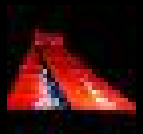
POWER MANAGEMENT SYSTEMS



MAYA SOFTWARE ENGINE MANAGEMENT

(EVO and ADVANCE LICENSES)

USER MANUAL

ENGLISH

MAYA – SOFTWARE
Maya Release 0.10.8

INDEX:

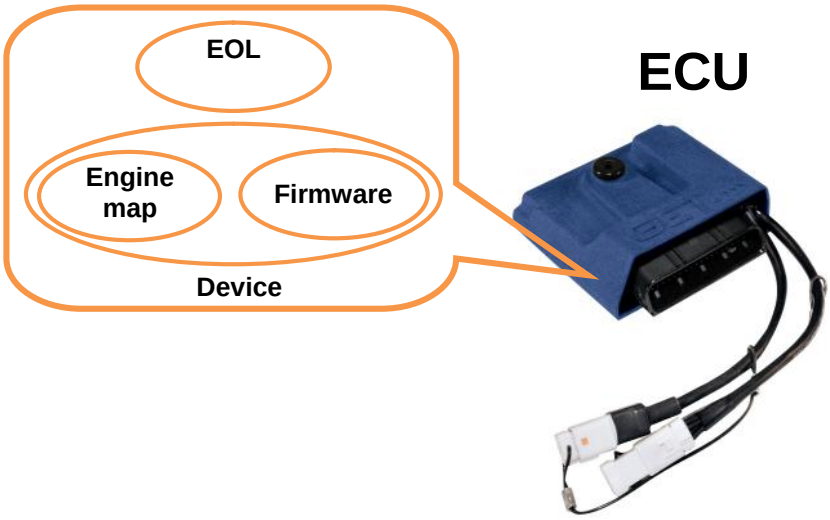
1 BASIC PRINCIPLES

ENGLISH

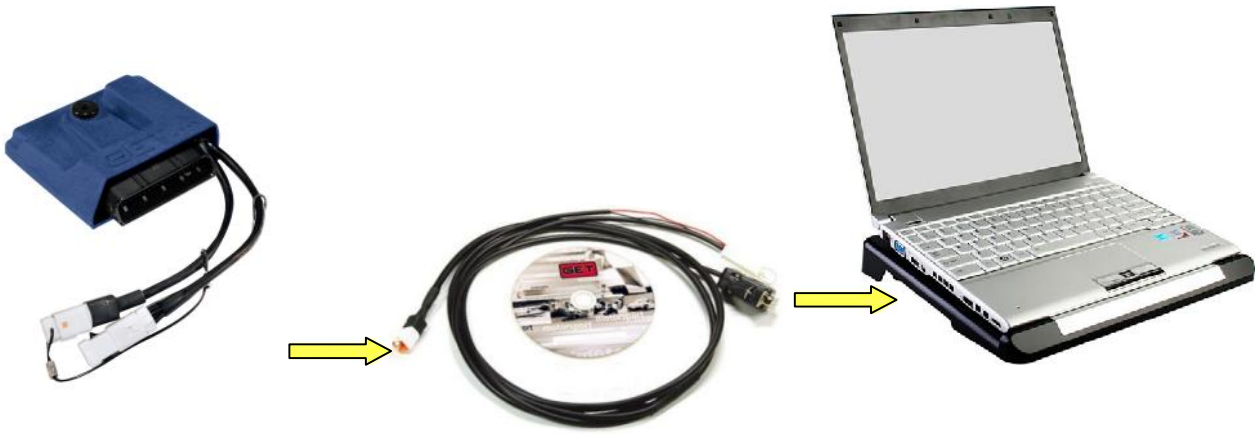
Before starting the use of Maya it is fundamental understand some basic principles relatives to the structure and functioning of ECU[1] by GET- Athena.
Inside microprocessor memory we could find two components that are necessary to engine management:

- **Firmware :** allow to manage the engine using what define in **Engine maps** and by **End Of Line**. Belonging to **firmware** inside the ECU we could load **Engine maps** (this is done in order to reduce risks if many ECUs are used).
- **Engine map**: define parameter values (i.e. fuel quantity, spark advance, temperature corrections, etc.) that are necessary to the **firmware** in order to manage the engine.
- **EOL** – **E**nd **O**f **L**ine: this helps to change quickly some specific values in order to adapt the ECU to a specific engine (throttle position calibration, fuel factors - INJ_OFFSET and spark advance - SPARK_OFFSET, engine limiter - LIMITER_ADJ – etc.. **EOL** change engine maps**.**

Maps, EOL and firmware are the **Device** inside the ECU. In order to use **Maya** it is necessary to reply (loading a similar file both in the ECU and in the PC) the **Device**.
Athena Evolution supply maps files and **Device** in the CD attached to the ECU and in the website www.getdata.it .



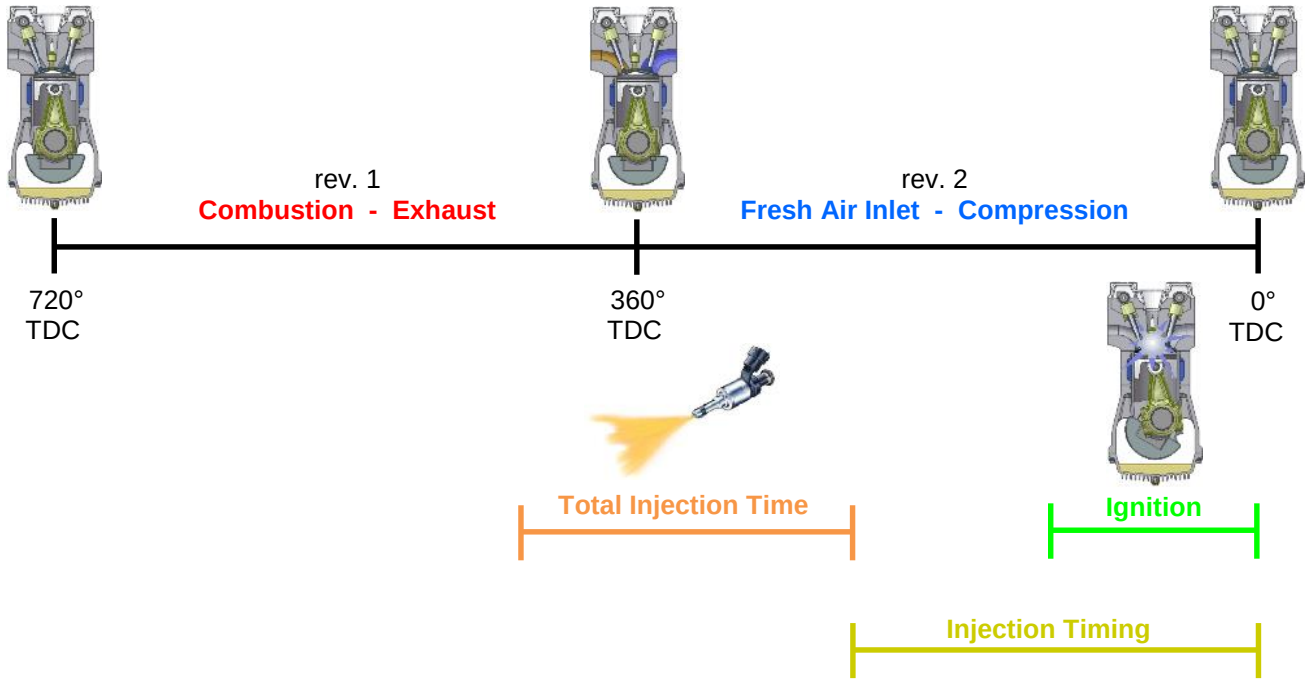
You could link ECU and PC with a specific communication cable.



Maya licence define which parameters can be view/adjusted.
This manual is dedicated to the use on **Maya** with **EVO** and **ADVANCE** licence.

[1] ECU (acronimus of **E**ngine **C**ontrol **U**nit)

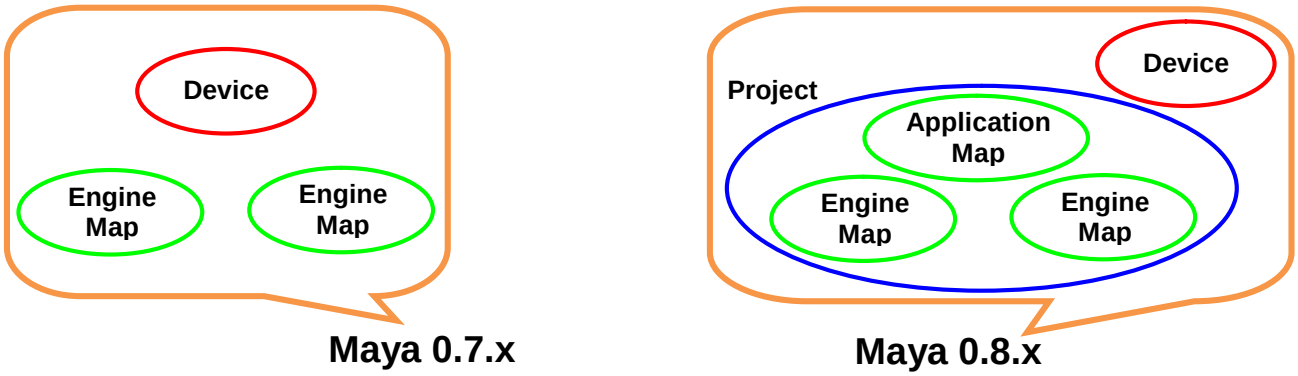
The following picture represents a 4 strokes petrol engine phases.



In this example the engine is at the first devolution of the crankshaft (**rev 1**), before combustion and exhaust.
The duration of injection time (called **Total Injection Time**) is the result of which defined in engine map (fuel base map and relative correction values).
The end of fuel injection (and therefore the beginning, due to the fact that **Total Injection Time** is known) is calculated with **Injection Timing** (expressed in degrees of crank rotation respect to the active top death center) contained in engine map.
Ignition advance (**Ignition**) is defined by other component in the engine map (base table and correction factors) and is expressed in degrees respect to **TDC** (o **T.D.C.**).
The description above is only an easy summarization of how an ECU works.
Details on ECU's **Device** will be listed in following chapters.

1.1 MAYA projects

Maya **project** is the new feature of release **0.8.x** .
The project file (**.mpj** extension) combines the engine maps in a unique file to make the loading and saving procedures easy and fast.



Please note: a new kind of map (**Application Map**) has been introduced in Maya **Project** file. It contains the common elements between Engine Maps (e.g. sensors calibrations).
Application Map might be available only for some **device**.

2 BEFORE STARTING

Before starting the use of **MAYA** it is necessary to do the following operations.

2.1 Software Installation

2.1.1 System requirements

Hardware:

- Hardware: PC Intel x86 or AMD64 compatible
- Processor: Intel Pentium III or better
- RAM: 512 Mb minimum
- Network adapter: 10/100 Mbps (or better)
- Communication port: serial port RS232 9-pin UART16550 compatible or, alternatively, a USB 2.0 to connect ECU to PC
- USB 2.0 port for hardware licence key

Software:

- Operating system: Microsoft Windows© XP, Windows© Vista, Windows© 7-8-10, Linux 2.6.x
- Graphic library: OpenGL compatible (hardware acceleration is recommended)

2.1.2 Installation on Microsoft Windows© system

Maya is available for Microsoft Windows©. Official compatible versions are:

Windows© XP (Service Pack 2, Service Pack 3)
Windows© Vista (32 - 64 bit ,Service Pack 1, Service Pack 2)
Windows© 7 (32 - 64 bit)
Windows© 8 (32 - 64 bit)
Windows© 10 (32 - 64 bit)

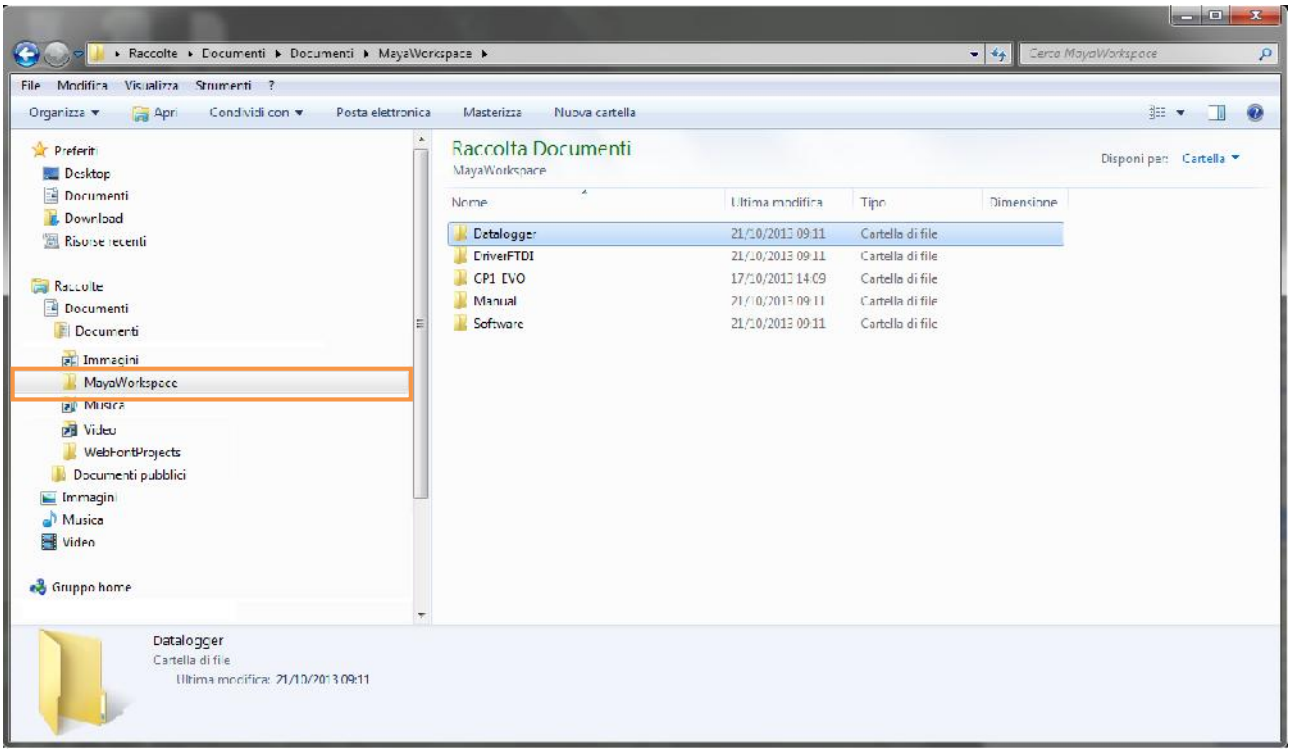
Maya is distributed as a *.exe self installing:

Maya_Install_<*Version number* >.exe

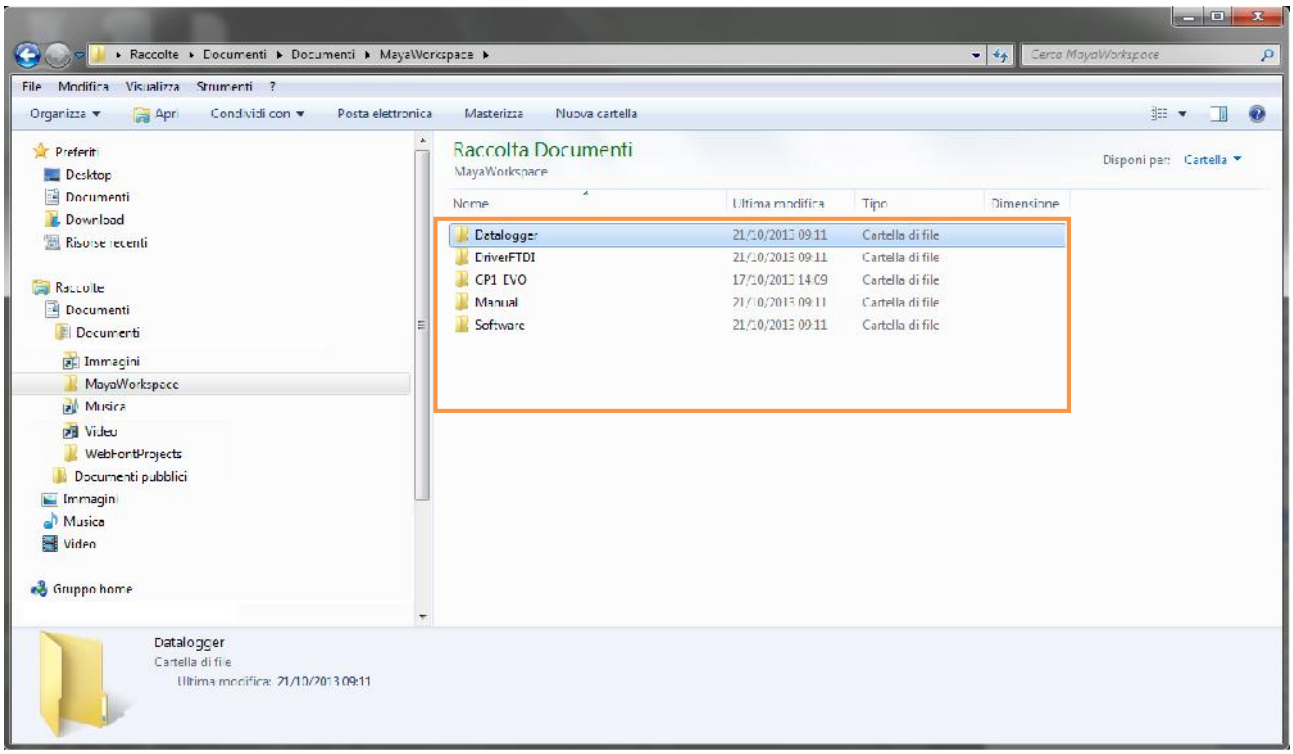
Maya_Install_0.10.0.exe

To install Maya you need to follow screen instructions:

- Create a new folder, rename it as **MayaWorkspace** inside **Documents** in Windows©



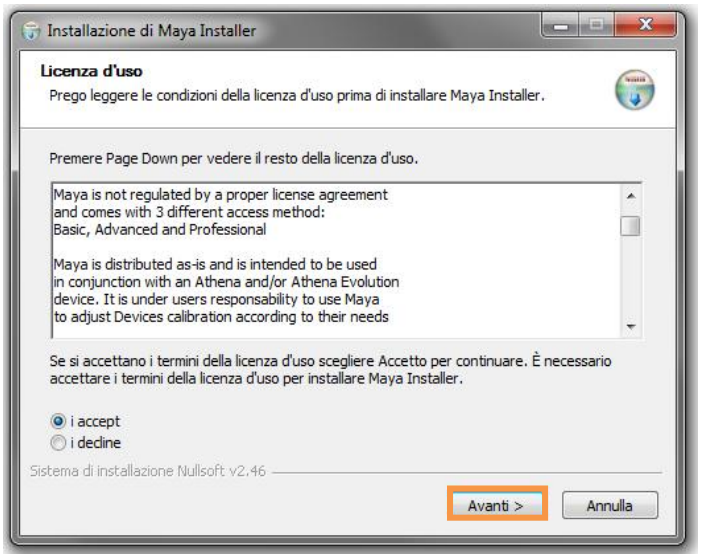
- Copy all CD Software Maya content inside the folder **MayaWorkspace**



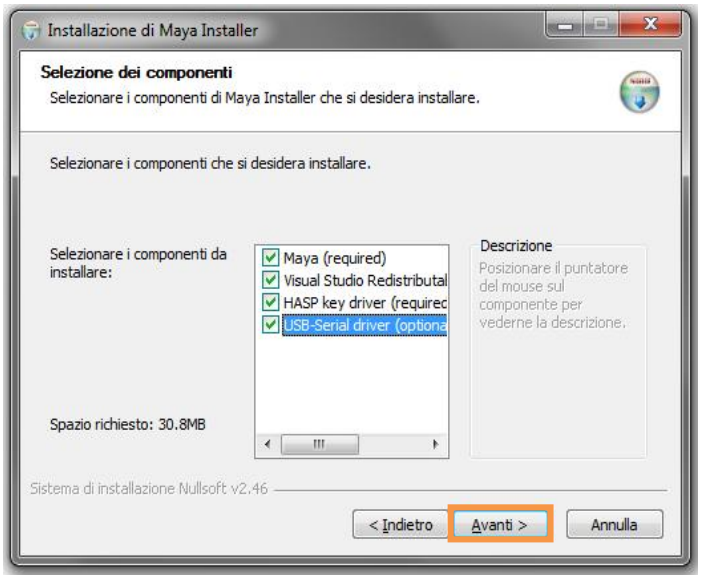
- Run **Maya_Install_<*Version number*>.exe** (double click) contained in **Software** in **MayaWorkspace** folder.

- NOTE: Windows© Vista and/or 7 could show some other permission requests. To continue, chose **Agree**.

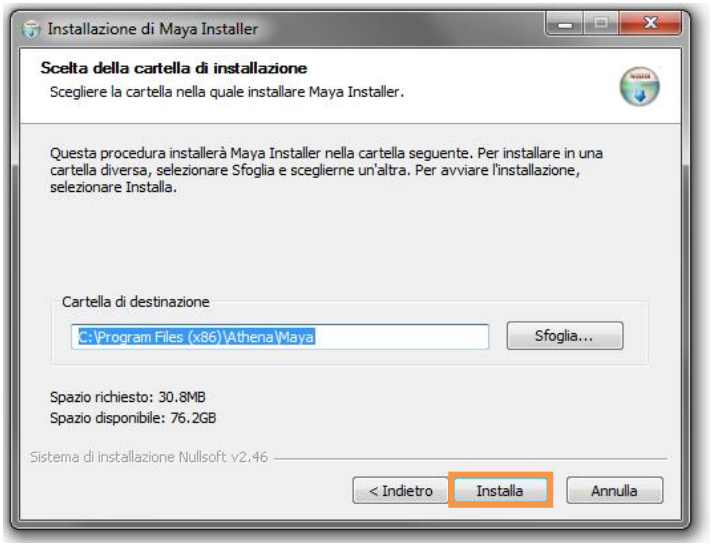
- Accept the user licence to proceed:



- Select software components to install (see figure below).
  NOTE: if you are running the installation for the first time it is necessary to select all components. If you are running an update it is possible to install only Maya



- Chose installation path (or accept the default one – strongly suggested) and click **Install** to start the installation process. During this process you could create a link to Desktop.



