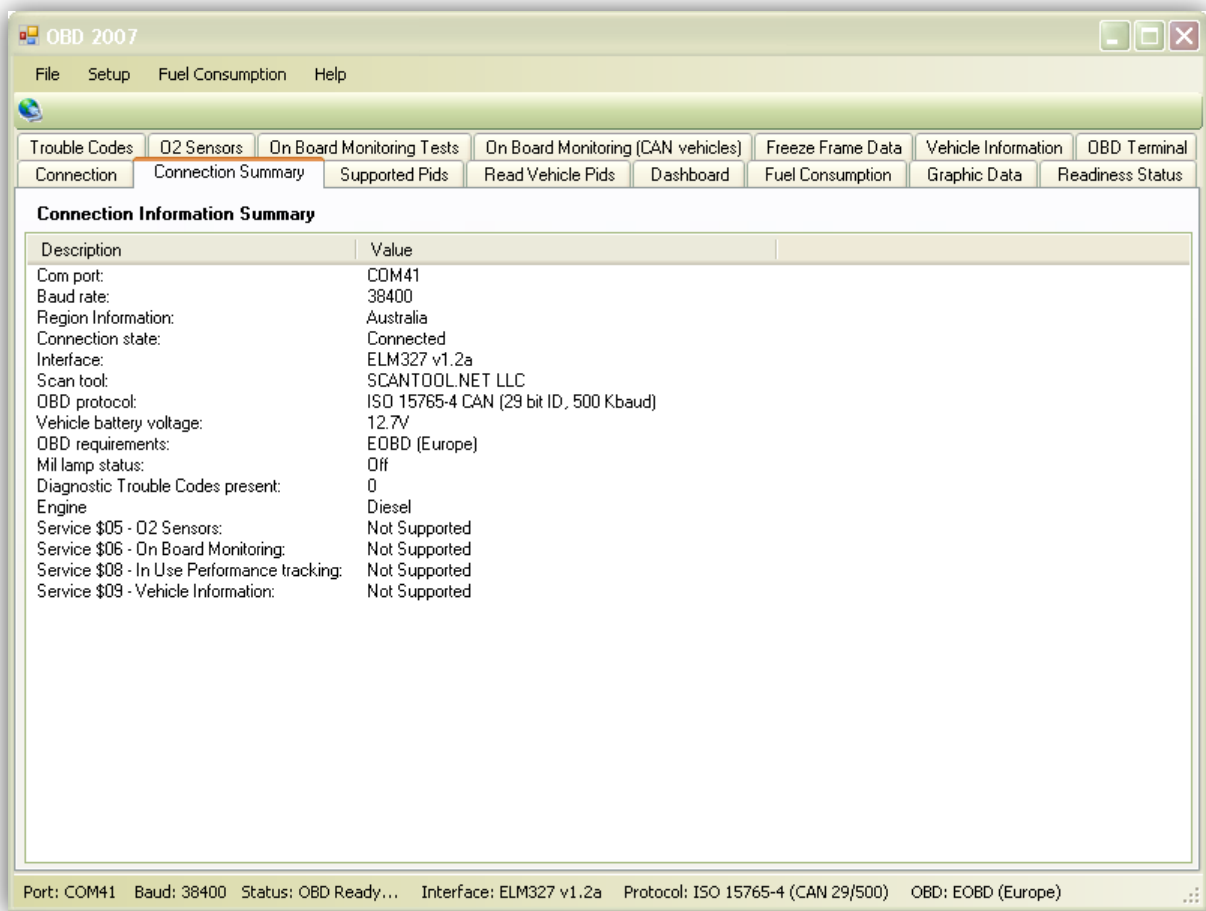


Figure 8 - Connection Summary

Supported Pids

Assuming you have successfully connected, you can now move to the **“Supported Pids”** tab. This tab allows you to select any combination of the Pids that your vehicle supports to view on the next tab **“Read Vehicle Pids”**.

If your vehicle doesn't support a particular Pid do not expect to see it in the list as the **“Supported Pids”** tab only displays Pids that your vehicle supports. In some older vehicles this list can be very sparse or even nonexistent. There is nothing that the software or the scan tool can do about this, the software and the scan tool can only report what is available.

CAN vehicles normally support many more Pids than any other protocols as the CAN protocol is the latest protocol and was first used in 2004 year models. Note all vehicles manufactured from Jan 1st 2008 will only support the CAN protocol.

The Pids with a padlock icon beside them indicate Pids that don't have dynamic values, therefore it would be pointless to be able to select them.

You can be as selective as you like when selecting Pids to view. Just check or uncheck Pids as required. The more Pids selected the slower the response will be. To get a response from the ECU, the scan tool has to send a command for that particular Pid, so the more Pids selected, the more commands that have to be sent by *OBD 2007* to the scan tool and each response from the ECU to the scan tool has to be processed successively by *OBD 2007*.

Some scan tool manufactures and software developers talk about real time data coming from the ECU. Please remember that the ECU's primary function is to look after the components of the engine, reporting diagnostic emission information is a secondary function. If the ECU is busy preventing your engine from over revving and disintegrating, please don't expect it to give you a real time RPM reading at the same time.

The following is an example of the **“Supported Pids”** tab of a late model CAN vehicle.

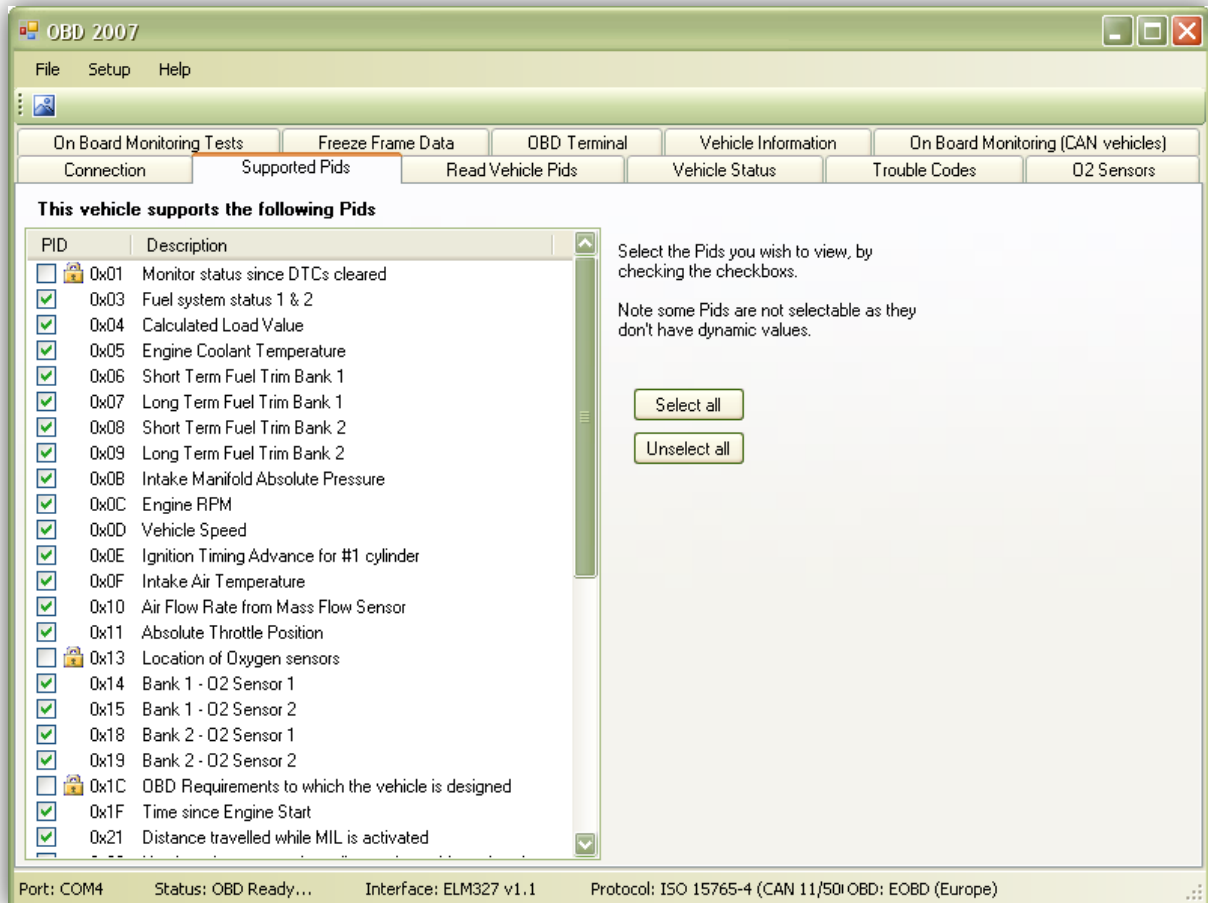


Figure 9 - Supported pids

Read Vehicle Pids

After selecting the Pids you wish to view, move to the **“Read Vehicle Pids”** tab and click the Read Pids button. If you haven't started the vehicle's engine, do so now. The program will now display in *“real time”* the values of each of the selected Pids. See the figure below for a typical display.

OBD 2007 automatically displays Pid values either in metric or imperial units based on the current regional settings of your computer. See Control Panel/Regional and Language Options to change from one to the other. If you swap to the **“Connection”** tab while reading the Pids you will see the raw data in hexadecimal format from the vehicle in the list labelled Hex data response.

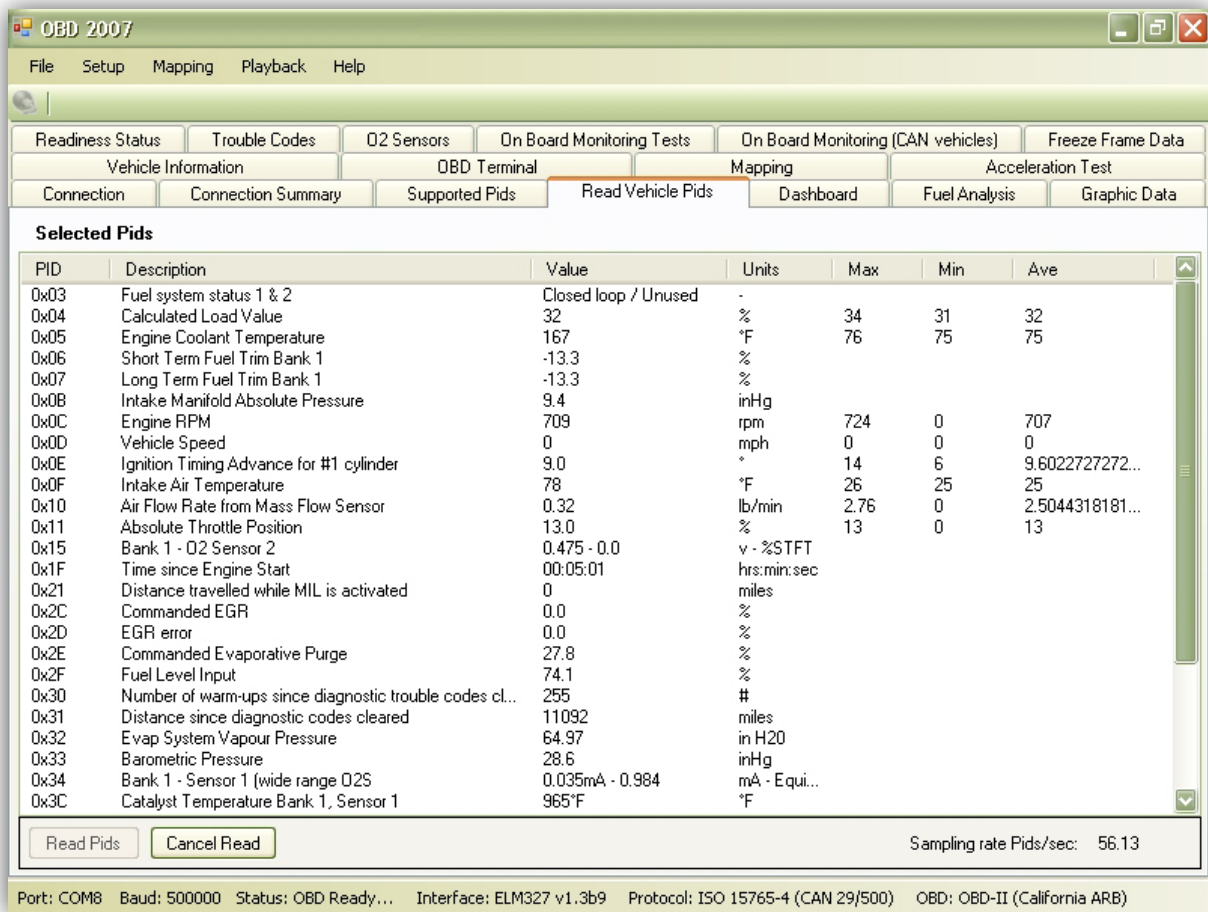


Figure 10 - Continuous real time data

The display will update continuously for each Pid until the Cancel Read button is pressed or you tab to another tab that doesn't support continuous read. The three tabs that do support continuous read are the Dashboard, Fuel Analysis and Graphic data tabs. The speed of the update will depend on the protocol of the vehicle and the number of Pids being shown. Reducing the number of Pids selected will speed up the update of the display considerably. CAN vehicles have the fastest refresh rate and update, while all the other protocols are much slower. For more information re protocol's speed refer to www.elmelectronics.com/DSheets/ELM327DS.pdf.

