

EvoLiveMap (ELM)

Documentation

Covering Version 0.5xx

Documentation Version 0.3

Documentation - Change Log:

Rev	Date	Description
0.1)	24 Dec. 2011	Initial release
0.2)	1 Feb. 2012	Updated for version 0442
0.3)	11 April 2012	Updated for version 0500

ELM Program – Change Log

0.5.0.0 (11/04/2012)

- bug: load all maps on first start does not recolour
- fixed: wrong car details in VDR car list
- fixed: adjust boost scale on VDR. for KPA or psi/bar
- fixed: included more data points for MAP/AFR in VDR
- fixed: clicking cancel when adding x,y in tables adds an empty item
- fixed: remove bold when recolour.
- fixed: hotkey for VDR screen.
- fixed: Finnish keyboard fix. (implemented force AU settings, and a FI keyboard with = being implemented by SHIFT+9
- Fixed: load all maps on first start
- Fixed: LC1 and ZT2 logging via serial cable.
- Fixed: Car PC support (move the logged item to a seperate tab)

0.4.4.2 (01/02/2012)

- bug: add table does not check for x/y axis
- fixed: bug in choose data definition where program crashes.
- fixed: bug in patching US evo9 rom
- fixed: trim email addresses entered in settings menu.. for registered users.
- fixed: rename the "Reset DEAD" to "Initialize RAM" as this better defines the function of the button.
- fixed: bug in the xml output for dma patching for USDM evo9
- fixed: reading xh table crashes program
- fixed: remember prev selected graphing view
- fixed: let user change if MAP is scaled for VDR Graph
- fixed: take that annoying message when editing tables off once user has seen it.

0.4.4.1(03/01/2012)

- fixed: all patch DMA to rom, also change rom id from 07 to 27 to signify its a DMA rom.
- fixed: disabled changing the graphing drop down causing crash while logger is running.
- fixed: disabled xml definition corruption in settings menu.
- fixed: re-working of VDR code, primarily to take one sample per 100rpm to increase accuracy.
- fixed: documentation done.

0.4.2.0 (27/10/2011)

- fixed: patch USDM rom to DMA (88580714)
- fixed: added RAM Mut requests for default request list so people do not have to manually add more.

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What is EvoLiveMap (ELM)?

ELM is a completely new tool to tune the stock ecu on evo 7-9. Normally all tuning is done via Ecuflash and EvoScan. With logging done with the car running then the car is turned off then eucflash is used to reflash the ecu. This can be time consuming and is completely different process quite alien to the normal process of tuning aftermarket ecus. ELM with a patched ecu allows users to log requests, read and write maps in real time. Just like an aftermarket ecu. The program can also display logs as map trace, display a VDR graph and a hundred features that are either not available or can be used in real-time.

I personally have been using ELM since 2009 and almost never use the Ecuflash/evoscan combination anymore. ELM is definitely the thing to tune SD 2.0.

Yes you still require Ecuflash to do a proper flash of the ecu. Otherwise as the maps are in the ecu ram, if the battery is disconnected or power lost the maps are lost. I use Ram2Disc button to save the contents of the ram to a file that I then flash using Ecuflash.

OP2 cables are currently NOT supported, there is plans to piggy back via evoscan to allow users to use their OP2 cables. There is also plan to develop functionality to access the serial interface of Innovate LC1 Wideband.

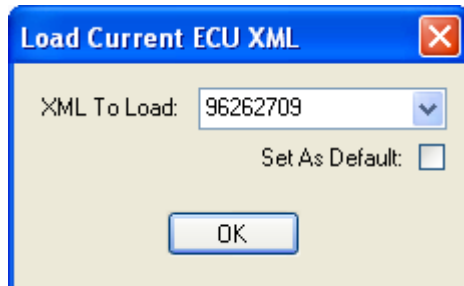
Requirements:

- DMA enabled rom, some roms can be patched via the program. Donner (evom username) has a collection of SD2.0 roms that have DMA enabled.
- OP1.3 cable
- USB 2 Serial Cable for Wideband via serial support. (Innovate LC1 and ZT2 currently in beta test support)
- Ecuflash
- Evo 7/8/9 ecus. (evoX is not supported)
- Rom IDs that can be patched are
 - Evo 7 (90550701)
 - Evo 8 (95630706)
 - Evo 8MR (96260709)
 - Evo 9 AUS (88580714)
 - Evo 9 US (88590715)

Getting Started: How to use ELM the first time:

Initial Setup:

Upon Starting ELM you will need to select an XML from a list of supported XMLs. Tick 'Set as Default' to not be asked again.



The toolbar will look like this



The tabs under the toolbar looks like this



A brief description of tabs is below. For more in depth description please see main documentation.

Graph: Displays a real time graph or the VDR graphs (either Live or offline).

Utilities: Contains a collection of utilities to use when not logging

MUT Requests: Displays RAM mut table

Fuel: Displays Alternate Maps Fuel Table

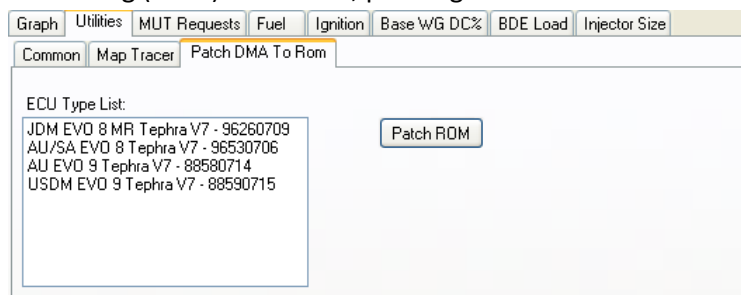
Ignition: Displays Alternate Maps Ignition Table

Base WG DC%: Displays Alternate Maps Wastegate DC Table

BDE Load: Displays Alternative Maps Boost Desired Engine Load Table

Injector Size: Displays Alternative Maps Injector Size

The first thing we need to do is convert our hex file to one that is capable of Direct Memory Addressing (DMA). To do this, please go to the Utilities Tab and select 'Patch DMA to ROM'.



Choose your ECU type and click Patch ROM. Navigate to your ROM file and click Open.

Your ROM file will now have a -DMA suffix on the end of it. Flash this to your ECU with your favourite tuning software.

With your Openport 1.3 cable connected and the car on but not started click on the “Reset DEAD” button, this initialises the ram area and hence is extremely important that you click this button after any reflashing. Otherwise car will not start, next click on the “Start” button on the toolbar. Your toolbar will now look like this.



A brief description of toolbar buttons are below. For more in depth description please see main documentation.

Start/Stop: Start or Stop ELM logger

Graph: Enable/Disable real time graphing

Display: Enable/Disable real time display pane on the right

Knock Trace: Enable/Disable knock tracing in the ignition/fuel tables

Read from RAM: Populate tables from ECU RAM

Write to RAM: Write modified tables in ELM back to RAM

Settings: Open settings page (Not available when ELM started)

Recolour: Re-colour tables with custom colour map

Clear: Clear knock trace

Ram2disk: Save current RAM file to a hex file on disk (Registered Users Only)

Disk2Ram: Open hex file to populate RAM tables from

Initialise RAM: Used to reset the RAM Space starting with 0xDEAD. This needs to be clicked (does not require the logger to be running) after any reflashing. Also note clicking this in error will mean you lose all changes to ram maps.

Click *Initialise Ram* now. The status bar at the bottom should read RAM Written Successfully.