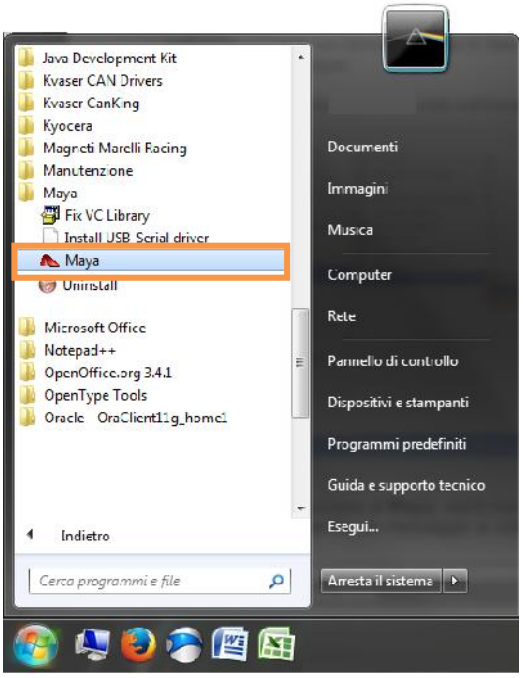
2.2 Base configuration

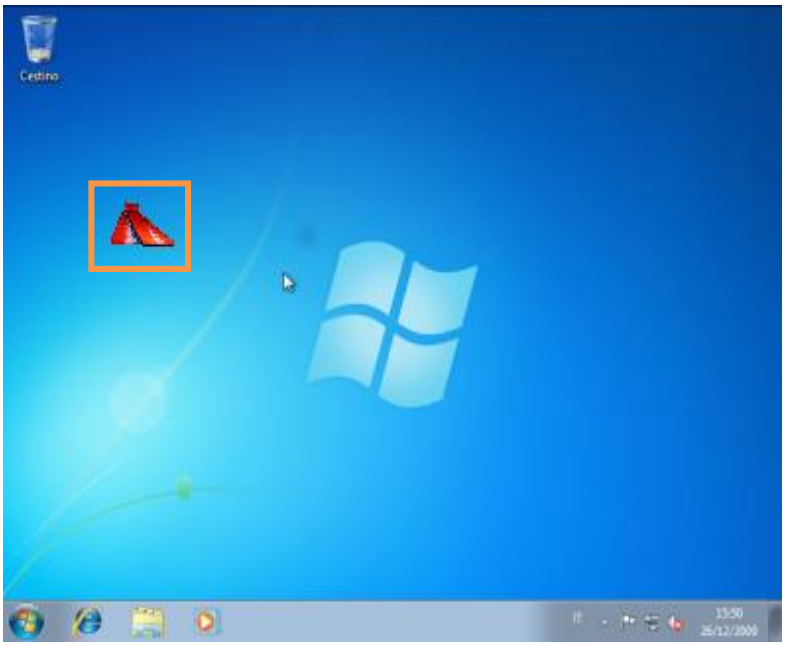
Following instructions help to configure the base settings of **Maya**.
Please follow these instructions in order to simplify the use of the software.

2.2.1 First start of Maya and selection of workspace

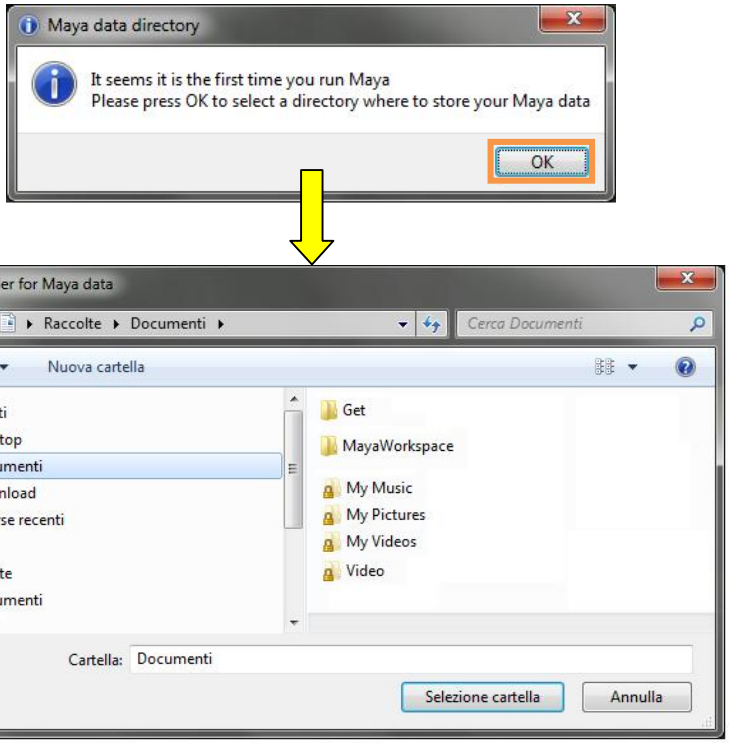
After installation, **Maya** can be launched via the link in **Start** → **Programs** → **Maya**, or directly from desktop (previously created).
Proceed as follows:

- Start **Maya** double clicking on icon :

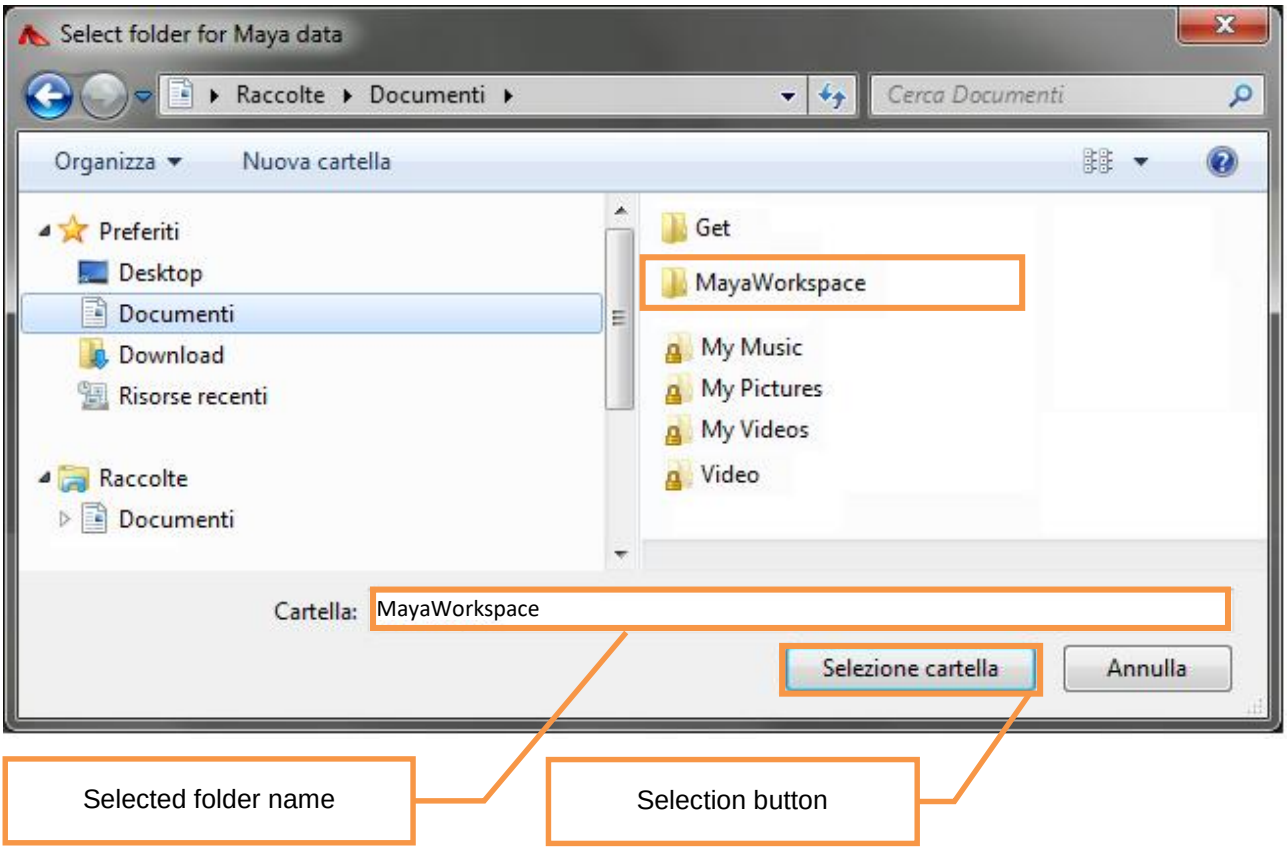




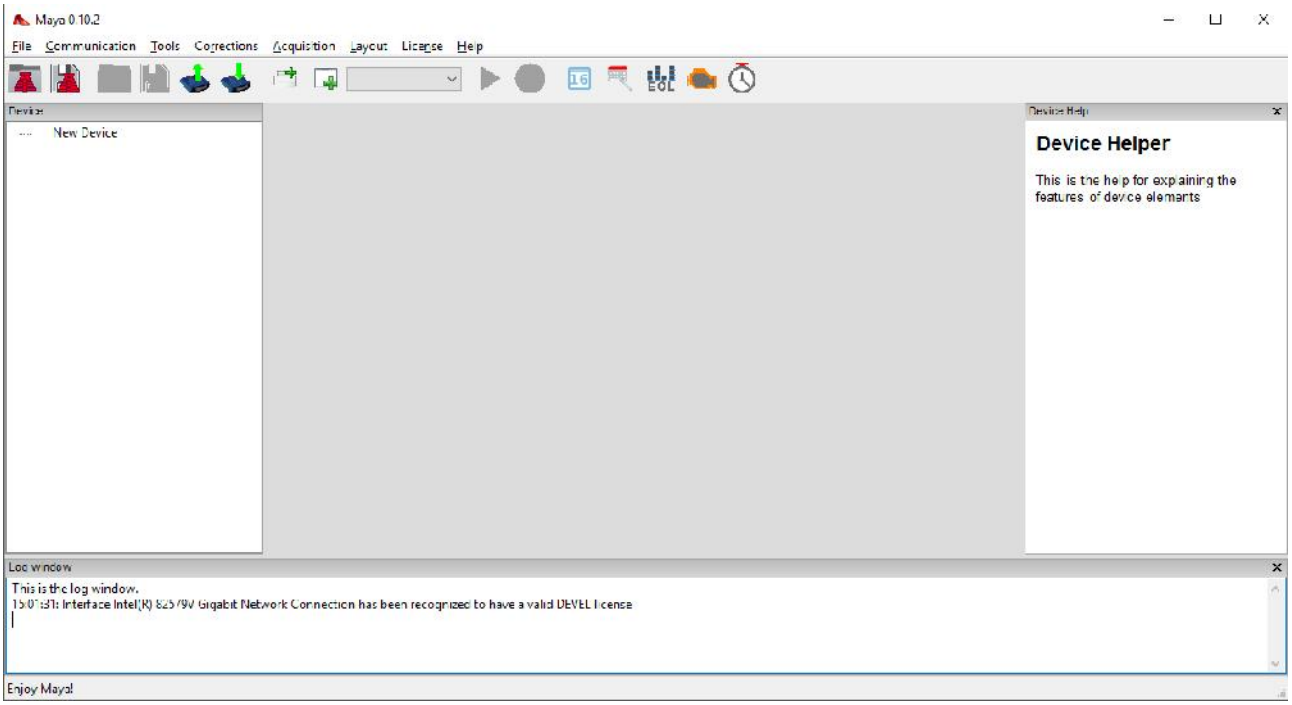
- During first execution of **Maya**, you need to define in which folder you wish to save data (**Workspace**):



- Browse folder tree and find **Documents**.
- Select **MayaWorkspace** previously created (see chap. **2.1.2**) and confirm the selection with **OK** (see previous page).



- The communication port auto-detect procedure will start (see chapter **2.2.2.3**):
- Finally the software main page will appear:



2.2.2 Communication port selection

To make **Maya** working with ECUs it is necessary to define communication port that PC will use.
Communication port selection procedure remains the same also if cables (see picture below) or PC are different.

Serial Cable

Standard USB Cable

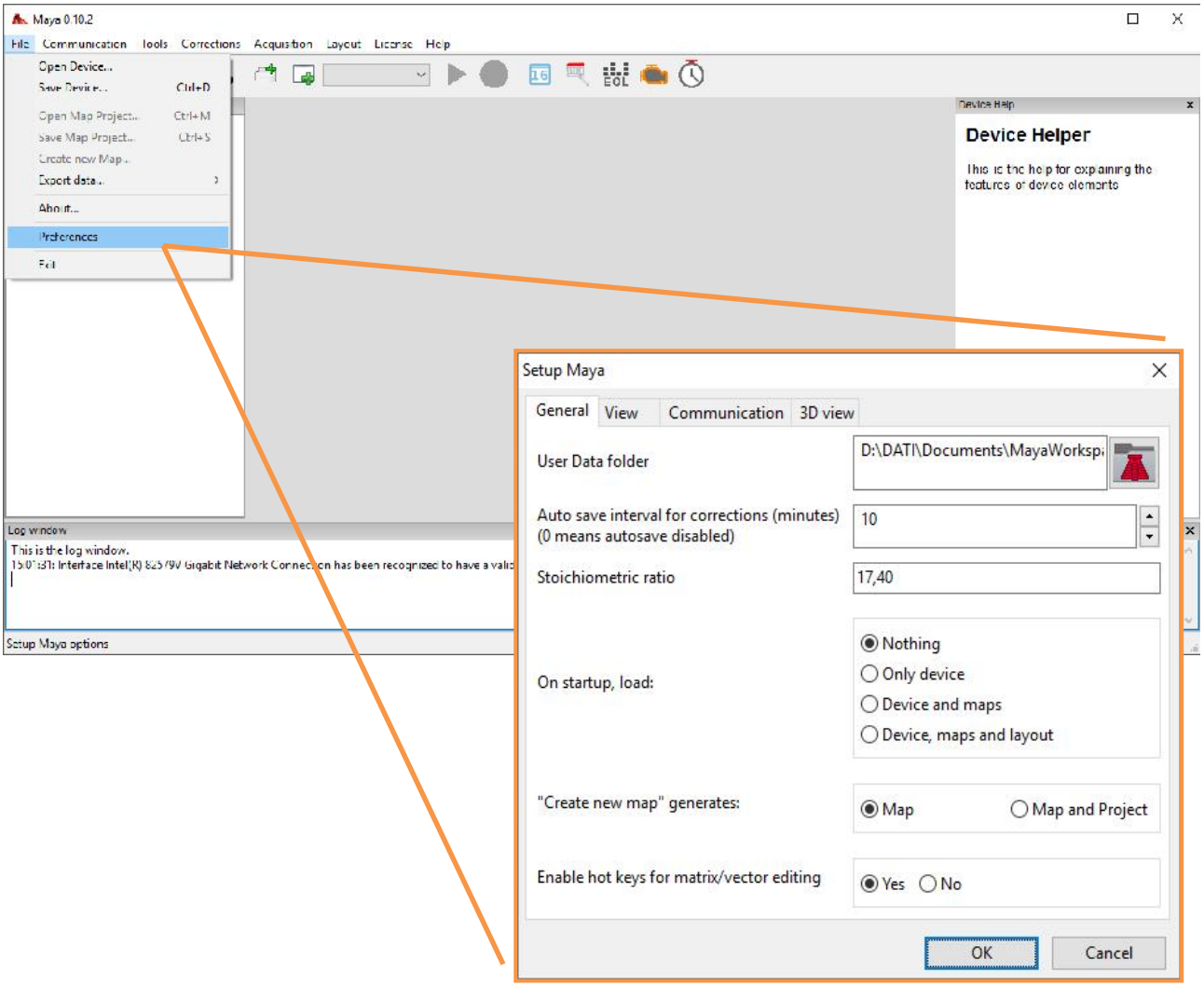
Serial/USB adaptor

CDI ECUs USB Cable

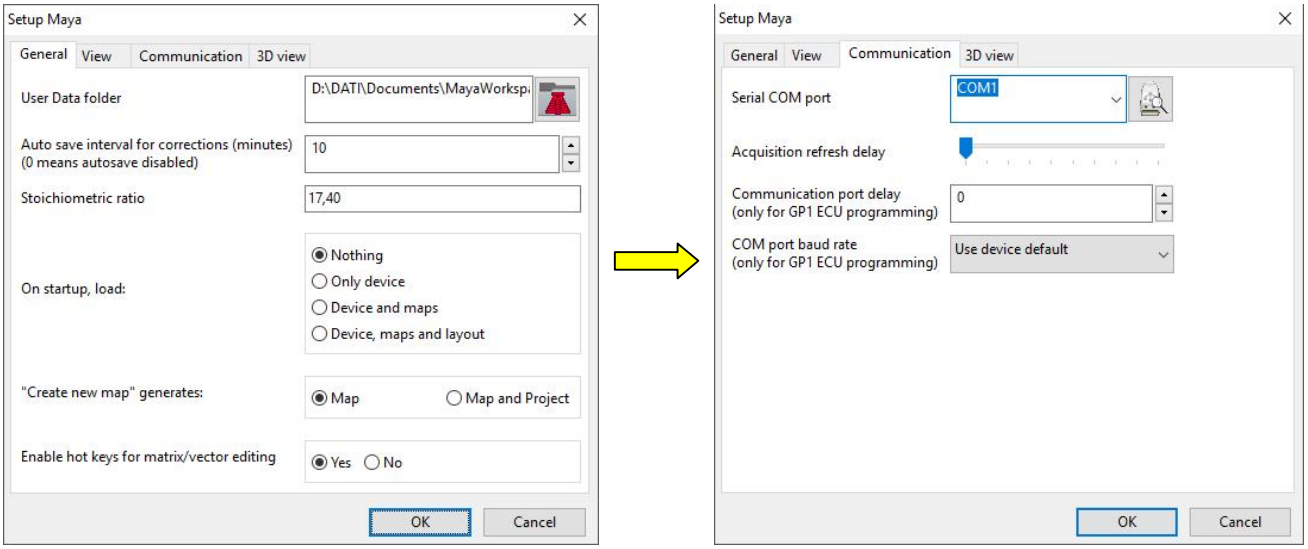
Maya requires a RS232 serial port (picture below) or an emulator for this king of hardware (usually an USB-RS232 adaptor or a cable) .
Serial ports are defined by Windows© with COM followed by a number (1 to 256).
If PC has got a physical serial port, generally is named **COM1.**
If you use an emulator, the name could be different.

To define the **Maya** communication port, you need to operate as describe here:

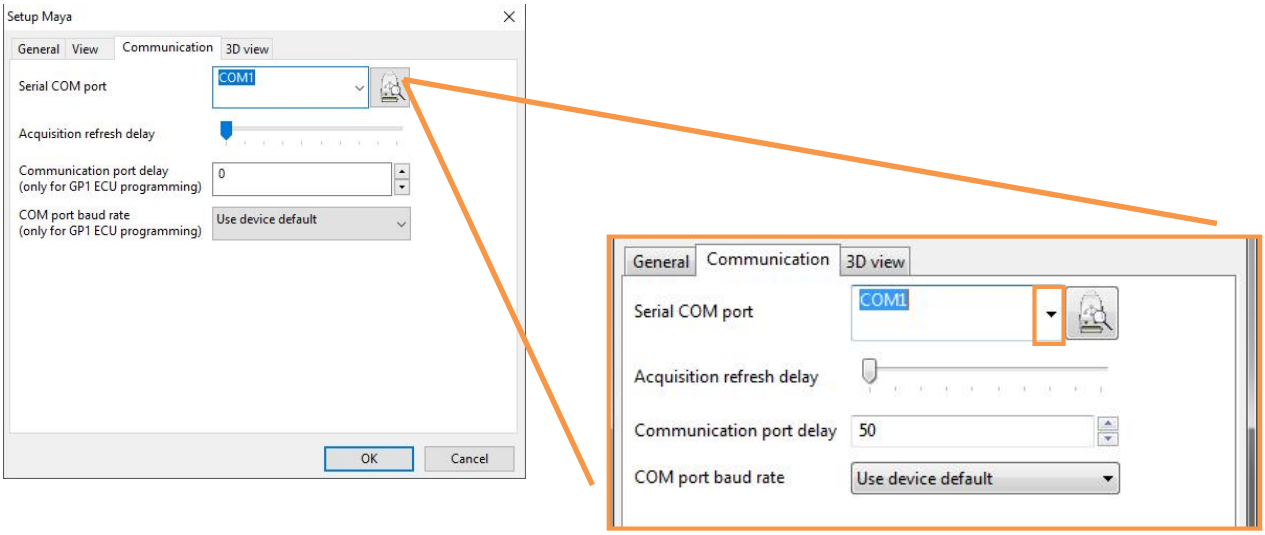
- Start **Maya**
- Select **File -> Preferences**



- Select Communication tab to see communication port preferences.



- Select dropdown menu in **Serial COM port** to visualize all ports recognized by the PC.



- Select desired port (the one that you will use to connect ECU cable).
- Push OK to confirm and get back to main screen in **Maya**.

NOTE: INSTRUCTION RELATIVE TO PORT NUMBER SELECTION ARE IN NEXT CHAPTER.

