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# 1 Introduction

ecuEdit - powerful program tool allowing:

- to diagnose the ECU parameters on the basis of SSM (Subaru Select Monitor), MUT (Mitsubishi) and OBD-II;
- to read and write firmware Subaru and Mitsubishi brand cars;
- to edit firmware binaries based on the XML description of 3D, 2D, 1D maps;
- to reviewing diagnostic logs.

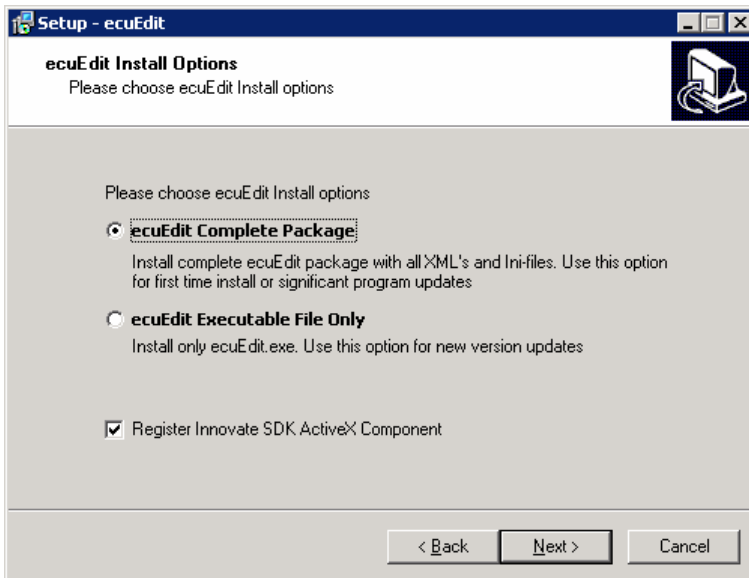
ecuEdit supports the following diagnostic cables:

- • OpenPort 1.2 (for the diagnosis of all cars, read / write Subaru 2.0 Turbo 2001-2005)
- • OpenPort 1.3M (for the diagnosis of all cars, read / write Mitsubishi Lancer Evo 7-9)
- • OpenPort 1.2S (for the diagnosis of all cars, read / write Subaru 2.5 Turbo)
- • OpenPort 1.3U (for the diagnosis of all cars, read / write all supported cars)

## 2 Installation

The ecuEdit installation process has the following options:

- **"ecuEdit Complete Package"** – is necessary with the primary installation of program. In the process of installation all entering the program files are copied, including standard descriptions and tuning;
- **"ecuEdit Executable File Only"** – in the process of installation will renew only program itself. Descriptions and tuning will remain without the changes;
- **"Register Innovate SDK ActiveX Component"** – install and register components for the work with the external sensors from Innovate Motorsports (LC -1, LM-1, etc)..



**Pic. 1** ecuEdit installation options

After selecting installation options is necessary to select **"Next >"**, accept license agreements and confirm other standard options of installation.

## 3 Work with ecuEdit

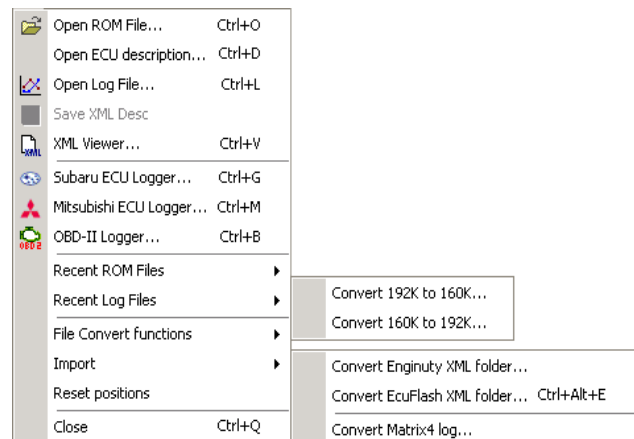
### 3.1 Main window of the program



Pic. 2 Main window of the ecuEdit program

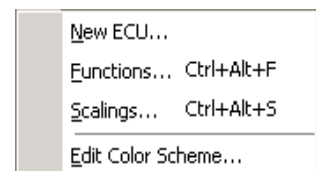
#### 3.1.1 "File" menu functions

- **"Open ROM File..."** – opening a file with the firmware;
- **"Open ECU description..."** – opening the description from descriptions library to view or editing;
- **"Open Log File..."** – view CSV-format log file;
- **"Save XML Desc"** – saving changes made in descriptions library;
- **"XML Viewer..."** – view descriptions library in XML format;
- **"Subaru ECU Logger..."** – starting diagnostic module for Subaru cars;
- **"Mitsubishi ECU Logger..."** – starting diagnostic module for Mitsubishi cars;
- **"OBD-II Logger..."** – starting OBD-II diagnostic module;
- **"Recent ROM Files"** – a list of previously used firmware files;
- **"Recent Log Files"** – a list of previously used log files;
- **"Convert 160K to 192K..."** – feature allows you to convert firmware file size 160 KB in file size of 192 KB (used for Subaru 2.0 Turbo firmware);
- **"Convert 192K to 160K..."** – feature allows you to convert firmware file size 192 KB in file size of 160 KB (used for Subaru 2.0 Turbo firmware);
- **"Convert Enginuity XML folder..."** – conversion firmware and logger descriptions from Enginuity format into ecuEdit format;
- **"Convert EcuFlash XML folder..."** – conversion firmware descriptions from EcuFlash format into ecuEdit format;



#### 3.1.2 "Edit" menu functions

- **"New ECU..."** – to create new firmware type description;
- **"Functions..."** – to work with internal functions list;
- **"Scalings..."** – to work with internal scaling list.



#### 3.1.3 "Tools" menu functions

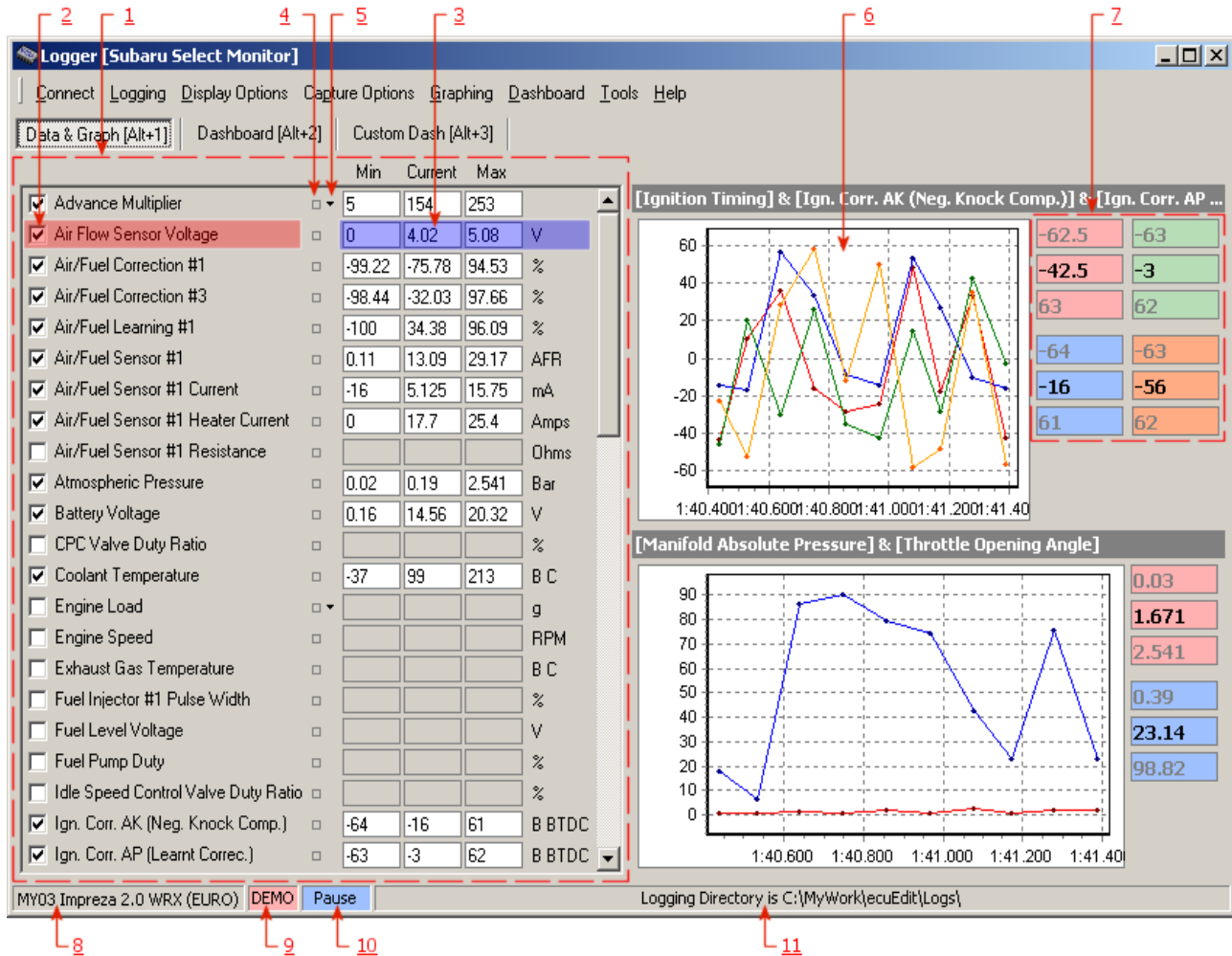
- **"Flash Utility"** – ECU read and flash utility;
- **"Options – Antialias Charts"** – enable graph smoothing.

#### 3.1.4 "Window" menu functions

- **"Own desktop style"** – switches interface programs to work in their own desktop mode-all the windows will be inside the main window;
- **"Next Window"** – activate next window.