****IMPORTANT NOTE: Remember to click reset dead after reflashing or the car and ELM will not work.****

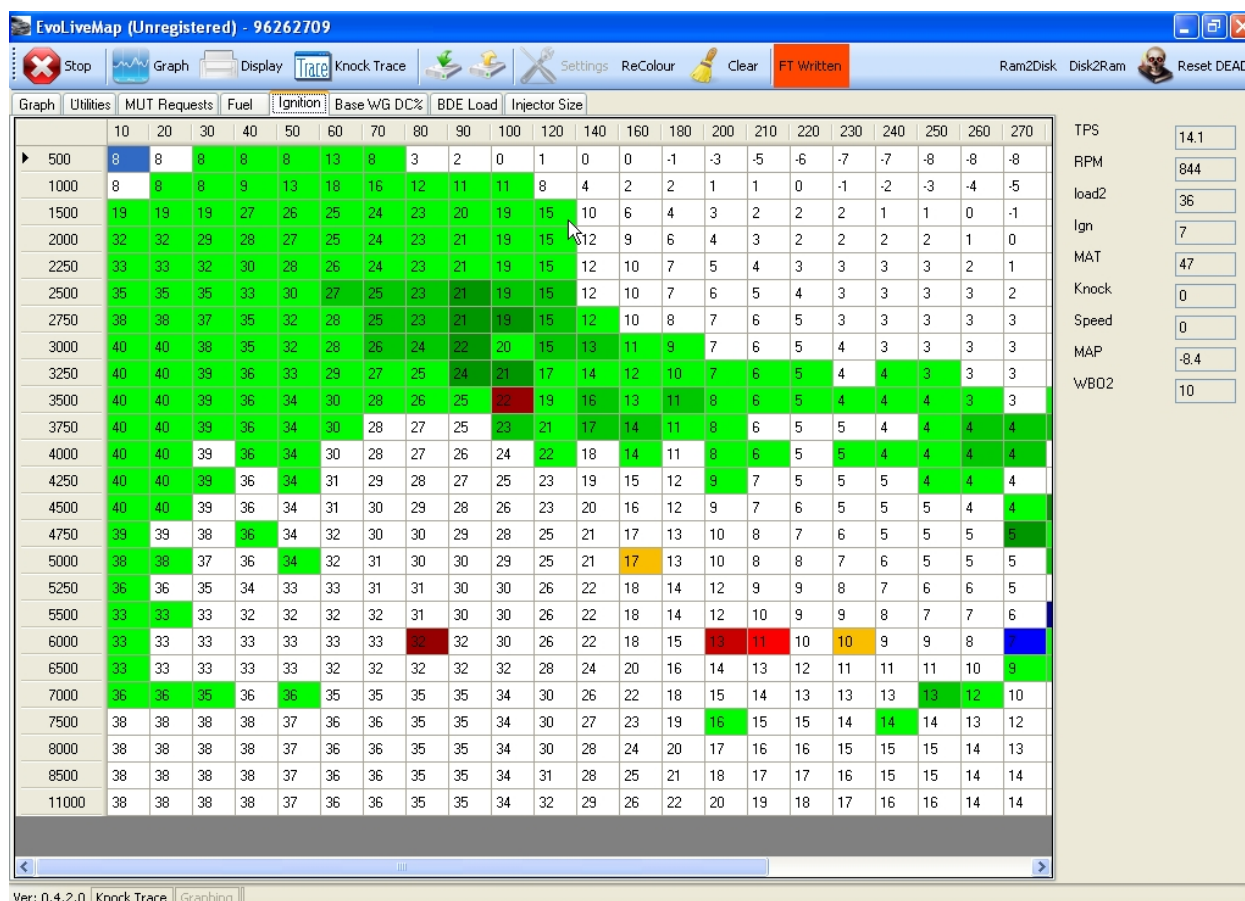
Let's start logging:

With the car started (engine running), start the ELM logger by clicking the start button. Make sure you are running on **Alternative Maps**.

Now go through each tab from MUT Requests to Injector size and Read from Ram. This will populate the tables for us to use. Click Knock Trace to start tracing which cell the ECU is reading. On the Ignition Map as this pointer moves around it will leave coloured cells. The cell colour represents max knock count. On the fuel map the knock trace will just leave green cells.

If you want to view a real time graph click the graph button.

After a drive your ignition table will look like this.



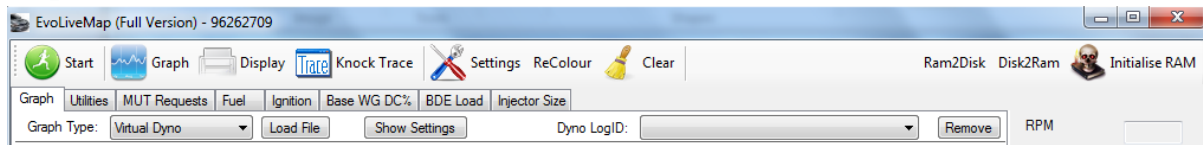
As can be seen by the colours there is a fair amount of knock at 6000rpm and 270 load. When the mouse is hovering over that blue cell it will show that the knock count is 5. We want to reduce the timing in that cell. So we highlight the cell by clicking on it and then manipulate it using the + and – keys on the keyboard. Once we are satisfied with the value we click ‘Write Table to RAM’ and go for another drive to verify that our changes worked. All this can be done with the car running.

Once the tune is complete remember to copy the table to Ecuflash and reflash the car so you do not lose the data if your ECU loses battery power.

If you have a registered version you can use Ram2Disk button to save all the ram maps to a hex file which can then be flashed via Ecuflash.

Main Screen:

Top Level Buttons:



Start/Stop: Starts or stops the logger.

Graph: This will toggle the display of graphing in normal or VDR mode. Once this is activated there is a status message that will pop up at the bottom of window.

Display: This will toggle the display of logged items. This is updated continuously and displays on the right side of the program window. Enabling this option does not slow the actual logger (ie saving to disk).

Knock Trace: this colours and runs a trace of the load achieved in both fuel and ignition tables. In the fuel table if you hover over a coloured box you will see the last AFR value achieved in that cell. In the ignition table the colour of the highlighted cell signifies the knock-sum in that cell. (Insert the different colours for the different knock-sum values).

Read Ram Table: Once a Ram table is selected this button becomes enabled. Clicking this will read from the RAM of the car ecu and copy the contents of the table to the screen. This is done in real time while the car engine is running and is the reason my program is called Live Map.

Write Ram Table: Once a Ram table is selected this button becomes enabled. Clicking this will copy the contents of the table on the screen to the RAM of the car ecu. This is done in real time while the car engine is running and is the reason my program is called Live Map.

Settings: The settings button brings up the settings window. This will be explained in its own section.

ReColour: this will colour the tables, eg ignition/Fuel etc just like Ecuflash to give a better representation of the values in the tables. The default map can be changed via the settings window but only in the "Registered" version.

Clear: This clears all tooltips, colours in the actively selected table.

Ram2Disk: This button is only available in the registered version. This saves the current contents of the ram maps to a hex file. So it can then be permanently written to the ecu via Ecuflash. This will auto-increment the filename to ensure previous versions are not overwritten.