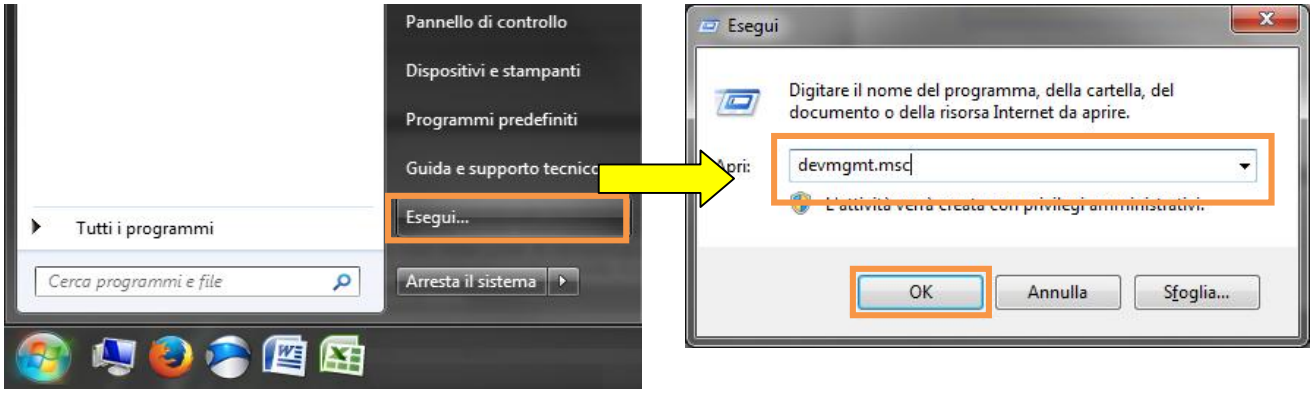
2.2.2.1 Finding port when serial/USB adaptor or USB cable is used

Using an serial/USB adaptor or follow the instructions:

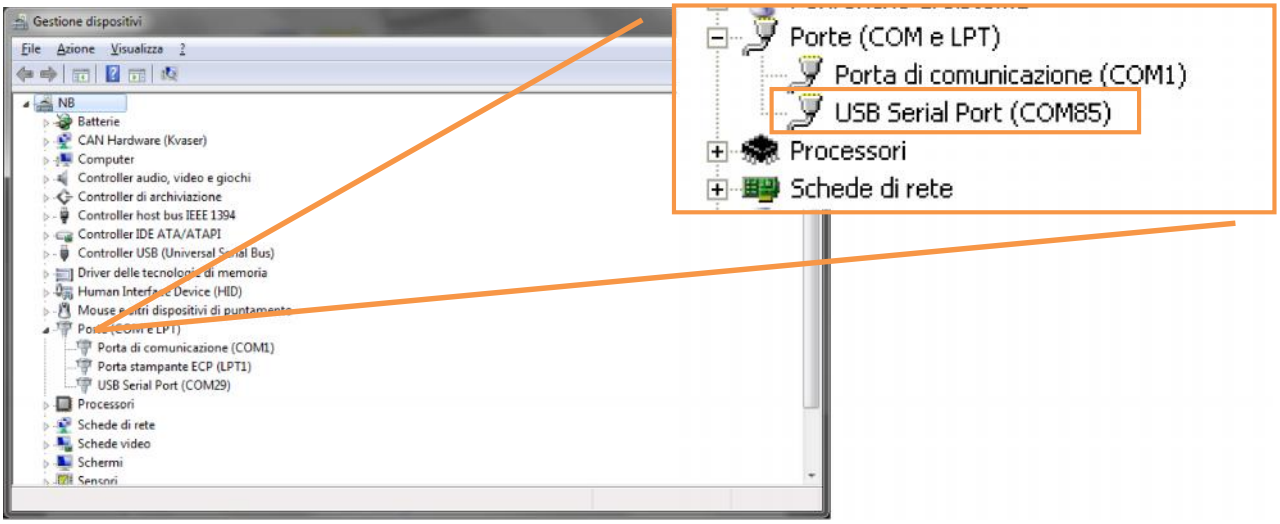
- Start PC
- Disconnect other USB devices
- Connect adaptor (or cable) to a USB port and wait until Windows© installs drivers (follow on screen instructions)

⚠	**WARNING: AVOID USB HUB**

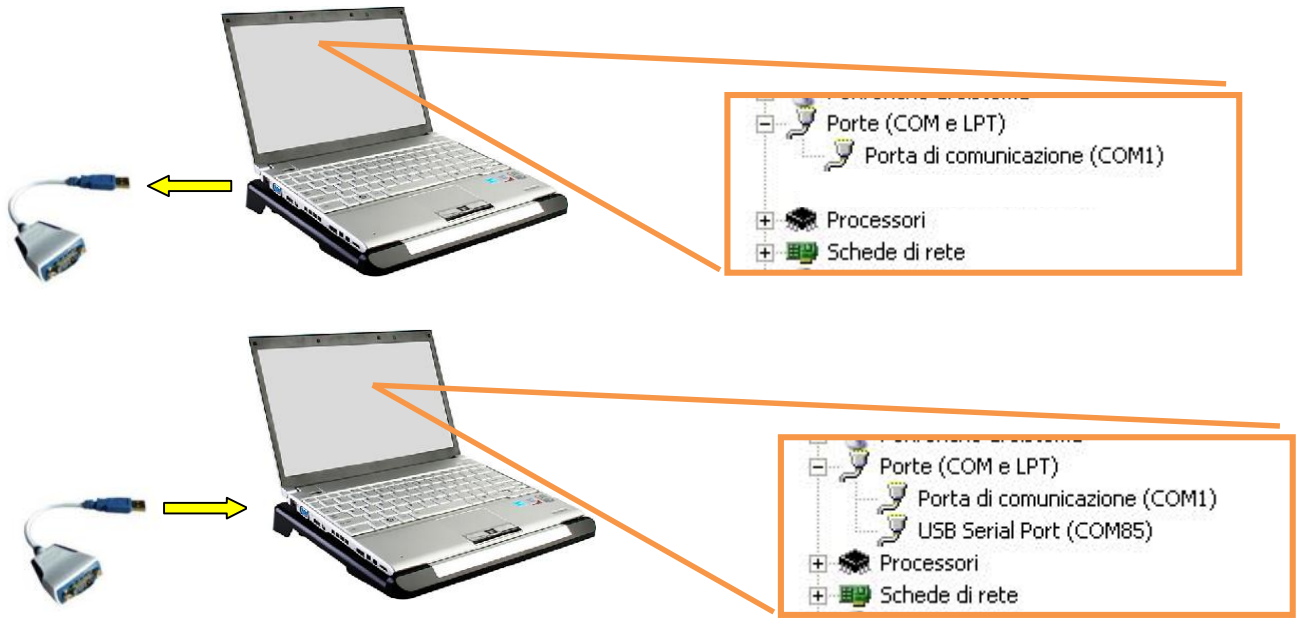
- Click on **Start** and select **Execute**, digit **devmgmt.msc** and confirm with OK (picture below): a new window will appear.



- Click on [+] near **Ports (COM and LPT)** to show list of recognized ports.



Device is identified in Windows© as **USB Serial Port** followed by port name(ie. **COM85**).
NOTE: in the list of communication ports you could see many devices. To be sure that the device you are managing is the correct one, disconnect the adaptor: COM85 (in this example) will disappear. Reconnecting the adaptor, COM85 will be back again.



⚠	**SOMETIMES WINDOWS© DOESN'T RECOGNIZE THE SERIAL/USB ADAPTOR AS A SERIAL PORT: IN THIS CASE THE USER HAVE TO INSTALL THE DRIVER MANUALLY (SEE THE NEXT CHAPTER FOR THE INSTALLING PROCEDURE)**

- After this, close **Device manager** in **Windows©**.

2.2.2.2 Serial/USB adptor: manual driver installation

If the serial/USB adaptor isn't recognize from your system follow these instructions:

- Disconnect the serial/USB adaptor from the PC
- Make sure that you have copied all of CD contents in your MayaWorkspace folder (see chapter **2.1.2**)
- Open the **Driver_FTDI** folder.
- Double click on the self installing file: the setup procedure will start.

***CDM<Version number >_Setup*.exe**

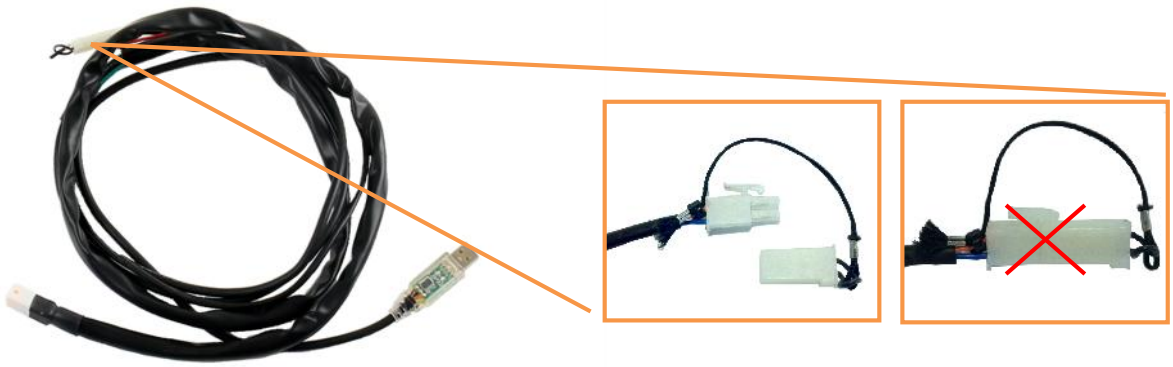
- Wait until the end of the setup process and try to reconnect the serial/USB adaptor to the PC.
- Wait until Windows© recognises the new peripheral.
- Try to find the serial/USB adaptor as described in chapter **2.2.2.1**

2.2.2.3 Communication port auto-detect

Follows these steps:

- Start PC.
- Check that the communication port is set correctly in **preferences of Maya**.
- Connect to programming cable to PC (if you PC has got a serial port).
- Connect GP1 EVO ECU to the programming cable:

- Be sure that the programming connector is **not connected (<u>if present on cable</u>)**.



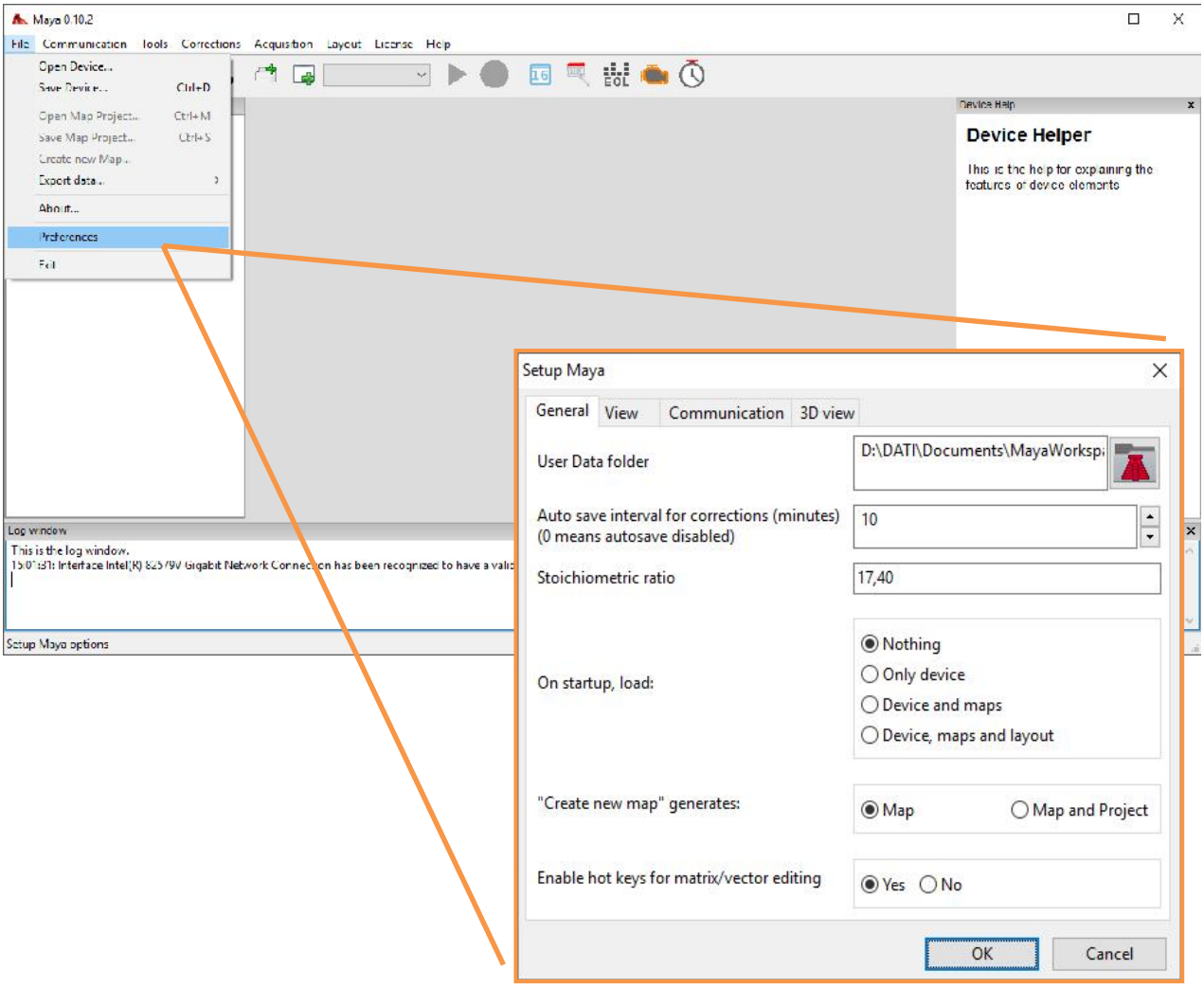
- Connect a power supply to programming cable to power the ECU (if the ECU is not powered by engine loom, or it is disconnected, or you are working in a battery less system).

⚠	**IN BATTERY LESS SYSTEMS IT IS SUGGESTED TO USE A AUXILIARY POWER. IN THIS SITUATION DISCONNECT THE FUEL PUMP.** **IF THE INJECTOR IS OPEN, THE CILINDER COULD BE LOADED WITH FUEL.**

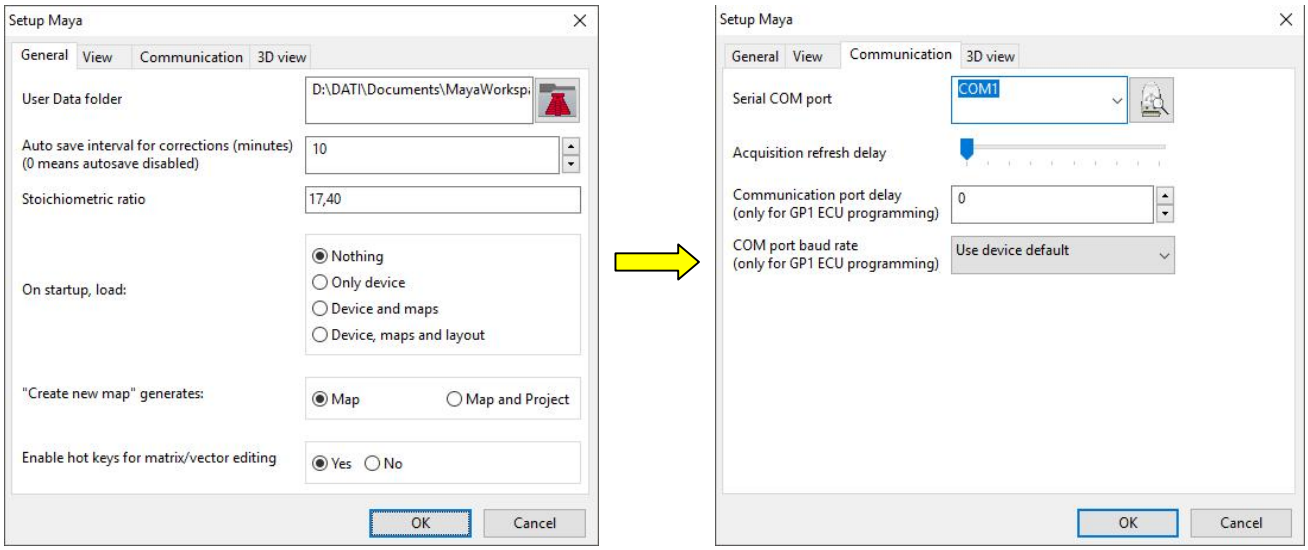
⚠	**LEAVE ECULMB ECU'S (SUCH AS YAMAHA YZF R25-R3 APPLICATION) CONNECTED TO THE BIKE HARNESS AND SWITCH IGNITION KEY IN ON POSITION DON'T USE EXTERNAL POWER SUPPLY**

⚠	**CDI ECUs ARE DIRECTLY POWERED BY PC (THROUGH USB PORT): NO EXTERNAL POWER SUPPLY IS NEEDED**

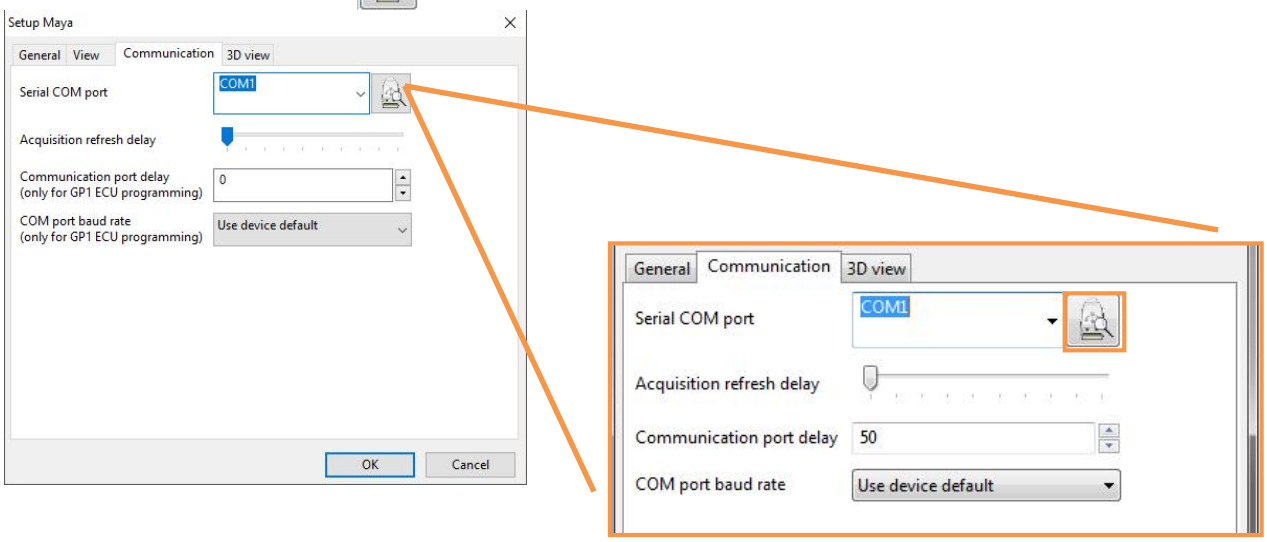
- Run **Maya**
- Select **File -> Preferences**