## 4 Diagnostic module (Logger)

### 4.1 General view



**Pic. 3** Logger's main window

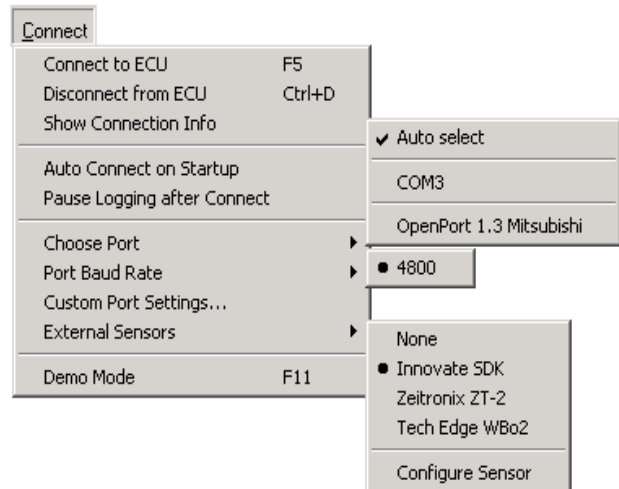
Pic. 3 explanations:

1. The list of available diagnostic parameters
2. Enable / disable reading of parameter
3. Current value of parameter (minimum / current / maximum value)
4. Access button to parameter settings
5. Selection of alternate addresses of parameter
6. Display selected parameters on the graph
7. Parameter statistics on the graph
8. Type of connected ECU
9. The port which used for connection to ECU or **DEMO** if module in **DEMO** mode.
10. The speed of data packet reading, or **PAUSE** if module in **PAUSE** mode
11. The path to the folder there will be logs stored or name of log file in the record mode.

## 4.2 Main menu

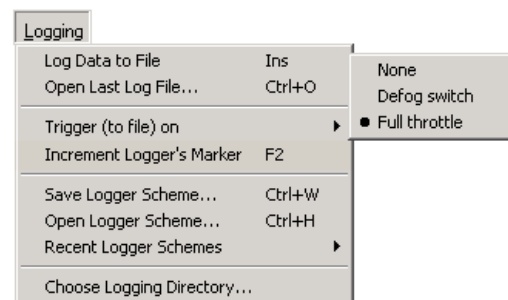
### 4.2.1 "Connect" menu functions

- **"Connect to ECU"** – the connection through selected port to ECU;
- **"Disconnect from ECU"** – disconnection from ECU;
- **"Show Connect Info"** – obtaining information about ECU;
- **"Auto Connect on Startup"** – automatic connection to ECU after running diagnostic module;
- **"Pause Logging after Connect"** – after connecting automatically switch to **PAUSE** mode;
- **"Choose Port"** – port which used for ECU connection (you can choose Auto Select-for automatic selection);
- **"Port Baud Rate"** – port baud rate for ECU connection;
- **"Custom Port Settings..."** – setting port (timeouts, etc.);
- **"External Sensors"** – connected external sensors (when module establish connection to ECU it also try establish connection to selected external sensor)
  - **"Innovate SDK"** – connect to LM-1, LC-1 sensors using ActiveX component from Innovate ([www.innovatemotorsports.com](http://www.innovatemotorsports.com)). Component can be installed in ecuEdit installation wizard by enable **"Register Innovate SDK ActiveX Component"** checkbox;
  - **"Zeitronix ZT-2"** – connect to Zeitronix ZT-2 sensor;
  - **"Tech Edge WBo2"** – connect to Tech Edge WBo2 sensor;
  - **"Configure Sensor"** – setting sensor parameters (available for the selected sensor);
- **"Demo Mode"** – starting diagnostic module in the demo mode (will be available most of module functions without physical connection to the ECU).



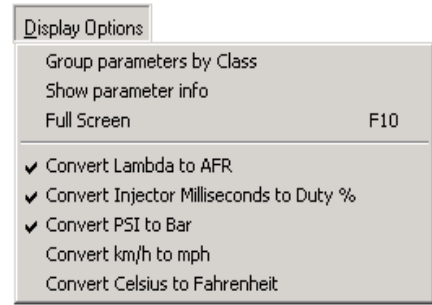
### 4.2.2 "Logging" menu functions

- **"Log Data to File"/"Stop Log"** – start/stop record in the log file (the file name will be assigned automatically and includes the date and time of the beginning of record);
- **"Open Last Log File..."** – open last recorded log-file in log viewer module;
- **"Trigger (to file) on"** – selecting one of the triggers for the automatic beginning of record to file (record started when value of trigger is true and stopped in the opposite case). Triggers are described in the XML-description of logger;
- **"Increment Logger's Marker"** – increments **"Marker"** parameter value by 1;
- **"Save Logger Scheme..."** – save logger scheme to XML file. The scheme includes:
  - list of selected parameters;
  - parameters settings;
  - graphs settings;
  - dashboard settings;
- **"Open Logger Scheme..."** – opening early saved logger schemes;
- **"Recent Logger Schemes"** – list of early saved/opened logger schemes;
- **"Choose Logging Directory"** – selection of folder that will be store log files.



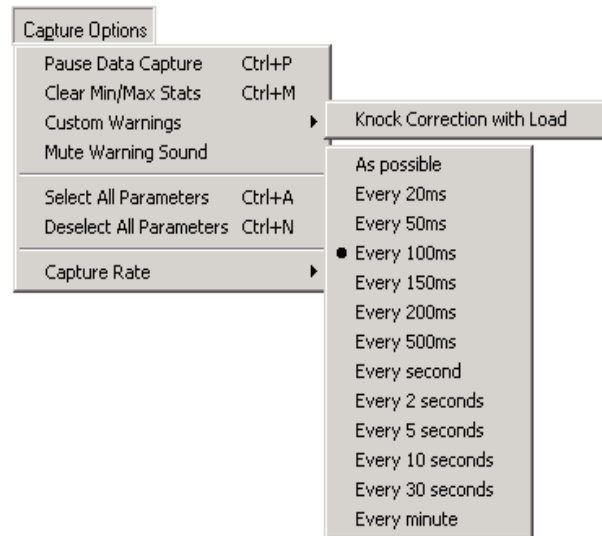
### 4.2.3 "Display Options" menu functions

- **"Group parameters by Class"** – turns on/off options for grouping parameters by classes;
- **"Show parameter info"** – turns on/off showing address and size of parameters;
- **"Full Screen"** – switching logger in full screen mode or return to the standard windowing mode;
- **"Convert Lambda to AFR"** and others – enable/disable conversion functions of parameters values. Conversion functions described in the XML description of logger.



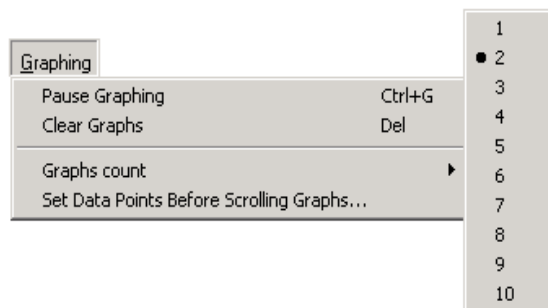
### 4.2.4 "Capture Options" menu functions

- **"Pause Data Capture"** – turns on / off pause mode;
- **"Clear Min/Max Stats"** – cleans statistics of parameters minimum and maximum values;
- **"Custom Warnings"** – enabling/disabling additional extended warnings based on the values of parameters. Additional warnings described in the XML description of logger;
- **"Mute Warning Sound"** – mute warning sound;
- **"Select All Parameters"** – select all available parameters for reading;
- **"Deselect All Parameters"** – deselect all available parameters for reading;
- **"Capture Rate"** – limiting speed of reading.



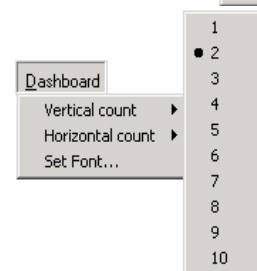
### 4.2.5 "Graphing" menu functions

- **"Pause Graphing"** – stop/start displaying graphs;
- **"Clear Graphs"** – clear graphs;
- **"Graph count"** – selection of a graphs quantity in the logger window;
- **"Set Data Points Before Scrolling Graphs..."** – assign a maximum quantity of points on graphs.



### 4.2.6 "Dashboard" menu functions

- **"Vertical count"** – quantity of parameters on the **"Dashboard"** panel on the vertical line;
- **"Horizontal count"** – quantity of parameters on the **"Dashboard"** panel on the horizontal line;
- **"Set Font"** – selection of font type for **"DashBoard"** panel. The size of font will be calculated automatically.



## 4.2.7 "Tools" menu functions

- **"Diagnostic Trouble Code Reader..."** – reading trouble codes from ECU;
- **"View Trouble Codes List"** – view descriptions of all of available errors;
- **"Read Freeze Frame"** – reading the value of parameters from OBD-II freeze frame;
- **"Memory Logger"** – tool for reading ECU memory;
- **"Reset ECU..."** – reset ECU and clears all trouble codes;
- **"Port Reader..."** – tool for reading data coming in I/O port. Used, for example, for reading data from unsupported external sensor.

Tools	
Diagnostic Trouble Code Reader...	F4
View Trouble Codes List	
Read Freeze Frame	F8
Memory Logger	F9
Reset ECU...	F7
Port Reader...	

## 4.3 Connection to ECU

This is necessary for the connection to ECU:

- connect diagnostic cable to OBD port of car and connect another end to the computer;
- select cable port in menu **"Connect\Choose Port"** or select **"Auto Select"** (in this case FTDI port adapter will be automatically selected);
- if using an external sensor (chosen from the menu **"Connect\External Sensors"**), you should also check its connection;
- the switch ignition key of a car to the **"ON"** position;
- execute menu function **"Connect\Connect to ECU"** (or press [F5]).

In the case of successful connection the list of the available diagnostic parameters will appear on the screen.

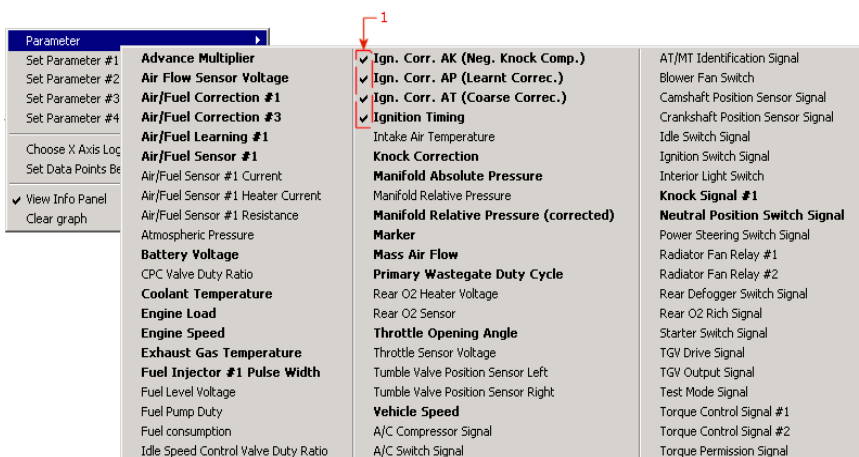
After connection the logger can be entered in the **"PAUSE"** mode. In this mode the diagnostic parameters do not request from ECU.

In the process of diagnostics the logger requests only selected parameters (they are marked by check sign in the list).