Logging

There are two forms of logging, diagnostic and data. Diagnostic logging is on by default and data logging is off by default. Both items are available from the Setup menu and can be toggled either on or off.

Diagnostic logging is on by default. This means that for every connect session, a log file is built which displays all the commands and responses between the scan tool and the ECU for that session. This can be very useful for later analysis, but assumes knowledge of the documentation of ISO-15031-5. If you would prefer to turn logging off, it is controlled by the Setup | Log diagnostics to file menu item. If you click the item it toggles between checked and unchecked. Checked is logging on, the default. With logging on a file is created for each session in the directory where the OBD 2007 executable resides. The naming convention for the file is "logddmmyyyy

hmmss.txt". Please note that these files can grow quite large during a long session and probably should be deleted when they are no longer required.

Data logging is off by default. Data logging is specific to the "**Reads Vehicle Pids**", "**Dashboard**" and "**Graphic Data**" tabs. Data logging files use a similar naming convention to the diagnostic log files, the only difference being the letters "OBD" inserted at the front of the name of the file. OBD logging does not contain raw data, but the actual values as shown on the "**Read Vehicle Pids**" tab. These files are in CSV format and are therefore suitable for importing into Excel by the Excel data import wizard. After you exit the program you will find a file with the following naming convention "OBDLogddmmyyyy hmmss.txt."

To import the data into Excel, use the following steps with the Excel import wizard. On step 1 choose Delimited and in file origin combo box choose Unicode UTF-8, then click Next. On the next window uncheck tab and check comma and then click Next. On the next window highlight the last column and select the radio button "Text" then click Finish and then OK. You will now have the data correctly formatted in a spreadsheet. The columns displayed are Pid number, Pid description, Value, Units and Time stamp. For the data logging file to be created you must choose the menu entry Setup | Log OBD Data to file prior to clicking the "Read" button on the "**Reads Vehicle Pids**" tab.

Dashboard

While displaying pid data continuously, you may also toggle between the "**Read Vehicle Pids**" tab and the "**Dashboard**" tab. The dashboard tab contains 7 gauges which resemble the dashboard of a typical vehicle. Instead of a digital read out as is displayed on the "**Read Vehicle Pids**" tab, the dashboard displays the same data in analogue gauge format. If your vehicle doesn't support a particular pid of the dashboard or is not selected then that gauge will read zero. A typical display is shown in the window below.



Figure 11 - Dashboard continuous real time data

The **Dashboard** tab is best viewed in full screen mode, where the gauges are displayed at their maximum size. Note the scales and display units of each gauge are automatically set where applicable, and depend on the setting of your Window's region. See the notes earlier in this guide re setting your Windows region via the Window's the Control Panel.

Fuel Analysis

Even though there is no specific pid for fuel consumption in the OBDII specification, fuel consumption can be calculated, if a vehicle supports Pid 0x0D Vehicle Speed and Pid 0x10 Mass Air Flow. All vehicles support vehicle speed and nearly all vehicles support MAF.

MAF, the mass of air moving into the engine is measured in grams per second. A petrol/gasoline engine burns the air/fuel mixture at the stoichiometric air fuel ratio of 14.64:1. The oxygen sensors in a modern vehicle are designed in conjunction with both the short and long term fuel trims to maintain this ratio. Under ideal conditions for every 14.64 grams of air an engine will consume 1 gram of petrol. We can therefore calculate $\text{FuelFlowGramsPerSec} = \text{MAF} / \text{Air Fuel ratio}$. We can convert the previous figure to $\text{FuelFlowLitresPerSecond}$ by dividing $\text{FuelFlowGramsPerSec}$ by the density of petrol/gasoline.

We can then readily convert that figure to $\text{FuelFlowLitresPerHour}$ – i.e. litres/hour. Fuel consumption is then simply $\text{SpeedKmsPerHour} / \text{FuelFlowLitresPerHours}$ – i.e. litres/kms. All the

remaining figures on the OBD 2007 Fuel Analysis tab are returned by simple conversion factors – for Metric, Imperial (US) and Imperial (UK) units.

Late model vehicles which use Oxygen sensors known as wide range linear Oxygen sensors, can also introduce another Pid 0x44, Commanded Equivalence Ratio. This pid allows fine adjustment of air fuel ratio from the constant 14.64 by modifying the air fuel ratio by a value between 0 and 1.999 which permits air fuel ratios to be measured to greater precision. If a vehicle supports Pid 0x44, OBD 2007 fuel consumption figure is modified by the effect of Commanded Equivalence Ratio.

To assist in understanding what is going on under various driving conditions, the OBD 2007 Fuel Analysis tab also includes gauges for Short and Long Term Fuel Trims. Ideally the short term fuel trims are trying to maintain the long term fuel trims at around 0%. A negative figure is an indication of leanness and a positive figure is an indication of richness.

The final components of OBD 2007's Fuel Analysis tab are two LEDs to indicate the state of Pid 0x03, Fuel Status. The LEDs can display 5 different colours to indicate the various states of Fuel Status.

Gray – Unused.

Red – System is running Open loop – has not yet satisfied conditions to go Closed loop.

Green – System is running Closed loop – using O2 sensors as feedback for fuel control.

Amber – Open loop due to driving conditions – either enrichment or enleanment.

Orange/Gray – Fault detected.

Because the gauge is an instantaneous fuel consumption gauge, it is quite normal for the gauge to swing wildly whenever the vehicle is accelerated quickly (high fuel consumption) or decelerated quickly (low fuel consumption). You may even notice on the digital fuel consumption gauges a reading of "Err". This doesn't actually signify an error, but is an indication that the fuel consumption figure is greater than what the gauge can display. E.g. if the fuel consumption is greater or equal to 100mpg, that figure cannot be displayed because there is only room for two significant digits.

When the vehicle is stationary with the engine idling, fuel consumption is zero. However the fuel rates of the right hand digital gauges will show their respective fuel flow rates. The following window below displays a typical fuel consumption window.

Please note like the Dashboard tab the Fuel consumption tab is optimised for viewing in full screen mode.



Figure 12 - Fuel Consumption

Graphic Data

While displaying Pid data continuously, you may also toggle between the “**Read Vehicle Pids**” tab, the “**Dashboard**” tab and the “**Graphic Data**” tab. Before viewing the Graphic Data tab you need to select the Pids you wish to read as per normal for the “**Reads Vehicle Pids**” tab. When you then select the Graphic Data tab you will have a new selection of Pids to choose from based on the original list you selected. Pids are filtered from the original list if they don’t lend themselves to a graphic display. E.g. it doesn’t make much sense to graph Pids such as Distance since DTCs Cleared or Time run by engine while MIL activated etc.

You have the option of selecting up to 4 graphs simultaneously. When the graphic tab is first displayed, it displays 4 dummy graph areas. You first need to choose which graph area - Top left, bottom left, top right or bottom right from the combo on the left hand side. Pick a graph position and then select a Pid to graph from the combo on the right hand side. You can then continue on, selecting another position and another Pid to graph for up to 4 graphs. You can even select the same Pid on both sides, if required. However on the same side, you can’t select the same Pid twice – you’ll get a warning that it has already been selected.

When you have your graphs selected, go back to the “**Read Vehicle Pids**” tab and click the read button – once you have data appearing on that tab, you can now swap back to the “**Graphic Data**” tab and view your data graphically. While viewing the data after about 30 secs as the graph approaches the right hand edge, the time Axis, or X axis starts scrolling. What is happening is that

the old data is discarded and you are now viewing the new data over time, as it is a real time display depending on the speed of the protocol of the vehicle. Each graph has a tooltip which will display the actual reading, when you hover the mouse over the graphic line as its drawn. Each graph adjusts its Y Axis scale properties etc. depending on the pid being graphed.

As you are viewing the graphs, you can select a different Pid to graph – you don't have to stop and restart, just because you change Pids. The previous graph is then replaced with the new graph.

To maximise the graphs, either maximise the screen or choose one of standard screen layout sizes from the Window layout menu to increase the size of the layout. You also have the option of removing the Legends, the X axis and the Graph Titles to further maximise the viewable graph area.

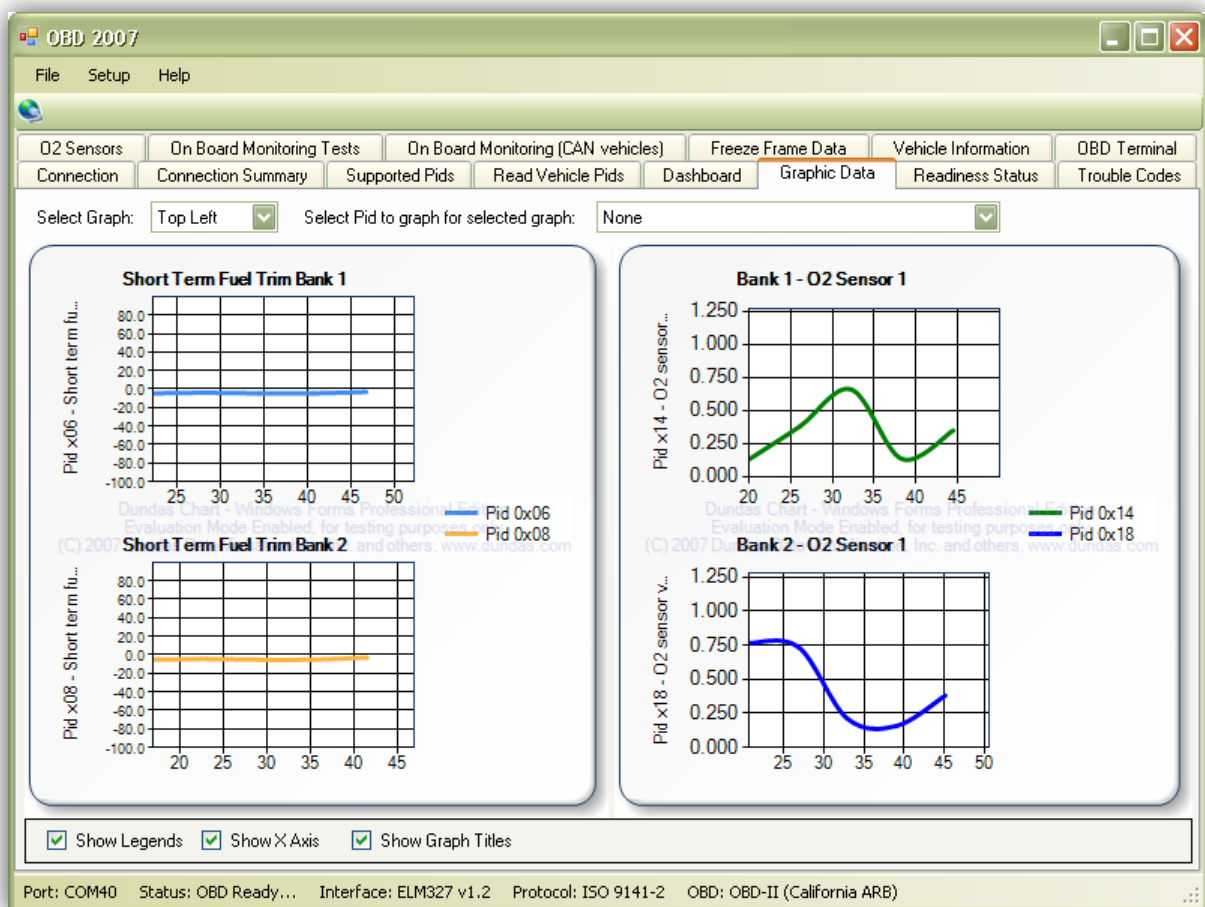


Figure 13 - Graphic data

Readiness Status

The next tab is "**Readiness Status**". This displays the result of service \$01, Pid \$01 – the command is sent to the ECU by the scan tool. It will return the number of emission-related power train Diagnostic Trouble Codes (DTCs) and the status of the Malfunction Indicator Lamp (MIL). If the vehicle has more than one ECU that supports this service, there could be multiple responses e.g. power train and transmission ECU's. If more than one ECU responds there will be multiple entries in the combo box labelled ECU #. This tab also displays the results of standardized Continuous

and Non Continuous tests. Note that not all vehicles support each test, hence the supported column. If the test results in no DTCs and the MIL status as off – then all emission controls are in good working order. If however there are DTCs and the MIL is activated, then you will need to move to the “**Trouble Codes**” tab to read the DTCs (trouble codes) that caused the MIL to activate. Below you will find a typical “**Readiness Status**” display.