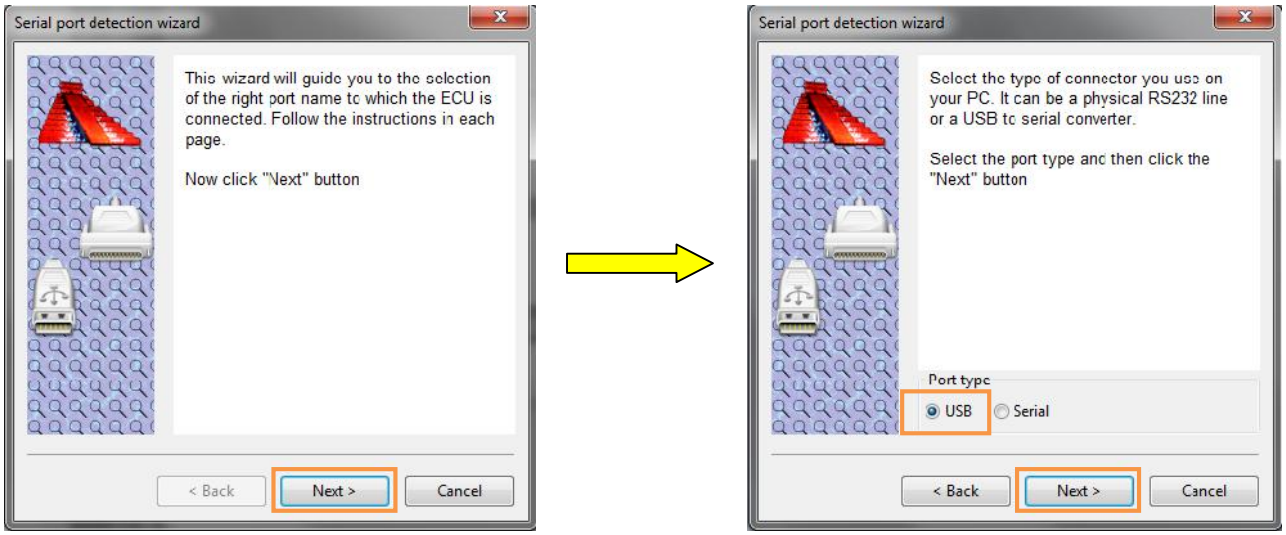
- Select the **Communication** tab



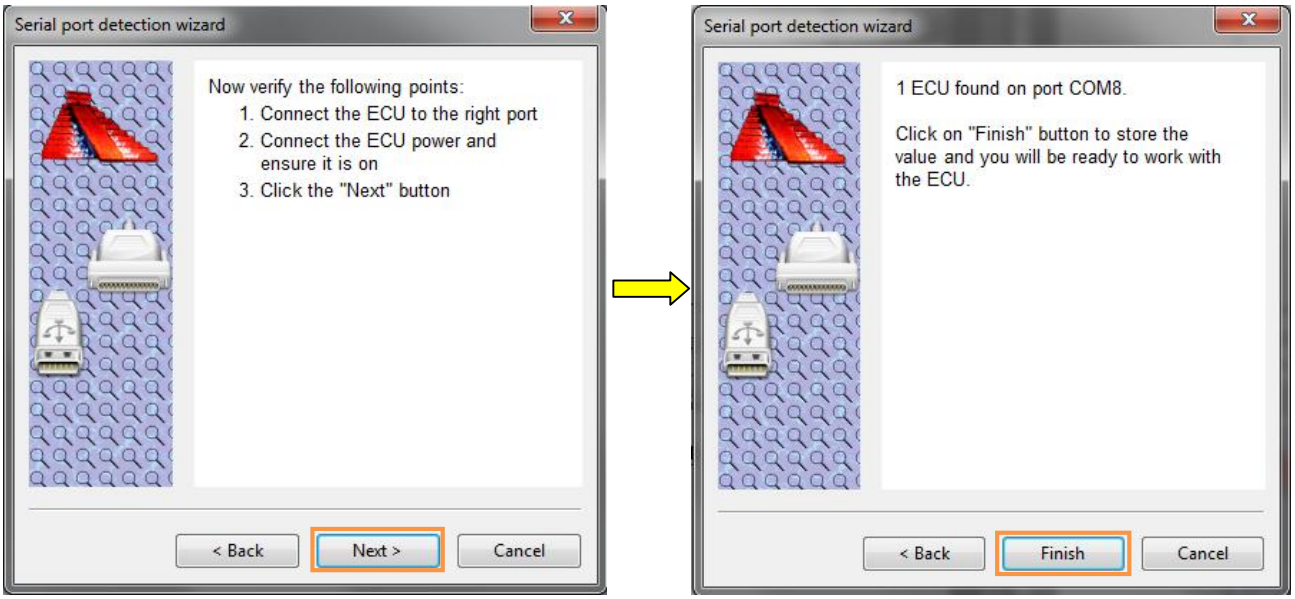
- Click the auto-detect icon  in the right side of **Serial COM port** option to start the wizard program



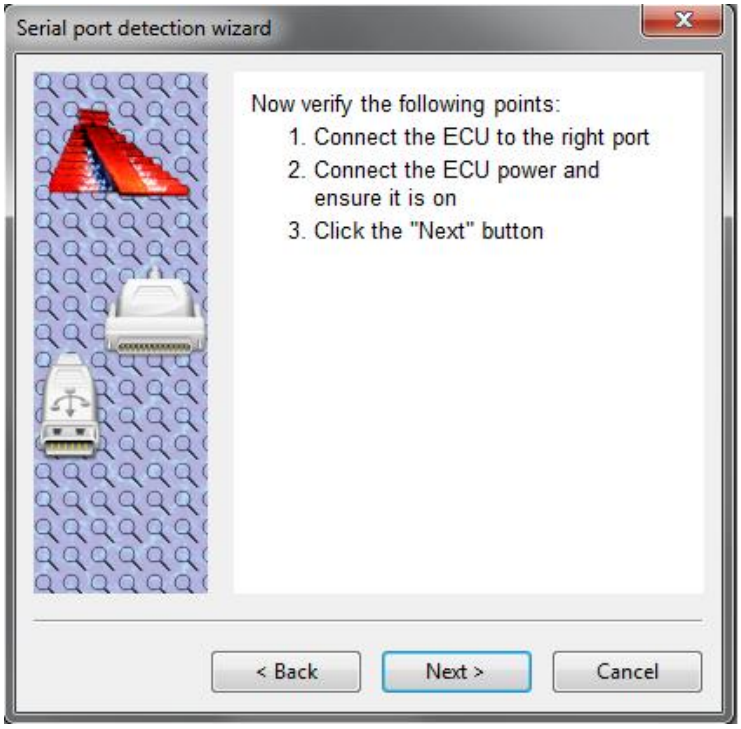
- Click **Next >** and select which type of interface that you're using (serial or USB). Click **Next >** again.



- Check that all conditions are true and click **Next >** . Wait until the end of the operations and then press **Finish** to exit the operation.



PLEASE NOTE: if the message below appears check the connections and the power supply level and restart the auto-detect procedure.

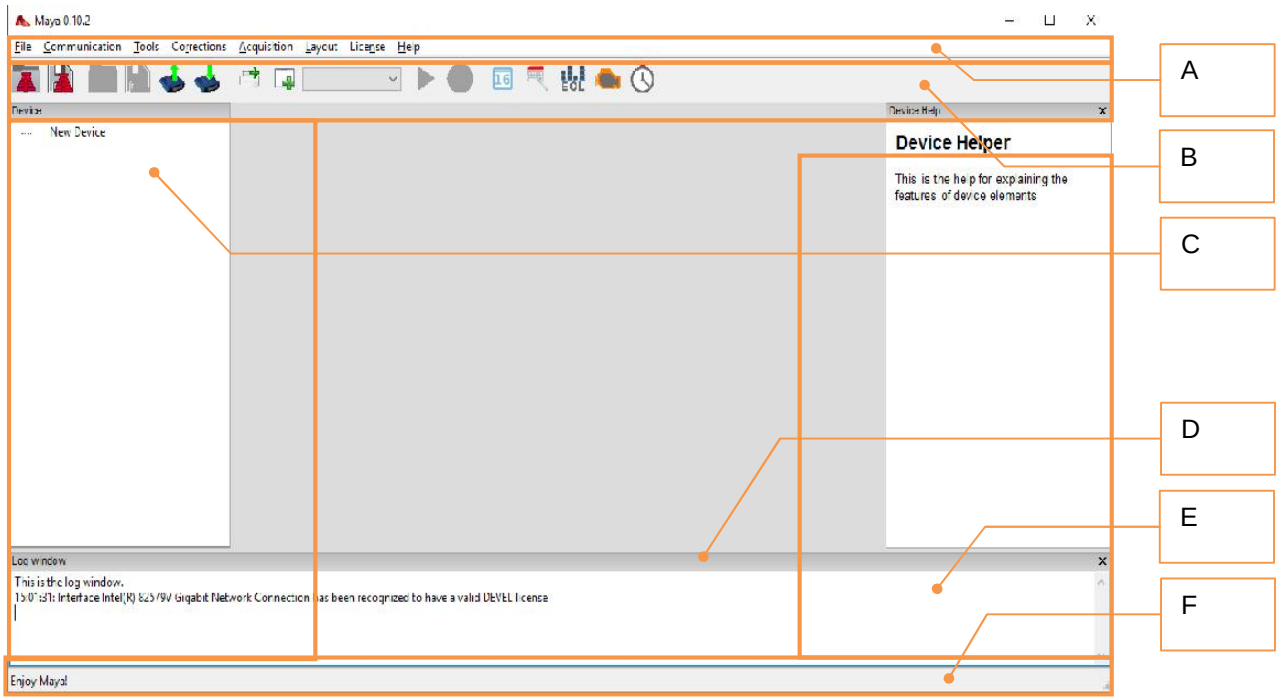


2.2.2.4 Setting communication port on CDI ECUs

CDI ECUs requie manual communication port set (see chapter **2.2.2.1**).

3 MENÙ AND MAYA FUNCTIONS

Maya main page could be divided into the following areas:



A: Menu bar

B: Instruments bar

C: Device Manager bar

D: Activity area (modification and visualization of elements and maps)

E: Device Helper area (visualization of help messages)

F: Status messages is relative to elements selected by the user. In this area you can see the value of a parameter.

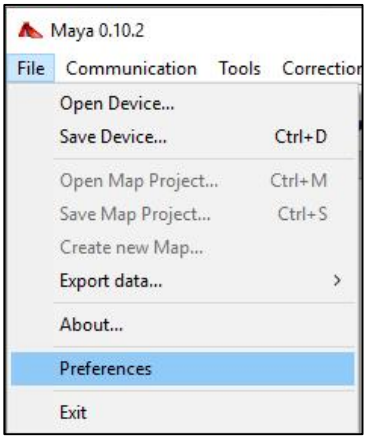
D, **E** and **F** are extremely specific and can vary due to user's activities, following chapters will describe only **A**, **B** and **C**.

3.1 Menu bar

Menu bar include all Maya menus.

3.1.1 File menu

Here you could find:

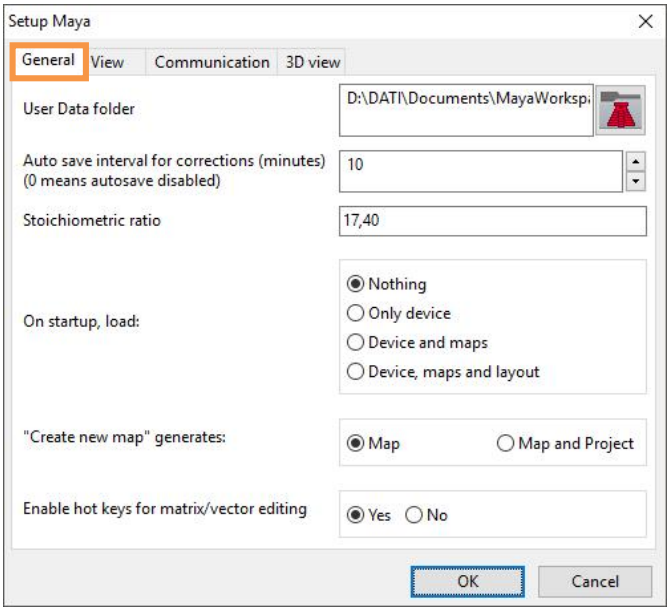


- **Open Device… :** you can open a **Device** in current **Maya** session.
- **Open Map Project… :** you can open a saved **project** in current **Maya** session.
- **Save Map Project… :** you could create a new **Maya** project (**.mpj** file).
- **Create New Map… :** you could create a new engine map if the correction table has been modified (**.myp** file)
- **Apply Maplet:** it allows to employ a special configuration file – **Maplet** – supplied by **GET - Athena** (**.myt** file)
- **About… :** you can obtain information on release and licence of **Maya**
- **Preferences :** you can modify some **Maya** options
- **Exit :** exit **Maya**

3.1.1.1 Maya preferences

By clicking **Preferences** you could adjust preferences. You could see three tabs: **General, Communication** and **3D View**

General contains:



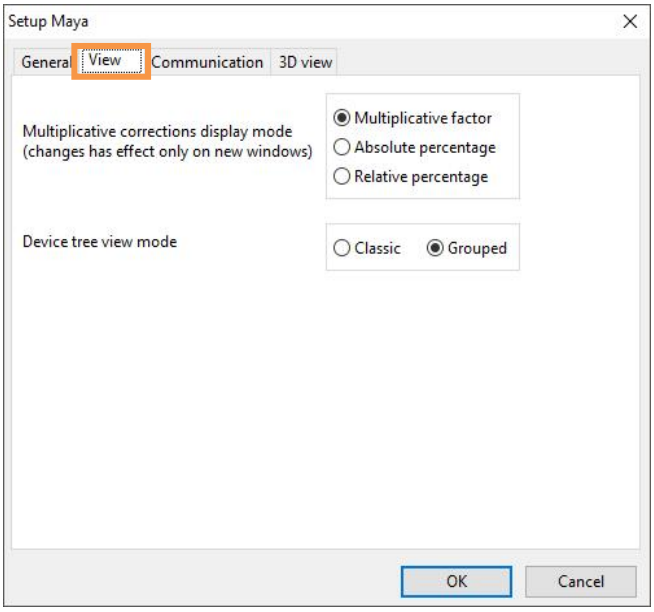
- **User Data folder:** define working folder. If you need to modify this, just click on the icon.
- **Auto save…… (disable):** auto saving time (how frequently the software save automatically maps loaded in **Maya** session (only corrections).
- **Stoichiometric ratio:** you could adjust the stoichiometric ratio (STO) for the used fuel (i.e. **14.70** for petrol). This is used to adjust λ value in AFR.
- **On startup, load:** define which files download starting **Maya**. Settings are:
  Nothing: no file will be downloaded
  Only Device: will be downloaded only the **Device** used previously in **Maya**
  Device and maps: will be downloaded both **Device** and **maps** used previously in **Maya.**
  Device, maps and layout: software will load **Device, maps** and **layout** (visualization settings in **Activity** area) used previously in **Maya**.
- **Create new map" generates**: set Maya behavior when map correction session needs to be saved.
  Map: creates a map file which contains all corrections that have been done.
  Map & Project: creates a map file which contains all corrections and a new project file.

- **Enable hot keys…:** options **Yes** and **No** switch function buttons (**F1, F2** etc..) for a rapid execution of fast controls in **Maya** (example sending and receiving maps, etc…). **<u>It is suggested to switch on this function.</u>**

View contains:

- **Multiplicative corrections… :** select visualization mode for values expressed in correction tables of **map matrix**. It is possible to select visualization as: multiplicative factor, absolute percentage or relative percentage (ie. Multiplicative factor 1.10 correspond to an absolute percentage of 110 % and to a relative percentage of 10% of original map value). It is suggested to use engineering multiplicative constant.

- **Device tree view mode:** you could choose the visualization of **Device Manager** area: **Classic** (standard visualization) or **Grouped** (the components of device are sorted by typology).



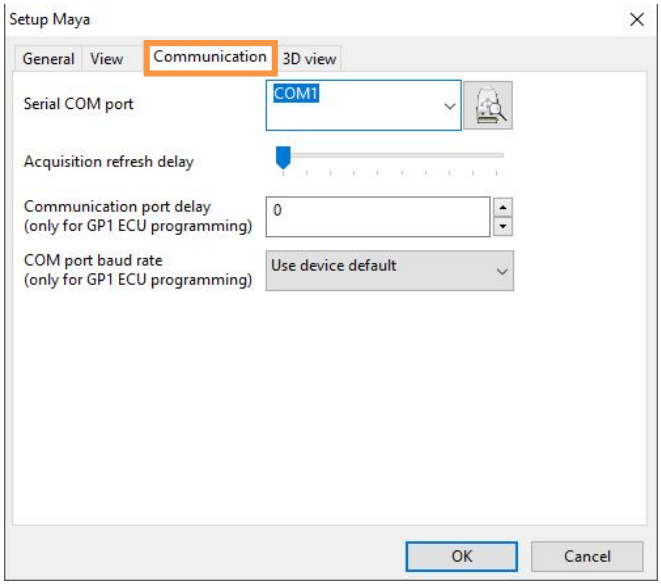
Communication contains:

- **Serial COM port:** here you could select the communication port of pc to connect with ECU (see chapter **2.2.2**).

- **Acquisition refresh delay :** you could select which how fast values loaded from ECU are updated (during **Scalar Display** or **Analog Meter Display**).

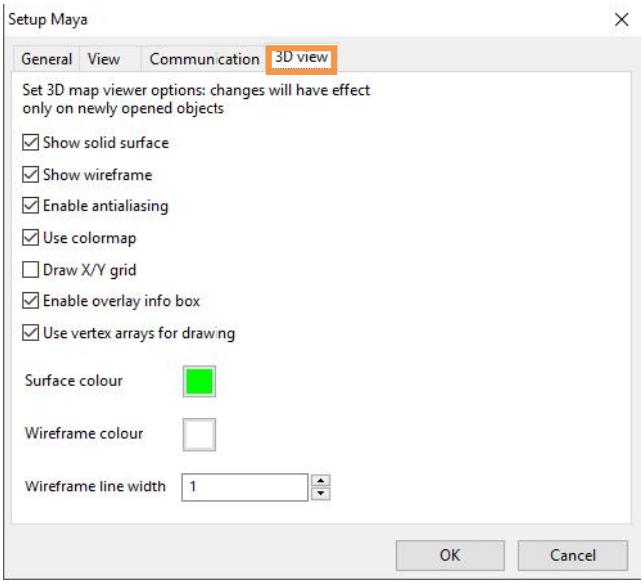
- **Communication port delay :** you could adjust here response time between PC and ECU. If you face problems you could set higher values (i.e. 200). Max value: 300.

- **COM port baud rate :** you could adjust here communication speed to/from ECU. In case of communication problems you could set 19200.



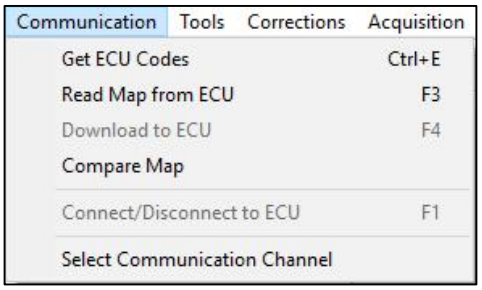
3D view contains:

You could adjust the 3D matrix view, with colours and lines.



3.1.2 Communication menu

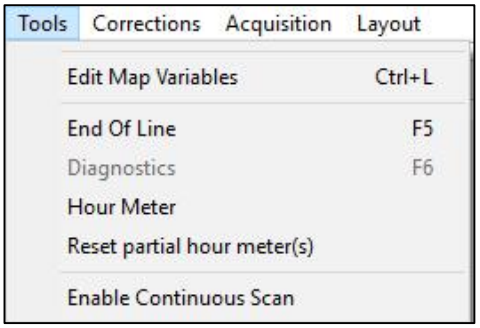
Communication menu has got all these functions:



- **Get ECU Codes :** you could read ECU data. Data are: **Calibration Map code**, **Packet code**[2] and **Firmware code**. Hot key: **Crtl** + **E**.
- **Read Map from ECU :** you could read data in ECU maps. You could decide which map you will read. By selecting **All** you will download all data. Hot key: **F3**.
- Download to ECU : you could write data to ECU. The ECU needs to be in programming mode (read chapter 6.6). Hot key: F4.
- **Compare Map :** you could compare an ECU map with a PC map.
- **Connect/Disconnect to ECU:** you could switch on/off live visualization of values in **Scalar Display** and **Analog Display**. Hot key: **F1**. NOTE: when this function is on, some options in **Maya** are disabled.
- **Select Communication Channel :** you could choice type of communication to use between PC and ECU. Actually **Maya** supports only serial protocol **RS232**.

3.1.3 Tools menu

Tools menu has got these options:

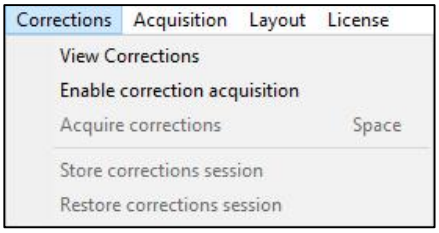


- **Edit Map Variables :** you could visualize and modify values of variables[3] in selected map. Hot key: **Ctrl** + **L**.
- **End Of Line :** you could visualize the window parameter in **End of Line** (**EOL**) in selected map. Hot key: **F5**.
- **Diagnostics :** you could visualize diagnosis window of ECU to verify the status of the unit. Hot key: **6**.
- **Hour Meter :** you could count ECU time activity (hour counter function).
- **Enable Continuous Scan :** set continuous COM port polling also when ECU is disconnected. Use this function at your own risk.

[2] The packet code is used by **Maya** to manage visualization of Scalar and Analog Display.
[3] For further information on engine maps components please read chapter **4.1**

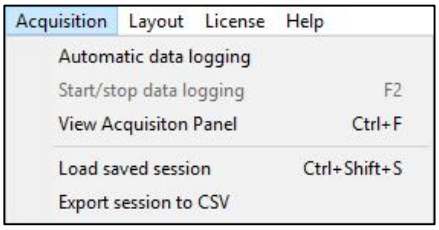
3.1.4 Corrections menu

Corrections menu allows to modify parameters for advance and injection in map/s loaded in to the ECU.
For more information read chapter **6.14**.



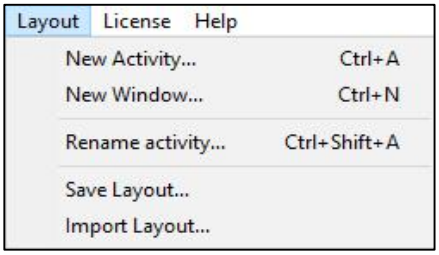
3.1.5 Acquisition menu

In **Acquisition** menu you could access to logging facilities in **Maya**. These functions are used for remote assistance by GET-Athena.
For more information read chapter **6.23**.



3.1.6 Layout menu

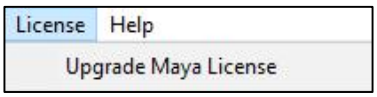
In **Layout** menu you could modify **Activity** area (read chapter **6.7** for more information) and add windows. **Layout** is linked to the used **Device** and to the **Maya** licence type.



- **New Activity :** here it is possible to add and divide **Activity** area. Following vide instructions, it is possible to add various objects (matrix, scalars etc..). Hot key: **Ctrl** + **A**.
- **New Window... :** here it is possible objects in a new window. Hot key: **Ctrl** + **N**.
- **Rename Activity… :** you could rename area the **Activity** area. Hot key: **Ctrl** + **Shift** + **N**.
- **Save Layout… :** save the layout of **Activity** area and all windows created. From **Layout selection** you could rapidly access to this.
- **Import Layout… :** read a previously created layout. NOTE: some functions could be disabled, due to differences between Devices.

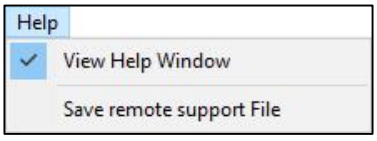
3.1.7 License menu

Here you could update your **Maya** licence. Only for OEM licences.