## 4.4 Graphs configure

For the access to graph settings use graph context menu (by right button mouse click on the graph).

To adding parameter on the graph select it from graph context menu. To remove parameter from graph necessary to select this parameter again.



**Pic. 4 The choice of parameters to be displayed on the graph**

The graph may appear up to 4 parameters. The number of graphs can be set via a menu **"Graphing\Graph count"**.

Graph has a limitation in a quantity of visible points. After exceeding of this quantity graph will be scrolled. A quantity of visible points can be assigned, using a function of menu



**"Graphing\Set Data Points Before Scrolling Graphs..."** or analogous function from the graph context menu.

By default, the X axis of graphs is time. There is a possibility of selection any parameter as the X axis of the graph through context menu of graph **"Choose X Axis Log"**.

To switch off/on panel with parameter statistics use item **"View Info Panel"** from the graph context menu.

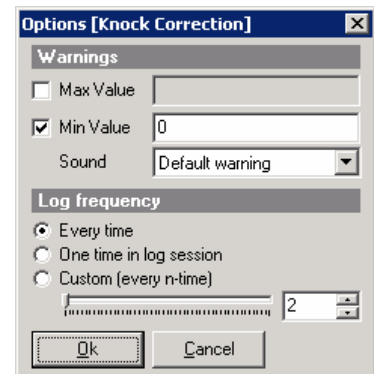
## 4.5 Parameters configure

Program makes it possible to produce additional settings of the diagnostic parameters:

- configuration warnings of allowable values range;
- warning sound selections;
- frequency of the parameter requests:
  - every time;
  - one time per log session;
  - every n-time.

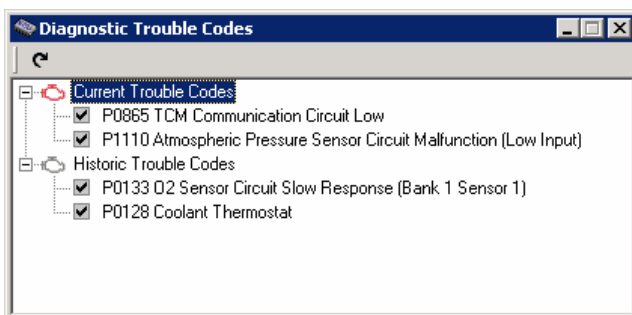
Setting request frequency can improve speed of requests priority parameters, which will provide more detailed diagnostic view.

Color of the text parameter is changed to red when warning is happens. So you can find the source of warnings.



## 4.6 Trouble code reader

This function makes possible to retrieve information about trouble codes from ECU.



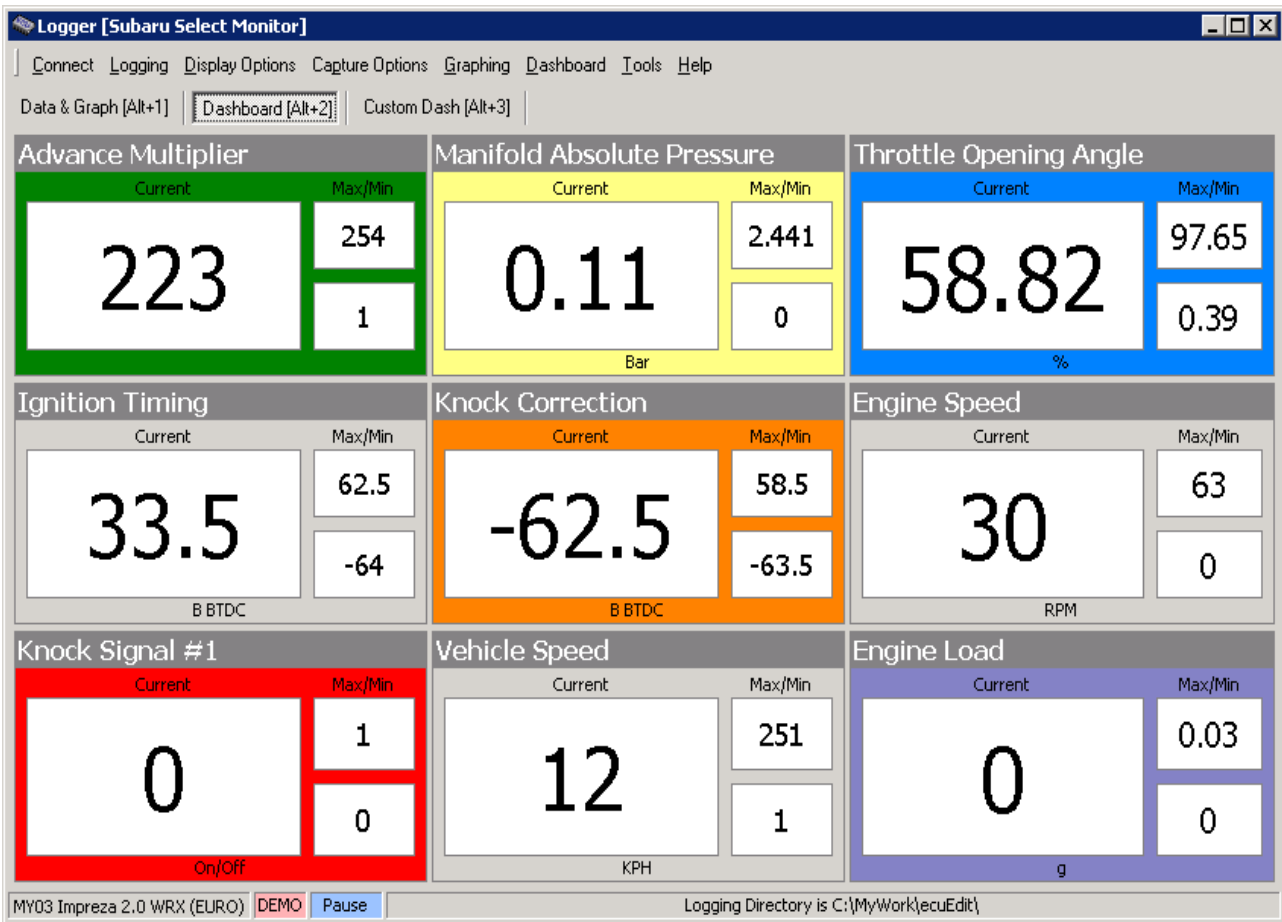
**Pic. 5** Logger. Trouble code reader

## 4.7 Memory Logger tool

The function allows you to read any available range of ECU memory and display this data in **HEX Viewer** window.

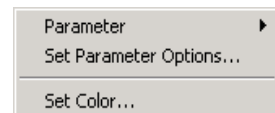
## 4.8 Dashboard

Parameters can be displayed in the form of a simple dashboard. The number of parameters on the panel can be specified using the function menu **"Dashboard\Vertical Count"** and **"Dashboard\Horizontal Count"**. Also you can change the type font using the **"Dashboard\Set Font"**. Font size is calculated automatically, depending on the size of the logger's window.



**Pic. 6** Logger. Dashboard

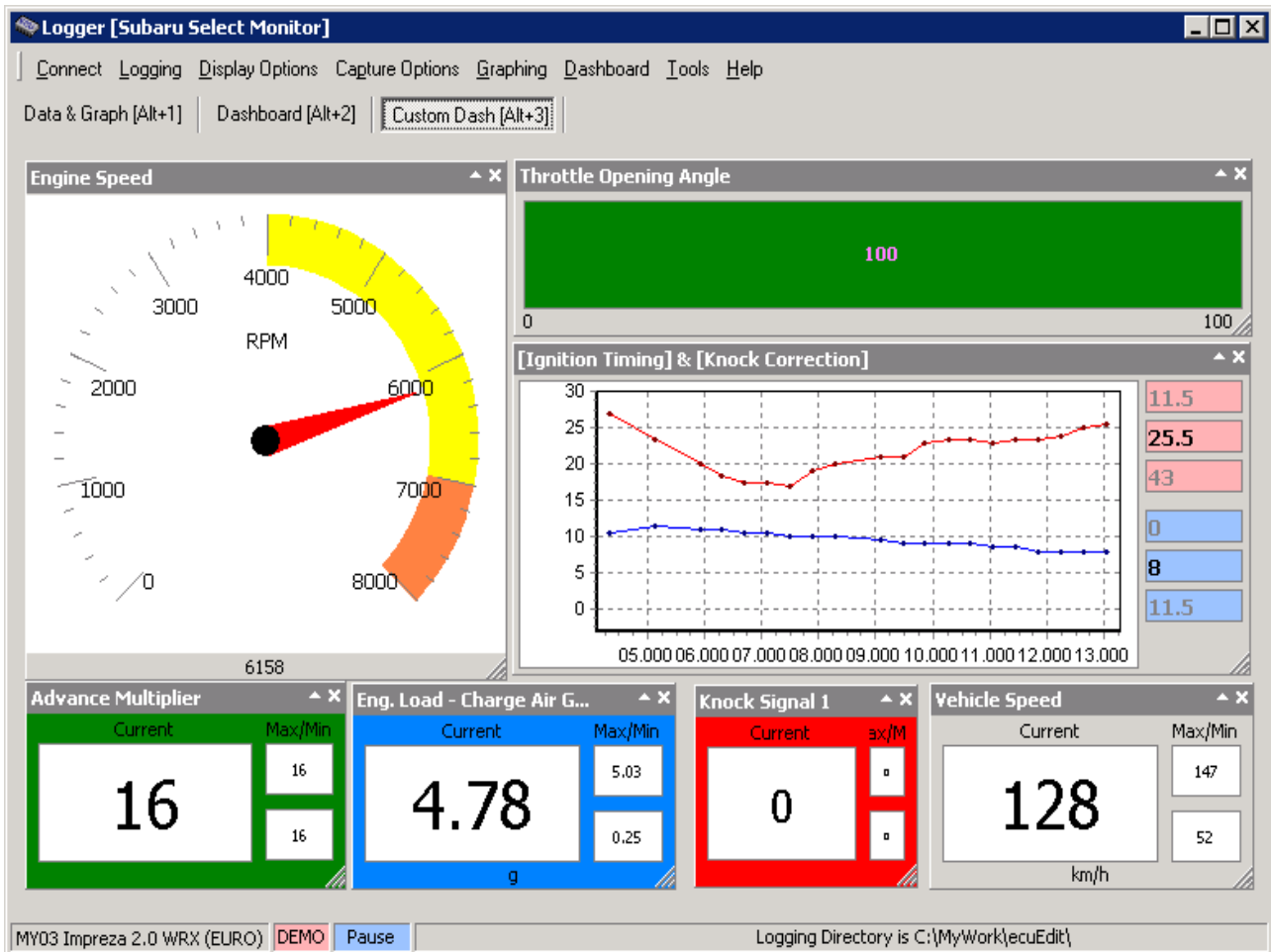
Each element of the dashboard has its own context menu (right button mouse click on the element). The selection of the diagnostic parameter is accessible in menu item **"Parameter"**. Also possible to assign the background color of element using menu item **"Set Color..."**.