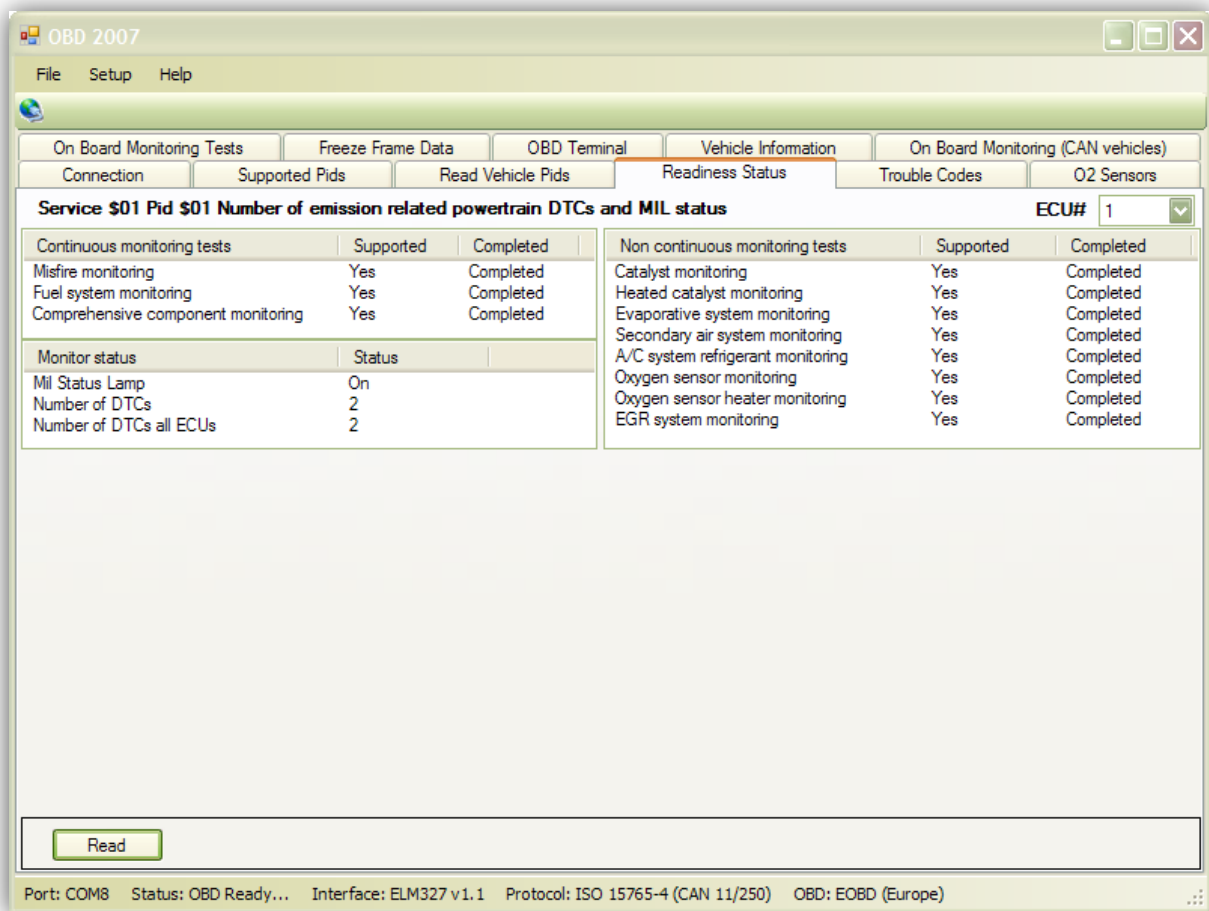


Figure 14 - DTCs and Mil status

Diagnostic Trouble Codes

If your vehicle has a problem, this is the tab that should guide you to solving the problem. When you click the Read button the scan tool will send two commands to the ECU – two responses will be received for stored trouble codes or pending trouble codes. A list of trouble codes and their descriptions will be displayed in both panels if appropriate. Now that you know what the problem is, it should be a relatively simple task for a technician or yourself to replace the defective part and repeat the test at the completion of the repair. When you are satisfied that the problem has been rectified, use the Clear DTCs button to turn off your MIL light and clear the existing DTCs. Note to turn off the MIL and clear the DTCs the engine must not be running, but the ignition should be on. *OBD 2007* will display a warning window, asking you to confirm that you want the command executed. A typical “Trouble Codes” window is displayed below.

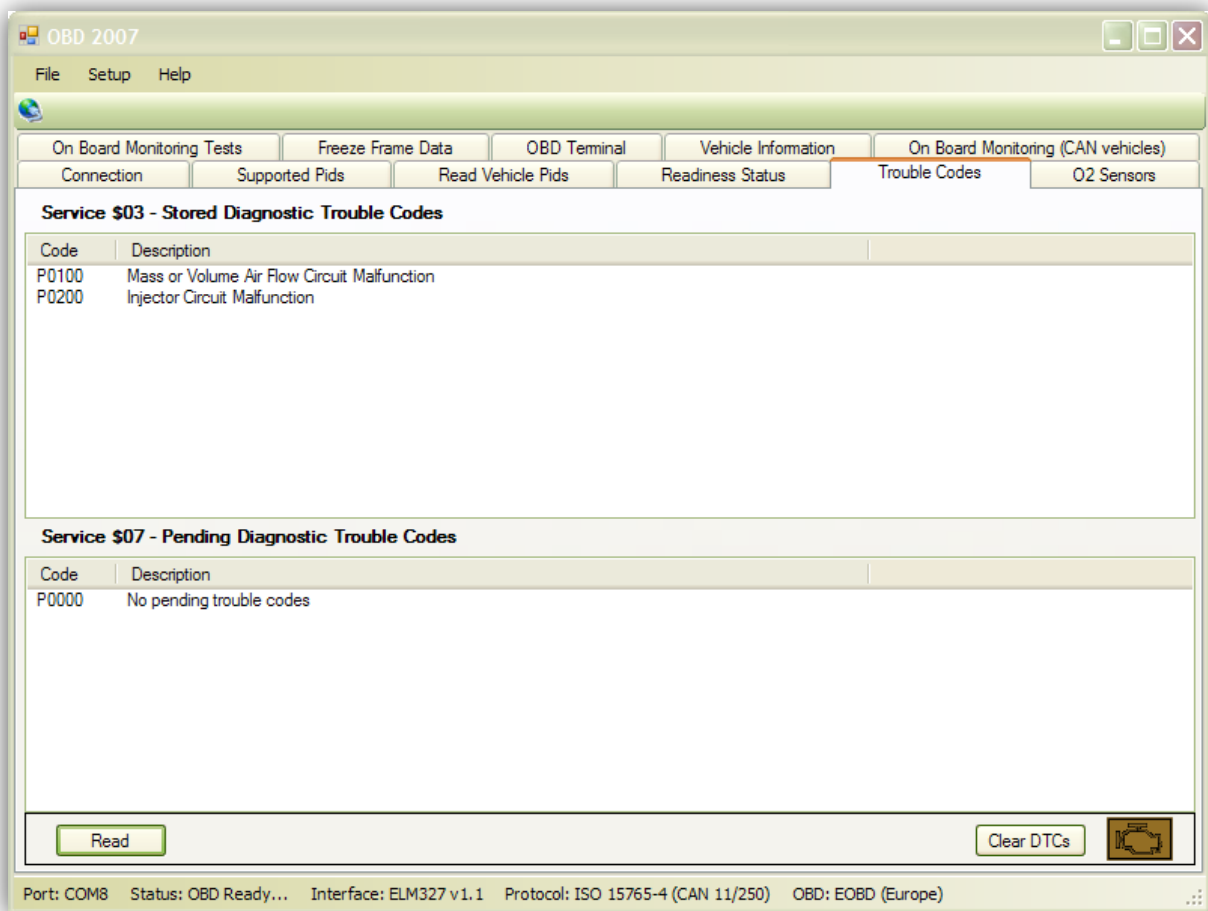


Figure 15 - Diagnostic trouble codes

Oxygen Sensors

The next tab **“O2 Sensors”** displays detailed information about each Oxygen Sensor. During the initialization sequence *OBD 2007* determines the location of the Oxygen sensors and the Test ID (Tids) that the Oxygen sensors support. The supported Oxygen sensors were first displayed under the **“Supported Pids”** tab. These will appear in the combo box on the middle left of the window. The supported Tids are not selectable, only the Tids supported by the test vehicle will be checked. Not all vehicles support service \$05 including CAN vehicles. See the **“On Board Monitoring”** and **“On Board Monitoring (CAN vehicles)”** tabs for more information re O2 sensors for CAN vehicles.

Oxygen sensor tests should be considered in conjunction with Pid 0x03 Fuel System status. When the engine is cold and during warm up, the O2 sensors are not used to adjust fuel trim and the Fuel System Status will report Open Loop. When the engine and O2 sensors have warmed up the Fuel System will go Closed Loop using the O2 sensor(s) as feedback for fuel control. It is possible for one Fuel System to be in Closed Loop and the other Open Loop, the O2 Sensors values should indicate which.

A typical O2 Sensor window is displayed below.

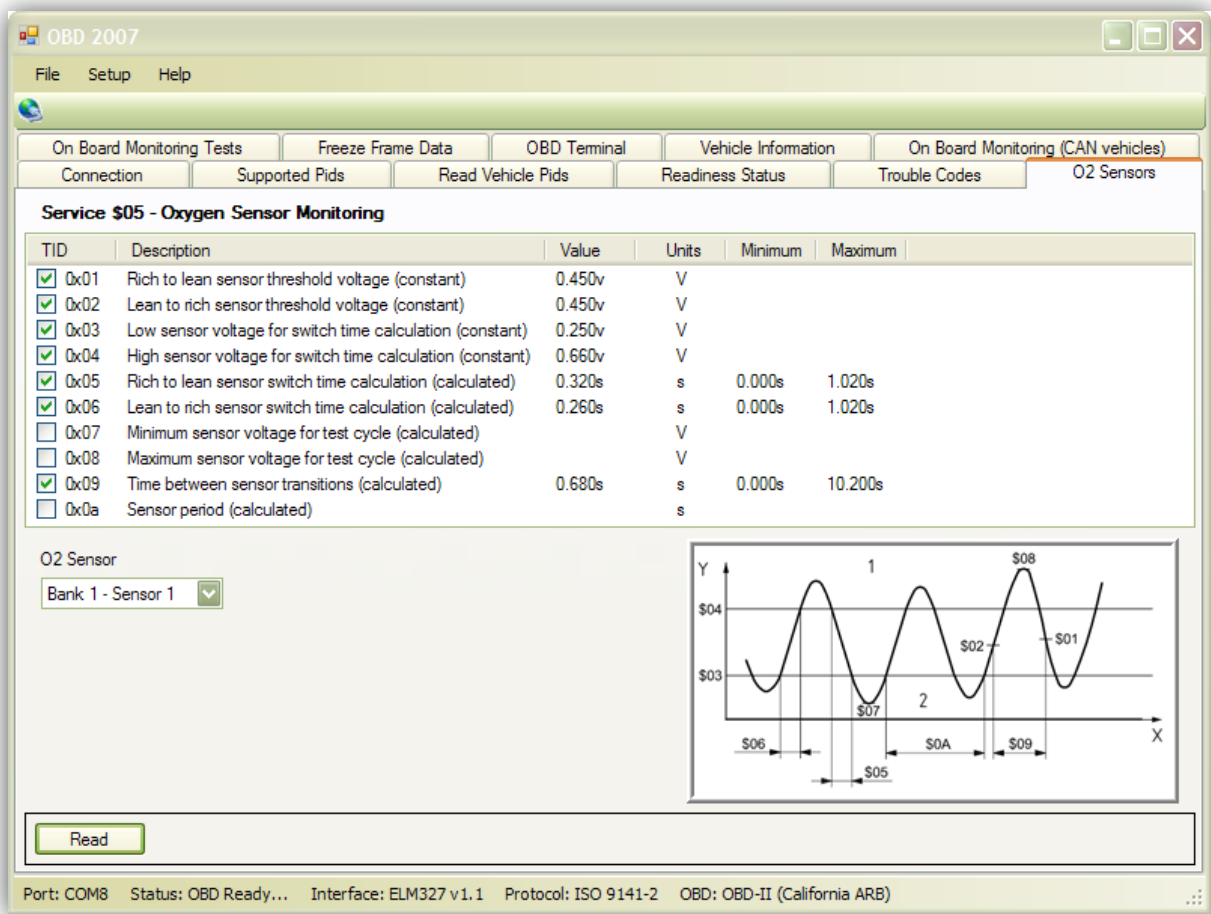


Figure 16 - Oxygen sensors

On Board Monitoring Tests

There are two tabs for On Board Monitoring, one for non CAN vehicles and another for CAN vehicles. More information is available for CAN vehicles hence the extra tab.

On Board Monitoring includes standardised Test IDs plus manufacture specific Test IDs. O2 sensor information for CAN vehicles is only available via the “**On Board Monitoring (CAN Vehicles)**” tab as service \$05 is not supported for CAN vehicles. On Board monitoring allows access to the results of tests of specific components that are either continuously monitored (e.g. misfire monitoring) and components that are non-continuously monitored (e.g. catalyst system). The vehicle manufacturer is responsible for the assignment of manufacturer defined test ids and therefore you may have to consult the respective workshop manuals for the definitions of these test ids. The following window contains a typical display of an On Board monitoring window.