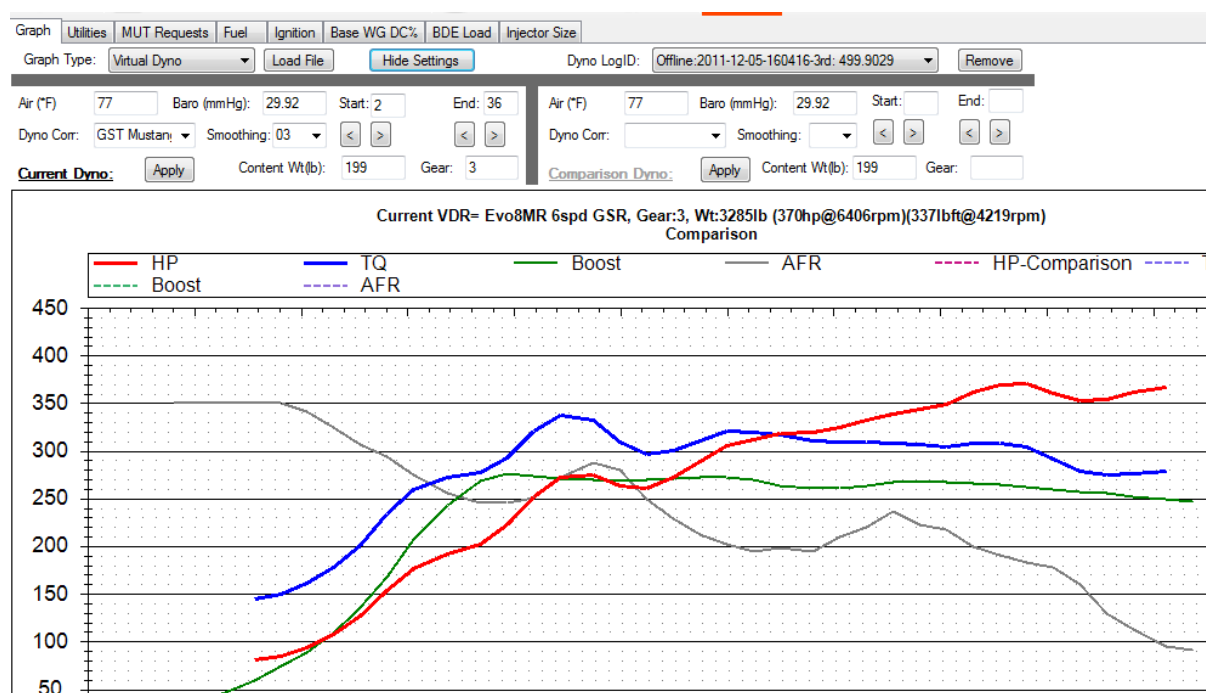
Disk2Ram: this button is used to rewrite the ram from a rom file. Usually if extensive changes are made offline (in Ecuflash), point ELM settings window to the file and click this button.

Initialise Ram: this is one of the most important buttons. In most of the ecus after writing with Ecuflash, the writing process does not reset the memory and slightly corrupts the ram contents. This usually results in inability of the car to idle/drive properly in alt-map mode or the program will not work/log properly. Clicking this resets the whole ram. ie all ram contents are reset to the values as flashed by Ecuflash. This is a good way to clear all changes.

Different tabs:

Graph: This tab displays the graphing screen. Please ensure that graphing button is selected and on otherwise nothing will display. There are two different type of graphs. One is a normal graph. The other is the VDR (virtual dyno room) graph.

Normal Graph: The settings are changed primarily from the settings window. In the Advanced Settings screen are three options. Graph points; this will increase or decrease the memory of the graph, ie how long the data is stored for and in numbers, generally 30 is equal to one second. Graph Refresh; this is how many items it will refresh in. generally 30 is 1 second. So the default of 10 implies that the graph is refreshed 3 times a second. Change this if the UI is slow. Graph TPS; this is the value of TPS in percentage, that items are added to the graph. Good way to use it is to set it as max TPS (usually 100) the u can see what happened when u went WOT. The actual items to be logged are set in the requests tab. There u can also set a graph multiplier. Eg usually I set RPM as 0.01 this will display 5000rpm as 50. So makes the graph easier to see.



VDR Graph: This is a graph to show power/torque values. It is a good way to compared two different tunes. Please note the numbers shown will not match the VD program. The numbers will be close and the curves similar but slightly different. The VDR Graph will work in both live and offline mode. In offline mode it will accept ELM logs as well as evoscan logs. Please also note that you will need to ensure that the maximum TPS is correctly set in settings window in the advanced tab. If your car is different and MAX TPS is not 100% then u may need to change that value. ELM does not require any manual processing of the log files also it is setup to handle multiple runs in a single log. It works this by looking for the MAX TPS value as set in settings window. All runs are added to the list box on the right top side. The main settings are chosen in the VDR Settings Tab in settings window. Mainly chose the correct car the parameters of which u can change. You can change the unit of measure between imperial and metric. You can also setup the default contents weight and the unit of

measure. This is very important. Sometimes u will want the VDR to display in imperial but the logs are setup in KPH or vice versa.

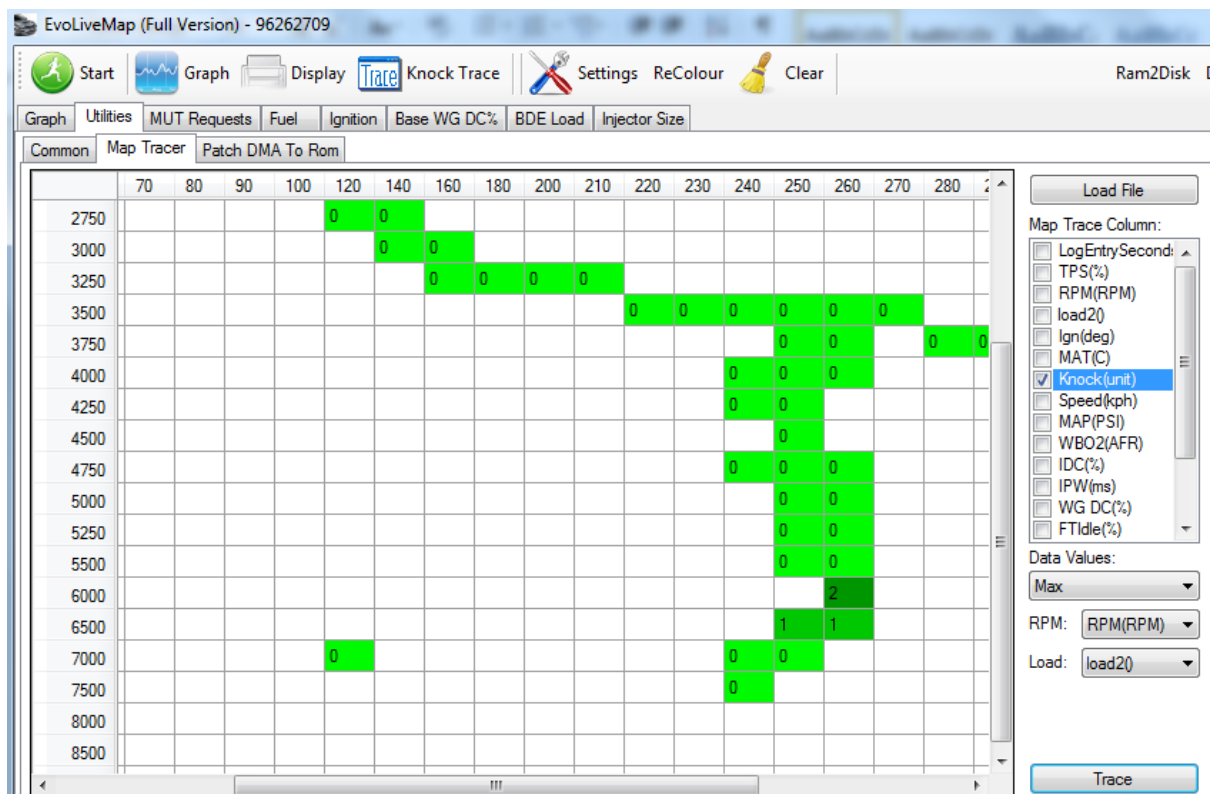
The show settings window will show settings for both the current as well as the comparison dyno graphs. These are the environmental settings and can change. Please note if you have speed available it's a good chance the VDR will automatically workout the correct gear and display the log. This was done because the VDR components work in real-time and need to be able to calculate the gear. This auto gear is not fool proof and can at times be wrong; in that case the gear can be changed manually. The rest of the options are quite straight forward. There are Corrections for the dyno, smoothing level, Air temp, baro pressure. Lastly the 4x arrow buttons. This will move the left and right edges of the curve to compensate for logging errors on the edges (usually a very high hp value which then drops on the start of the curve 200hp at 2500rpm which then drops to 100hp by 3000rpm) or an abnormal jump up of the curve (usually a sudden high hp value at the end of the curve, eg 50hp jump at 7000rpm compared to 6500rpm).