## 4.9 Custom dashboard

The function allows you to configure dashboard panel using the following types of gauges:

- digital gauge – a digital display of parameter’s values and statistics;
- analog gauge – in the form of 270 ° face with an arrow;
- bar gauge – filled rectangle in % of values range;
- graph – display up to 4 parameters of the graph.



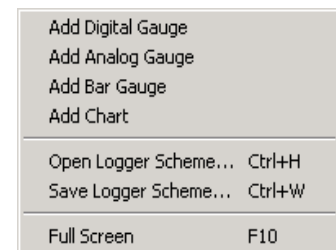
Pic. 7 Logger. Custom dashboard

### 4.9.1 Adding gauge items

The adding of gauges occurs from the context menu of background dashboard panel:

- **"Add Digital Gauge"** – adding digital gauge;
- **"Add Analog Gauge"** – adding analog gauge;
- **"Add Bar Gauge"** – adding bar gauge;
- **"Add Chart"** – adding graph.

After selection gauge is appears at the dashboard panel. You can change size and position of gauge.

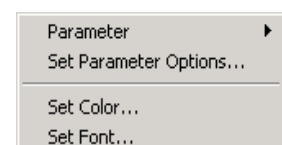


### 4.9.2 Gauge settings

Each gauge has its own context menu, which depends on the type of gauge.



#### 4.9.2.1 Digital Gauge settings

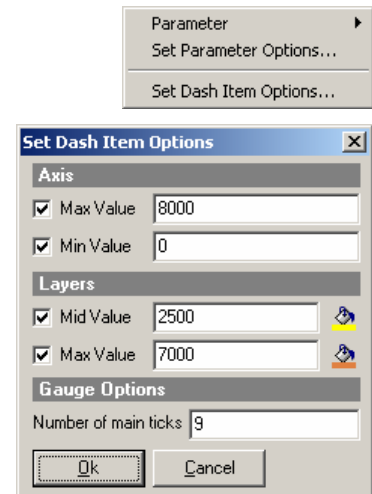
- **"Parameter"** – diagnostic parameter selection;





- **"Set Parameter Options..."** – set options for selected diagnostic parameter (see 4.5);
- **"Set Color..."** – set gauge background color;
- **"Set Font..."** – set font type (size is calculated automatically).

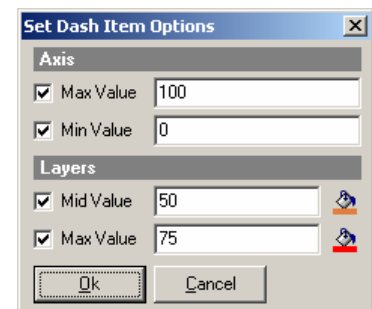
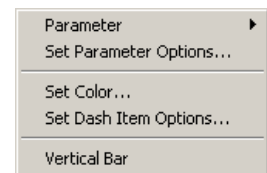
#### 4.9.2.2 Analog Gauge settings

- **"Parameter"** – diagnostic parameter selection;
- **"Set Parameter Options..."** – set options for selected diagnostic parameter (see 4.5);
- **"Set Dash Item Options..."** – gauge additional options:
  - **"Axis Max Value"**, **"Axis Min Value"** – setup axis maximum and minimum values;
  - **"Layers Mid Value"** – the starting value of the zone of average values (  – color selection of filling zone);
  - **"Layers Max Value"** – the starting value of the zone of maximum values (  – color selection of filling zone);
  - **"Number of main ticks"** – number of main ticks of analog gauge.



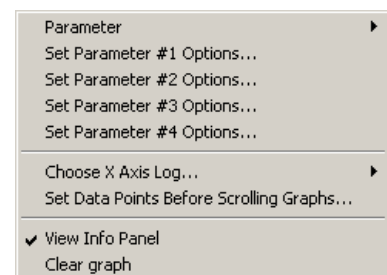
#### 4.9.2.3 Bar Gauge settings

- **"Parameter"** – diagnostic parameter selection;
- **"Set Parameter Options..."** – set options for selected diagnostic parameter (see 4.5);
- **"Set Color..."** – set bar gauge color;
- **"Set Dash Item Options..."** – gauge additional options:
  - **"Axis Max Value"**, **"Axis Min Value"** – setup axis maximum and minimum values;
  - **"Layers Mid Value"** – the starting value of the zone of average values (  – color selection of filling zone);
  - **"Layers Max Value"** – the starting value of the zone of maximum values (  – color selection of filling zone);
  - **"Vertical Bar"** – gauge as vertical bar.



#### 4.9.2.4 Chart settings

- **"Parameter"** – diagnostic parameter selection;
- **"Set Parameter Options #1-#4..."** – set options for selected diagnostic parameter (see 4.5);
- **"Choose X Axis Log..."** – selection parameter for X-Axis;
- **"Set Data Points Before Scrolling Graphs..."** – the selection of a maximum quantity of points on the X-axis;
- **"View Info Panel"** – switch on/off display the statistics of selected parameters;
- **"Clear graph"** – clear graphs.

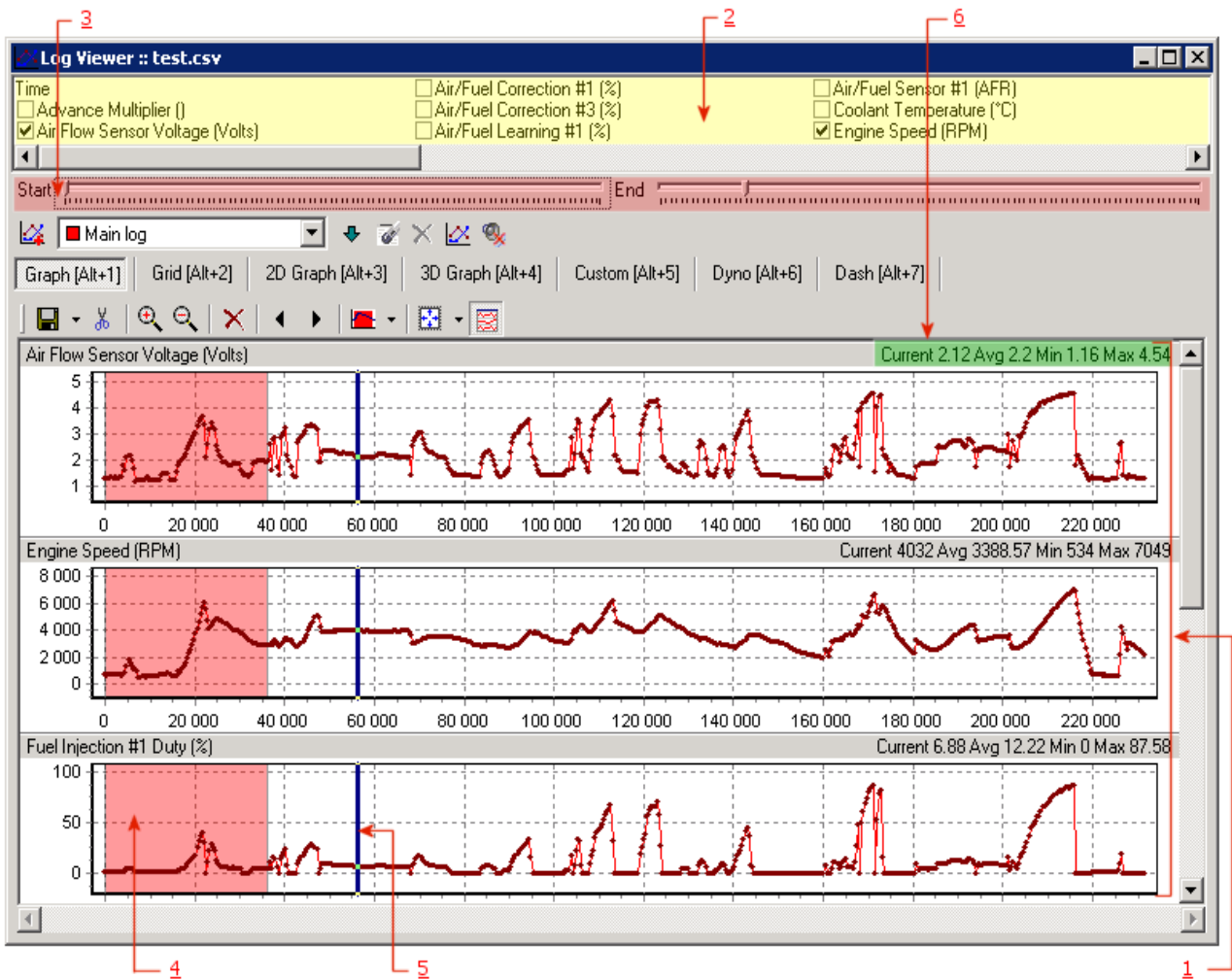


#### 4.10 Extras

In the process of diagnostics you can place memorable markers after including the parameter **"Marker"** in the list of the diagnosed parameters. Marker can take values from **0** to **65535**. Value increases by **[F2]** key.