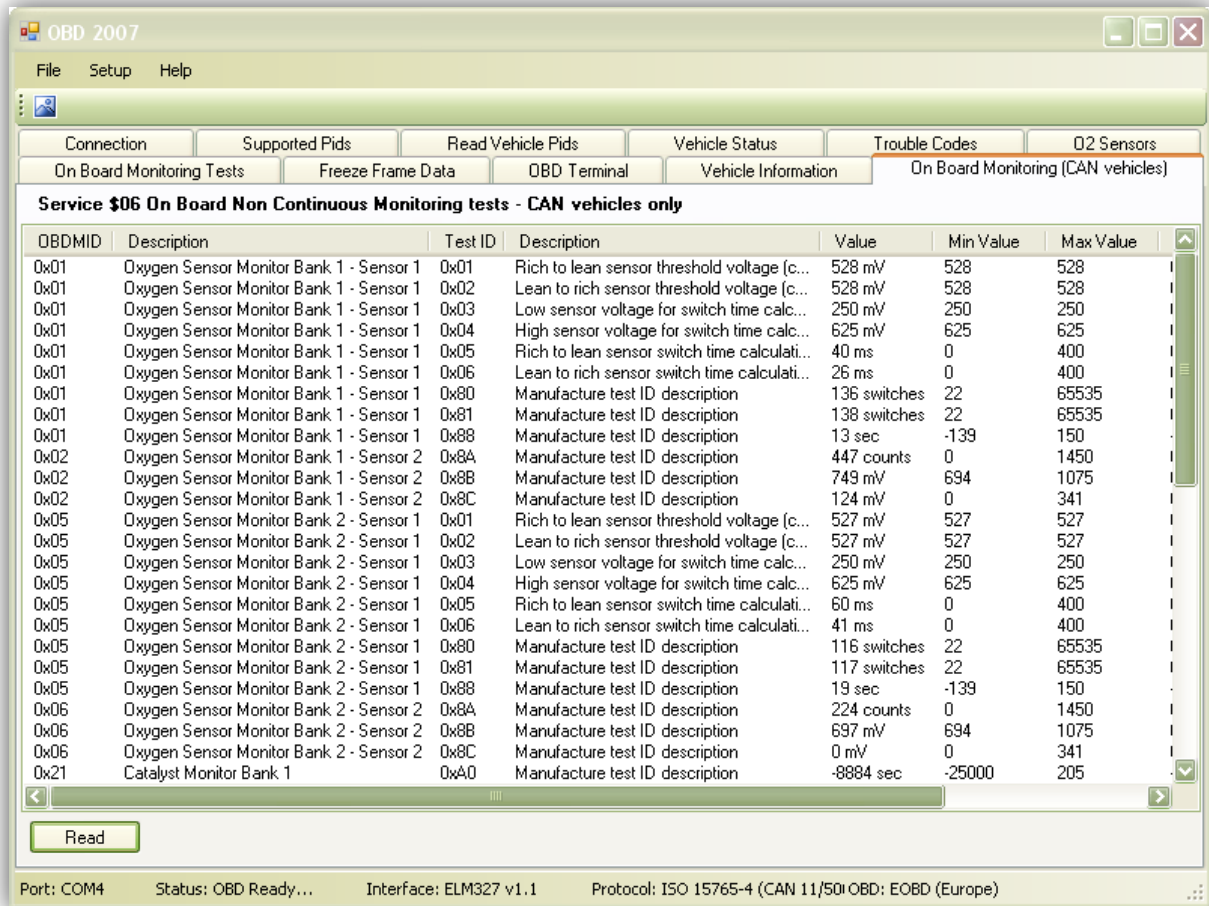


Figure 17 - On Board Monitoring CAN

To read the results of each test you can either expand the window to full screen or scroll horizontally to see the results column. For any TestID that fails, the complete row will be drawn with a red background to help pin point the problem.

Freeze Frame Data

If the vehicle has developed a fault, the freeze frame data will record the DTC that set the fault and provide a snapshot of the Pid data as it was at the time the DTC was set. This can be a great assistance in diagnosing the problem at a later time. Don't overlook this information when determining the reason for a fault.

The Pids supported by this service are very similar to the supported Pids as presented in the **"Supported Pids"** tab although usually they will be a subset of those Pids. The following window contains a typical display of an On Board monitoring window with a DTC set.

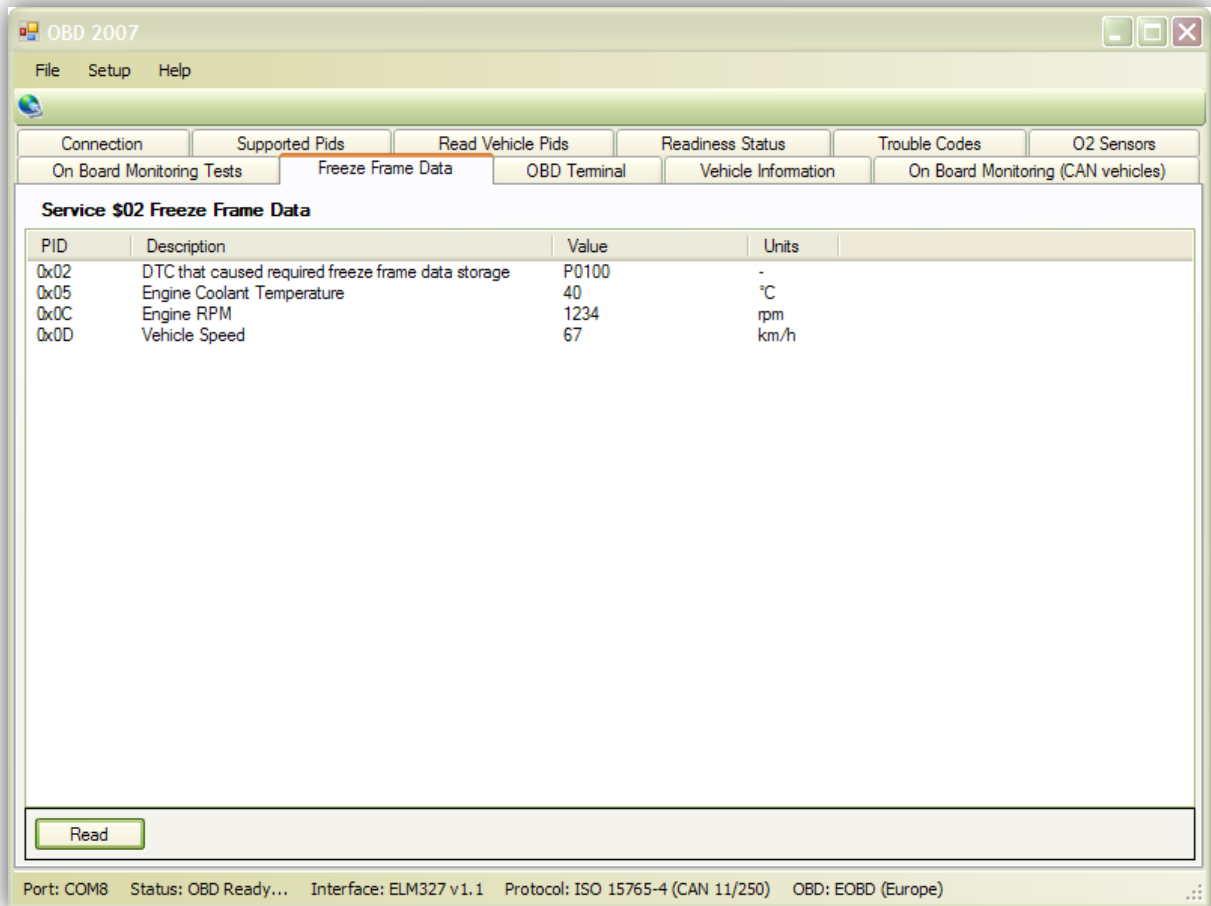


Figure 18- Freeze Frame data

Vehicle Information

Not all vehicles support service \$09. If your vehicle does not support this service the Read button will be disabled. Vehicle information includes items such as Vehicle Identification Number (VIN), Calibration Identifications and Calibration Verification Numbers for supported ECU's. If your vehicle supports InfoType \$08 this tab will also display In-use Performance Tracking. The following window contains a typical display of a Vehicle Information window.

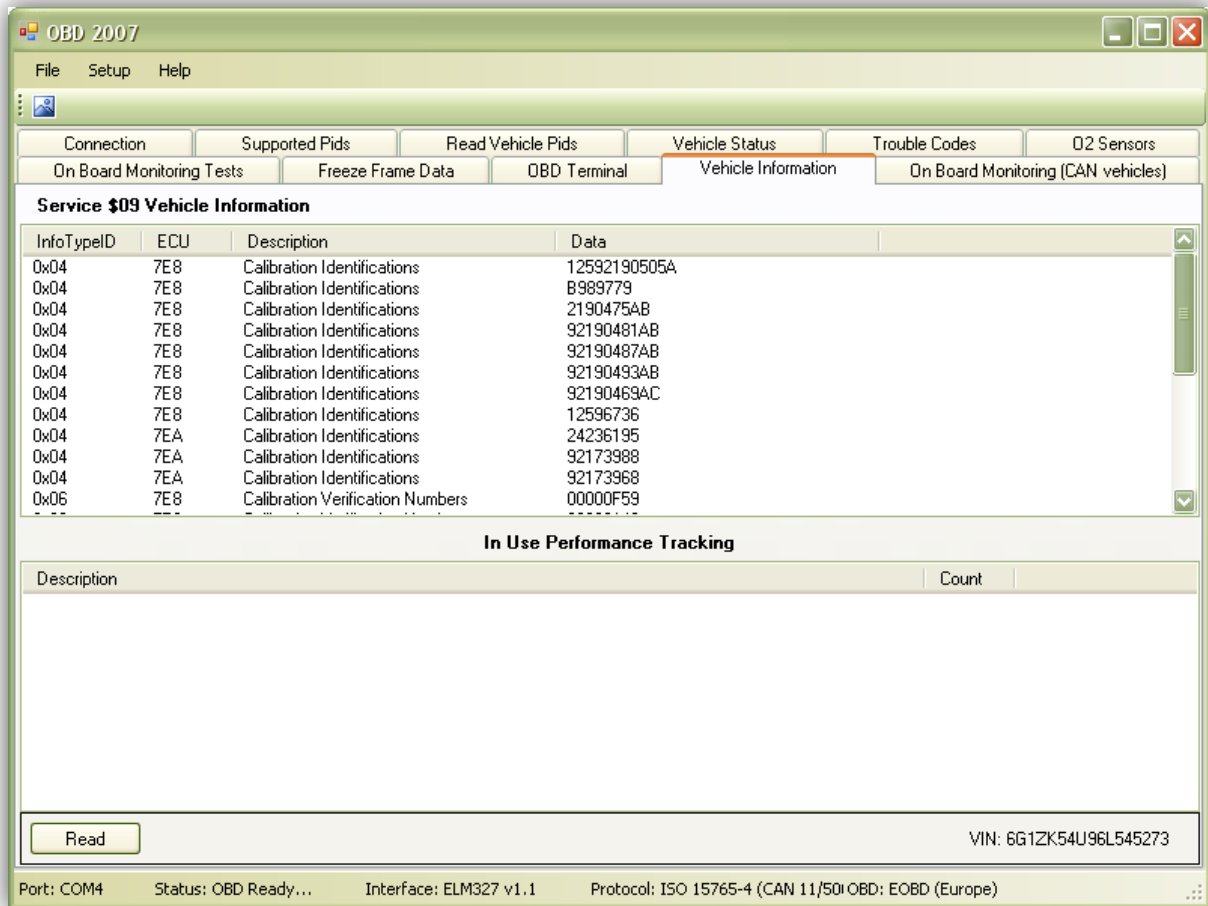


Figure 19 - Vehicle information

OBD Terminal

The OBD Terminal tab is a convenience feature for advanced users and is not strictly OBD compliant. It performs a similar function to Hyperterminal in that it allows you to manually enter commands from *OBD 2007* that can be addressed directly to the scan tool or the ECU of the vehicle through your OBD scan tool. It presumes you are familiar with the command set of the ELM 327 chip and are conversant enough to know what commands can be entered. ELM Electronics has detailed information about all the commands that can be issued through the OBD Terminal tab. See the follow datasheet for more information

<http://www.elmelectronics.com/DSheets/ELM327DS.pdf>.

Depending on what commands you issue from the OBD Terminal tab, it is recommended that after using OBD Terminal that you disconnect using the Disconnect button on the “**Connection**” tab and then reconnect using the Connect button. When you Connect, *OBD 2007* runs through an initialization sequence and sets many parameters. It is quite likely that the values of these parameters could be changed when manually issuing commands. Please note that it is very unlikely that you could damage your scan tool or ECU using the OBD Terminal feature, but we advise not using it if you are not familiar with the command set of the ELM 327 chip.

The following window shows a typical display of an OBD Terminal window.