Offline VDR, this is the process that u can compare runs from different times/day. It can even process evoscan logs as well as other type of logs as long as they are in text and CSV format. When you open a file a window pops up. This requires a few elements of data, other elements are optional. Required ones are Time, RPM & TPS. TPS is especially required because in ELM one log file can have multiple runs. The MAX TPS should be set in the advanced tab of the settings window. Speed is optional but if you do not specify it then gear will need to be set manually, otherwise the program will do a pretty good job of working out the gear. Note only 3rd and 4th gear are calculated. If u notice an abnormally high or low hp/torque amount it might be due to wrong gear. You can also graph Boost/AFR profiles for the graphs to get a quick view of what AFR is being run.

On the left of the VDR Graph are some buttons. You use them to hide or display the curves. E.g. if you do not want to view the AFR curve for the current graph you may click the "RED" AFR button to hide the curve.

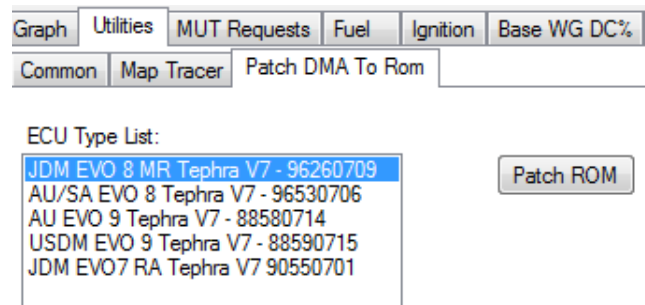
In the settings screen you can now also select if you want the MAP value shown in the VDR graph to be scaled or unscaled. Scaling multiplies the value by 10, this is good for PSI and BAR to show them on the graph in a easier to read manner. If user is using some other unit of measure, like KPA then change the setting to "NO" from "YES"

Lastly and only for registered users, I have a feature of further processing of the AFR curve. Consider that the AFR curve is shown as 14.7 (normal Stoich AFR) with 12.0 being the AFR you want to aim for during your pull. Normally the 12.0 AFR will become 120... when powers/torques in the graph get around 350+ the change between 11.6 and 12.0 AFR is not very easy to see. So further processing will first chop all values over 14.0AFR and all values under 10.0AFR. Then the amount is multiplied by 100 to get a value between 0-400... this way the change in AFR becomes more noticeable on the graph. The picture above shows further processing of AFR enabled.

[illegible]

Utilities > Patch DMA to Rom: Currently only 4 Tephra Mod V7 ROMs are enabled. Basically this is the way any new person to DMA should patch a normal ROM to a DMA enabled rom. In the patch process please ensure that you choose the correct rom ID for your rom. As currently the program does not do any error checking. This patching process will copy all required code, it will move most of the ALT tables to ram and create a ram MUT table. Please note the patched file is saved in the same location as the original file, but the name ends with “-dma” to signify that it is the patched file.

Furthermore the screen gives some xml to put into your normal Ecuflash xml file. If you want to edit the ram mut table in Ecuflash.



REST OF THE TABS: The rest of the tabs are for the relevant ram tables. Please note only the listed tables are moved to ram and can be edited in real time. Also note that reading and writing is done in real time (as long as logger is running) by clicking the “Read Ram Table” and “Write Ram Table” buttons. Copying and Pasting of the contents of the maps with another program (like Ecuflash) can be done by right clicking and selecting the relevant context menu option. To change values manually you can select one or more cells and hit either of “=” or “+” or “-” or “h” or “v” buttons, in exactly the same manner as Ecuflash program. Lastly please note manual copy and paste methods do not work, i.e. **Ctrl+C** or **Ctrl+V** do not work

Settings Window:

Basic Settings Tab:

The screenshot shows the 'Settings' window with the 'Basic Settings' tab selected. The window has a title bar with a close button. Below the title bar is a tabbed interface with tabs for 'Basic Settings', 'Advanced Settings', 'UI Settings', 'VDR Settings', 'Requests', 'Ecu Definition', 'Data Definitions', and 'About'. The 'Basic Settings' tab is active and contains the following fields and controls:

- Email Address:** A text input field.
- Saved Logs Location:** A text input field containing 'C:\Users\Ziad\Documents\evolvemap\data logs', with 'Choose' and 'Default' buttons to its right.
- BaudRate:** A text input field containing '15625'.
- Current Ecu XML:** A dropdown menu showing 'z96262709', with a 'Set As Default' checkbox to its right.
- Ecu Hex File Location:** A text input field containing 'C:\Users\Ziad\Documents\evo stuff\my ecu\0EF3-meth-30032012-1.hex', with a 'Choose' button to its right.
- Save Ram Maps To Hex File:** A checkbox, currently unchecked.
- Enable Knock Trace:** A checked checkbox.
- Enable Select Active Cell in Knock Trace:** An unchecked checkbox.
- Import XML From Old:** A 'Create' button.
- Logging Protocol:** A dropdown menu showing 'DMA'.
- Check For Updates At Startup:** An unchecked checkbox.
- Load New Colour Map:** A 'Create' button.

At the bottom of the window, there is a status bar with the text 'EvoLiveMap (c) ZIAD' and 'OK' and 'Cancel' buttons.

- **Email Address:** Enter the email address if u have a registration key.
- **Saved Logs Location:** This is the location where logs are saved, default is "My Documents\evolvemap\data logs"
- **Baud Rate:** Leave this unchanged, default is 15625. If your ecu is modified to run at higher baud rates then change this number, but even at the default rate ELM is plenty fast.
- **Current ECU XML:** this is the current definition loaded. If u set as default then the selector box will not show up when program starts.
- **ECU Hex File Location:** This is the location of the Ecuflash file. That is used when u click "Ram2Disk" or "Disk2Ram"
- **Enable Knock Trace:** This will enable knock trace and is the same as the "knock trace" button on the main screen.
- **Enable Select Active Cell in Knock Trace:** This highlights the active cell in the ignition map when knock trace is activated. Please note enabling this will mean you cannot edit maps.
- **Logging Protocol:** Set it to DMA or MUT for the relevant protocol. MUT is the same as evoscan etc, and does not allow editing or maps in real time or high logging speeds.

- **Check for Update at Start-up:** Enable this so that the program will check for updates when you start it. Please note an internet connection is required. If there is none then the program will not check, it is very quick and does not slow the load times. If an update is available please download the file from <http://www.mztec.org/livemap>
- **Load New Colour Map:** This is for registered users only, if they want a different colour map then the default one. Please choose the colour map from “C:\Program Files (x86)\OpenECU\Ecuflash\colormaps” or “C:\Program Files\OpenECU\Ecuflash\colormaps” folders depending on version of windows used and the location of Ecuflash folder.