## 5 Log viewer

### 5.1 General view














**Pic. 8 Main window of Log viewer**

Pic. 8 explanations:

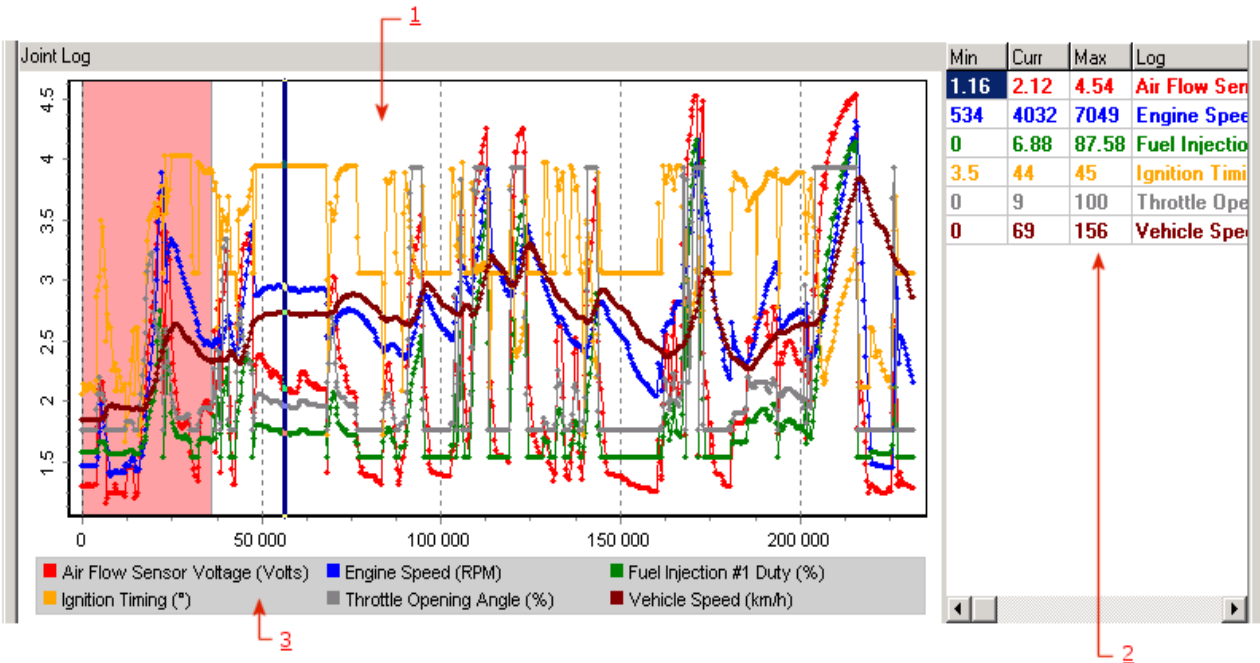
1. Graphs of log parameters
2. The list of log parameters (possible choice of parameters to be displayed)
3. Rulers to select area of logs
4. Selected log area
5. Time cursor (moving by keys or click the left mouse button on the point of logs)
6. Parameter statistics and the current parameter data of cursor.

Functional buttons:

-  – save log/selection area to a file;
-  – cut log selected area;
-  – zoom log (mouse zoom available);
-  – unzoom log;
-  – show full log on screen;
-  – move cursor backward **[Alt+Left]**;
-  – move cursor forward **[Alt+Right]**;
-  – log selection functions (see 5.2);
-  – select graph size;

-  – show all log parameters on single graph;
-  – mute warning sound while log playback.

Log can be represented as single graph. To do this use  icon or **[Ctrl+J]**.

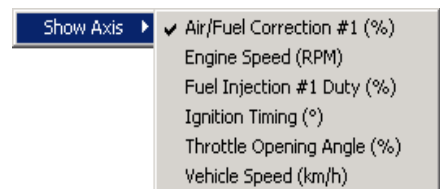


**Pic. 9 Viewing log as single graph**

Pic. 9 explanations:

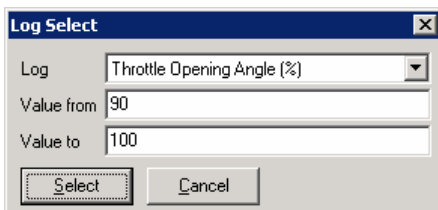
7. Parameters graphs
8. Parameters statistics
9. Parameters legends

On the graph possible to show the axes of the any parameter (by default, the axis of first parameter is shown). For do this necessary in the context menu of graph choose **"Show Axis"** and select the necessary axes.

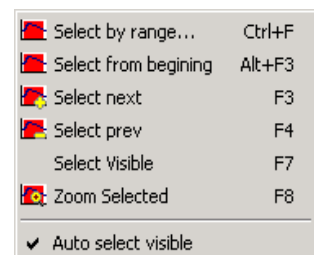


## 5.2 Log area selection

Most log analyzer functions work only with selected log area. You can use rulers (Pic. 8) to select area manually. Program can automatically select log area in accordance with assigned conditions (menu item **"Select by of range..."**).



In the dialogue box, select the log parameter and sets the minimum and maximum value of the parameter. Use functions **"Select next"** [F3] and **"Select prev"** [F4] to find next or previous logs area meeting the desired values. The **"Select from beginning"** [Alt + F3] function repeats search area from the beginning.



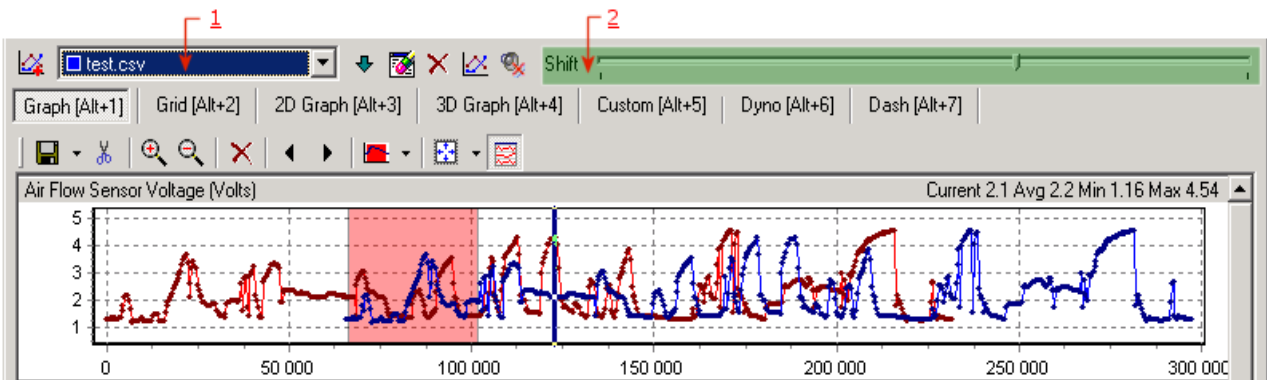
For selection of the visible are of log (for example, after zoom or scroll) use **"Select visible"** [F7]. To zoom select area on entire screen - **"Zoom Selected"** [F8]. With switched on parameter **"Auto select visible"** program automatically select visible area of log.

The boundaries of the selected area can be changed using keys:

- **[Ctrl+Left]**, **[Ctrl+Right]** – change right boundary;
- **[Alt+Left]**, **[Alt+Right]** – change left boundary.

## 5.3 Merge logs

For merge new log with current log use  icon or **[Ctrl+M]** and choose log file.



**Pic. 10 Merge logs**

1. Active log selection
2. Time shift track bar. Use keys:
  - **[Ctrl+<]**, **[Ctrl+>]** – precise shift of log;
  - **[Shift+<]**, **[Shift+>]** – fast shift of log.

## 5.4 Grid view of log

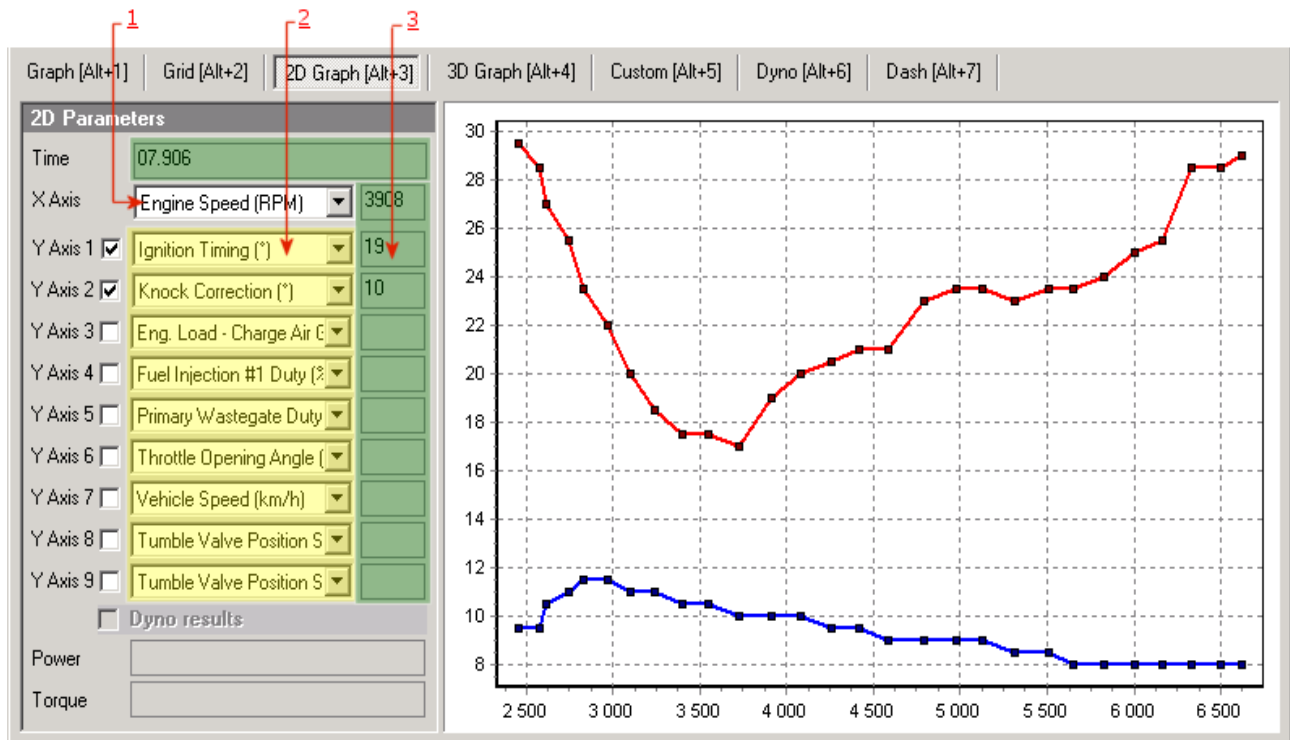
Time	Min	Avg	Max	21.406	21.797	22.172	22.562	22.937	23.328	23.719	24.094	24.484	24.875	25.265
Air/Fuel Correction #1 (%)	-25	-2.44	25	0	0	0	0	0	0	0	0	0	0	0
Engine Speed (RPM)	534	3388.57	7049	5212	5725	6107	5572	4817	4114	4420	4629	4753	4883	4839
Fuel Injection #1 Duty (%)	0	12.22	87.58	36.69	40.3	31.27	0	11.3	22.82	29.23	25.68	23.32	12.5	9.29
Ignition Timing (°)	3.5	31.39	45	36.5	38	40.5	28	45	39	36.5	39	40	45	45
Throttle Opening Angle (%)	0	21.27	100	37.3	34.9	19.2	0	23.9	38.4	36.9	25.9	22.7	13.7	10.2
Vehicle Speed (km/h)	0	65.89	156	34	38	44	44	48	51	52	54	57	57	59

**Pic. 11 Grid view of log**

1. Active parameters
2. Parameter statistics
3. Time axis

## 5.5 2D Graph

Building a custom 2D graphs is possible on the "2D Graph" page. Data for graph building is used from selected log area.