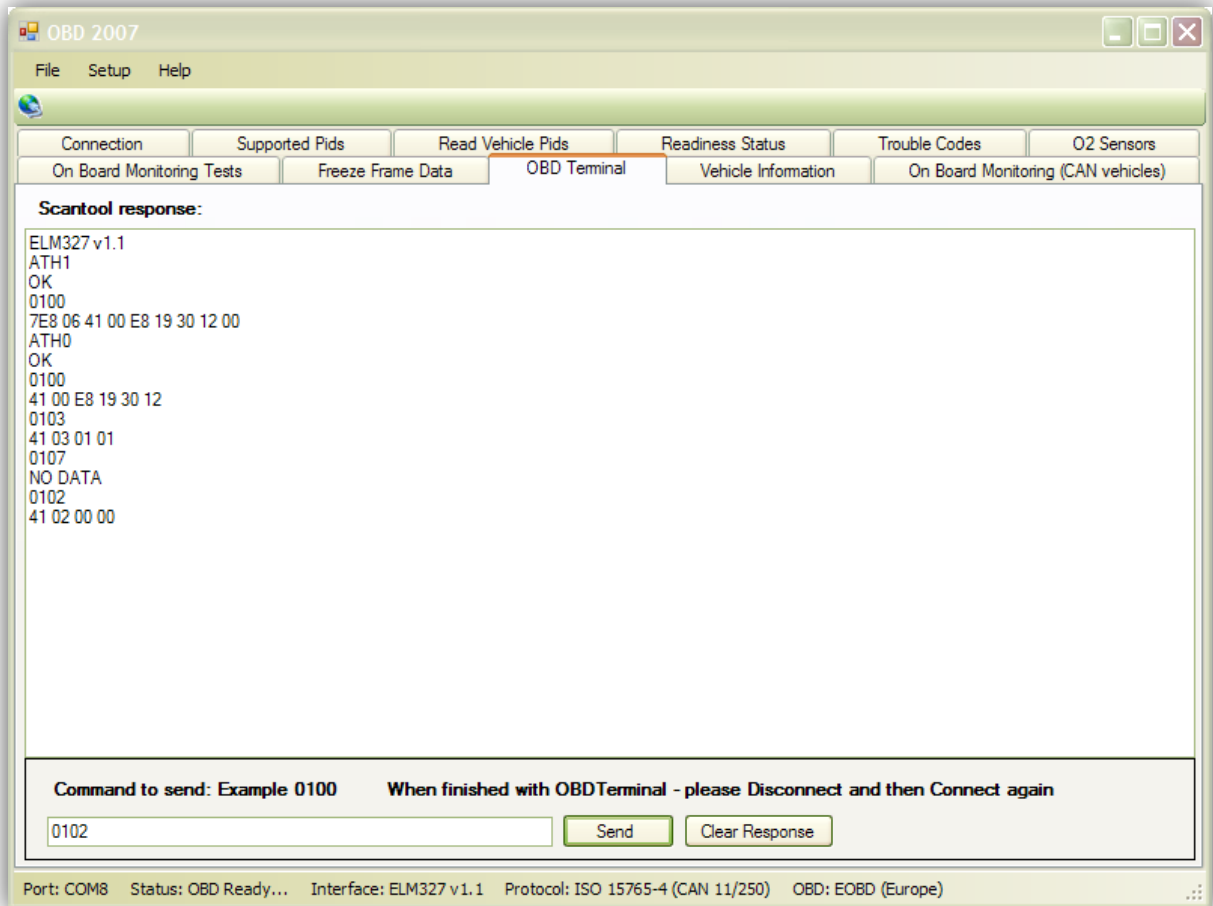


Figure 20 - OBD terminal

OBD 2007 Mapping

OBD 2007's Mapping module allows you to examine data from your vehicle in a three dimensional format. The Mapping tab is the one module of *OBD 2007* that doesn't require a connection to your vehicle. You are not examining live data, but data that was pre recorded in an earlier *OBD 2007* connection session.

When you are viewing live data of the pids of your vehicle in a normal *OBD 2007* connection session, you have the option to record the live data to an *OBD 2007* log file. At the completion of your logging session, you will find a text file in the *OBD 2007* program folder that is date and time stamped for that session – e.g. OBDLog10052008 153422.txt. The log file is always named, based on the date and time that the session was logged. The generic format is "OBDLogddmmyyyy hhmmss.txt"

This text file contains the output of all the Pid information that was collected during your connection session. The text file, which is viewable in Notepad consists of individual pid descriptions, pid values and a timestamp of when the event occurred, one line of information per pid. In earlier versions of *OBD 2007*, this data could be imported into an Excel spreadsheet and manipulated within Excel. With our new *OBD 2007* mapping module we now do that work for you and present the data as a 3D map, plus a graphical representation of the individual pids, graphed over the same period of time.

A typical *OBD 2007* map is displayed below.

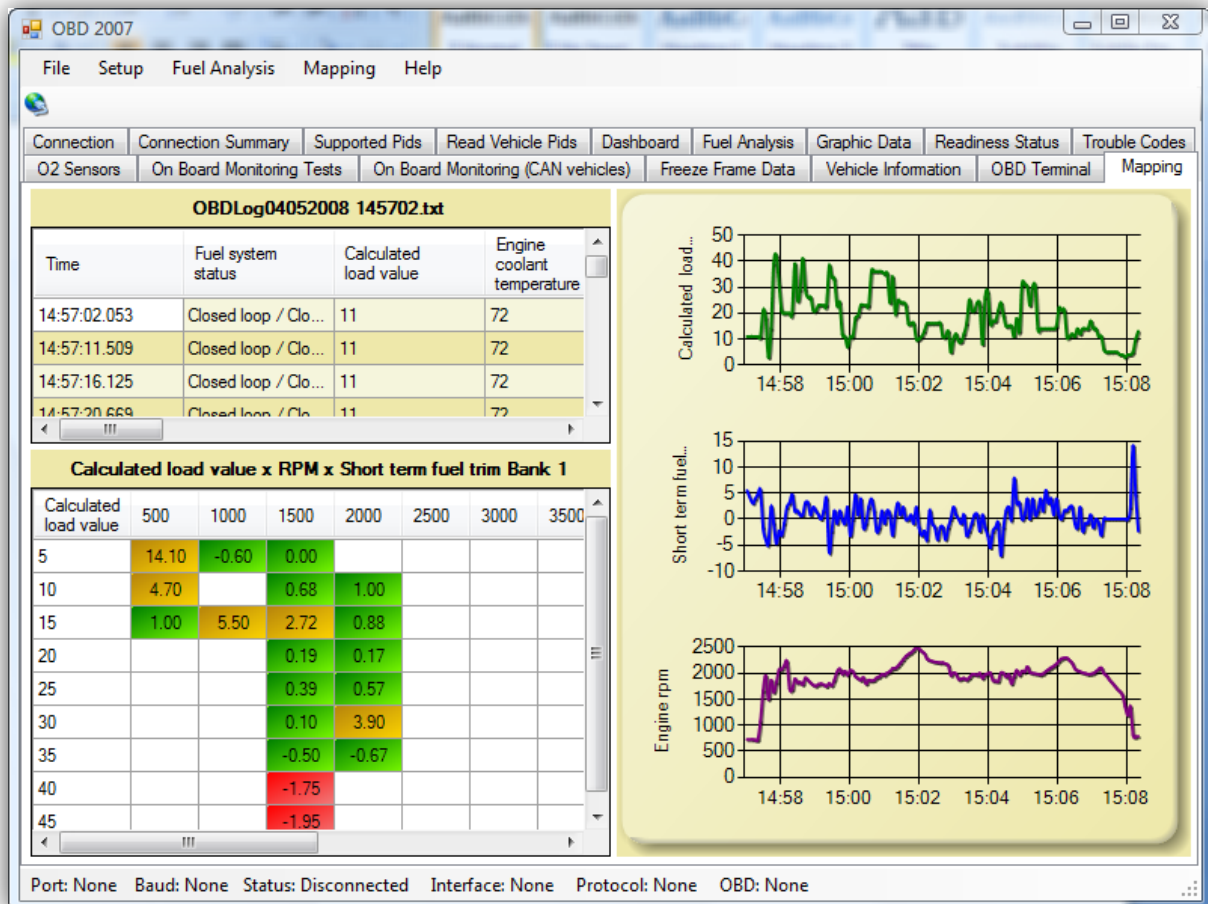


Figure 21 - OBD 2007 Mapping module

Example of mapping

In the above example we have chosen to map the following pids, **Calculated Load Value x Engine RPM x Short Term Fuel Trim Bank 1**. In the top left of the screen is the table of records, from the *OBD 2007* database containing the data that was collected. In the right hand section of the screen are three individual graphs of each of the chosen pids. Note how the X axis labels are the same for all three graphs. The X axis label is the time that the data was recorded in hours and minutes. At any point in time along the X Axis the three values can be compared. The bottom left section of the screen is a 3D map of the average values of the Short Term Fuel Trim, plotted against the other two pids, Calculated Load Value and Engine RPM.

The values in the cells are coloured depending on the range of the values. Green indicates the values are OK, the amber and red values indicate that the values are outside the OK range, being too high or low respectively. You are free to change these values to best represent the way you wish to view the data.

Another view of the data, could choose a different pid for the left hand column, for example substitute Calculated load value, with Absolute Throttle Position or Intake manifold Absolute Pressure. Interesting variations of the results are then very easy to compare.

Obviously when you are considering using the *OBD 2007* mapping module you need to give prior consideration to the list of pids that you want to map. The less pids you select, the more accurate the data recorded. This is particularly important for the slower protocols such as ISO 9141-2, which only have a maximum pid rate of about 5 pids per second. It is not so much of a concern with modern late model vehicles running the high speed CAN protocol where you usually have a pid rate of around 20 pids/second. So prior to logging your data, think carefully about what pids you would like to examine in an *OBD 2007* mapping session.

One *OBD 2007* mapping session can however expose a great deal of data, so it is advantageous to select multiple pids, so that you don't need to repeat the logging session. With some practice, most users will instinctively know what pids to select to provide the maximum amount of information from the one *OBD 2007* logging session.

Importing the data

The *OBD 2007* Mapping module is driven from the Mapping menu. First you must select the Mapping tab which will display a blank tab. Then from the Mapping Menu choose – “Open OBD Log file to log”. A standard Window file open dialog will appear as shown below.

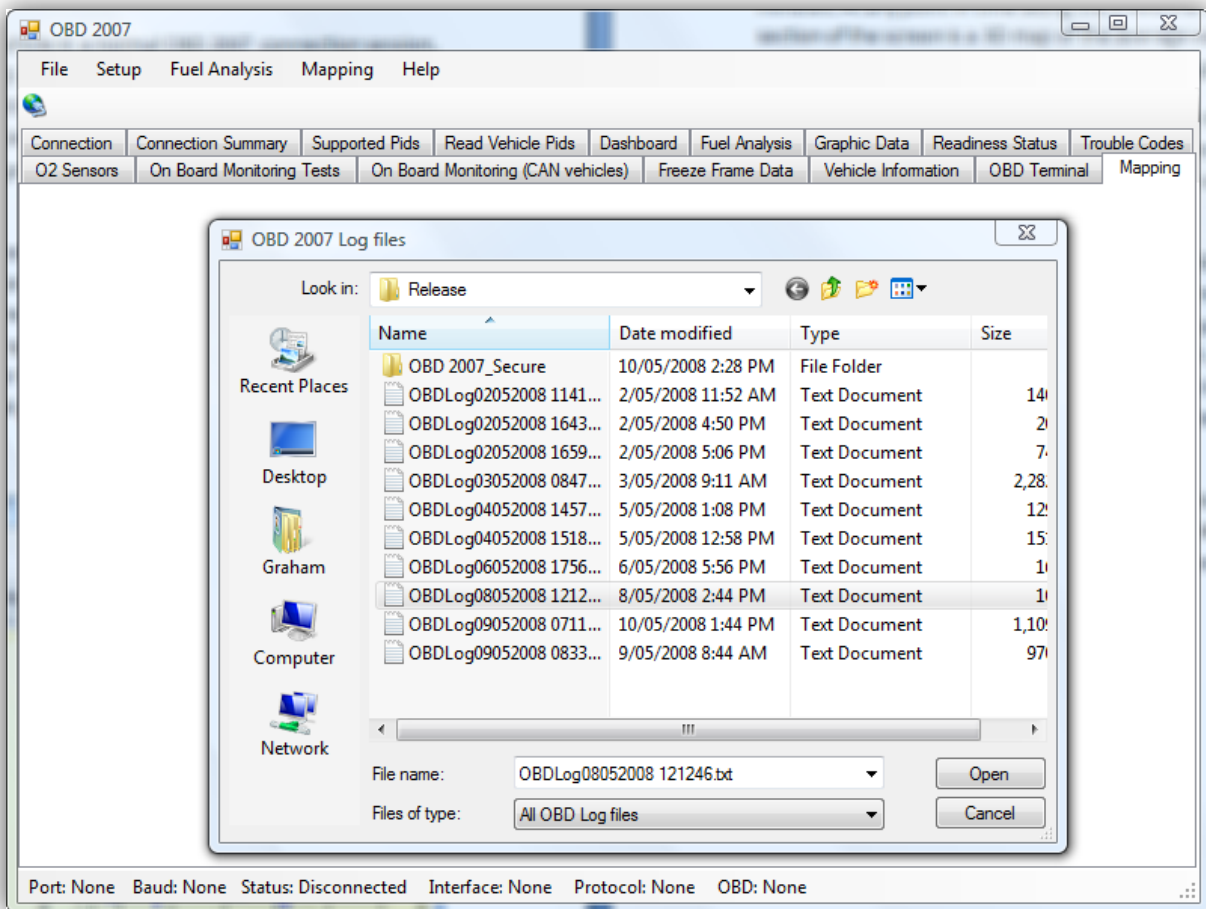


Figure 22 - Open OBD 2007 log file

Choose the file you wish to map. *OBD 2007* will then import the file into the OBD 2007 database and the Mapping window will now display the records you just imported as shown below.