Advanced Tab:

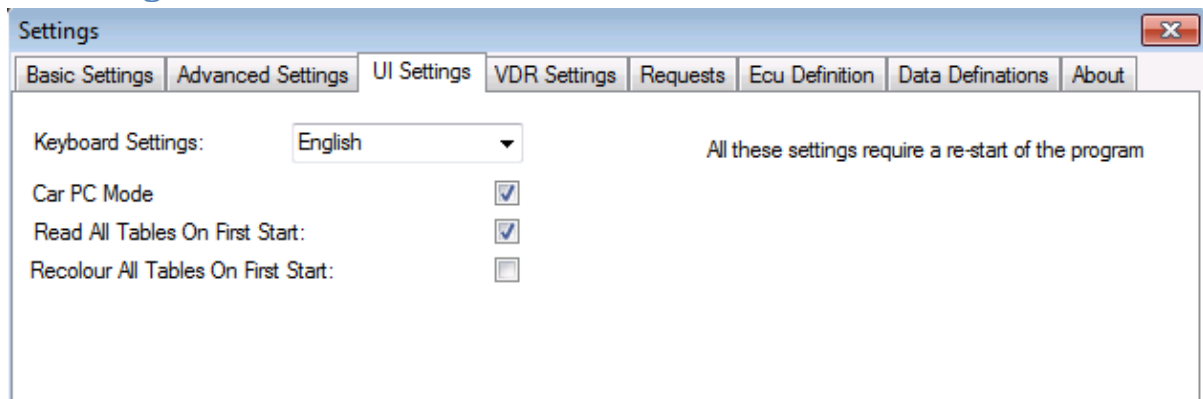
The screenshot shows the 'Settings' window with the 'Advanced Settings' tab selected. The window has a title bar with a close button. Below the title bar are several tabs: 'Basic Settings', 'Advanced Settings' (selected), 'UI Settings', 'VDR Settings', 'Requests', 'Ecu Definition', 'Data Definitions', and 'About'. The 'Advanced Settings' tab contains two main sections. The left section has six input fields: 'MUT Sleep (ms):' with value 8, 'Graph Points:' with value 1200, 'Graph Refresh:' with value 10, 'Graph TPS%' with value 35, 'FTDI Device ID:' with value 0, and 'Max TPS Value:' with value 100. Below these is a 'Create New XML Def:' label and a 'Create' button. The right section is titled 'Hot Key Combinations' and contains seven rows, each with a label, an input field, and a 'Disable' button. The rows are: 'Start Stop Logger' (F1), 'Select Fuel Table:' (F4), 'Select Ignition Table:' (F5), 'Read Current Ram Table:' (F11), 'Write Current Ram Table:' (F12), 'Clear Current Table:' (None), and 'Select VDR Tab:' (F2). At the bottom of the window is a status bar with the text 'EvoLiveMap (c) ZIAD' on the left and 'OK' and 'Cancel' buttons on the right.

Setting	Value
MUT Sleep (ms)	8
Graph Points	1200
Graph Refresh	10
Graph TPS%	35
FTDI Device ID	0
Max TPS Value	100

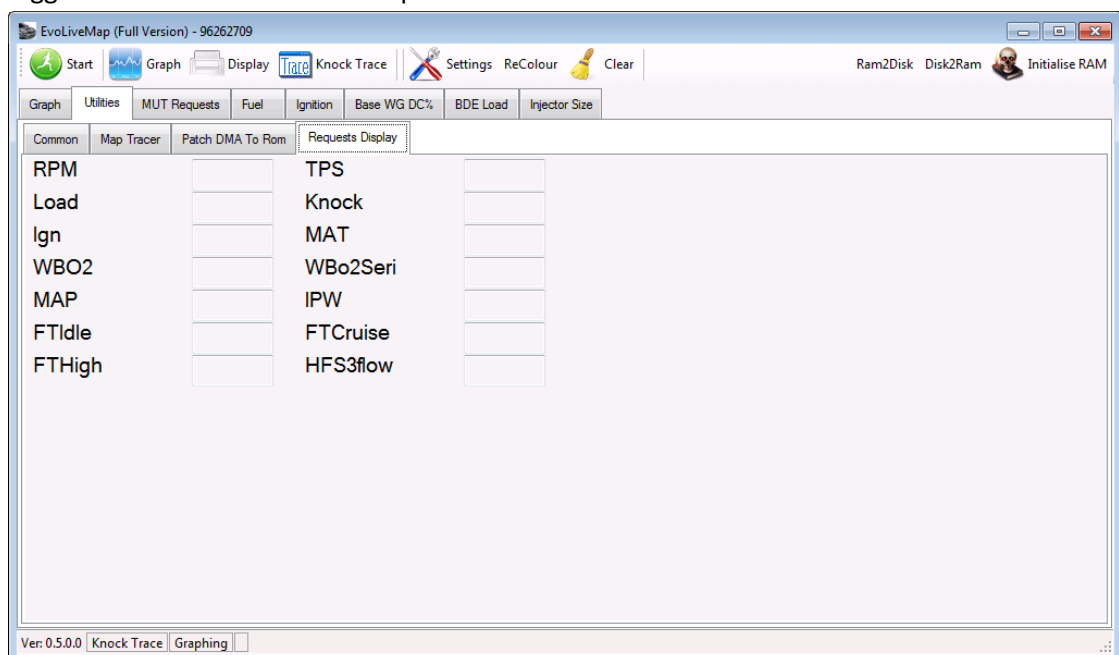
Hot Key Combination	Key	Action
Start Stop Logger	F1	Disable
Select Fuel Table	F4	Disable
Select Ignition Table	F5	Disable
Read Current Ram Table	F11	Disable
Write Current Ram Table	F12	Disable
Clear Current Table	None	Disable
Select VDR Tab	F2	Disable

- **Mut Sleep Time:** Default is 10ms. Please do not change it unless you are getting a lot of read request errors in the middle of logging. Then this value can be increased slightly by 10 upto 100 to see if the connection becomes stable.
- **Graph Points:** Maximum samples shown in graph.
- **Graph Refresh:** approximately 30 is equal to 1 second. By default is set at 10, meaning the graph is refreshed 3 times a second. Lower value will slow the screen updates as it takes longer time to refresh graph. The speed of logging to disk is not effected.
- **Graph TPS:** this is the percentage above which the TPS will be for the data to be sent to graph. Good way to see the graph of a pull.
- **FTDI Device ID:** This sets the device ID, if you have multiple FTDI usb cables and the OP1.3 cable is not the first device change this.
- **MAX TPS value:** This is the MAX TPS value, change it if your car does not reach 100% TPS when u press full throttle.
- **Hot Key Combinations:** As the name implies some commonly used features can be called by a quick hot key. All can be disabled individually.

UI Settings



- **Keyboard Settings:** You either select English or Finnish keyboards. Please note there is a slight bug in Finnish Support, you need to type SHIFT + 8 instead of SHIFT + 9 to get = key combination.
- **Car PC Mode:** This mode is for users that use ELM in their cars or on a touch screen. Basically this will make the screen tabs bigger in size so easier for a touch screen. Also display of the logged items is moved from side panel to under Utilities. So ELM will look like below:



- **Read All Tables on Start:** Slightly complicated to explain but easy once you know how it works. Checking this item will load all table maps on clicking the start button (First time only). To make it easier for users to have the maps loaded into the program saving them reading ram for every map.

VDR Settings:

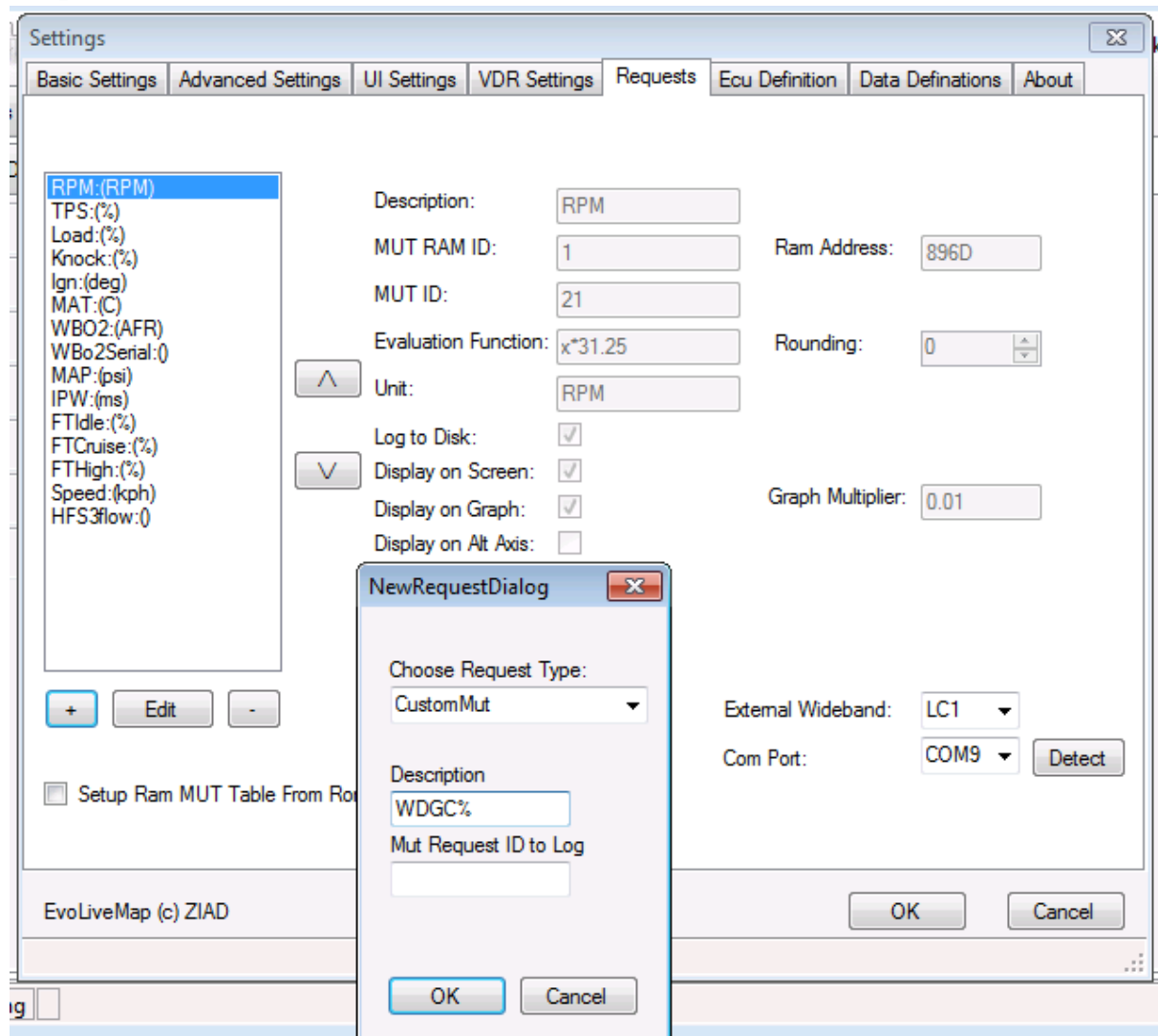
The screenshot shows the 'Settings' window with the 'VDR Settings' tab selected. The window contains the following elements:

- Unit of Measure:** A dropdown menu set to 'Imperial'.
- Unit of Speed:** A dropdown menu set to 'KMH'.
- Car Model:** A dropdown menu set to 'Evo8MR 6spd GSR' with an 'Edit Car Details' button next to it.
- Contents Weight(lb):** A text input field containing '199'.
- Scale MAP:** A dropdown menu set to 'YES'.
- Car Details:** A section containing:
 - Car Description:** A text input field containing 'Evo8MR 6spd GSR'.
 - Car Coef of Drag:** A text input field containing '0.38'.
 - Car Frontal Area:** A text input field containing '23.37'.
 - Car Weight(LB):** A text input field containing '3086'.
 - 3rd Gear Ratio:** A text input field containing '1.434'.
 - 4th Gear Ratio:** A text input field containing '1.1'.
 - Final Drive Ratio:** A text input field containing '4.583'.
 - Tire Diameter Calculator:** A sub-section with three dropdown menus for 'Width:', 'Height:', and 'Diameter:', and a 'Tyre Diameter(In):' text input field containing '25'.

At the bottom of the window, there is a status bar with the text 'EvoLiveMap (c) ZIAD' and two buttons: 'OK' and 'Cancel'.

- **Unit of Measure:** Select imperial or metric unit of measures for temp, baro, weight, hp and torque etc.
- **Car Model:** Change the currently selected model of car here. Also all the parameters can be changed here and are visible to see
- **Unit of speed:** this allows you to have speed in a different unit of measure then the rest of VDR. Eg if logs are in km/h while you want vdr to show hp/lbft.
- **Contents Weight:** default content weight, this can be changed for each graph.
- **Scale Map:** Default is "Yes" this will multiply MAP value by 10 to display better in the VDR graph. Perfect for PSI or BAR. If your unit of measure is KPA then best is to change this value to "No"

Requests Tab:



Please also check the Data Definitions section for further information if removing or adding a request.

- **Request List:** This is the current list that is in the RAM MUT table. Please note ELM uses a ram MUT table that is separate than the normal MUT table to get more functionality. The requests can be moved up or down (change of display order), can be removed or more added. And can be edited by either clicking the edit button or double clicking the request in the list. Once any changes are made they will be saved when u click on another request automatically.
- **+ (Add Request):** This brings up a window to add requests. You have 3 main choices; the drop down list will have some commonly used MUT requests. If your request is not on the list then use "Custom MUT" to add a custom MUT request. Please note that the main thing here is the ID for the request. Lastly if a specific memory address needs to be logged then use the "Custom" option this will allow you to enter a memory address directly. Next enter a description. The rest of the details will need to be updated on the main requests screen.
- **Setup Ram MUT ID:** This is only available to registered users. Basically this will automatically populate the ram MUT table as the requests are set out. Otherwise you have to manually

change the mut table by looking up the memory address for the mut table and putting it into the relevant address in ram MUT table tab.

- **MUT RAM ID:** This is the ID for the ram table. I.e the location of the MUT request in the ram table. Eg user moves TPS to the first location in the ram table will have "0" in this field.
- **MUT ID:** This is the real MUT id for the request.
- **Evaluation Function:** Function in normal maths on how to convert the logged value to human readable format. *(insert 2 byte function as example from evom ELM thread, post 1)*
- **Unit:** Unit of Measure.
- **Log to Disk:** if you do not want to log something to disk. Usually during testing or if logging 2 byte items and their 2nd byte does not need to be saved to disk log file.
- **Display on Screen:** This shows the item on the main screen, there is a list on the right side.
- **Display on Graph:** This shows the item log on the graph.
- **Graph Multiplier:** This is to adjust the value of the item being logged. Example if you want to normalise RPM you will normally use 0.01 as the multiplier. Knock might have 10 as its multiplier. This makes the graph easier to read.
- **External Wideband Support:** You can either select "None" or "LC1" or "ZT2". Also need to select the com port used by the serial port connected to the external wideband. You still need a request for wideband; this can just be a MUT Request to ID 0. The program will substitute the AFR value in the logs. Please check the External AFR section of this manual.

Ecu Definition Tab:

The screenshot shows the 'Settings' window with the 'Ecu Definition' tab selected. The window has a title bar 'Settings' and a close button. Below the title bar are tabs: 'Basic Settings', 'Advanced Settings', 'UI Settings', 'VDR Settings', 'Requests', 'Ecu Definition' (selected), 'Data Definitions', and 'About'. The 'Ecu Definition' tab contains several input fields and a table configuration section. At the top, there are fields for 'Ecu Label' (96262709), 'Start of Rom' (00037B00), 'Rom MUT' (00034528), 'Enable SD' (checkbox), 'DEAD Location' (FFFFA800), 'Start of Ram' (FFFFA000), and 'Segment Size' (0800). Below these is a 'Tables' list on the left containing 'MUT Requests', 'Fuel', 'Ignition', 'Base WG DC%', 'BDE Load', and 'Injector Size'. To the right of the list is a 'Table Name' field and a 'Table' configuration area. This area includes an 'Address' field, a 'Scaling To' label, a 'Display' field, a 'Rom' field, a 'Flip For Negative Values' checkbox, a 'Data Type' dropdown (set to 'Uint8'), and a 'Round To' dropdown (set to '0'). To the right of these fields are two large empty boxes labeled 'X Axis Elements' and 'Y Axis Elements'. Below these boxes are four small buttons: '+', '-', '+', and '-'. At the bottom of the window are 'Add' and 'Remove' buttons. The footer of the window shows 'EvoLiveMap (c) ZIAD' and 'OK' and 'Cancel' buttons.