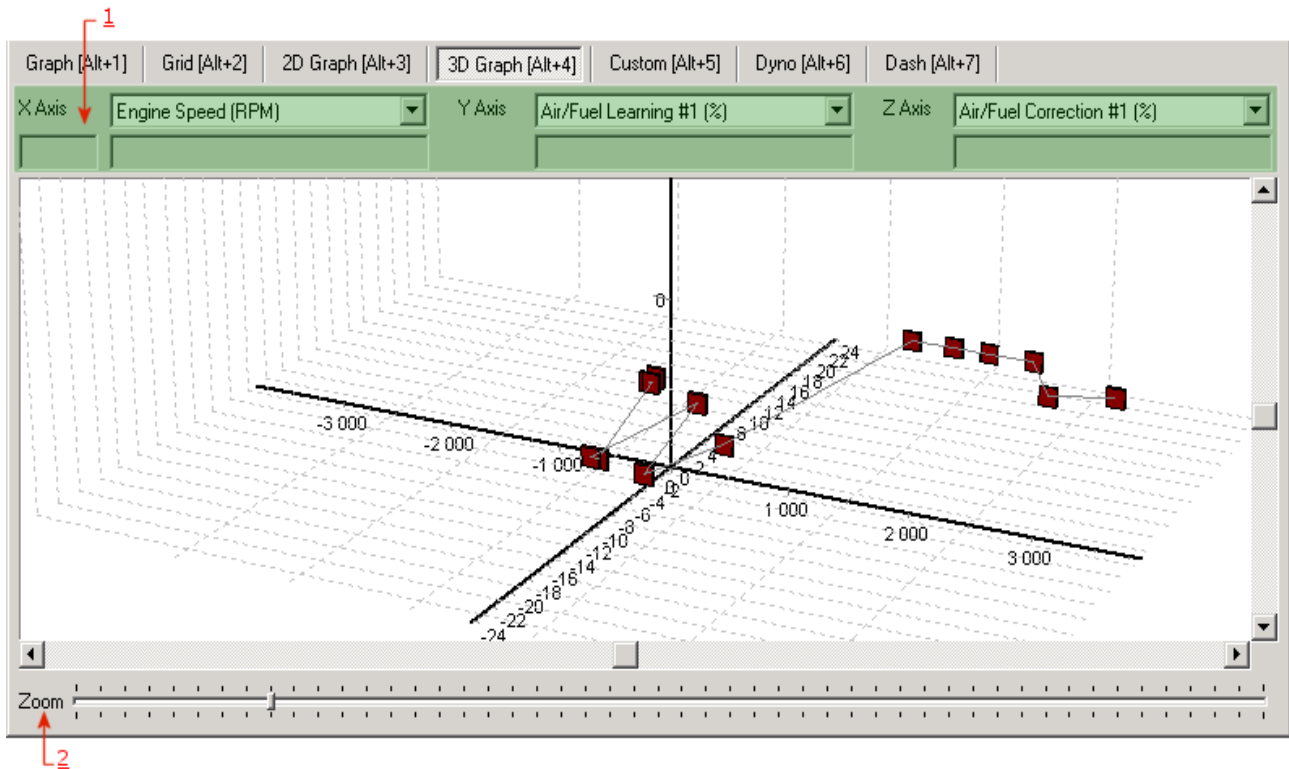
**Pic. 12 2D graph build**

1. Selection of the parameter for the X-axis
2. Selection of the parameter for the Y1-Y9-axes
3. Values of the parameters and time at the selected point of the graph



## 5.6 3D graph

Building a custom 3D graphs is possible on the "3D Graph" page. Data for graph building is used from selected log area.



**Pic. 13 2D graph build**

1. Selection of the parameter for the X,Y,Z-axes and values of the parameters at the selected point of the graph
2. Zoom ruler

## 5.7 3D/2D table

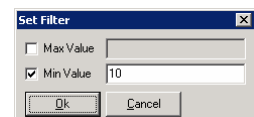
Functions on the page **"Custom"** can provide creation 3D/2D tables in the standard form. Data for table creation is used from selected log area.

The screenshot shows the 'Custom' configuration window for creating a 2D table. The X-axis is 'Eng. Load - Charge Air Grams (g)' and the Y-axis is 'Engine Speed (RPM)'. The data source is 'Ignition Timing (\*)'. The table is 16x16, with X-axis values rounded to 0.2 and Y-axis values rounded to 500. The 'Log Link View' window shows the following data:

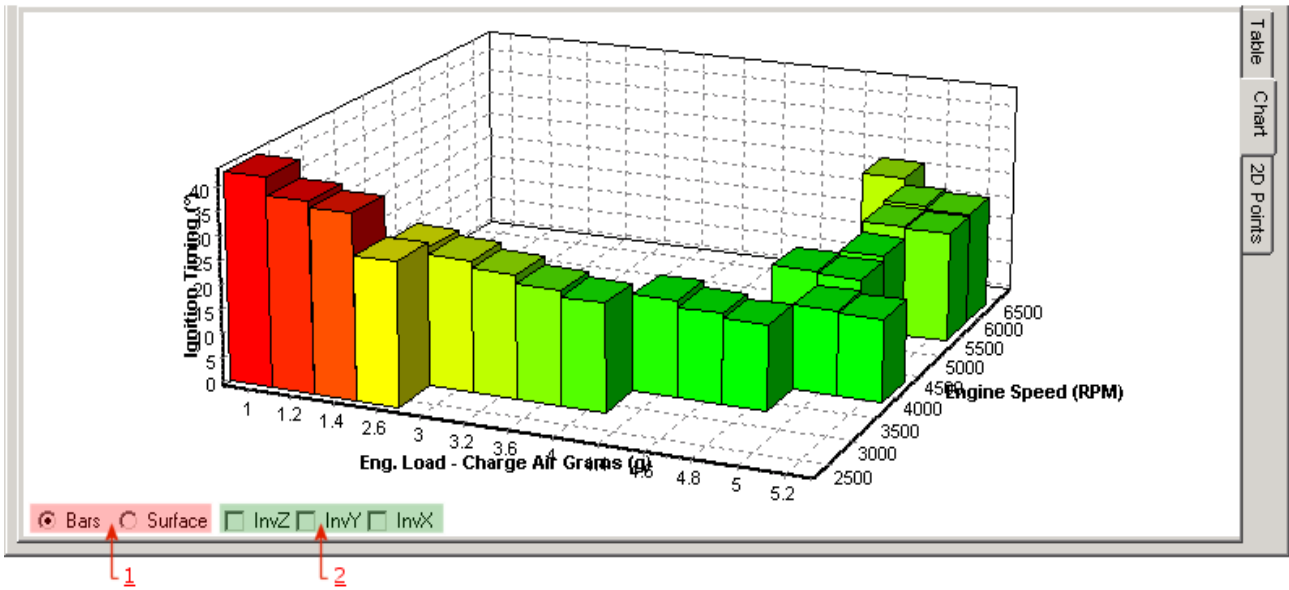
Time	Min	Avg	Max	01.593	01.984	02.390	02.781	03.171
Engine Speed (RPM)	2364	2402.6	2445	2364	2381	2405	2418	2445
Eng. Load - Charge Air Grams (g)	1.25	1.256	1.28	1.25	1.25	1.25	1.25	1.28
Ignition Timing (*)	37.5	37.9	38	38	38	38	38	37.5

**Pic. 14 3D/2D table build**

1. Parameter selection for X-axis
2. Parameter selection for Y-axis (a 2D-tables need to disable the option **"Y Axis"**)
3. Parameter selection for data
4. Option for rounding values of X-axis (for example, if values in log for the selected parameter were 1, 3, 5, 7, then, after establishing the option of rounding equal to 5, we will obtain 2 columns with values of 5 and 10)
5. Option for rounding values of Y-axis
6. Table data display options:
  - First data – parameter data for the first entry into grid cell
  - Min data – minimum data for cell
  - Max data – maximum data for cell
  - Avg data – average data for cell
  - Count – quantity of entries into cell
  - Sum – sum of all values of parameter for cell
7. Data filter (can help to build table with values that satisfying predetermined range)
8. Choosing a fixed tables described in XML (table provides a fixed axis values, such as maps of appropriate firmware)
9. Grid cursor
10. Table of entries for the highlighted cursor cell
11. Switching to view table as graph.