The data from the OBD log file – OBDLog08052008 121246.txt in this example has been imported into a database table. Note the data has been transformed from the raw data that was in the log file. If you study the data in the text file, you will see that each record contains data for one pid and is followed by data from the next pid. You originally made a selection of pids from *OBD 2007*'s "Supported Pids" tab before clicking the read button to begin the collection of data. Looking closely at the data in the text file you will notice a repeating pattern depending on which pids you selected. When you come to the last pid selected, you will see the pattern start over again from the first pid and repeat again and again until you reach the end of the file.

Time	Fuel system status	Calculated load value	Engine coolant temperature	Short term fuel trim Bank 1	Long term fuel trim Bank 1	Short term fuel trim Bank 2	Engine R
12:12:46.919	Open loop / Ope...	0	17	0.0	-2.3	0.0	1356
12:12:59.121	Open loop / Ope...	25	17	0.0	-2.3	0.0	1087
12:13:04.260	Open loop / Ope...	30	17	0.0	-2.3	0.0	1017
12:13:09.345	Open loop / Ope...	30	17	0.0	-2.3	0.0	1032
12:13:14.483	Open loop / Ope...	29	18	0.0	-2.3	0.0	1043

Figure 23 - OBD log file imported into the database

For example you may be tracking 10 pids out of a possible 20 pids that your vehicle supports, so that pattern of 10 pids worth of data is repeated every 10 records. When OBD 2007 imported the data it placed 10 pids worth of data into the first record or row of the table of the database and assigned it a timestamp of the 1st pid's time stamp. It then repeats the process for the next 10 pids, placing them into one record in the second record or row in the new table in the database and assigning it a timestamp of the 1st pid of this group of records. So each set of 10 records in the original text file is treated as one record in the new table.

Also note that the column headings of each record or row are the actual pid descriptions and the values in the columns are the pid values. This is known as a pivot table or cross tab table. Exactly the same thing can be done with Excel. We are looking at the same data as the text file, but we have transformed the data or reduced the data into a more meaningful chunk of data at a particular point in time.

You now have a menu option from the Mapping menu of Choose Pids to map. Making this selection will cause the Pid Selection window to open which allows you to make a choice of the pid you require for the left hand column of the map and a second choice of which pid you would like to map as shown below.

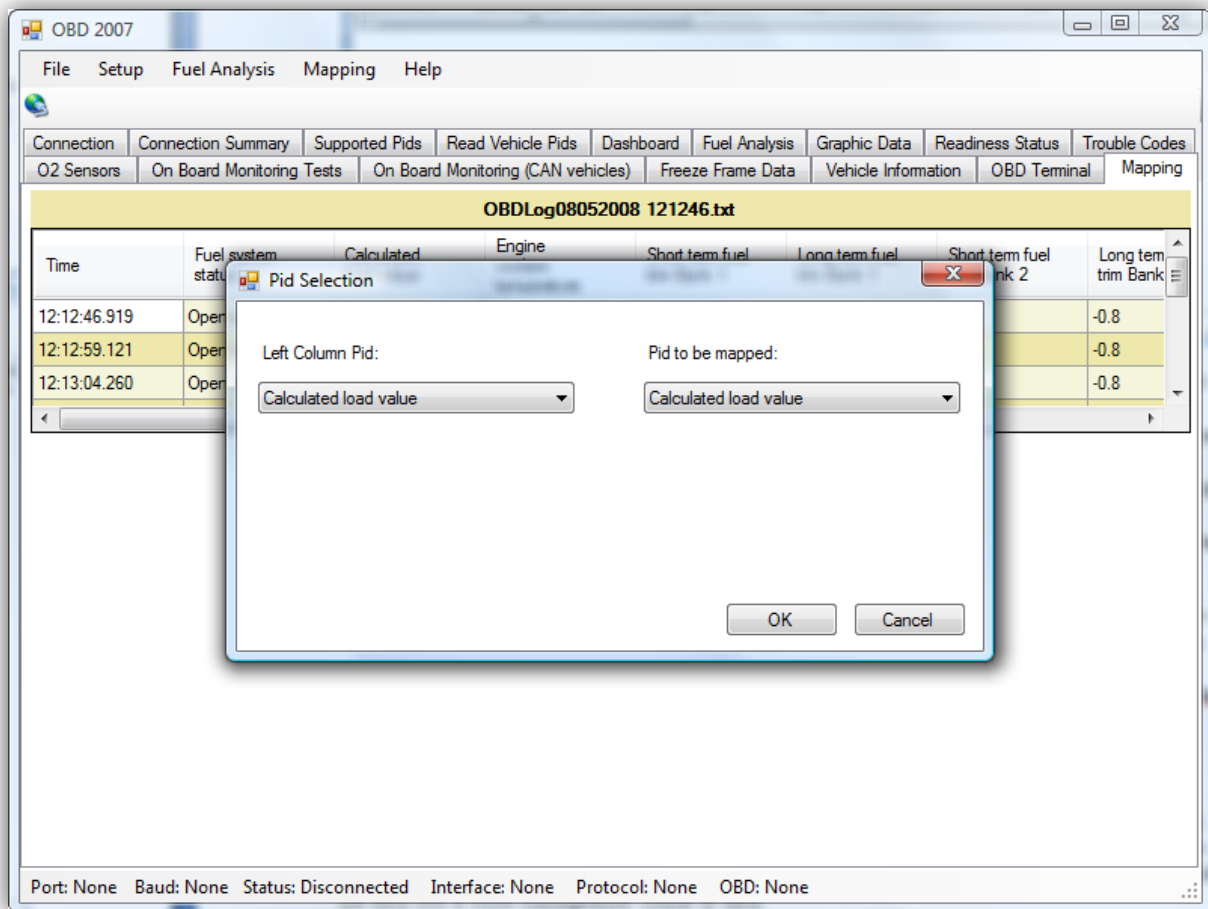


Figure 24 - OBD Mapping - Pid Selection

Not all available pids are shown in these combo box selections. Pids that are unsuitable for mapping such as “Time since engine start” are filtered out. You should take care when selecting the pid for the left column. Suitable pids for the left column would be pids such as the following, Absolute Throttle Position, Calculated load value, Intake manifold absolute pressure, Commanded throttle actuator control etc. What these pids have in common is that they either have values that range from 0 to 100 or the values can be considered as a percentage. The third pid Engine RPM is a constant and is automatically displayed in every map. A Mapping grid is designed to show unusual relationships or to confirm that the values being mapped are within range throughout the entire rpm range that the engine can operate.

Displaying the mapped data

After selecting the two pids from the Pid Selection window, the main window will resize to include the mapping grid plus a chart as was shown in the table. The data is transformed again and average values are calculated for each cell within the map.

The chart and the mapping grid are obviously optimised when running in full screen mode, but you are free to size the individual components by dragging on the splitters between each component.

Colouring the values

The third Mapping menu option – Choose values and colour ranges displays a Map Metrics window, which allows you to change the values that are coloured in the mapping grid. Three colour values are available, green, amber and red. You are free to assign any value to any colour. Upon completing your selection, the cells in the mapping grid will be redrawn in the colours you have chosen for the respective values. The idea is to highlight cells that either fall within the range you want or to highlight cells that are outside of the expected values.

Two other instructional windows will appear during the mapping process. The first, once after the initial grid appears and the second after the pid selection window closes. Both these windows can be prevented from appearing by checking their respective checkboxes.

Note

In previous versions of OBD 2007, the menu item “Log OBD data to file” was always enabled. We now only enable this menu item after the “Read Pids” button has been clicked.

Playback Mechanism

The *OBD 2007* Playback mechanism allows you to play back any OBD diagnostic log file. *OBD 2007* diagnostic log files are created for every connection session and are therefore always available in the *OBD 2007* folder. They are in the format “logddmmyyyy hhmmss.txt” The log files of interest are those that contain continuous read information. Other data from an *OBD 2007* connection session may be present in the file, but that data will be ignored in Playback mode.

From the Playback menu open, select the Open log file menu item. A file dialog window will open displaying all available *OBD 2007* diagnostic files. After you select a file to playback a new Toolbar will appear with Play, Pause and Stop buttons, plus a combo box allowing you to select the speed of the playback. During playback a progress bar tracks the current position of the file.

During playback you may swap between, the following tabs Read Vehicles Pids, Dash and Fuel analysis. You may also change the speed on playback from the playback speed combo box.

A typical playback window is displayed in the window below.

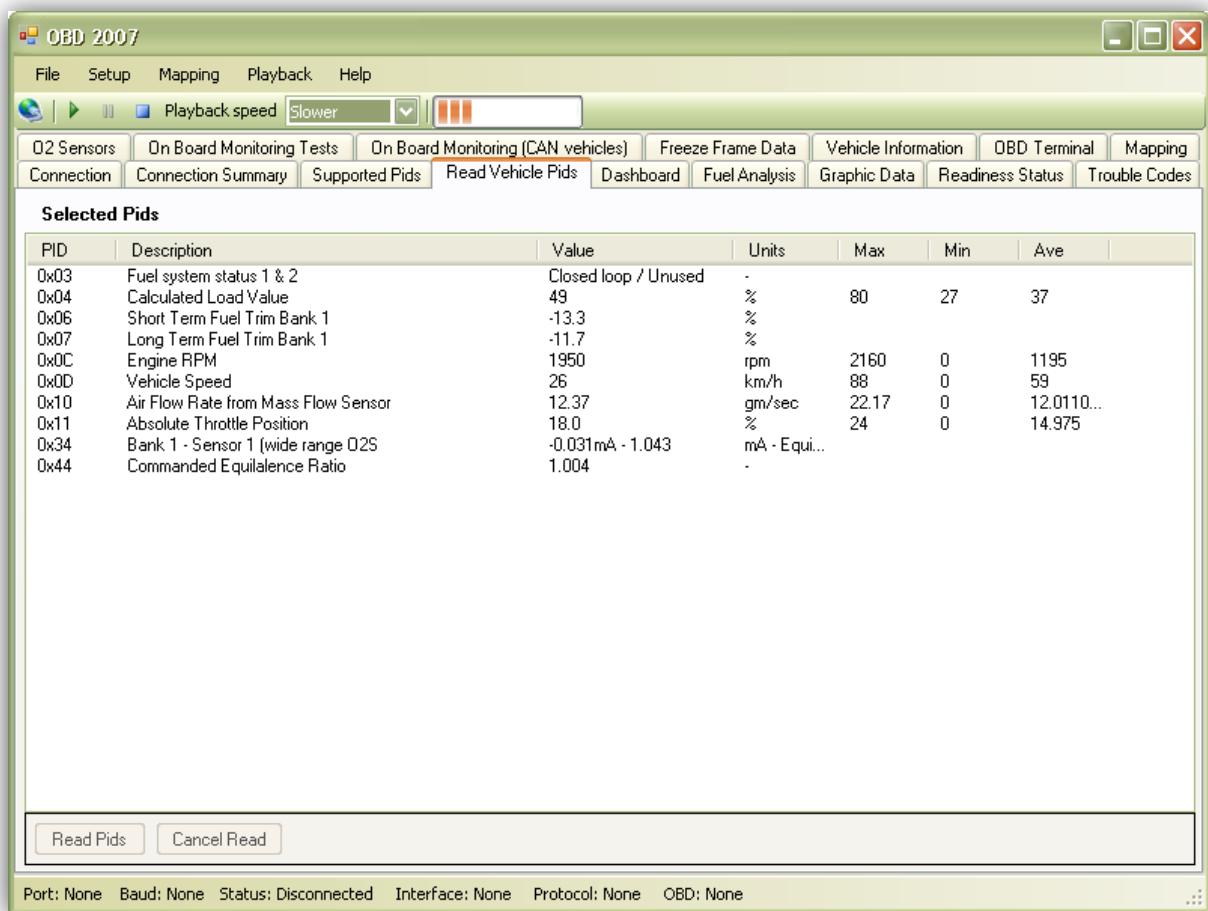


Figure 25 - OBD 2007 Playback

Acceleration Test

The *OBD 2007* Acceleration Test module (introduced in build 1.0.13.96) allows you to perform an Acceleration test as a result of some modification or to establish a base line for pending modifications.

The Acceleration test is not a “drag strip” type test because *OBD 2007* makes no attempt to calculate the reaction time of the driver. In fact the test does not even start until the vehicle has reached the minimum speed as set by the user. The test can easily be performed by the driver with a laptop secured on the passenger seat, but it is obviously safer (for the laptop) to ask a passenger to assist. However, no user interaction is required for the duration of the test.