3.1.8 Menù Help

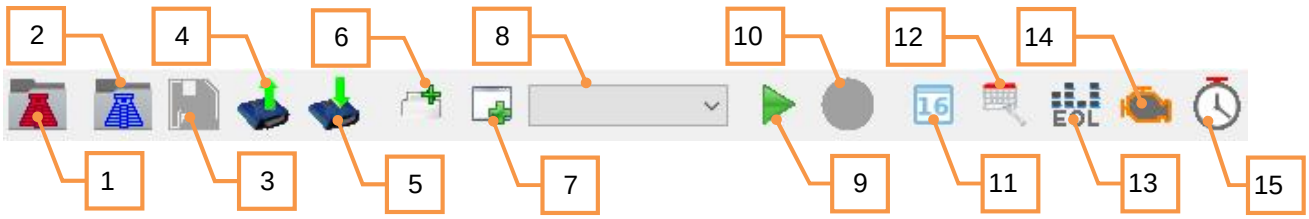
Help contains:



- **View Help Window :** able/disable the view of **Device Helper** window in **Maya**.
- **Save Log File :** this function can save a log file if a problems occurs during the use of **Maya** software. This file could be sent to **GET – Athena** Technical Support for further actions.

3.2 Instruments bar

This is the Instruments bar in **Maya**:

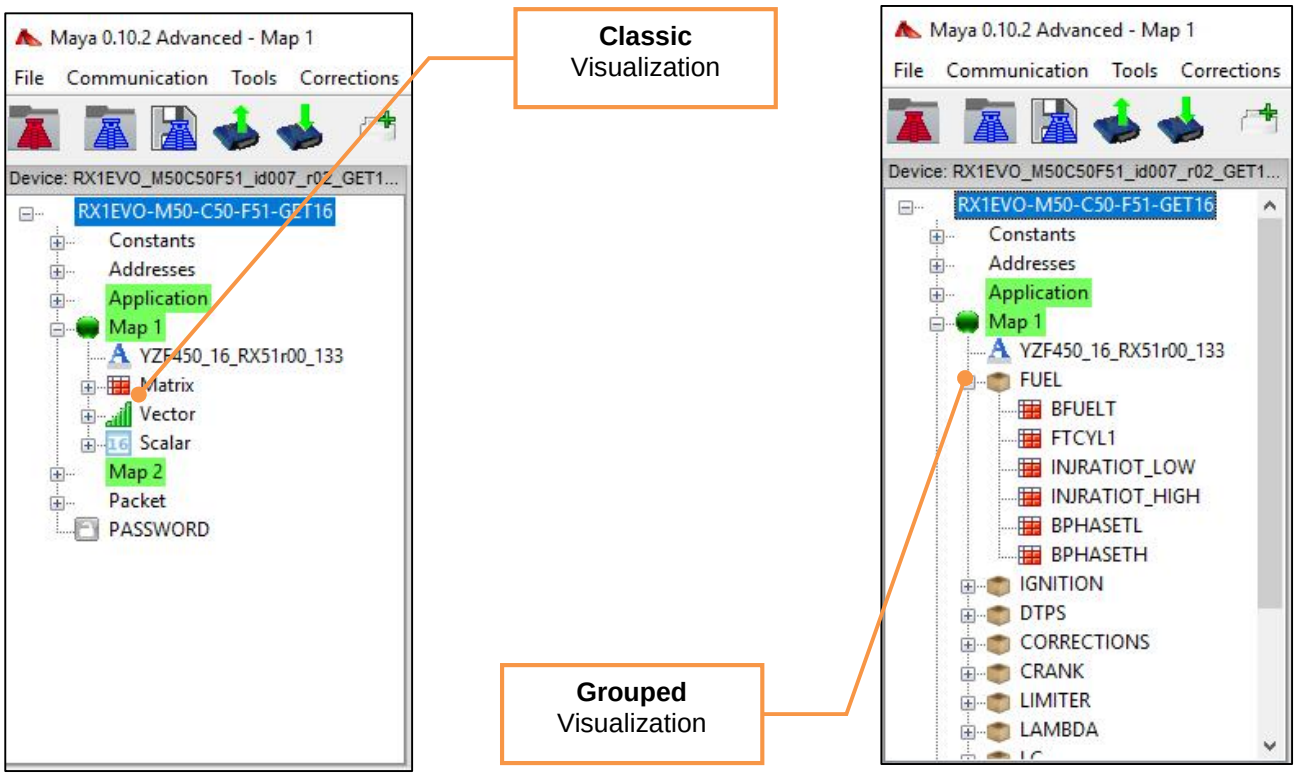


These are all elements:

- (1) **Open Device descriptor :** open the window for the selection of **Device** in used ECU (you need to do this in order to operate with engine maps).
- (2) **Open Map Project file:** open the window of project file selection saved in the PC.
- (3) **Save current map project to file:** open map project saving dialog window.
- (4) **Read map from ECU:** download of ECU maps (for more information read chapter **6.3.3**).
- (5) **Download map to ECU:** upload to ECU **Maya** maps (for more information read chapter **6.6**).
- (6) **Create new activity window:** same as **New Activity…** in **Layout** menu (for more information read chapter **6.7**).
- (7) **Create a new separate viewer window:** same as **New window …** in **Layout** menu (for more information read **6.7**).
- (8) **Layout selection:** you could select a previously created and saved **Layout** (for more information read **6.7**).
- (9) **Toggle connection with ECU:** same as **Connect/Disconnect to ECU** in **Connections** menu to read live ECU parameters (for more information read chapter **6.8**). The icon changes belonging to ECU connection status. The command could be executed also pressing **F1** in the keyboard.
- (10) **Start/Stop data logging :** same as **Start/Stop data logging** in **Acquisition** menu for data logging during ECU running. This function is used for remote assistance by GET-Athena.
- (11) **Edit Scalar Variables :** shows the scalar value parameters and allows its changing. The parameters may be different based on ECU in use and **Maya** license
- (12): **Enable / Disable correction :** First click will start logging, a second click will stop logging. For further information read chapter **6.14**. This function is also available in **Correction** menu as **Enable correction acquisition**
- (13) **Open End of Line Setting Window:** same as **End Of Line** in **Tools** menu to visualize parameter window in linked ECU (for more information read chapter **5**). Hot key: **F5**.
- (14) **Open Diagnostic window:** similar to **Diagnostics** in **Tools** menu for visualization of diagnosis window for once ECU (for more information read chapter **6.17**). Hot key: **F6**.
- (15) **View Hour Meter :** same as **Hour Meter** in **Tools** menu to visualize activity ECU time (for more information read chapter**6.18**). Hot key **F6**.

3.3 Device Manager Area

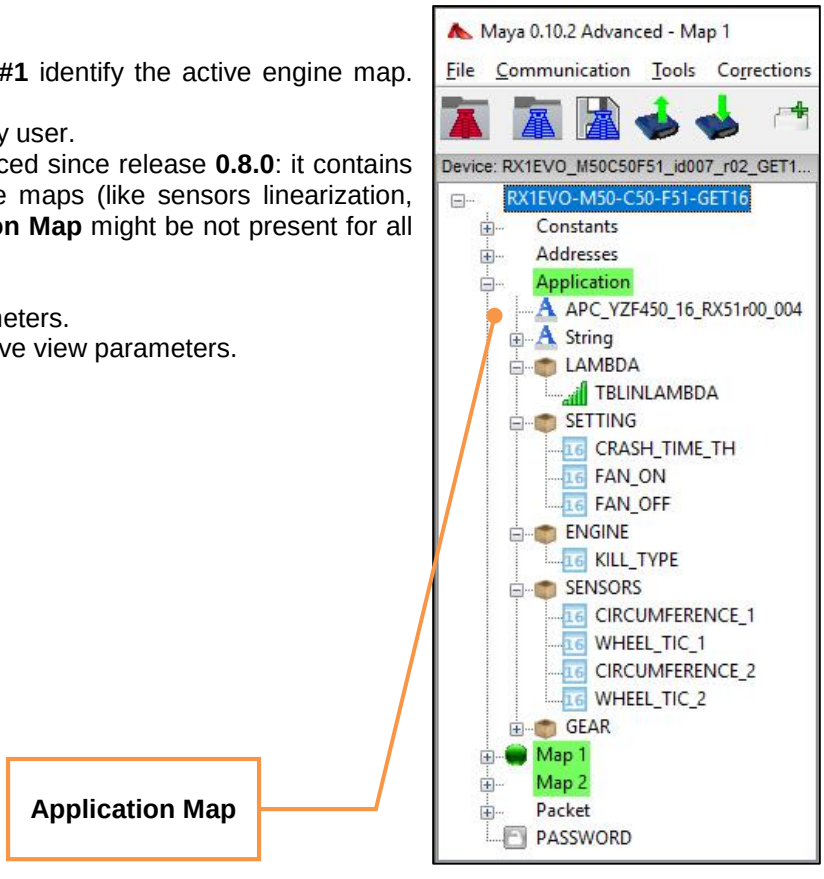
Device Manager in **Maya** is deputed to visualization of loaded **Device**.
Number and type of visualized elements belonging to **Device** (ECU) type used and to **Maya** licence.
The order of elements depends on settings in **Preference** panel.



Device represent a sort of "virtual copy" of ECU memory: by click [+] is possible to expand roots to explore elements in **Device**.

This symbol near **MAP#1** or **MAP#1** identify the active engine map. **Maya** will operate on this.
MAP#1 and **MAP#2** can be changed by user.
The **Application** Map has been introduced since release **0.8.0**: it contains the shared parameters between engine maps (like sensors linearization, CAN bus speed etc. ...). The **Application Map** might be not present for all **devices**.

Addresses contains non editable parameters.
Packet contains information relative to live view parameters.



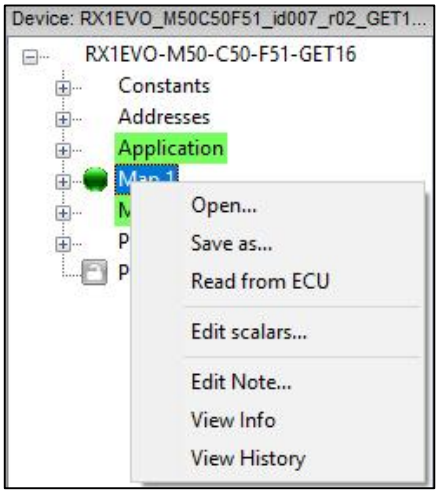
3.4 Other menu – context menu

In **Maya** you could use context menu by right clicking.
Menu change in combination with elements underneath.

3.4.1 Map menu

The context menu is visualized when the cursor is on the map (**MAP #1** or **MAP #2**) and you right click.

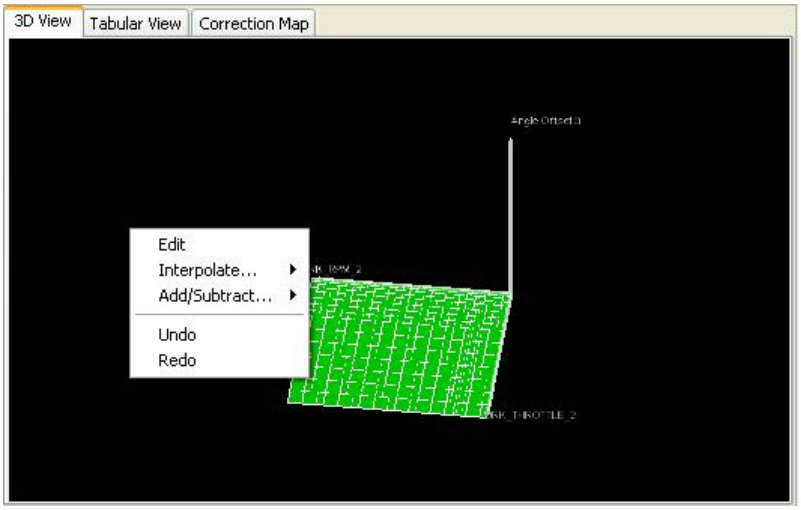
In the menu are available following options:



- **Open…** : open a map or calibration
- **Save as…** : save the map
- **Read from ECU** : download map data from connected ECU
- **Edit scalars…** : shows the Scalar panel window for a fast visualization and/or modification
- **Edit Note…** : open note pad for maps (useful if you wish to add notes to map...)
- **View Info :** shows map info (e.g. creation date)
- **View History :** shows the engine map modification history

3.4.2 Matrix menu – 3D View

3D matrix menu is visualized right clicking with cursor in the 3D area of the graph.

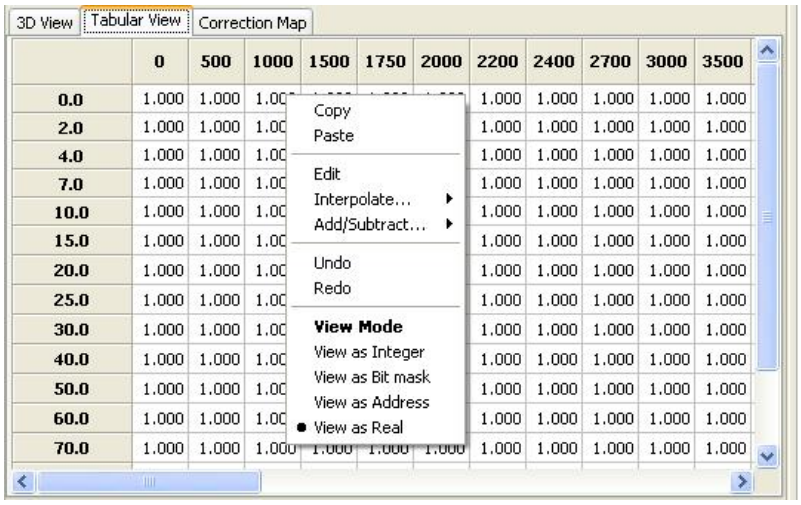


In the menu are available following options:

- **Edit** : you could modify values if selected points in the graph with **Offset** and **Gain** options.
- **Interpolate**… : you could operate a linear interpolation of selected data, **along X, along Y, bilinear**. **Along X** operates by rows, values are transformed between first and last value selected in the row. **Along Y** is done by columns, values are transformed between first and last value of each column. **Bilinear** is a bi-linear transformation, and it is done both in rows and columns: values in selected cells are transformed using 4 values at each corner of the selection; for this reason this command does not work in a single row, single column selection.
- **Add/Subtract…** : you can modify values in the matrix, and therefore in the graph.
- **Undo** : undo the previous action.
- **Redo** : repeat the last action.

3.4.3 Matrix menu – Tabular View

Tabular View appears when right clicking once the cursor is on top of a table.

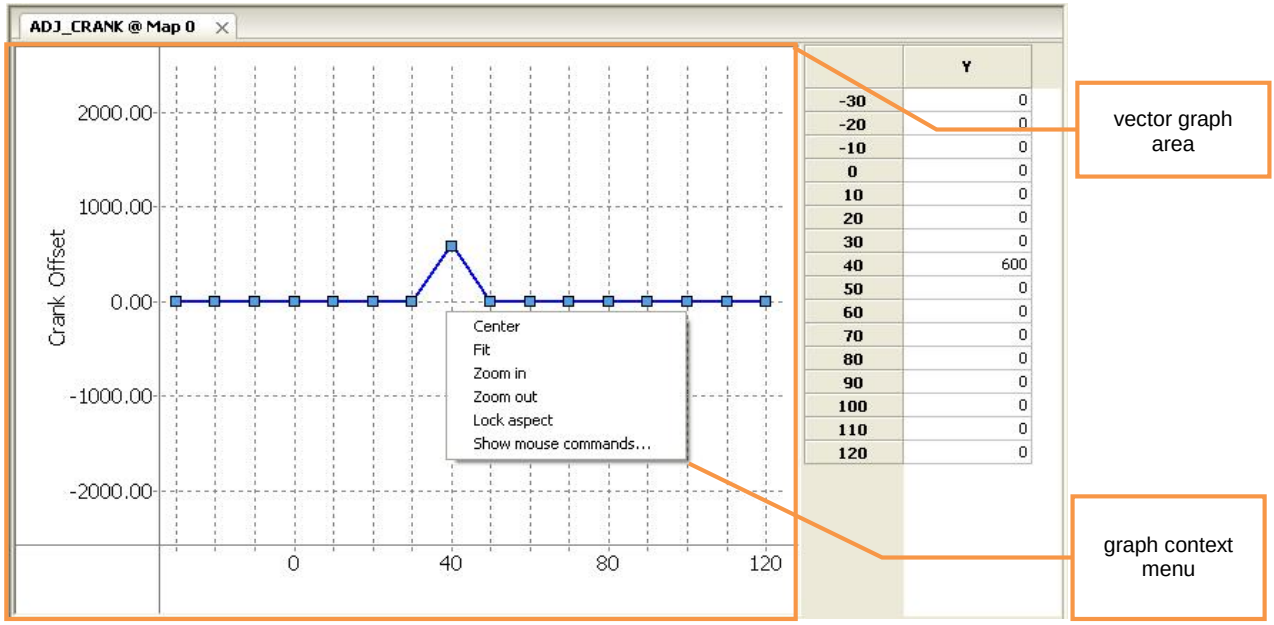


In the menu are available following options:

- **Copy** : store in the memory selected values (to use in other cells or MS Excell®).
- **Paste** : you could paste values, previously copied in a table or in a spreadsheet.
- **Edit** : you could edit values of selected points with **Offset** and **Gain**
- **Interpolate**… : you could operate a linear interpolation of selected data, **along X, along Y, bilinear**. **Along X** operates by rows, values are transformed between first and last value selected in the row. **Along Y** is done by columns, values are transformed between first and last value of each column. **Bilinear** is a bi-linear transformation, and it is done both in rows and columns: values in selected cells are transformed using 4 values at each corner of the selection; for this reason this command does not work in a single row, single column selection.
- **Add/Subtract…** : you can modify values in the matrix, and therefore in the graph.
- **Undo** : undo the previous action.
- **Redo** : repeat the last action.
- **View Mode** : you could change the display output if the value (real, integer, binary).

3.4.4 Vector menu – Graph area

The context menu appears if you right click when you are on a vector graph.

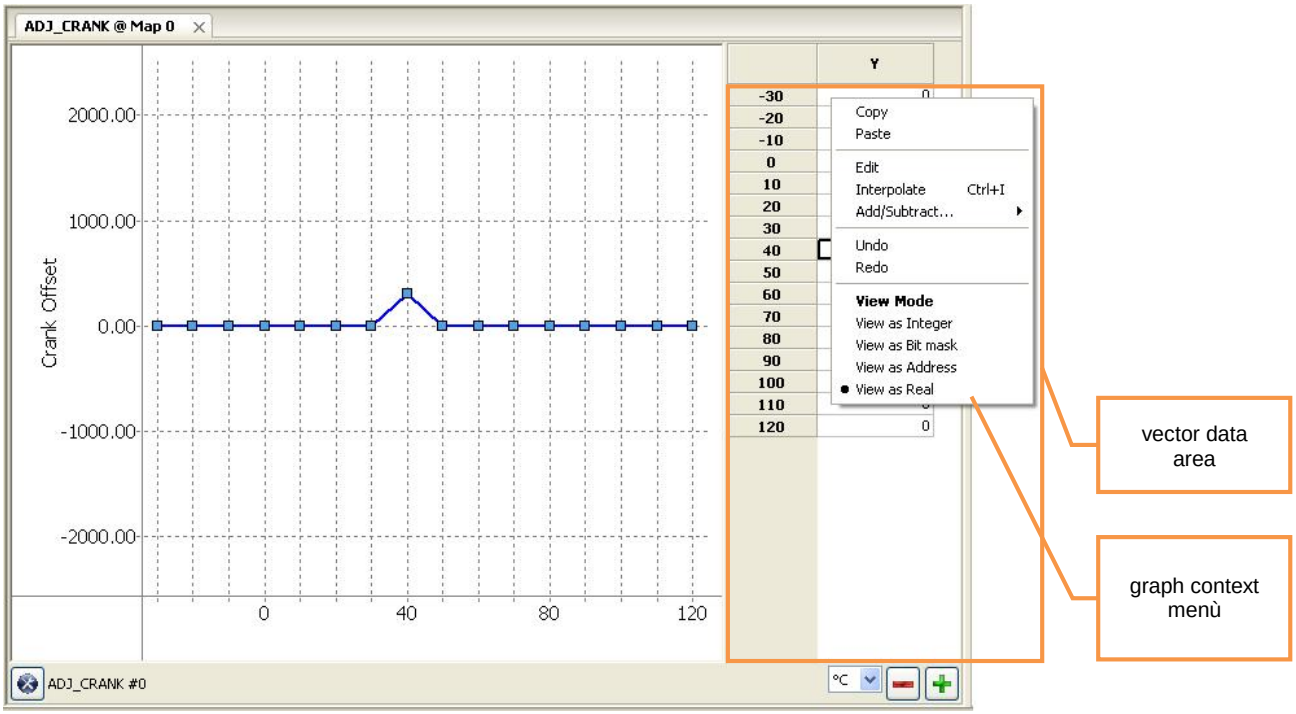


In the menu are available following options:

- **Center** : you could center the view of graph area in the point of the mouse cursor.
- **Fit** : fit the view.
- **Zoom in** : you could zoom in the view where the cursor is positioned
- **Zoom out** : you could zoom out the view where the cursor is positioned
- **Lock aspect**: you could lock the y axis scale during **Zoom in** / **Zoom Out**.
- **Show Mouse command**: you can show controls by the mouse.

3.4.5 Vector menu – Data area

The context menu appears if you right click when you are on the Y column.