### 5.7.1 3D-graph for 3D-table

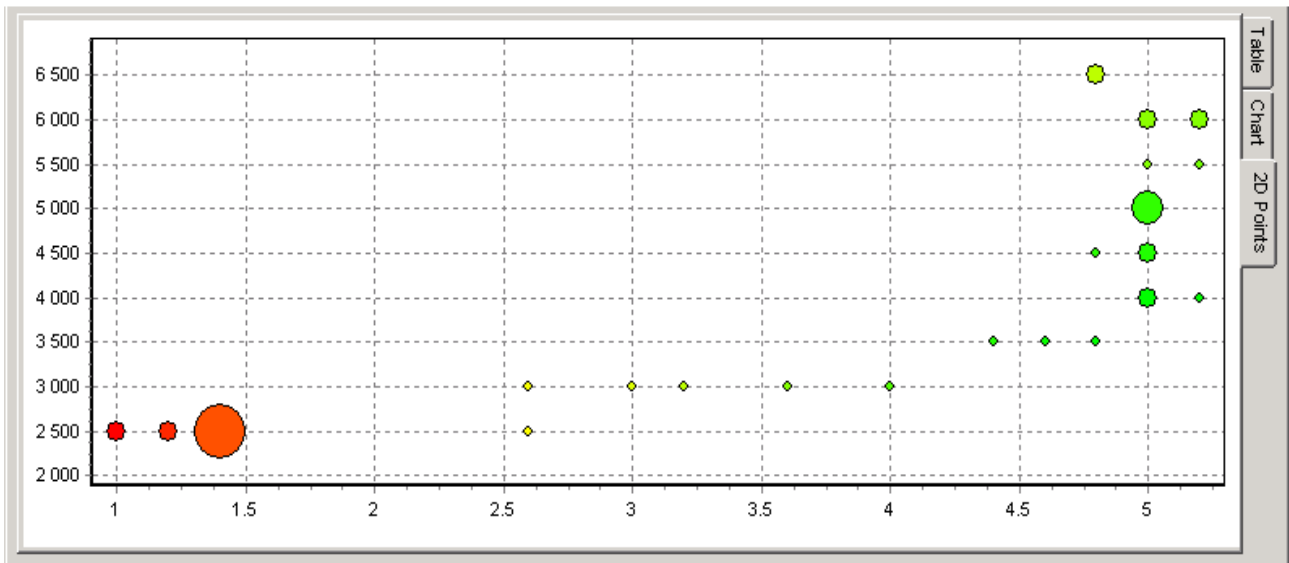


**Pic. 15 3D-graph for 3D-table**

1. Selecting graph type: bars or surface
2. Invert axis options

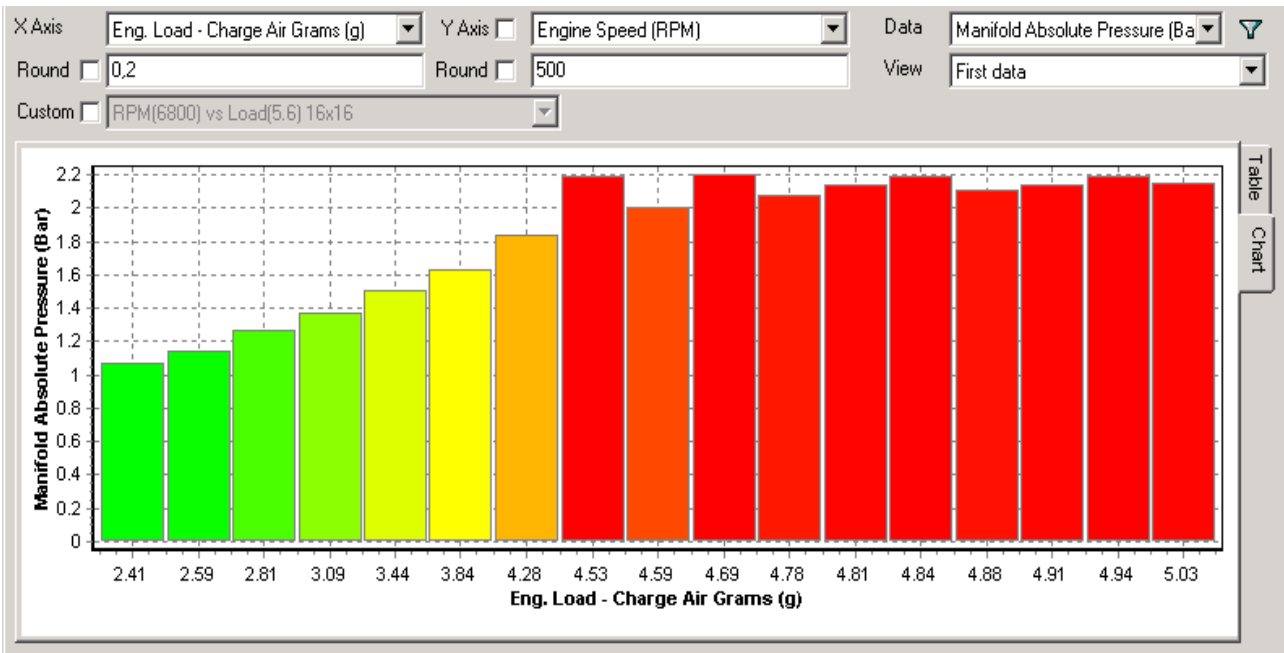
### 5.7.2 2D-graph for 3D-table

3D table is possible to view as 2D graphs, where the points are represented cells of table, and the size of point depends on a quantity of entries into the cell.



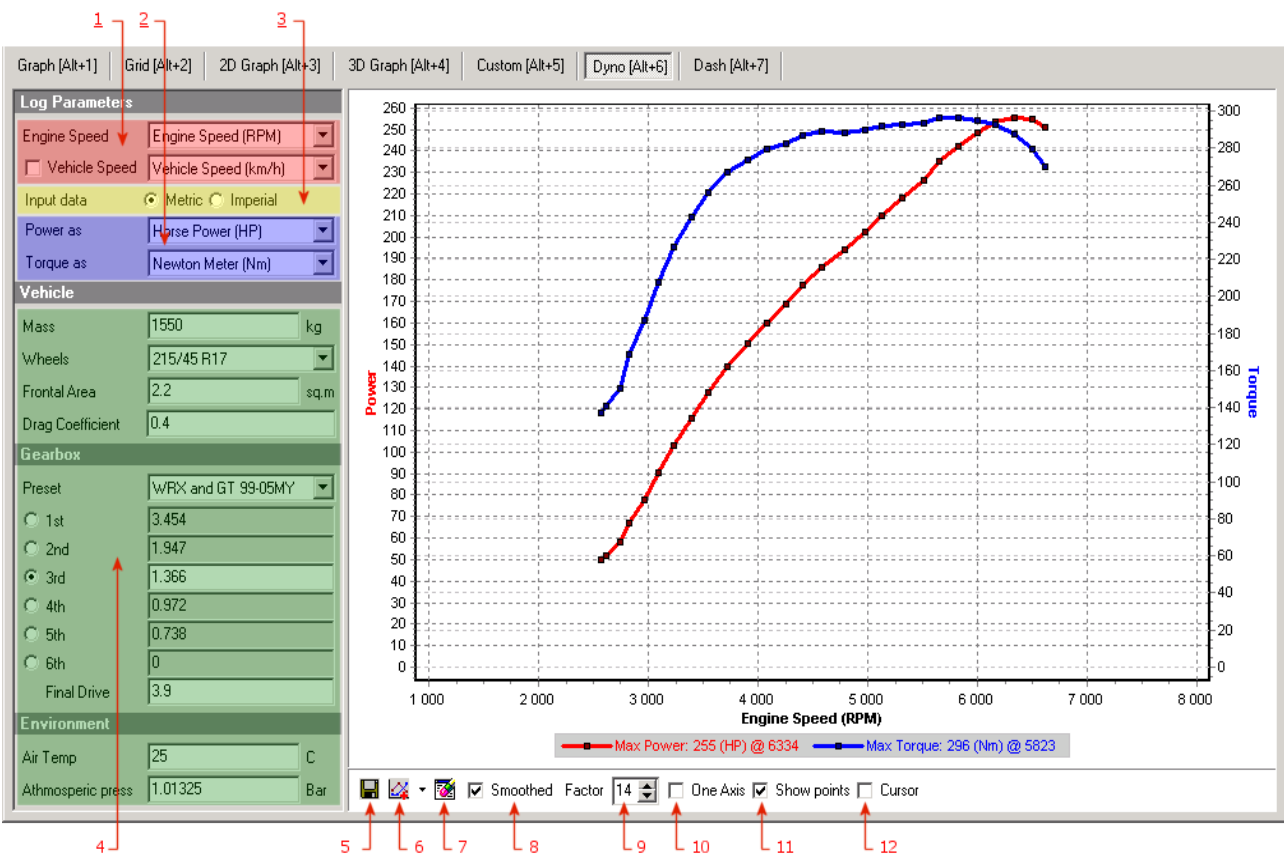
**Pic. 16 2D-graph for 3D-table**

### 5.7.3 2D-table graph



Pic. 17 2D-table graph

### 5.8 Power and torque calculator (dyno)




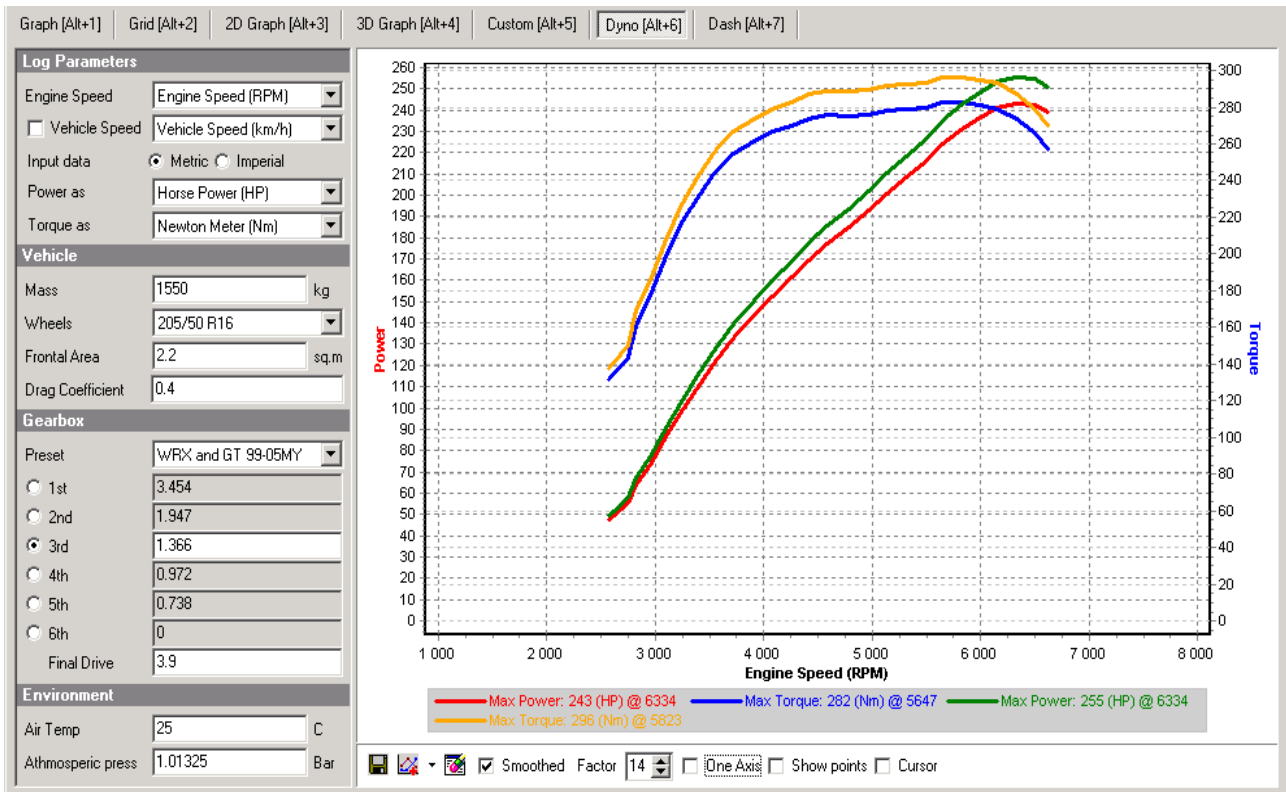
Pic. 18 Power and torque calculator (dyno)