Only two pids are required for the Acceleration Test, Pid 0x0C Engine RPM and Pid 0x0D Vehicle Speed. Both these pids are automatically selected when the Start button on the Acceleration Test tab is clicked. All that is required to perform the acceleration test is to first establish a normal connection with the vehicle from the Connection tab by clicking the Connect button as if you were about to read pids.

You may then optionally check that the vehicle is connected successfully by briefly reading pids and then cancelling the “Read”. There is no need to deselect the selected pids as they will be automatically deselected for you and the two pids mentioned above will automatically be selected.



Figure 26 - Acceleration Test

Prior to clicking the Start button, enter a Start speed and a Finish speed. Ensure that *OBD 2007* is reading pids correctly by observing a positive RPM figure. When you are ready to begin the Acceleration Test click the Start button and then begin your acceleration run.

As soon as you start accelerating, Speed and RPM are displayed, when your Start speed is exceeded, Elapsed Time and Distance Travelled will also be automatically displayed and all four values will be continually updated until the Finish speed is attained at which point *OBD 2007* will automatically terminate the test.

OBD 2007 will play a sound to indicate that the test is complete and store the terminal and maximum figures. Therefore there is no real need to observe the output while you perform the acceleration test. At the completion of the test, the graph of vehicle's speed and engine rpm against time will be updated plus an additional value - the Average Speed for the duration of the acceleration test.

A typical Acceleration Test window is displayed above.

During an Acceleration Test you may cancel the test at any time via the Cancel button. The Cancel button will clear any partial readings ready for the next Acceleration Test. The start speed and finish speed are retained between tests.

Please note that the displayed terminal speed may not exactly match your selected Finish speed. In the above example the finish speed is 66 mph, but the terminal speed displays 65 mph. Even though there are only two pids selected, so as the pid rate (pids/sec) is close to the maximum

possible rate, it is still possible that that two consecutive speed pid readings could be 65 mph and 67 mph. Therefore as 66 mph was the Finish speed, the last available reading 65 mph was used as the final reading and in this particular example the speed reading of 67 mph, which is greater than the Finish speed reading, was discarded.

This particular example was performed with an Elm 327 v1.3 chip on a CAN vehicle, the Elm 327 v1.3 is considerably faster (more than double the speed of the earlier Elm 327 chips) and therefore there are many more data points to the graph. For slower protocols and older chips expect fewer data points.

At the completion of an Acceleration Test, it is necessary to Disconnect and then Connect again to re establish the full list of supported pids for your vehicle to resume normal testing with *OBD 2007*.

Connection Trouble Shooting

There are 3 types of connections that can be used with the scan tools that *OBD 2007* supports.

Serial cables are usually only available on older laptops and desktop computers. Desktop computers aren't conducive to this type work because the computer needs to be connected to a vehicle via the scan tool.

USB/Serial cable or straight USB connection is the most common type of connection. Please follow the instructions for installing the driver.

Bluetooth serial. This is an unwired connection between the scan tool and the laptop. Bluetooth serial is the preferred connection for our *OBD 2007 Pocket PC* and *OBD2007 Smartphone* product. At the time of writing Car-Pal is the only Bluetooth ELM327 based unit which works unmodified with OBD 2007. We believe that Scantool also intend to release a Bluetooth enabled ElmScan5 in the first quarter of 2007. Both the ElmScan5 and the AllInOne scan tool can be adapted to use a Bluetooth Serial adapter Module. These types of adapters are available from Socket Communications www.socketcom.com and Aircable www.aircable.net. To be used successfully each of these products requires 5V power to power the BT radio of the adapter. The power can be sourced via pin 9 on the DB9 connector of the scan tool. Keep in mind that some models of the various scan tools will require modifications to bring power to pin 9. Please check with the scan tool manufacturer.

From reading most of the scan tool manufacturer's forums the most common type of problem reported is trying to connect to a non OBD-II compliant vehicle. At first glance this seems quite ridiculous, but it happens time and again. The reason for this is that although OBD-II has been a requirement in the US since 1996, it was not necessarily taken up by other countries until more recently, 2000 in the UK and Europe and 2006 in Australia. Some vehicles appear to be compliant because they have what appears to be an OBD-II connector. Before you buy a scan tool make sure your vehicle is OBD-II compliant. The various scan tool manufacturers do have links to sites that list a vehicle's OBD-II compatibility, but if in doubt check with the motor manufacturer or distributor in your country.

Each scan tool comes with detailed instructions for connecting to your vehicle, but still there are connection failures. Some of the connection failures are in fact due to poorly written software. If you are having connection problems – there is a tool on every Window's computer that should be able to solve the connection problem. Look under Programs | Accessories | Communications and you will find Hyperterminal and for those of you using a Pocket PC consider downloading Zterm, both products perform identical functions. That is they can communicate with the serial port on your computer and the scan tool.

If your computer can communicate with your scan tool through Hyperterminal then it will work with *OBD 2007*. There are only two requirements – make sure the scan tool is communicating with the correct serial port and that the baud rate is correct. When the Hyperterminal window opens go to File | Properties set the Com port and baud rate.

Now type ATZ, the command to reset the device and the response should be

```
ELM327 v1.1
```

If you get this response, then you know the connection is ok. If not, you have done something wrong during the setup or your vehicle is not OBD-II compliant.

For a complete description of using Hyperterminal refer to the following link

http://www.scantool.net/support/index.php?_m=knowledgebase&_a=viewarticle&kbarticleid=25&nav=0,6

Bluetooth Connection Notes

Nearly all new laptops and Pocket PCs come with Bluetooth wireless support built in. The following are some notes to assist you in connecting a BT enabled scan tool. After installing the software for the first time, you will note that the Connect and Disconnect buttons on the Connection tab are disabled. This is because *OBD 2007* at this stage is not aware of which Com port to be used. For Bluetooth to be used successfully a virtual serial port has to be established before you can enter that serial port number into the *OBD 2007* Com port setup window. Since the BT radio has to be powered before it can work, unlike a USB/Cable connection, the BT scan tool must be connected to your vehicle via the OBD connector to successfully establish a virtual serial port for the BT scan tool. With the ignition switch on, the vehicle powers the scan tool and the BT radio (see notes above for other types of serial adapters).

The following describes the procedure for a laptop computer, but the procedure for a Pocket PC is very similar and most Pocket PCs have a wizard to take you through the process. If your laptop uses a wizard just follow the steps on the wizard, if not click on the Bluetooth icon in control panel or on the taskbar. We know the BT service we want to use (Bluetooth serial) what we need the computer to do is scan for nearby devices that support that service. Once you start the search the computer should return a list of products within your "*Bluetooth Neighborhood*". If there is an option to only show certain devices, make sure you choose all devices.

When the device is found it will be represented by an icon with a descriptive name describing the device. For example a Car-Pal unit will show Car-Pal OBD 100xxx – the xxx part of the number is different for each Car-Pal unit. The next step will show something like Car-Pal 100xxx AT Serial. You will then be asked to configure the BT unit. The configuration can either be secured or non secured – if you choose secure you will be asked to enter the pin number (usually 0000) or (1234 in the case of ElmScan5 Bluetooth) of your BT scan tool. At the completion of the configuration a serial port number will be assigned, such as Com8. Please note this serial port number. This is the value you must select when you start *OBD 2007* and open the Com port setup window.

This is a once only configuration. *OBD 2007* remembers the Com port between successive uses of the program. Of course if you change back to USB/Serial cable at any time you would have to change the com port number to match the USB/Serial cable and vice versa.

References

International Standard ISO 15031-5 Available at www.iso.org

SEA International SEA J1979 Available at www.sae.org

Both of these are technically equivalent, but at the time of writing the ISO product appears to be more current.

Appendix A

Elm327 v1.2 chip - Support for higher baud rates

The Elm327 1.2 chip introduced support for higher baud rates. The 1.2 chip still supports the 9,600 bps and 38,400 bps baud rates of the previous model chips, but now offers support for increased speeds of 57,600 bps through to 500,000 bps.

By increasing the baud rate the Elm327 chip is less likely to suffer from BUFFER FULL errors, which can be quite common in vehicles operating with the CAN protocol.

To enable backward compatibility with the older chips we have redesigned the Com Port setup window to simplify the selection of baud rate. The original Baud Rate combo box containing the two original settings is retained, but we have introduced an additional High Speed Baud Rate combo box to support users with Elm327 1.2 chipped scan tools. See the window below.

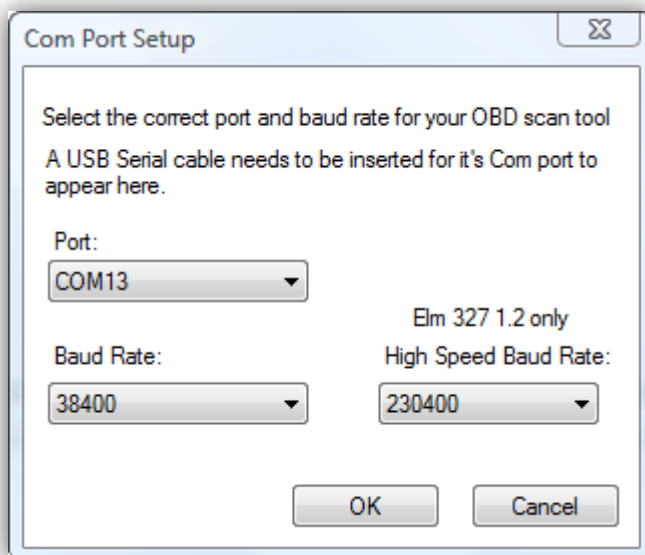


Figure 27 - Com Port Setup

If your scan tool contains an Elm327 1.1 chip, you only need to select the baud rate from the left hand combo box as in previous versions of *OBD 2007*. Any selection in the right hand combo box is ignored. For the 1.2 chip you may select any of the new baud rates from 57,600 bps through 500,000 bps.

Please be aware that the *OBD 2007* baud rate selection of the left hand combo box, must match the selection of your hardware baud rate. Failure to do so will prevent *OBD 2007* making a connection with the vehicle. Please see your scan tool manufacturer's user guide for how to change the baud rate on your scan tool. The following diagram courtesy of Scantool.Net shows the layout of the jumper pins on the ElmScan5 board. Position C is the baud rate pin. Without a jumper the baud rate is 9,600 bps, with the jumper in place the baud rate is 38,400

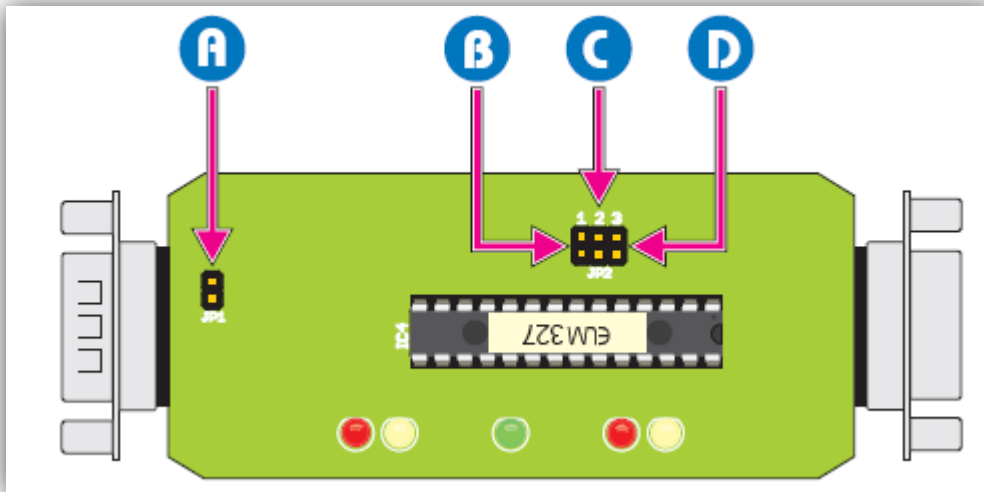


Figure 28 - ElmScan5 Jumper Pins

Other manufacturers have similar jumper pin layouts; please follow the instructions of your scan tool manufacturer.

OBD 2007 will always start the connection at either 9,600 or 38,400 depending on your original selection from the left hand combo box of the Com Port Setup window. When *OBD 2007* connects to the vehicle, an initialization sequence is run which gathers information about your vehicle. At the completion of this process, if your scan tool is equipped with a 1.2 chip, *OBD 2007* will automatically attempt to increase the baud rate to the baud rate you have selected in the Com Port Setup window via the right hand combo box. At the completion of the attempt, the baud rate will be set at the new baud rate. If the attempt failed, *OBD 2007* will automatically revert to the baud rate you selected in the left hand combo box of the Com Port Setup window. You will be notified on the baud rate change both in the upper window of the Connection tab and the status bar of the main window. The next window shows the Connection tab and Status bar showing a connection at 230,400 baud.