Settings

Basic Settings | Advanced Settings | UI Settings | VDR Settings | Requests | **Ecu Definition** | Data Definitions | About

Ecu Label: 96262709 Start of Rom: 00037B00 Rom MUT: 00034528 Enable SD: ☐

DEAD Location: FFFFA800 Start of Ram: FFFFA000 Segment Size: 0800

Tables:

- MUT Requests
- Fuel
- Ignition
- Base WG DC%
- BDE Load
- Injector Size

Table Name:

Address:

Scaling To

Display:

Rom:

Flip For Negative Values: ☐

Data Type: Uint8

Round To: 0

X Axis Elements

Y Axis Elements

+ - + -

Add Remove

EvoLiveMap (c) ZIAD OK Cancel

This is the main screen where the ram tables are defined and setup. By default there are a common set of tables that is defined in the rom. If you use ELM to patch your rom file then the default maps are already setup in the definitions in ELM. The only thing to consider is the X and Y axis. People can change them manually if so then you will need to update the definitions using ELM. All addresses are in HEX. **Do not change any addresses unless you know what you are doing, as this WILL result in ENGINE DAMAGE.**

Please also check the Data Definitions section for further information if removing or adding a table.

- **Enable SD:** This enables the SD VE map tracer. Please note you need to log boost in kPa and have a table called "VE" for this to work.
- **Start of Rom:** This is the location of the memory block that is on the rom file. This address is used in Ram2Disk and Disk2Ram primarily. Do not change this address unless you know what you are doing.
- **Start of Ram:** This is the memory address where the rom memory block is copied to. Ie the address in ram where all the tables are kept. This is used by Ram2Disk and Disk2Ram. Do not change this address unless you know what you are doing.

- **ROM MUT:** This is the address of the MUT table for the ecu. It is the address that Ecuflash has for the MUT Table. This is used to create a ram MUT table if using registered mode. Do not change this address unless you know what you are doing.
- **Segment Size:** This is the ram block size. Do not change this address unless you know what you are doing.
- **DEAD Location:** This is the address for the DEAD variable, as used by the reset DEAD button. Do not change this address unless you know what you are doing.
- **Tables List (Add):** Click this button to add a new table to the list. Again normally do not add a table. If you require a specific table to be moved to RAM please contact me at livesmap@mztec.org. Apart from SD tables, this is advanced feature and not many people can do it. If I do it I usually will request a donation, as it is a very labour intensive process.
- **Tables List (Remove):** Removes a table. You can remove a table if u do not intend to use it, it does not do anything bad except requiring you to recreate if that table is every needed again.
- **Table List Sub features**
 - **Table Name:** Normally is uneditable field unless creating a new table.
 - **Address:** This is the address of the table in ram. Hence requires a 8 digit hex address. The first 4 digits are always FFFF
 - **Scaling to Display:** This is the scaling to convert the data read from the ram to human readable format. It is basically same as the scalings used in Ecuflash.
 - **Scaling to Rom:** This is the scaling to covert human readable format of the tables to data for the ecu. It is basically same as the scalings used in Ecuflash.
 - **Flip for negative values:** Used in the ignition table. Otherwise leave unticked.
 - **Data Type:** signifies if the value is single or double byte. Same as Ecuflash. Two options are uint8 and uint16.
 - **Round to:** if an evaluation function is used then use this to round the output to specific digit.
 - **X – Elements:** This is the x-axis of the table. Please be careful in changing it as it will affect the table displayed and hence memory corruption issue.
 - **Y-Elements:** This is the y-axis of the table. Please be careful in changing it as it will affect the table displayed and hence memory corruption issue.

Data Definitions Tab:

Settings

Basic Settings | Advanced Settings | UI Settings | VDR Settings | Requests | Ecu Definition | **Data Definitions** | About

Ignition Table:	Ignition	Load Request:	0:Load
Fuel Table:	Fuel	RPM Request:	1:RPM
Mut Table:	MUT Requests	Knock Request:	2:Knock
		TPS Request:	8:TPS
		WBO2 Request:	F:WBo2Serial
		MAP Request:	7:MAP
		Timing Request:	3:Ign
		Speed Request:	D:Speed

Recheck Definitions Auto Setup

You Can Change Request By Double Clicking The Text Box

EvoLiveMap (c) ZIAD OK Cancel

The program requires certain tables and requests to be defined and properly identified to work properly. As the program allows users to customise it a fair bit this tab is very important. Please note it is definition based so will be different between different definitions.

The time to use it is if any tables or requests is added/removed/modified. First click "Auto Setup" this will try and populate all fields automatically, if it can populate all then a message comes up saying "All settings are acceptable" if it cannot work-out some then an error message shows up. Then it's the user responsibility to manually identify the missing definitions. Once manual identification is done click "Recheck Definitions" button to see if the addresses are allowed.

To manually identify a definition just click the text box with on the right of the request/table missing a definition. This will bring up a window with all requests/tables and the user selects the correct definition.

HOW-TO Section

External Wideband:

This is a feature that was requested by a few users. Currently two wideband devices are supported by ELM, Innovate LC1 and Zeitronix ZT2. Any type of USB to Serial or if your laptop a normal serial port can be used. Please note your Openport 1.3 cable is also assigned a serial port hence the serial port assigned to the external wideband needs to be checked in “Windows Device Manager” basically exactly the same as in Evoscan.

To setup the external wideband feature you will first need to ensure you create a request for wideband. If you don’t already have one then just create a new request, it can be either a normal mut request or a custom one does not matter. Don’t worry about filling the evaluation formula field. But logging to disk needs to be checked.

Next we need to, goto the external wideband section on the request tab in settings, there u can select “None, LC1 or ZT2”. Also please select the correct com port from the list. If the com port is not on the list you can click “Detect” button to repopulate the available comports in the list.

Last step is to goto the “Data Definitions” tab and ensure the “WBO2 Request” points to the new/correct definition.

Please note that you do not necessarily need to create a new request and can just point the “WBO2 Request” to any request, the program internally will replace the logged item with an afr value from the logger.

If there is a problem then ELM will output 0 as the afr value.

Appendix A: Russian Language Instructions

(By Jury – jktuning)

For Russian Language user = Для русскоязычных пользователей

Important note

In Russian Language version of Windows it is necessary to make some changes in the Control panel / Language and regional standards / Adjustment to allow ELM to work properly - set a separator of the whole and fractional part of numbers "point." (As default In Russian Language version of Windows set "comma").