1. Parameters selection for calculation of power and torque. More precise method is based on the use engine speed (with the turned-off option "Vehicle Speed"), gears rates and diameter of wheels. Method that basis on speed is less precise, because, usually, vehicle speed sensor in ECU is less precise.
2. Setup measurement units for power and torque;
3. Setup measurement units for input data of vehicle and environment;

4. Configuring vehicle and the environment
5. Export graph to XML-file or graphics format (JPG, GIF, BMP, PDF, WMF)
6. Adding power/torque graph for compare (see 5.8.1)
7. Removal of all additional graphs
8. Apply smoothing algorithm for graph
9. Smoothing factor
10. Displays graph with common axis of power and torque
11. Switch on/off display points on graph
12. Switch on/off cursor to view values of power and torque at any point on graph

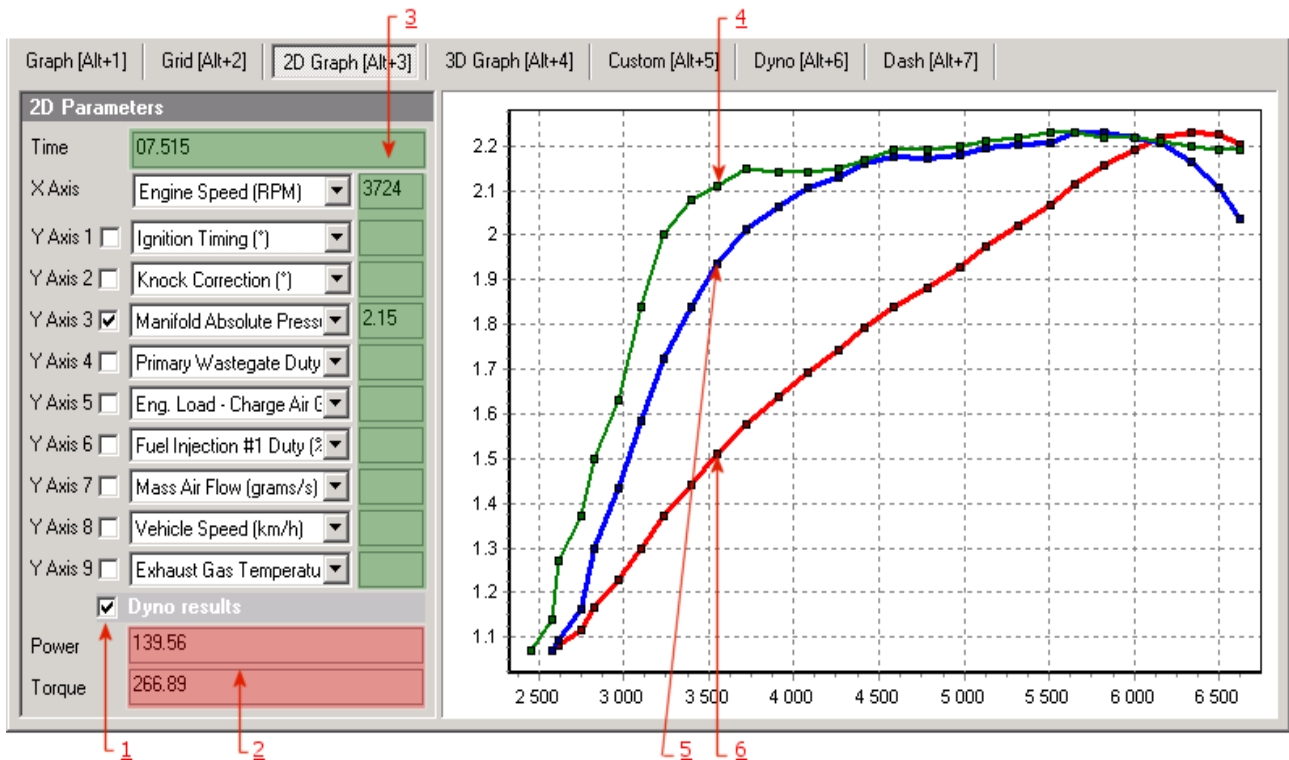
### 5.8.1 Comparing power and torque graphs

For the graphs comparison of power and torque with previously saved graphs use a  icon. The comparison of several files is possible.



**Pic. 19 Comparing power and torque graphs**

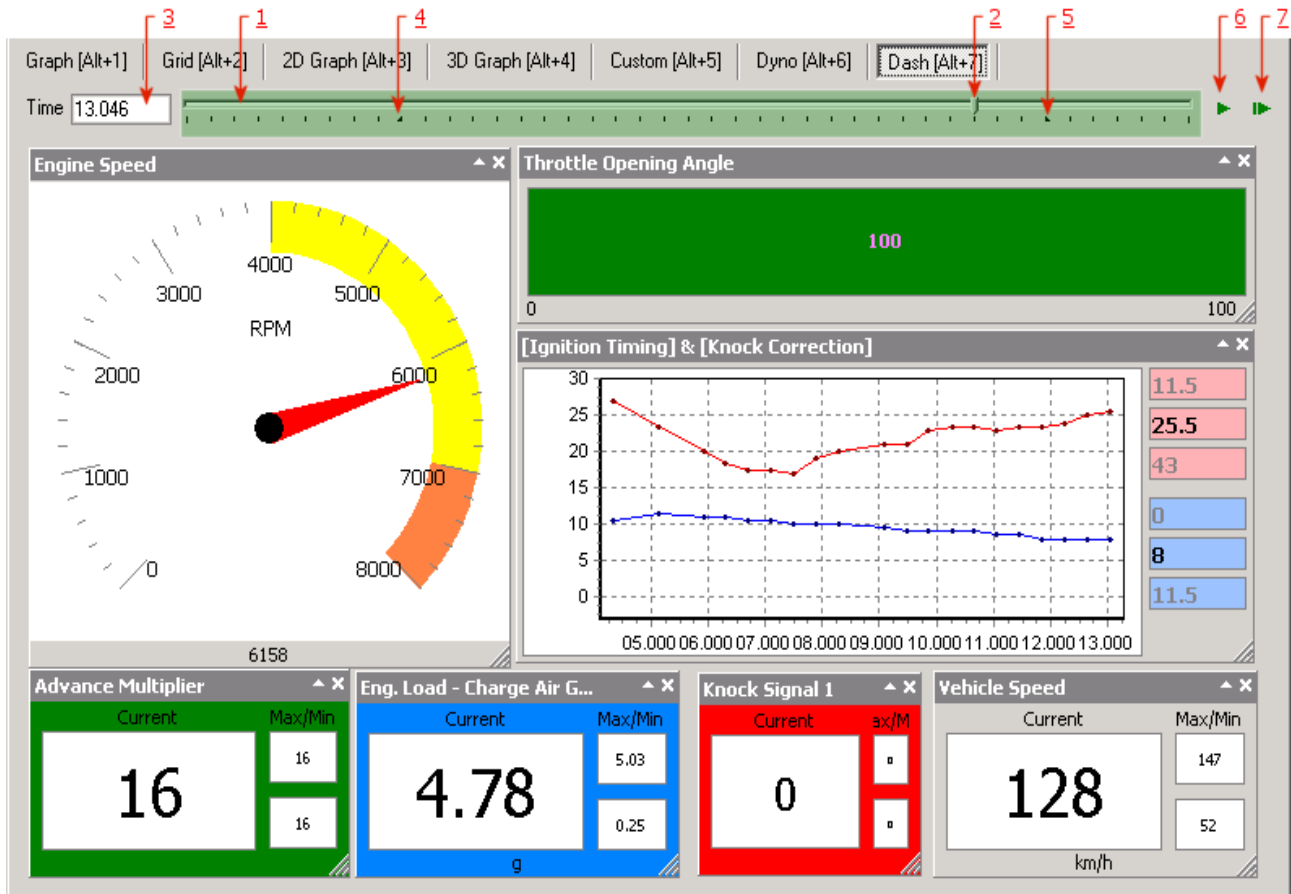
## 5.8.2 Merge power and torque graphs into 2D-graph



**Pic. 20 Merge power and torque graphs into 2D-graph**

1. Adding power and torque graphs (adding only possible if the **"Engine Speed"** is selected as X-axis)
2. Power and torque values at selected point
3. Parameters values at selected point
4. Parameter graph
5. Torque graph
6. Power graph

## 5.9 Log playback and dashboard



**Pic. 21** View log on dashboard

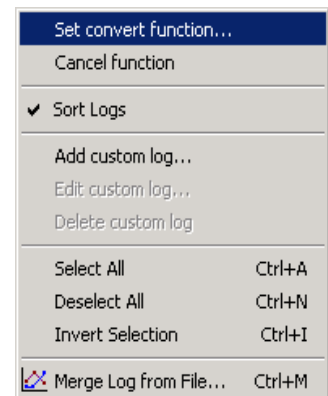
1. Time ruler
2. Log cursor position
3. Time at cursor
4. Beginning of log selected area
5. Ending of log selected area
6. Selected area playback
7. Entire log playback

Dashboard configure instruction see at 4.9.

## 5.10 Extras

### 5.10.1 Data conversion functions

The program allows you to assign for any log parameter one of available convert functions. To do this: select necessary parameter in parameters list box and select **"Set convert function"** from context menu. Then, from the list of available functions choose necessary function. Values of parameter will be recalculated by using selected function. For example, to convert **Time** from milliseconds (ms) in usual format **HH:MM:SS.000** you can use **logMSToTime** function. To return the original value of parameter you must select the **"Cancel function"**.



## 5.10.2 Custom calculated parameters

The program allows you to create additional calculated parameters based on the values of other parameters and selected convert function. To add a calculated parameter use **"Add custom log"** function from context menu of parameters list box. In custom log settings window you need to enter:

1. the name of calculated parameter,
2. select convert function or direct enter expression (for example:  
 $[x]+[x2]/1000+([map]+[map2])*[x3]$ , where  $[x],[x2],[x3]$  – values of 1st, 2nd and 3rd selected parameter;  $[map],[map2]$  – values from 1st and 2nd selected ECU map);
3. select parameters for expression attributes;
4. choose ECU map (if used in the expression), apply log parameters for link with map axes and set parameters for calculating:
  - **"Interpolate"** – use interpolation,
  - **"Round"** – set round coefficient.

If you need to use more log parameters or maps you can use the button **+** in appropriate tree node. To reduce the attributes quantity – **-** button.

After confirmation all entries new parameter of log will appear. To edit attributes of calculated parameter use **"Edit custom log..."** function. For removal parameter from log use **"Delete custom log"** function.