You may ask why an attempt at a certain baud rate might fail. Your connection to your computer could be by serial cable, USB serial adapter cable, USB scan tool or even via Bluetooth serial. Each of these types of connections can support various baud rates – some adapters even come with support for variable settings. Not all of these adapters support the higher speed baud rates. Most will connect at either 57,600 bps or 115,200 bps, but some will not connect at 234,000 bps or 500,000 bps, hence the need for *OBD 2007* to attempt a higher baud rate connection. Because *OBD 2007* will always first connect at 9,600 or 38,400 you can be guaranteed that your connection will still succeed even if your higher baud rate connection does not.

You can quite easily establish which connection speeds are supported, by sequentially testing from lower to higher baud rates until the highest baud rate fails, if in fact it does. If for instance you can successfully connect at 230,400, but not 500,000, reselect 230,400 and save the setting. All subsequent connections of *OBD 2007* to your scan tool will then be made at 230,400 bps.

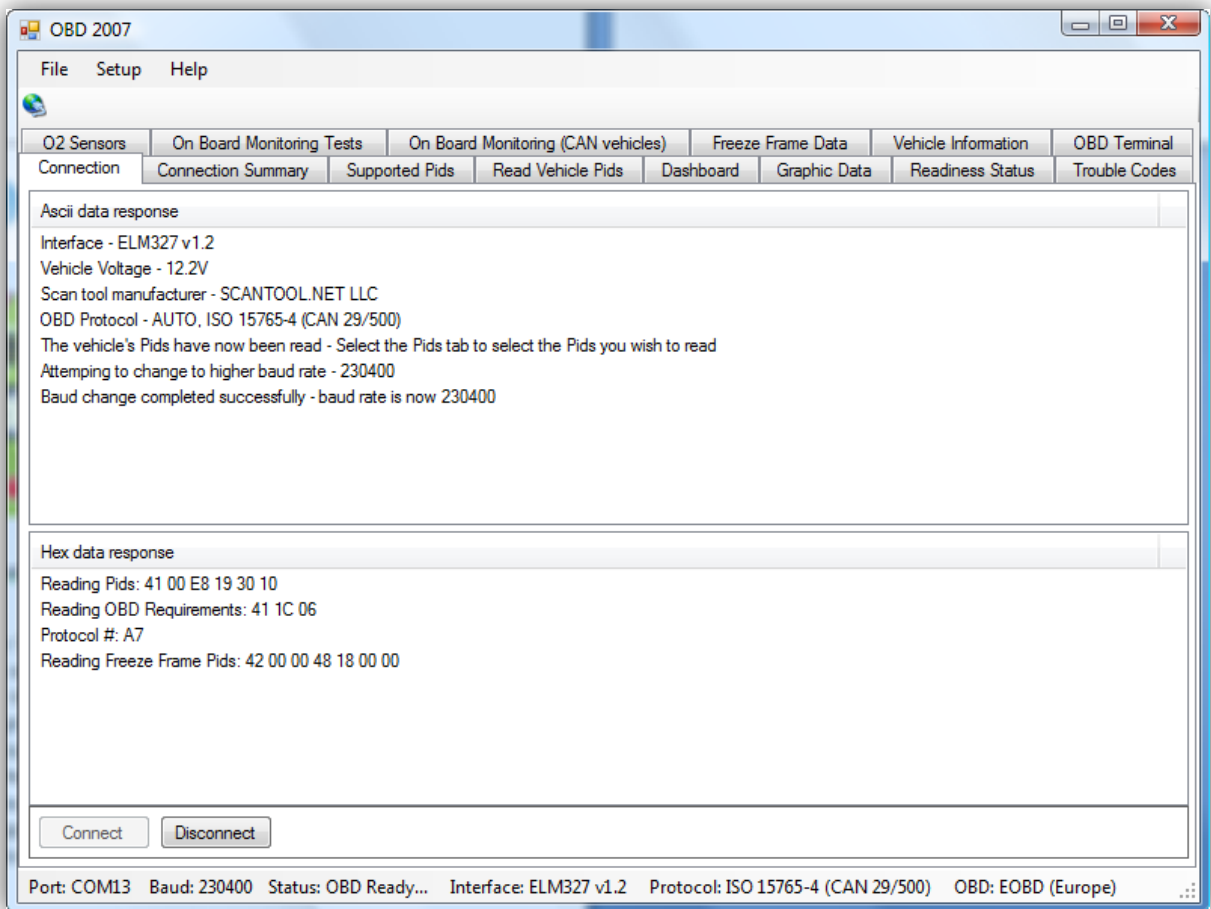


Figure 29 - Connected at 230400 baud

Appendix B – Auto Discovery

With the release of *OBD 2007* version 1.0.13.8 we introduced a new feature to the Com Port Setup window to make it easier to select the correct Com port for your scan tool. This version of *OBD 2007* adds a new Auto Discover button to the Com Port Setup window. The Auto Discover button will automatically cycle through the Com ports of your computer looking for the Com port that your scan tool is connected to. This is a useful feature if you have more than one way of connecting to your scan tool. You may have a scan tool that is capable of connecting by both Bluetooth serial and a USB serial adapter, such as the ElmScan5 Bluetooth. In each case the Com port used would be different. The Auto Discovery process eliminates the need to remember or lookup the correct Com port for each connection.

When you click the Auto Discover button, *OBD 2007* builds a list of Com ports that are attached to your machine. It then tests each Com port sequentially testing if the Com port is connected to your scan tool. The progress of the testing is indicated on the status bar at the bottom of the window. As most new scan tools are now set to 38,400 baud by default, it first tests at 38,400 baud and then at 9600 baud. If no OBD Port is found, it then moves on to the next Com port until the correct port is found. You are then offered a dialog window, where you can choose to save the found port or ignore the found port and set the port manually. In either case your selection is saved, so that the next time you run *OBD 2007* it will default to the saved port.

The new Com Port Set window is displayed below.

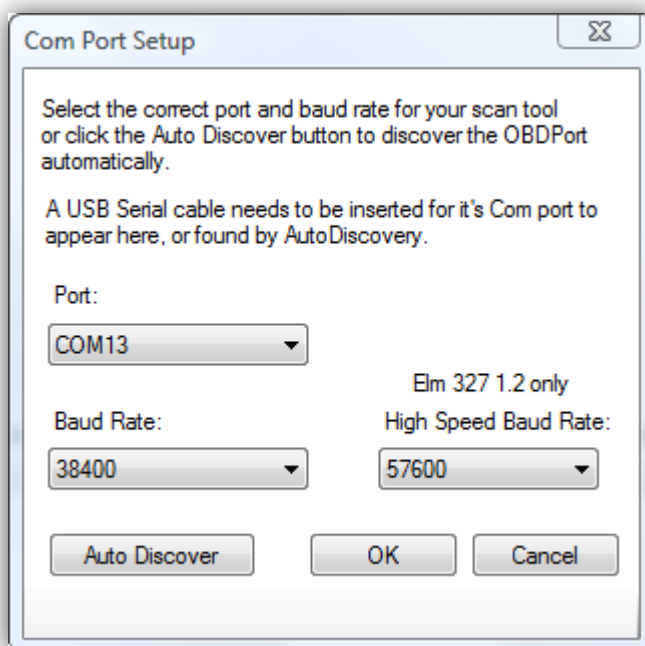


Figure 30 - Com port set - Prior to Auto Discovery

The following window displays Auto Discovery during testing.

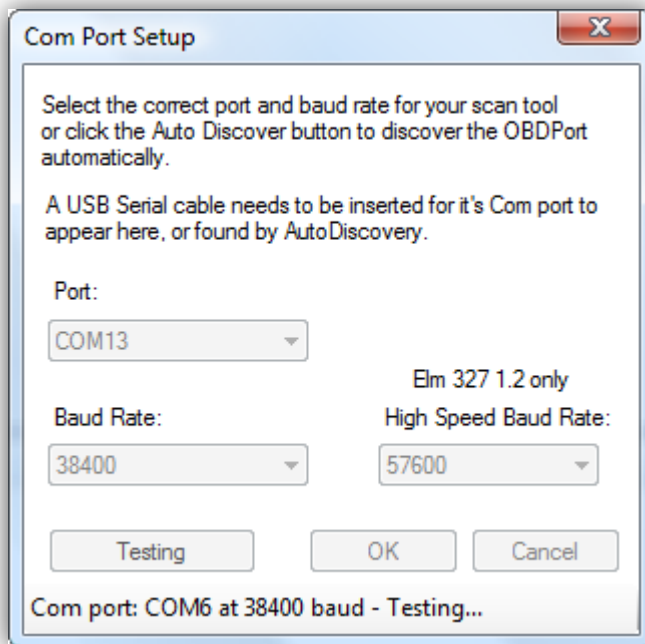


Figure 31 - Com port setup – During Auto Discovery

Appendix C - OBDPro Higher Baud Rates

With the introduction of the Elm v1.2 chip, *OBD 2007* introduced Higher Baud Rate selections to the Com Port Setup window. Now that we also support OBDPro we again need to revise our Com Port setup window. This appendix covers those changes.

OBDPro supports all of the AT commands of the Elm v1.2 chip except the commands used to change baud rates. The reason that there is a different mechanism is that the OBDPro supports even higher baud rates, which the Elm does not, and therefore the AT commands, need to be different to accommodate those baud rates. Both types of scan tools allow either the baud rate to be automatically changed by software or the user can change the baud rates manually by issuing the appropriate commands prior to connecting to the vehicle via *OBD 2007*.

The easiest option is to allow *OBD 2007* to automatically shift the baud rate for you for both types of scan tools as the earlier appendixes have indicated. However we now allow advanced users to utilize the ability to set their own baud rates. The advantage of allowing *OBD 2007* to automatically shift the baud rate is that if a particular baud rate fails, then automatically *OBD 2007* will shift back to a lower baud rate and continue with the connection.

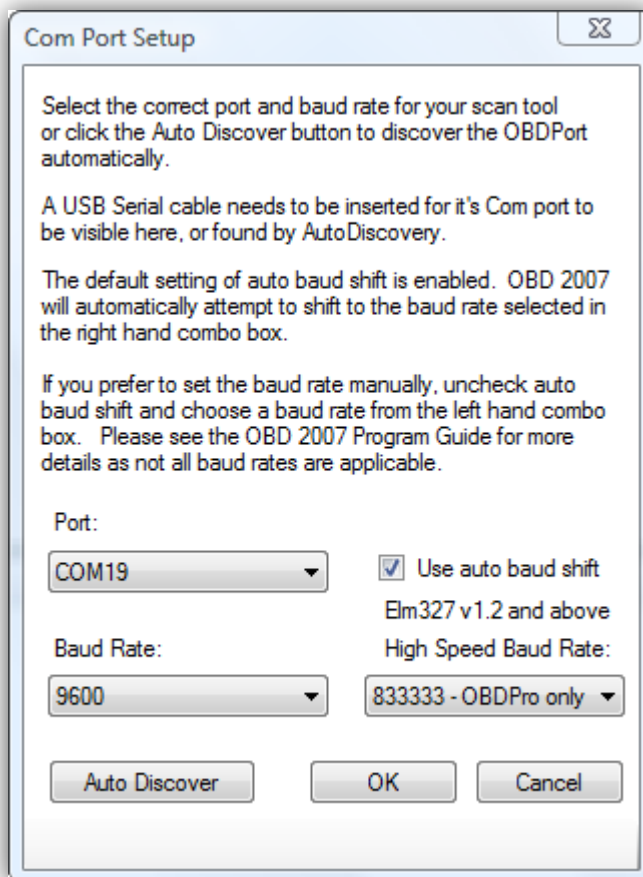


Figure 32 - Com port setup - OBDPro

The default behaviour of the new Com Port Setup window is the automatic baud rate change, so if you wish to still allow *OBD 2007* to operate as before, no changes need to be made. There are now new additional baud rates to accommodate the OBDPro higher baud rates in both the left hand combo box and the right hand combo box and baud rates that are unique to each tool are marked appropriately.

If don't wish to use the automatic baud shift behaviour of *OBD 2007*, uncheck the checkbox above the right hand combo box. When that check box is unchecked, the right hand combo box becomes disabled and baud rate selection is only available via the left hand combo box. Please note that no checking is done by *OBD 2007* when using baud rates from left hand combo box. If the hardware baud rate setting does not match the *OBD 2007* baud rate selection then the connection to the vehicle will fail.

Notes Higher Baud Rates

Elm v1.x scan tools can connect at either 9600 or 38400 baud. The correct setting depends on the jumper setting on the board – see Appendix A for a diagram of the jumper settings. Elm v1.2 and above scan tools require the use of the AT PP 0C command to permanently set baud rates at higher rates – please refer to the Elm data sheet for more details. Please also be aware of the hardware trick as noted on page 39 of the Elm datasheet to unlock an Elm chip if you have incorrectly used an AT PP command.

OBDPro uses both the AT SCS x and AT WSC commands to change baud rates. The default baud rate of the OBDPro scan tool is 9600 baud. Please refer to the OBDPro datasheet for more details.

Please also note that to be able to set and reset baud rates you will need to use a tool such as Hyperterminal or RealTerm. Do not attempt this procedure unless you are conversant with the respective datasheets and the use of the above software tools.

Hyperterminal ships with all versions of Windows except Vista. For Vista users <http://www.hilgraeve.com/hyperterminal.html>

RealTerm is available from <http://realterm.sourceforge.net/>