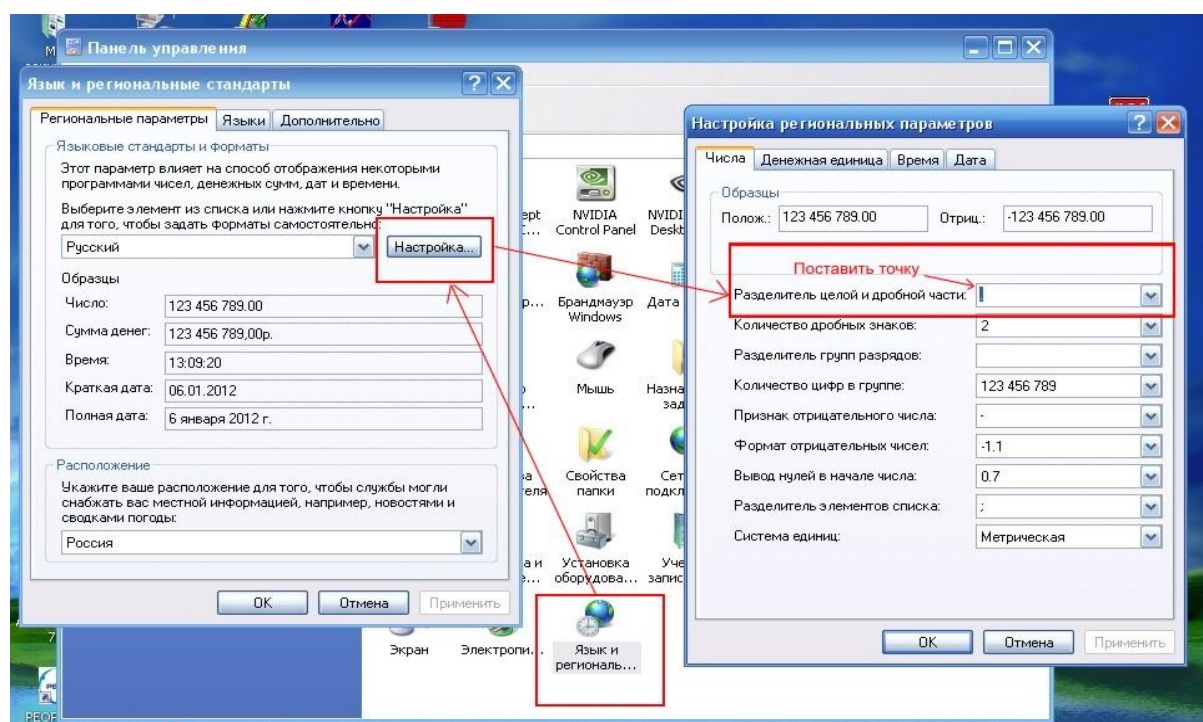
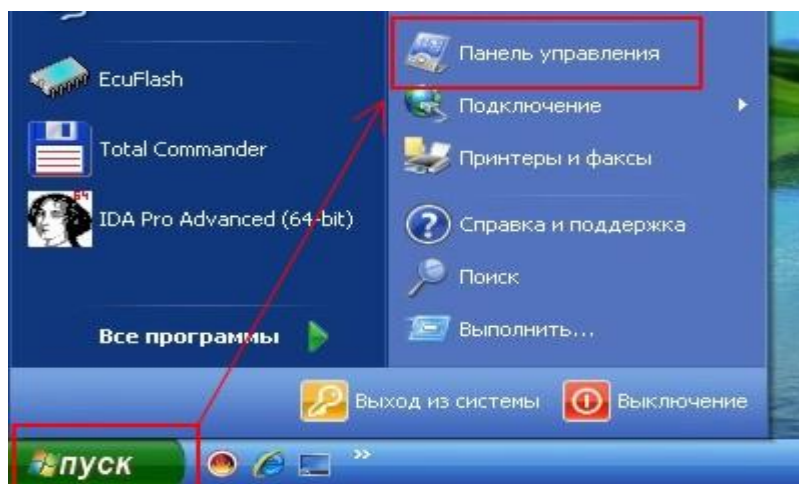
The same way it is also necessary for the correct operation of EvoScan.

Важно

Для правильной работы ELM в Русскоязычной версии Windows нужно в Панели управления / Язык и региональные стандарты / Настройка - поставить разделитель целой и дробной части чисел "точку".

По умолчанию стоит "запятая"

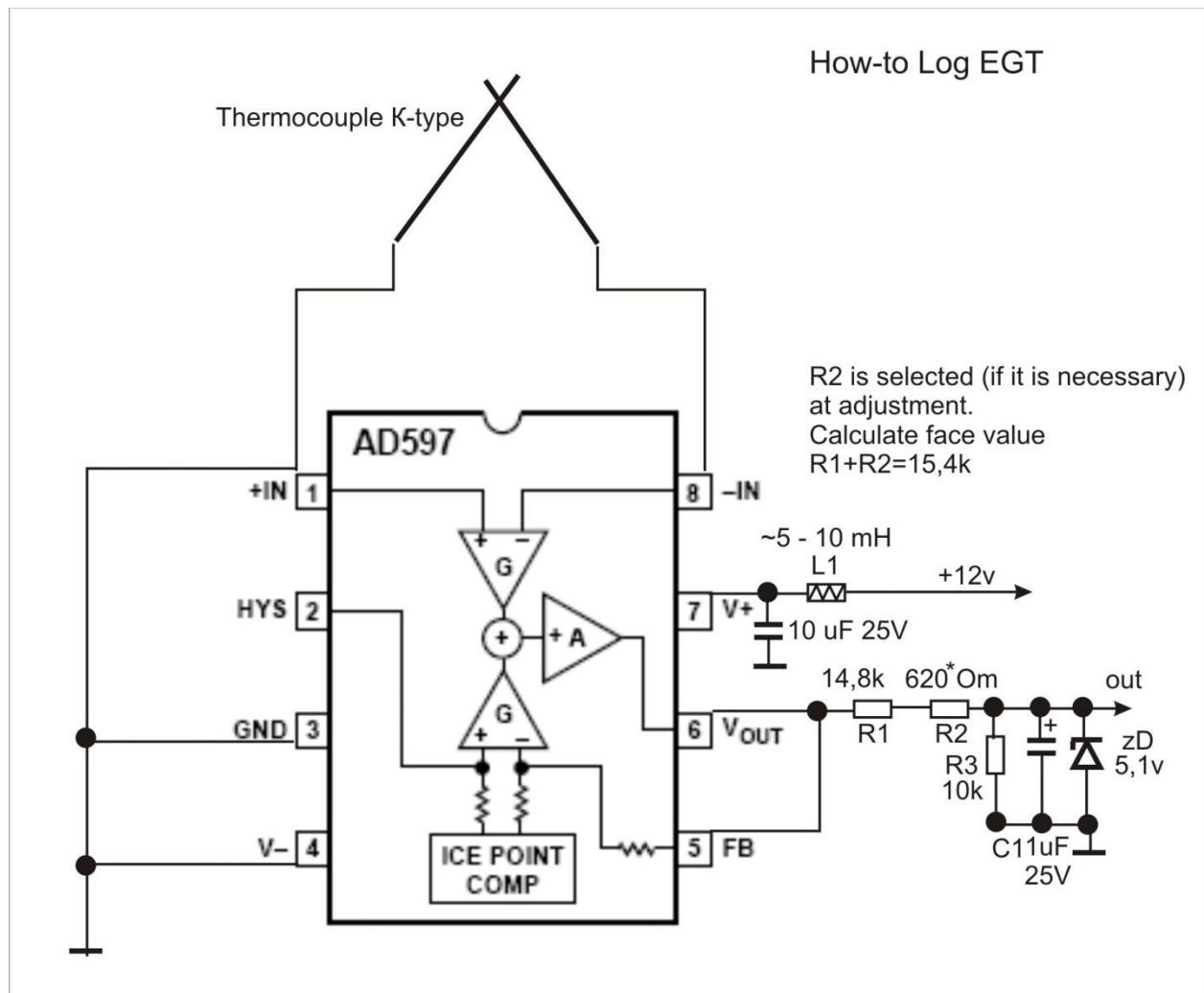
Так же это необходимо для правильной работы EvoScan.



Appendix B: How-to Log EGT

(By Jury – gktuning)

For logging EGT it is possible to use input from Fuel_Tank_Pressure in EVO ECU. Given below is a circuit diagram to setup a K-Type Thermocouple.



For example - for EVO VII ECU: pin 61 - an input of a signal
pin 26 - Ground
pin 12 (25) - +12v SW Supply

MUT_Request_ID 39 and RAM_MUT_Request 0E (at corresponding adjustment RAM_MUT table)

Eval. function: $X \cdot 4.902$ for deg. C

Addresses for logging:

ROM 9653x706 - FFFF 8935

ROM 9626x709 - FFFF 8935

ROM 9055x701 - FFFF 8825

For others ROM and ECU look corresponding addresses in the MUT table and the corresponding pin in the pinout diagram.

It is checked and works well.