In the menu are available following options:

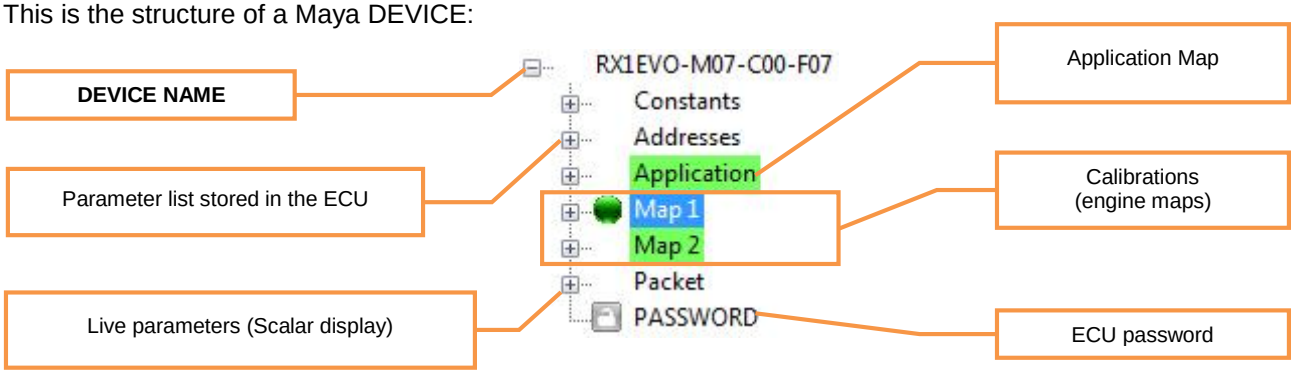
- **Copy** : store in the memory selected values (to use in other cells or MS Excell®).
- **Paste** : you could paste values, previously copied in a table or in a spreadsheet.
- **Edit** : you could edit values of selected points with **Offset** and **Gain**

Interpolate… : you could operate a linear interpolation of selected cells along column Y

- **Add/Subtract…** : you can modify values in the matrix, and therefore in the graph.
- **Undo** : undo the previous action.
- **Redo** : repeat the last action.
- **View Mode** : you could change the display output if the value (real, integer, binary).

4 STRUCTURE AND ELEMENTS OF THE DEVICE

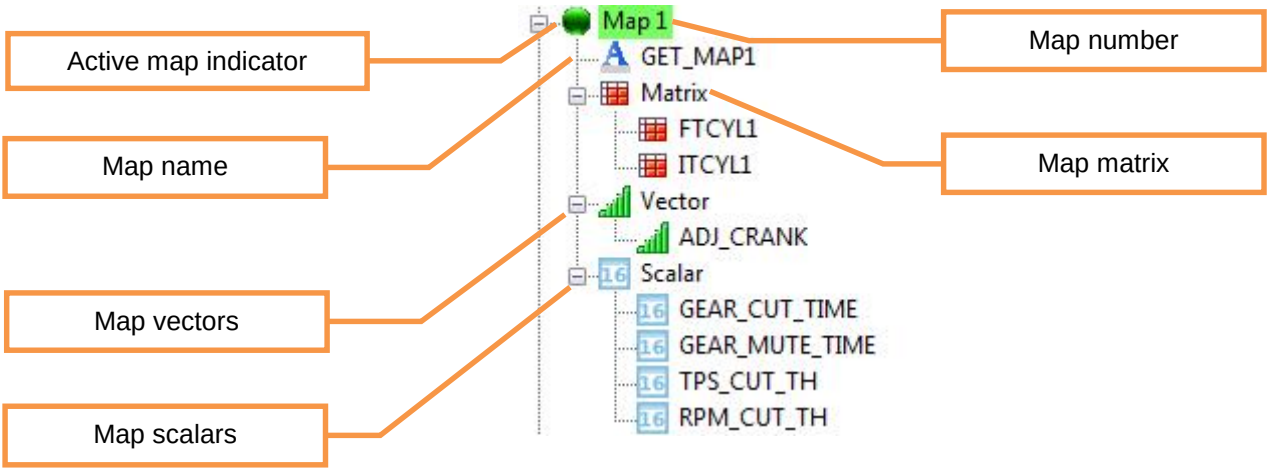
This is the structure of a Maya DEVICE:



As you could notice in the previous device is divided in various parts. Users will work in **calibration** (or engine maps). The structure is discussed in following chapters.
You could control the access with a **PASSWORD** for calibration.

4.1 Calibrations (engine maps) structure

Each map contains different correction factors, tables and various parameters.
Correction factors could depend by one or two elements: **Vector** or **Matrix**. Base tables (for spark advance or injection times) are inside **Matrix**. Fixed values are **Scalar**.
Following picture shows an example of components inside a ECU map mod. GP1 EVO (visualization setting:**Classic**):

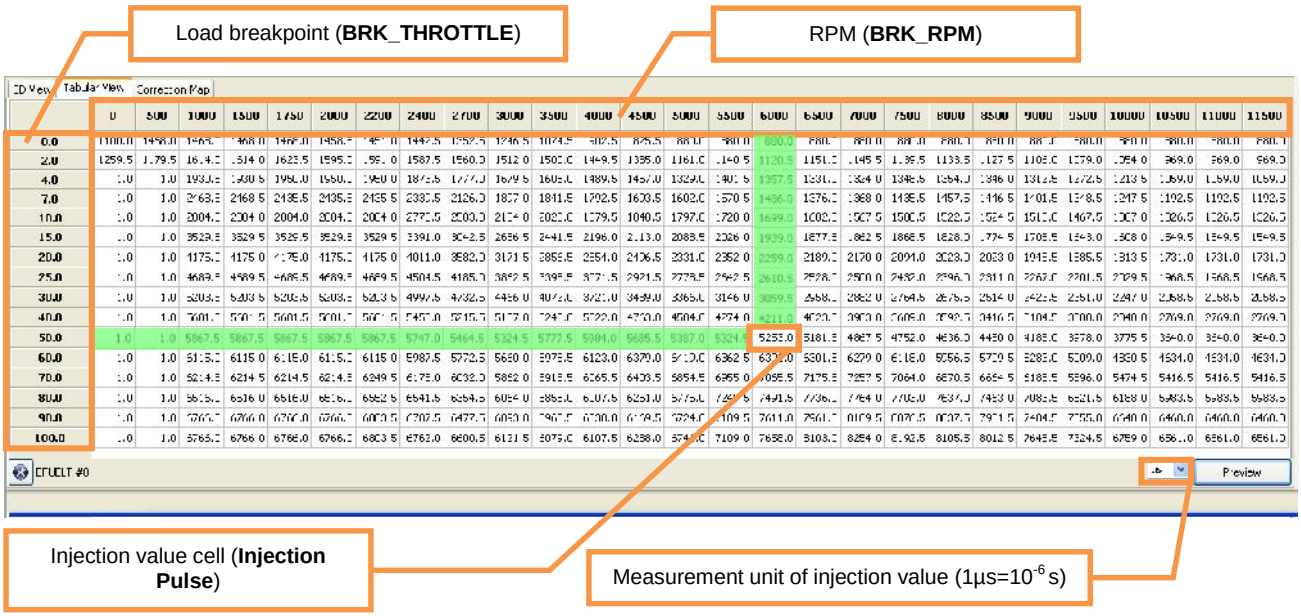


You could see, beside the map name, the indicator of active map that permit to understand which map you are working with.

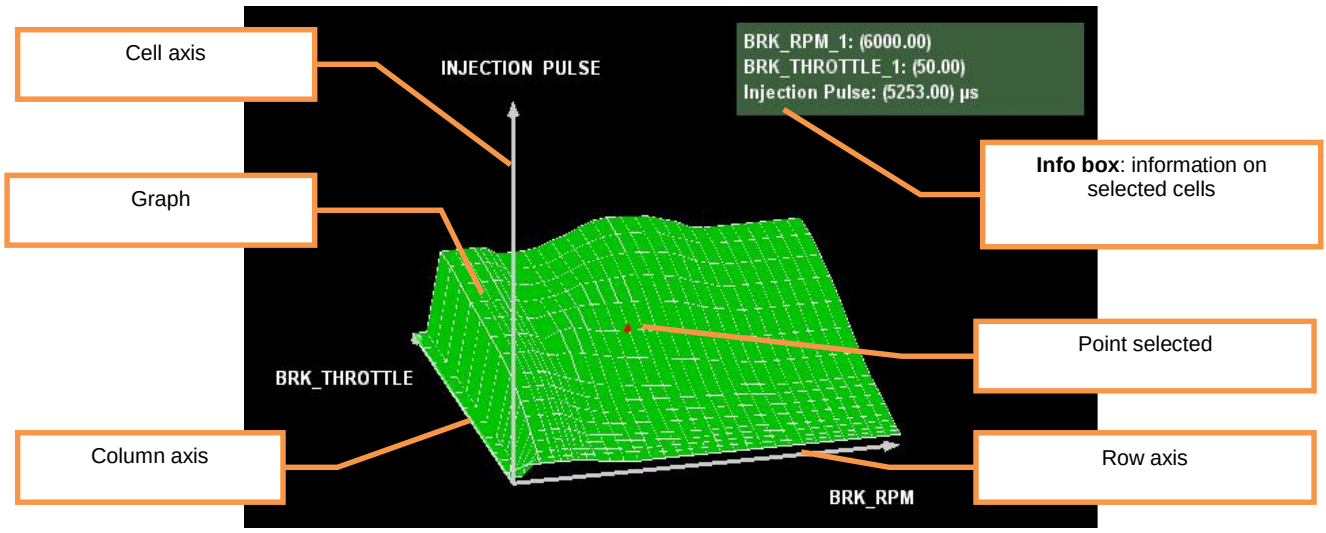
WARNING: MAP#1 is called MAP#0 and MAP#2 is called MAP#1 in some device.

4.1.1 Matrix

Matrix contains some elements for engine map.
A matrix could be represented in “test” mode (**Tabular View**) or “graph” mode (**3D View**).
In the first case a table with various rows and columns (**breakpoint**) is visualized. The crossing between a row and a column represent a value.
The value will be used by the ECU to manage the engine with the parameter defined by the table (example: injection time). Below a picture that express this:



In the above example at 6000 rpm and a TPS @ 50%, injection time is 5253 µs (or 5,253 ms).
The table could be visualized as follow.

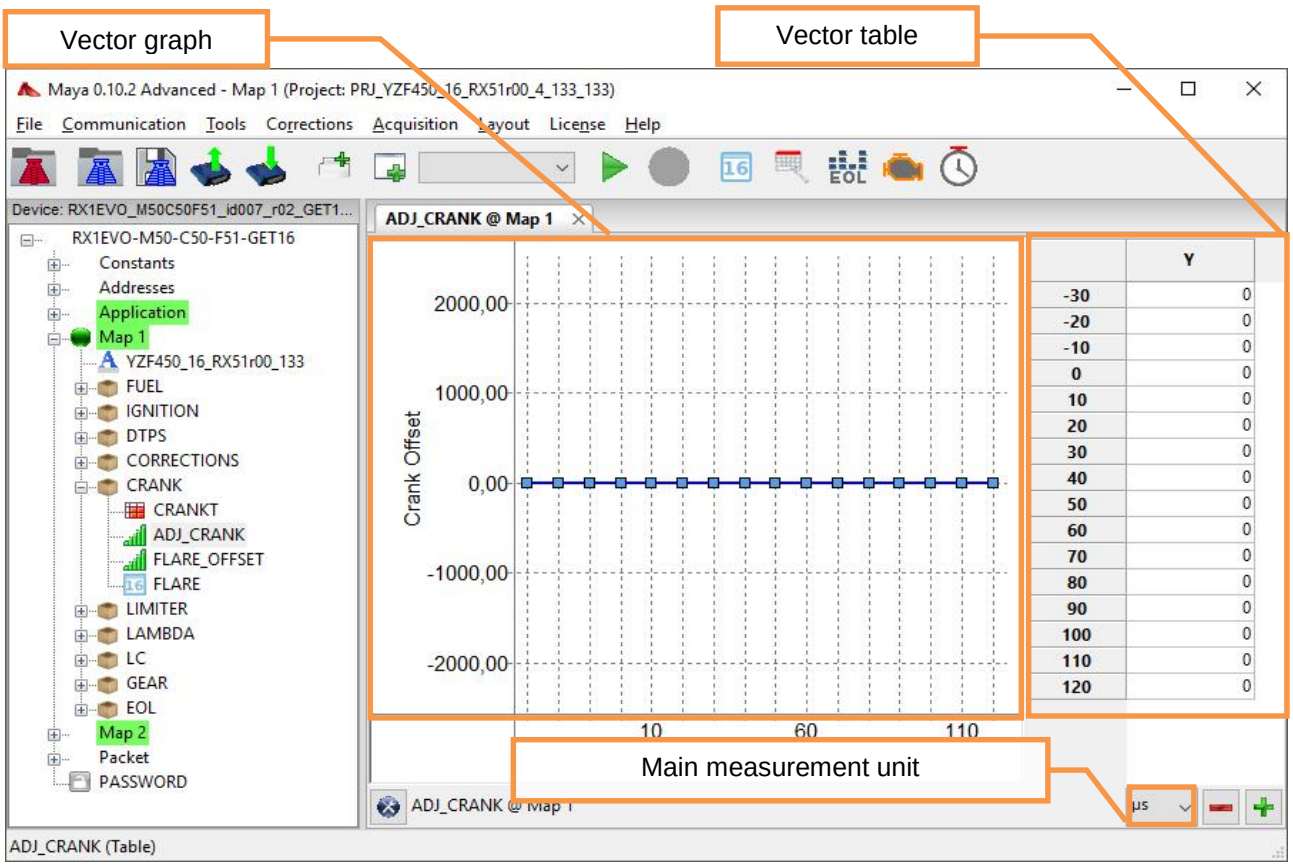


Intermediate values between **breakpoints** are **interpolated** (read chapter **3.4.3**) by the ECU during engine running.

The number of visualized and manageable matrix change belonging to device and user licence.

4.1.2 Vectors

Vectors represent correction values dependent by only one variable (as temperature corrections).
An example of vector is ADJ_CRANK (for further details read chapter **6.12**).

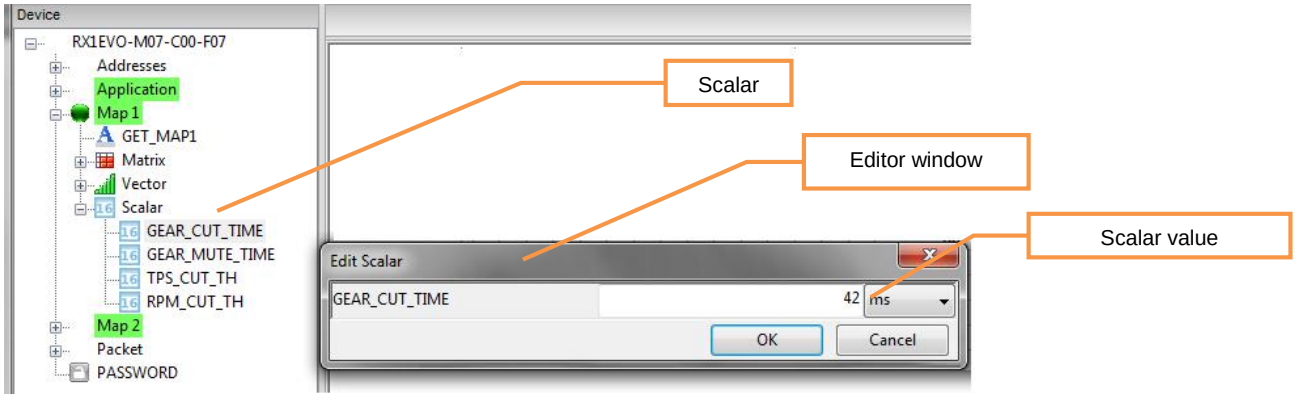


A **vector** is defined by a two column table and it could be visualized in a XY graph.
The first row contains main unit (fixed), the second row could be changed (**Y** column). The unit of measurement could be changed in low right menu.

<u>The number of visualized and manageable vector change belonging to device and user licence.</u>

4.1.3 Scalars

Scalars are values of engine map. Differently from a matrix or vector, scalars represent only one information (not the combination of two or three).
Below an example of scalar:



Clicking twice on scalar name, it is possible to change the value.

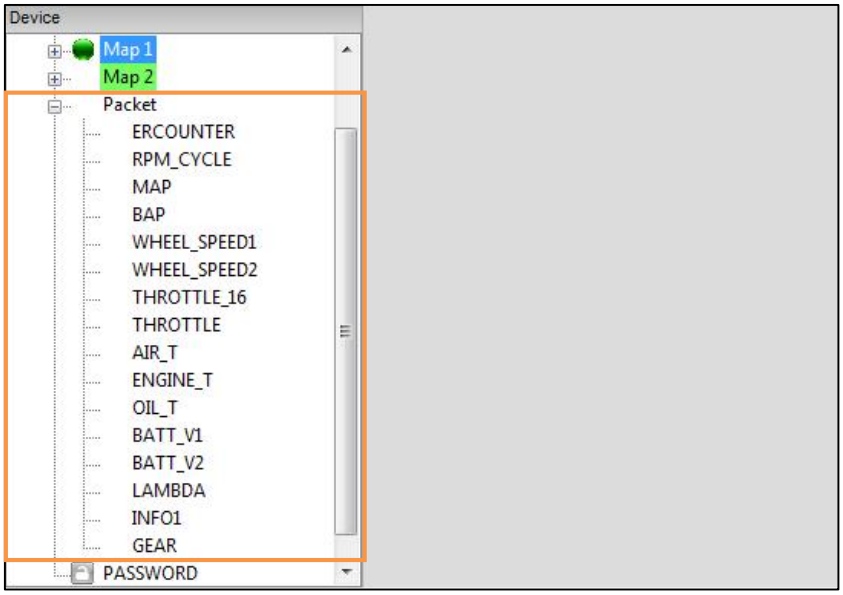
Scalar will change, for example, engine rpm limiter or quick shifter cut-off time.

The number of visualized and manageable scalar change belonging to device and user licence.

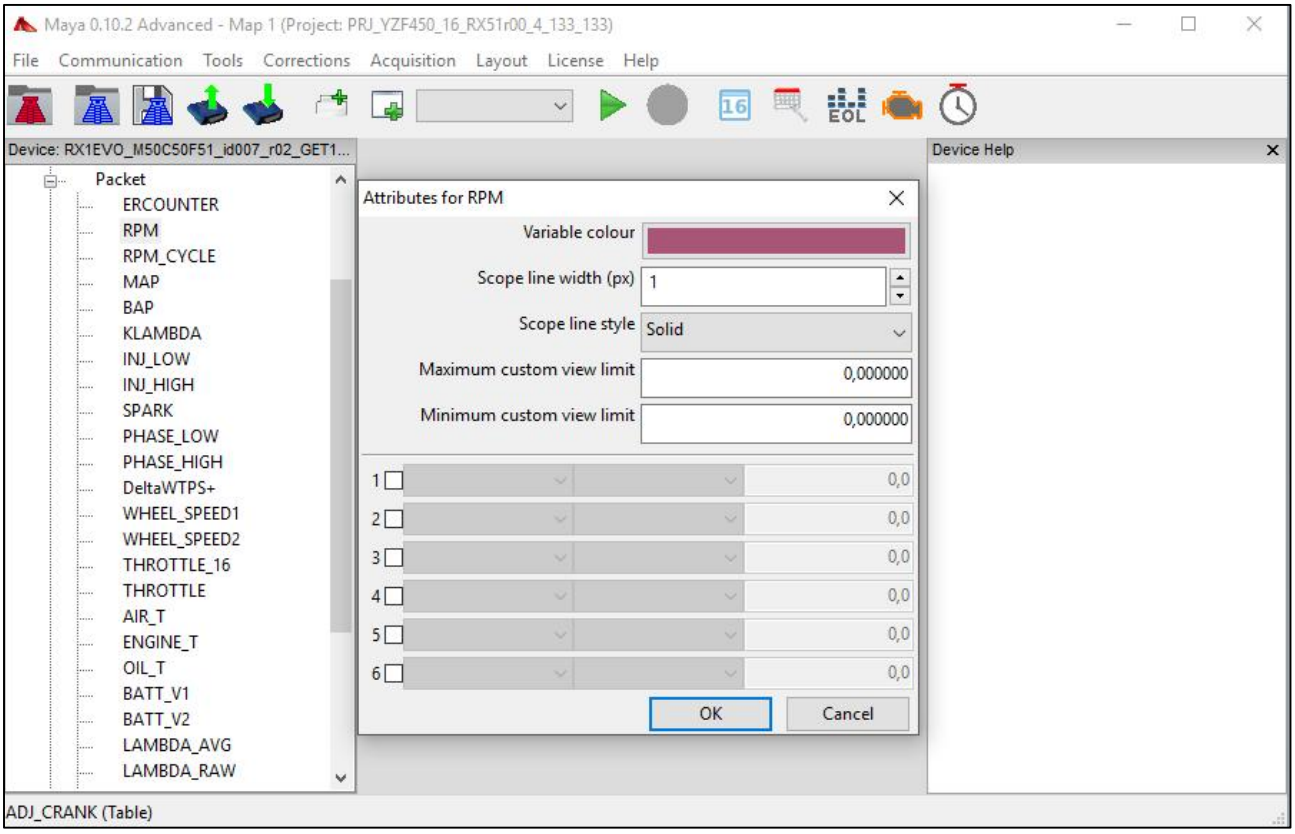
NOTE: matrix and vector depend on scalars

4.1.4 Packet

Packet contain parameters that could be visualized in **Maya**.
The number of parameters change belonging to device and user licence.



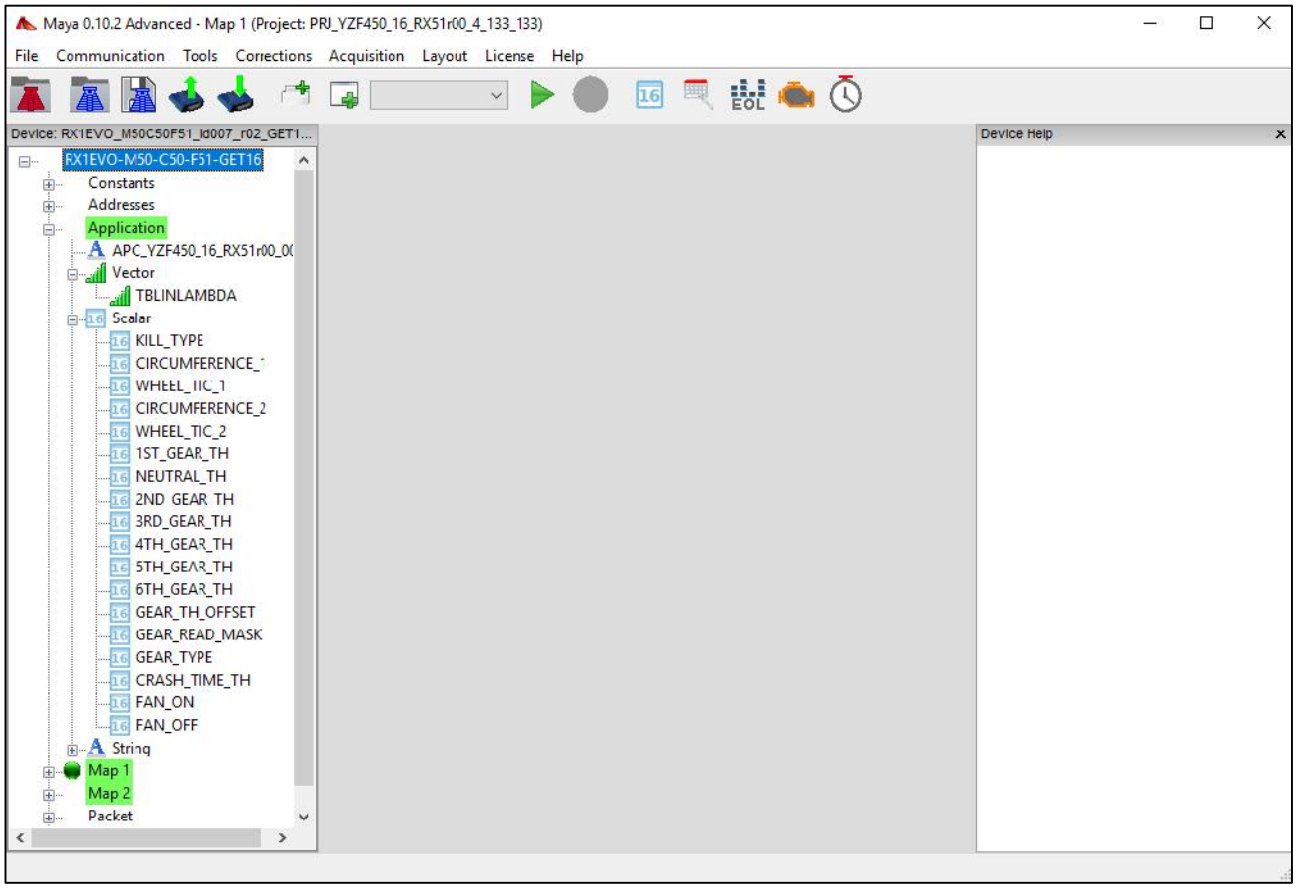
Clicking twice on each parameter in **Packet** you could visualize the window property: you could change graphical effects on **Scalar Display, Analog Display** and **Scope** in **Maya**.



For further information of **Packet** properties please read chapter **6.7**.

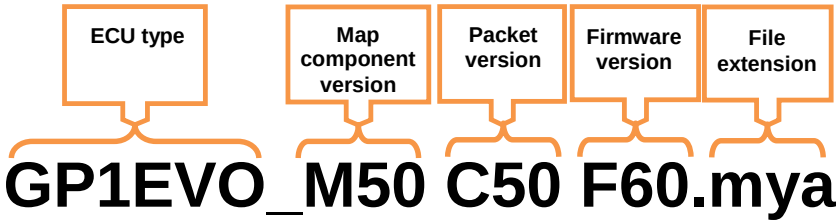
4.2 The Application Map

We've already spoken **Application Map** could be available for some ECU.
It binds the shared parameters between engine maps like sensor calibrations (e.g. engine water sensor calibration, gear ratio, air temperature sensor) and other settings (CAN bus speed, tilt switch behavior, etc. …).
The **Application Map** might be not present in some **device** version.



5 DEVICES

Device name contains information to identify it. For example:



- **ECU type:** this is the ECU that could be used with that specific device
- **Map component version (Calibration code):** Map version (quantity and components type). If there is a different version, probably the firmware has changed accordingly.
- **Packet version (Packet Code):** these are real time visualizable channels (**Scope, Scalar Display** and **Analog Meter Display**) by **Maya**
- **Firmware Code:** identify ECU firmware
- **File extension:** file extension

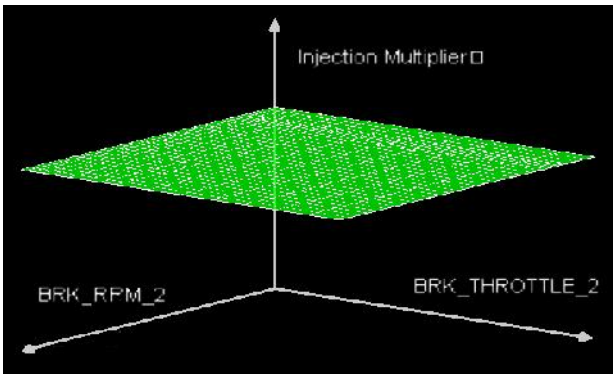
5.1 Device component for GP1EVO ECU

5.1.1 Device map for GP1EVO ECU (lic. EVO)

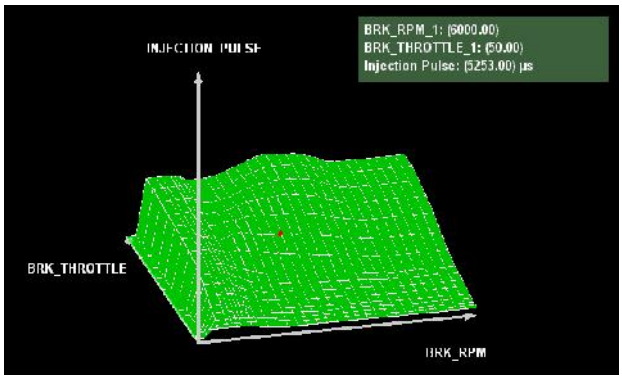
5.1.1.1 Matrix

Matrixes are:

- **FTCYL1:** map for correction of injection time in comparison to base map. With no correction the 3D view is a flat plane parallel to RPM and THROTTLE axis. Pictures below represent differences between correction map and base map.



Injection timing Correction map (without corrections)



Injection Base map

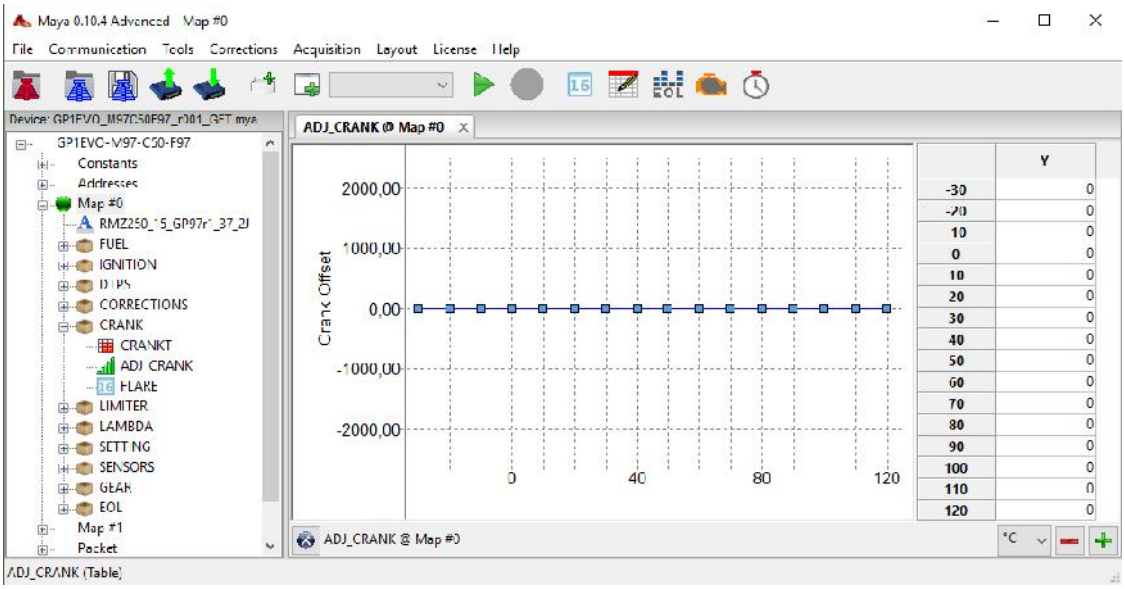
This modification is used to reduce or add fuel injected fuel quantity.

- **ITCYL1:** map for correction of spark advance in comparison to base map. Same principle of **FTCYL** but referred to ignition.

5.1.1.2 Vector

Vectors are:

- **ADJ_CRANK:** add or reduce fuel quantity injected during CRANK (first 16 revolution of the engine). It could be differentiated with engine temperature.



5.1.2 Scalar

Scalars are:

- **GEAR_CUT_TIME:** definition of cut off time (injection, ignition) for quick shifter.
- **GEAR_MUTE_TIME:** blind time definition for quick shifter: ECU will not activate any injection/ignition cut during this period of time.
- **TPS_CUT_TH:** threshold value. Below this value the quick shifter will not be enabled. Value in %.
- **RPM_CUT_TH:** threshold value. Below this value the quick shifter will not be enabled. Value in rpm.

5.1.3 End Of Line in GP1EVO ECU

End of Line parameters are:

- **MINPTV:** minimum throttle position (relative bit). This value is used for sensor calibration and by ECU during engine functioning.
- **MAXPTV:** maximum throttle position. This value is used for sensor calibration and by ECU during engine functioning.
- **SPARK_OFFSET_1:** add/reduce spark advance (ignition correction factor) through all working range of the engine in map 0.
- **SPARK_OFFSET_2:** add/reduce spark advance (ignition correction factor) through all working range of the engine in map 1.
- **INJ_OFFSET_1:** add/reduce injection quantity (injection correction factor) through all working range of the engine in map 0.
- **INJ_OFFSET_2:** add/reduce injection quantity (injection correction factor) through all working range of the engine in map 1.

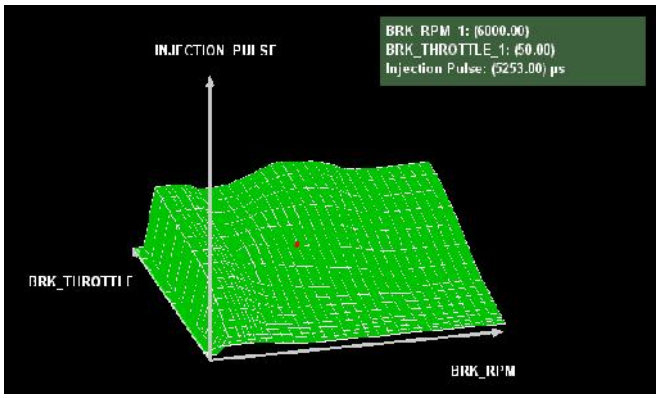
- **LIMITER_ADJ:** you could increase RPM limiter from value defined in ECU map. Maximum increase: 510 rpm.
- **FRAME_CODE:** GPA® enabling code (of not yet available).
- **ENGINE_CODE:** GPA® enabling code (of not yet available).
- **UNLOCK_CODE:** GPA® enabling code (of not yet available).
- **GPA_1: GPA®** (Get Power Assistance) adjusting in engine map 1 (**MAP #0** in **Maya**).
- **GPA_2: GPA®** (Get Power Assistance) adjusting in engine map 2 (**MAP #1** in **Maya**).
- **ECU_CODE:** ECU serial number
- **GEAR_CUT_TIME:** add/reduce cut-off time for quick shifter.

5.1.4 Device map in GP1EVO ECU (lic. ADVANCE)

5.1.4.1 Matrix

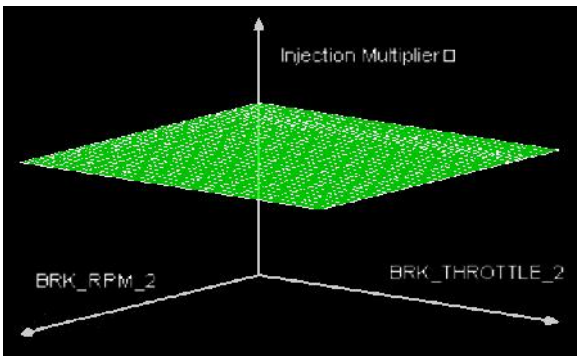
Map matrix are:

- **BFUELT:** base fuel map. Define opening time for injector/s during engine functioning. Below a 3D vie of the map:

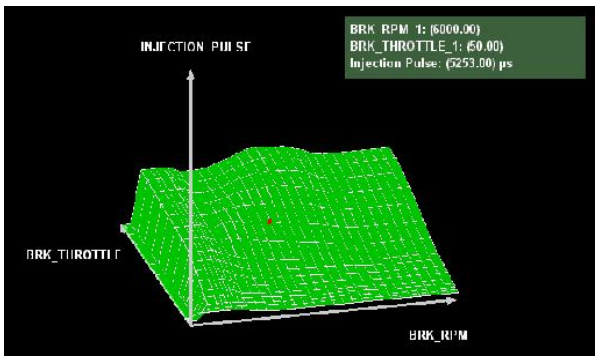


Base map

- **FTCYL1:** map for correction of injection time in comparison to base map. With no correction the 3D view is a flat plane parallel to RPM and THROTTLE axis. Pictures below represent differences between base map and correction map.



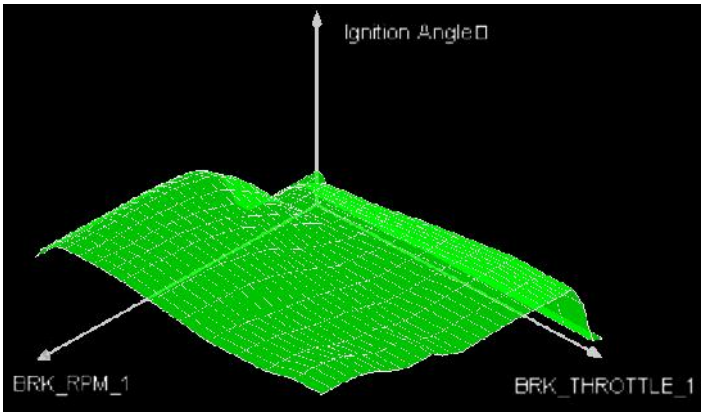
Correction map



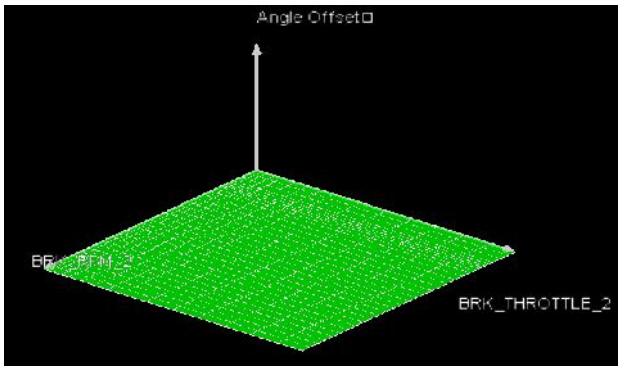
Base map

This modification is used to reduce or add fuel injected fuel quantity.

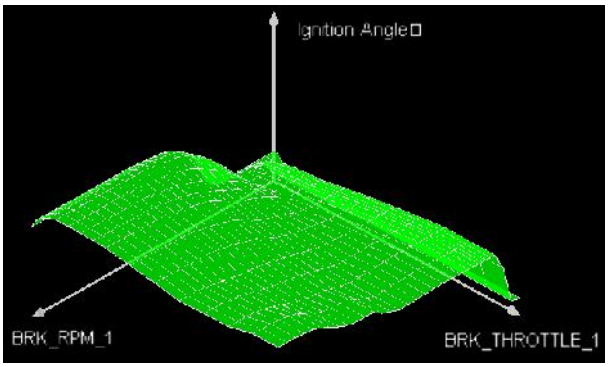
- **INJRATIOT:** matrix that define the quantity of fuel injected by the low injector (after throttle valve). The value 100 indicate that all the fuel (defined in **BFUELT**) is injected by low injector. A value of 20 indicates that 20% of fuel is injected by low injector and 80% by upper injector.
- **BIGNT:** spark advance matrix (advance base map). Define the point in which the spark will fire during engine running. Below a 3D View of the map:



- **ITCYL1:** map for correction of spark advance in comparison to base map. Same principle of **FTCYL** but referred to ignition. Differently from fuel correction (value=1), this correction factor is 0, if any correction have been used.



Spark correction map



Spark advance base map

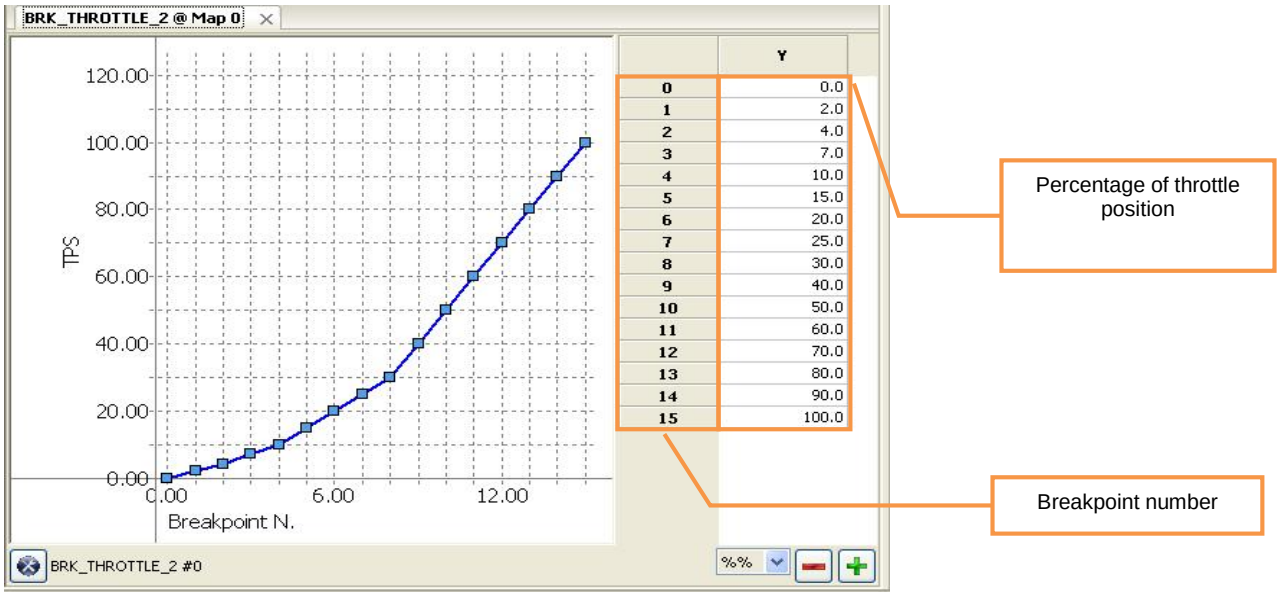
- **BPHASETL:** table that define the end of injection angles (defined with reference of **T.D.C.**). The ECU define how much the injector will be opened. Opening time is define in **BFUELT** and **FTCYL1** tables. Matrix will affect lower injector.
- **BPHASETH:** table that define the end of injection angles (defined with reference of **T.D.C.**). The ECU define how much the injector will be opened. Opening time is define in **BFUELT** and **FTCYL1** tables. Matrix will affect upper injector.
- **CRANKT:** this table will change offset values adding **injector opening time** (defined in **BFUELT** in cell **0-0** – first top left) to a defined revolution and engine temperature. This table is used during cranking.
- **ACCEL_INJ:** this table will add fuel depending on the speed of throttle opening (throttle derivate or **dTPS**) depending on throttle rpm. This function is similar to accelerator pump of carburettor. This matrix **ACCEL_INJ** depends on **ACCEL_DECAY_INJ** vector (this vector define the number of revolutions in which the matrix works – linear decay).
- **LAMBDAT:** this table define **Lambda** target value (**LAMBDA TARGET**) depending on rpm. Changing this value you could change the ratio between **AFR** and **AFRSTO** during fuel correction and in **Closed Loop**.
- **LAMBAENT:** this table enable the correction of air/fuel ratio using **Lambda** value read by ECU using target value defined in **LAMBDAT**. The table enable the correction using throttle position and rpm. The value 0 in a cell disable the correction, the value 2 enable the correction.

- **LIMIT_TABLE:** this table define engine running before rpm limiter intervention. Modifying values it is possible to change type of intervention (none, injection cut, ignition cut, both) and entity of limiter. Rpm range is defined with **LIMITER_OFFSET**, type of intervention by value in cells, length by number of columns (revolution of the engine).
- **AIR_INJ_T:** this table change injection as a function of air temperature and rpm.
- **TH2O_INJ_T:** this table change injection as a function of engine water temperature and rpm.

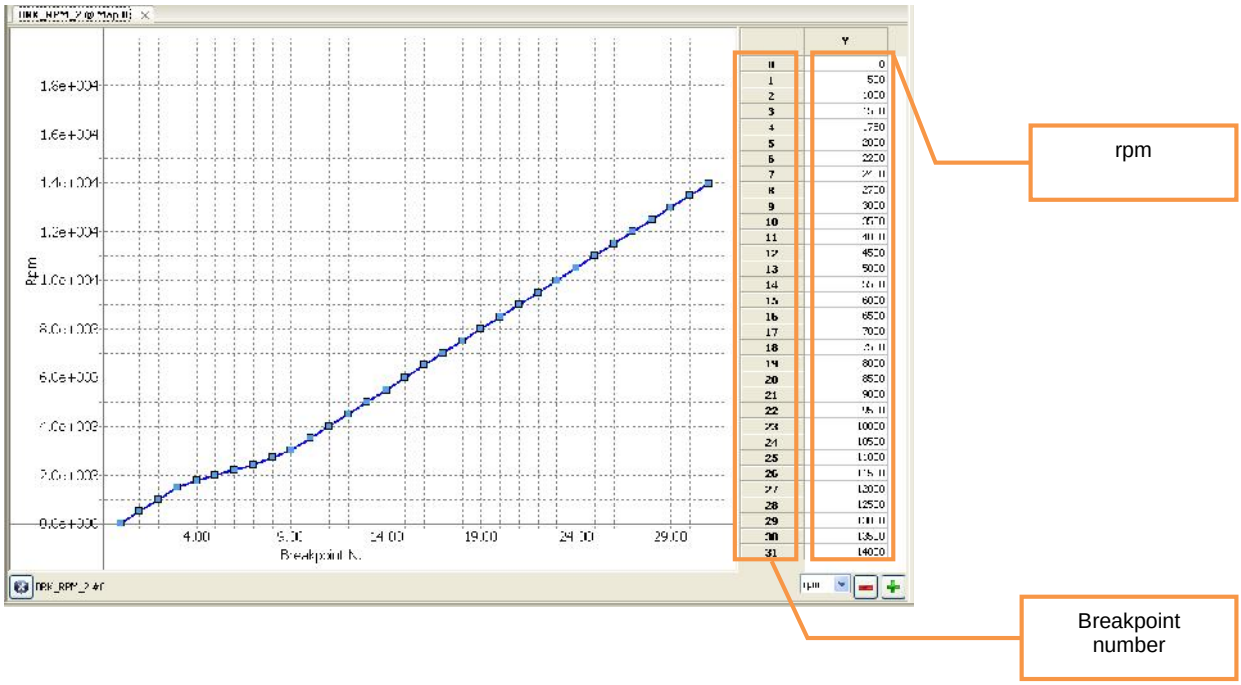
5.1.4.2 Vector

Map vector are:

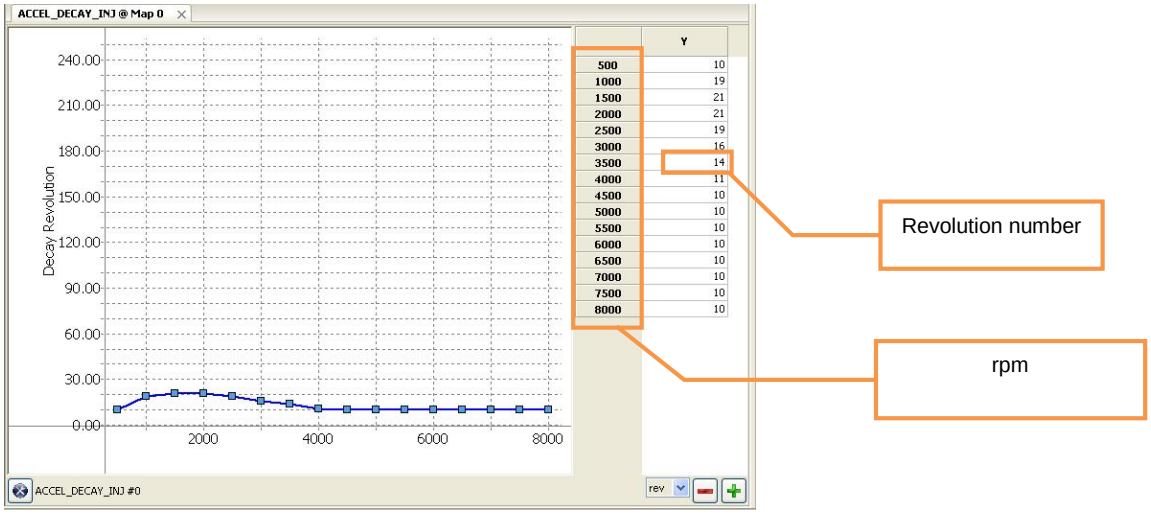
- **BRK_THROTTLE_2:** you could define load breakpoint **only** in matrix for injection correction (**FTCYL1**) and spark advance (**ITCYL1**) (see chapter **4.1.1**). There is a total of 16 breakpoints.



- **BRK_RPM_2:** you could define rpm breakpoints **only** in matrix for fuel correction (**FTCYL1**) and spark advance (**ITCYL1)** (see chapter **4.1.1**). there is a total of 32 rpm breakpoints.



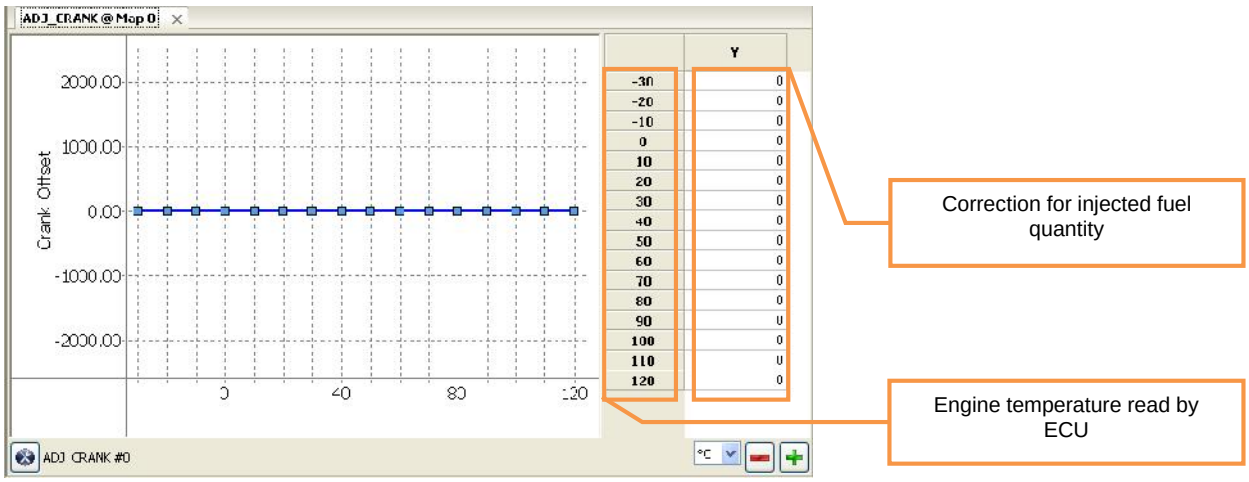
- **ACCEL_DECAY_INJ:** you can set the number of revolutions in which matrix **ACCEL_INJ** works. Example: if an enrichment have been define at 3500 rpms (for a given throttle speed), ECU will execute this operation for 14 revolutions (see picture below).



- **TBLINLAMBDA:** you could associate a voltage value (read in Lambda module) to a defined Lambda value (used by ECU to controll correction strategies). This association (voltage-lambda value) is called **linearization**.

- **TBAPINJ:** correction vector for injected fuel quantity due to ambient pressure.

- **ADJ_CRANK:** you could increase or reduce injected fuel quantity during CRANK (first 16 revolutions of the engine). This modification is independent for various engine temperatures (step: 10°C).



NOTE: steps are 10°C, if an engine is running at 89°C you will use the cell relative to 80°C, if the engine is at - 11°C the reference cell is -20°C

5.1.4.3 Scalar

The Scalar parameters are:

- **CAN_SPEED:** you could set CAN bus speed: 0 (1Mbps), 1 (500 kbps), 3 (250 kbps) and 7 (125 kbps). No other values could be used.

- **CRASH_TIME_TH:** you could set the time (seconds) the engine is switched off after the signal from tilt sensor (TILT SWITCH or Tipover) is high. Negative values have to be used if the used sensor is grounded when activated; positive values have to be used if the sensor, once activated, bring the value from ground to a specific state.

- **FLAMBDA:** you could enable **Closed Loop** functioning for Lambda sensor. 0 disable the function.
- **LAMBDAERR:** you could set tolerance for Lambda value red by ECU during **Closed Loop**. For example, if a value is set to 0.01 and Lambda target value is 0.83, the correction will not be done between 0.82 and 0.84
- **CLKLAMBDA:** you could adjust frequency of intervention (in rpm) of air/fuel ratio correction during **Closed Loop**
- **INCLKLAMBDA:** you could adjust correction value of injected fuel quantity to reach the desired lambda value (lambda target). This scalar is needed only if the engine request more fuel (lean situation).
- **DECLKLAMBDA:** you could adjust correction value of injected fuel quantity to reach the desired lambda value (lambda target). This scalar is needed only if the engine request less fuel (rich situation).
-
- **LOW_KLAMBDA:** you could set minimum intervention of correction during **Closed Loop**. With this setting you could avoid (if the Lambda sensor fails) that ECU constantly leans the air/fuel ratio over a specified limit.
- **HIGH_KLAMBDA:** you could set maximum intervention of correction during **Closed Loop**. With this setting you could avoid (if the Lambda sensor fails) that ECU constantly enrich the air/fuel ratio over a specified limit.
- **LIMITER:** you could set max rpm for the engine. For further information read chapter **6.15**.
- **LIMITER_OFFSET:** you could set intervention threshold for rpm limiter. For further information read chapter **6.15**.
- **CIRCUMFERENCE_1:** you could set wheel circumference. This parameter is used to calculate wheel speed with the channel connected to SPEED1 input.
- **WHEEL_TIC_1:** you could set number of impulses for wheel speed sensor for each wheel rotation (input 1).
- **CIRCUMFERENCE_2**: you could set wheel circumference. This parameter is used to calculate wheel speed with the channel connected to SPEED2 input.
- **WHEEL_TIC_2:** you could set number of impulses for wheel speed sensor for each wheel rotation (input 2).
- **GEAR_CUT_TIME:** you could set the injection and/or ignition cut time (the strategy is defined in **LIMIT_TABLE** matrix table) when quick shifter is activated.
- **GEAR_SPARK_TIME:** you could set the delay on activation of quick shifter strategy.
- **GEAR_MUTE_TIME:** you could set inhibition time for quick shifter: ECU will not activate any injection/ignition cut during this period of time.
- **TPS_CUT_TH:** threshold value. Below this value the quick shifter will not be enabled. Value in %.
- **RPM_CUT_TH:** threshold value. Below this value the quick shifter will not be enabled. Value in rpm.
- **SPARK_CUT:** you could set ignition delay during **GEAR_SPARK_TIME**. This value is expressed in **deg** or **rad**.
- **KILL_TYPE:** you could set the duration of depression of KILL SWITCH needed to stop the engine. Setting 0 the **Racing** mode is used: engine stop is done as per row 15 in matrix **LIMIT_TABLE**. This will cut the injection but not the ignition. By doing this the cylinder is cleaned from air/fuel residue.
- **FLARE:** define engine revolutions needed to clear the fuel correction in CRANK. For further information read chapter **6.12**.

- **1ST_GEAR_TH:** value (in count) given by gear position sensor in first gear. Range: 0-255.
- **NEUTRAL_TH:** value (in count) given by gear position sensor in neutral. Range: 0-255.
- **2ND_GEAR_TH:** value (in count) given by gear position sensor in second gear. Range: 0-255.
- **3RD_GEAR_TH:** value (in count) given by gear position sensor in third gear. Range: 0-255.
- **4TH_GEAR_TH:** value (in count) given by gear position sensor in fourth gear. Range: 0-255.
- **5TH_GEAR_TH:** value (in count) given by gear position sensor in fifth gear. Range: 0-255.
- **6TH_GEAR_TH:** value (in count) given by gear position sensor in sixth gear. Range: 0-255.
- **GEAR_TH_OFFSET:** you could set a tolerance of values given by gear position sensor.
- **GEAR_TYPE:** you could set the type of gear position sensor used in the system.
- **LIMITER_ADJ_DEFAULT:** if the **LIMITER** is set to 10000 and **LIMITER_ADJ_OFFSET** is set to 200, ECU will spin the engine up to 10200 rpm max. Range: 0-510 rpm.
  Note: if you change a End Of Line in the ECU, this value will be changed in **LIMITER_ADJ**.

5.1.5 End Of Line in GP1EVO ECU

The parameters are:

- **MINPTV:** minimum throttle position (relative bit). This value is used for sensor calibration and by ECU during engine functioning.
- **MAXPTV:** maximum throttle position. This value is used for sensor calibration and by ECU during engine functioning.
- **SPARK_OFFSET_1:** add/reduce spark advance (ignition correction factor) through all working range of the engine in map 1.
- **SPARK_OFFSET_2:** add/reduce spark advance (ignition correction factor) through all working range of the engine in map 2.
- **INJ_OFFSET_1:** add/reduce injection quantity (injection correction factor) through all working range of the engine in map 1.
- **INJ_OFFSET_2:** add/reduce injection quantity (injection correction factor) through all working range of the engine in map 2.
- **LIMITER_ADJ:** you could increase RPM limiter from value defined in ECU map. Maximum increase: 510 rpm. The default value is defined in **LIMITER_ADJ_DEFAULT**.
- **FRAME_CODE:** GPA® enabling code (of not yet available).
- **ENGINE_CODE:** GPA® enabling code (of not yet available).
- **UNLOCK_CODE:** GPA® enabling code (of not yet available).
- **DAY:** variable to set the date (day of the month) to store in the ECU. This could be useful in case you wish to keep trace of special events.
- **MONTH:** variable to set the date (month) to store in the ECU. This could be useful in case you wish to keep trace of special events.
- **YEAR:** variable to set the date (year) to store in the ECU. This could be useful in case you wish to keep trace of special events.

- **GPA_1: GPA®** (Get Power Assistance) adjusting in engine map 1 (**MAP #0** in **Maya**).
- **GPA_2: GPA®** (Get Power Assistance) adjusting in engine map 2 (**MAP #1** in **Maya**).
- **ECU_CODE:** ECU serial number
- **GEAR_CUT_TIME:** add/reduce cutoff time for quick shifter.

5.1.6 Packet in GP1EVO ECU (licence EVO)

- **ERCOUNT:** number of complete revolutions of the engine. The values goes from 0 to 65535 then get back to 0.
- **RPM_CYCLE:** number of complete cycles of the engine (in a four stroke engine 720° rotation)
- **MAP:** inlet manifold pressure value
- **BAP:** ambient pressure
- **WHEEL_SPEED1:** linearized value supplied by speed sensor 1
- **WHEEL_SPEED2:** linearized value supplied by speed sensor 2
- **THROTTLE:** throttle position (%)
- **AIR_T:** linearized value supplied by air temperature sensor
- **ENGINE_T:** linearized value supplied by engine temperature sensor
- **OIL_T:** linearized value supplied by oil temperature sensor
- **BATT_V1:** voltage of the battery
- **BATT_V2 :** voltage of the **ECR**
- **LAMBDA:** linearized and averaged value supplied by the Lambda sensor
- **INFO1:** ECU status. Last digit on the left is the diagnosis: 0 no alarms, 1 alarm (for further information read chapter **6.17**)
- **GEAR:** engaged gear

Number of parameters could vary belonging to used device.

5.1.7 Packet in GP1EVO ECU (licence ADVANCE)

The parameters are:

- **ERCOUNT:** number of complete revolutions of the engine. The values goes from 0 to 65535 then get back to 0.
- **RPM:** revolution per minute
- **RPM_CYCLE:** number of complete cycles of the engine (in a four stroke engine 720° rotation)
- **MAP:** inlet manifold pressure value
- **BAP:** ambient pressure
- **KLAMBDA:** this is the ratio between read lambda value and target lambda value (defined in **LAMBDAT**). This is the multiplicative factor that has to be used to make “read value” and “target value” the same.

- **INJ_LOW:** opening time for lower injector (inside throttle body)
- **INJ_HIGH:** opening time for upper injector (normally in the air box)
- **SPARK:** sparkle advance value
- **PHASE_LOW:** this value define the position of crankshaft when the fuel injection of lower injector stops (in comparison to **T.D.C** express in degree)
- **PHASE_LOW:** this value define the position of crankshaft when the fuel injection of upper injector stops (in comparison to **T.D.C** express in degree)
- **DeltaWTPS+ :** this value define how much the positive variation of the throttle influence the engine mix (see chapter **6.13**)
- **WHEEL_SPEED1:** linearized value supplied by speed sensor 1
- **WHEEL_SPEED2:** linearized value supplied by speed sensor 2
- **THROTTLE:** throttle position (%)
- **AIR_T:** linearized value supplied by air temperature sensor
- **ENGINE_T:** linearized value supplied by engine temperature sensor
- **OIL_T:** linearized value supplied by oil temperature sensor
- **BATT_V1:** voltage of the battery
- **BATT_V2 :** voltage of the **ECR**
- **LAMBDA:** linearized and averaged value supplied by the Lambda sensor
- **LAMBDA_RAW:** linearized and raw value supplied by the Lambda sensor
- **LAMBDA_TARGET:** Lambda target value defined in **LAMBDAT** table
- **ADVAR1:** for future uses
- **ADVAR2:** for future uses
- **INFO1:** ECU status. Last digit on the left is the diagnosis: 0 no alarms, 1 alarm (for further information read chapter **6.17**)
- **GEAR:** engaged gear

Number of parameters could vary belonging to used device.

5.2 Device components for RX1EVO ECU

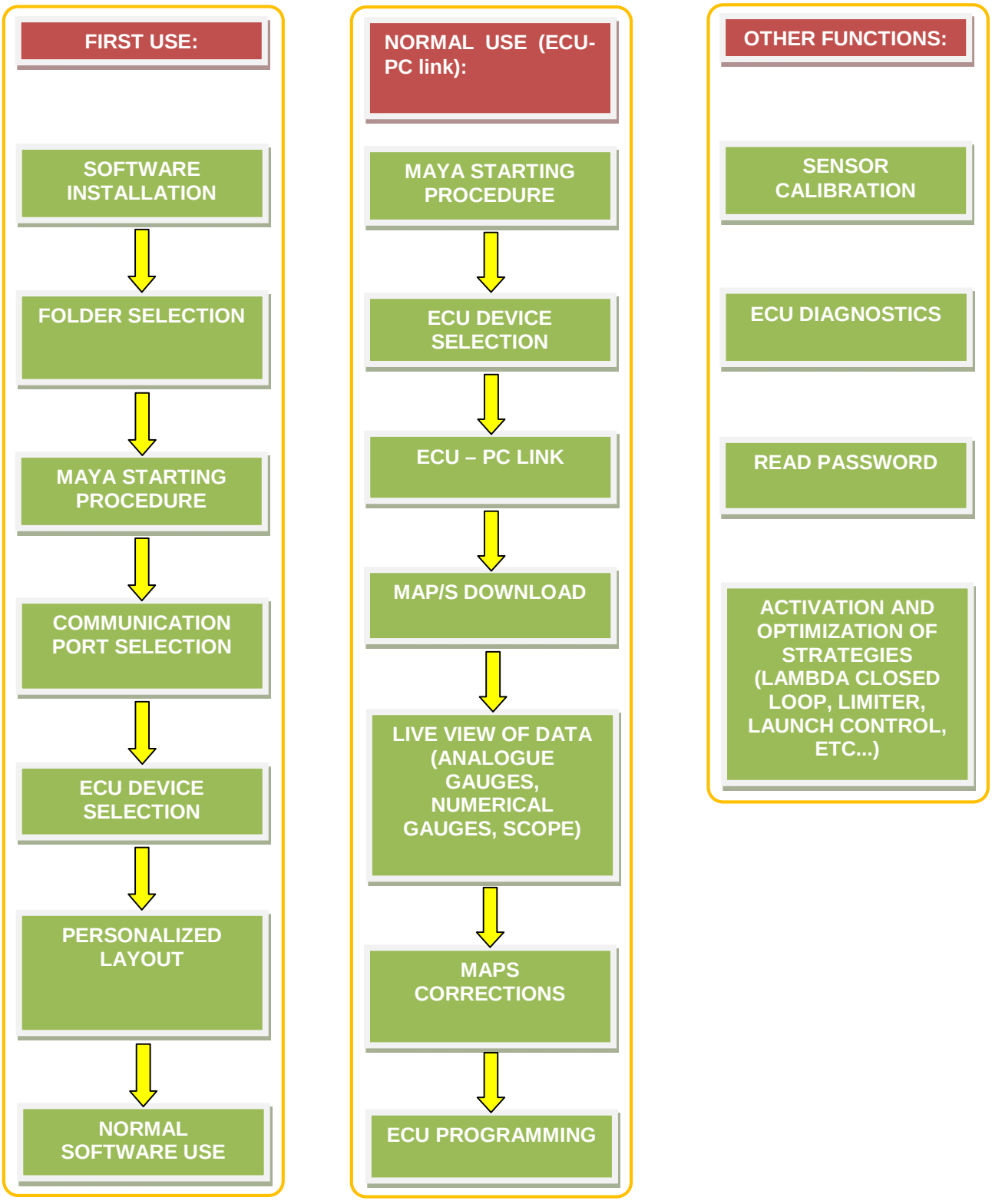
New RX1EVO ECU introduces some new features than GP1EVO.
The device parameter description is available on RX1EVO device table (see **chapter 8.2**).

5.3 Other ECU

ECU parameters are define in relative device table (see chapter **8.0**).

6 HOW TO …

Following chapter will introduce practical use of **Maya**.



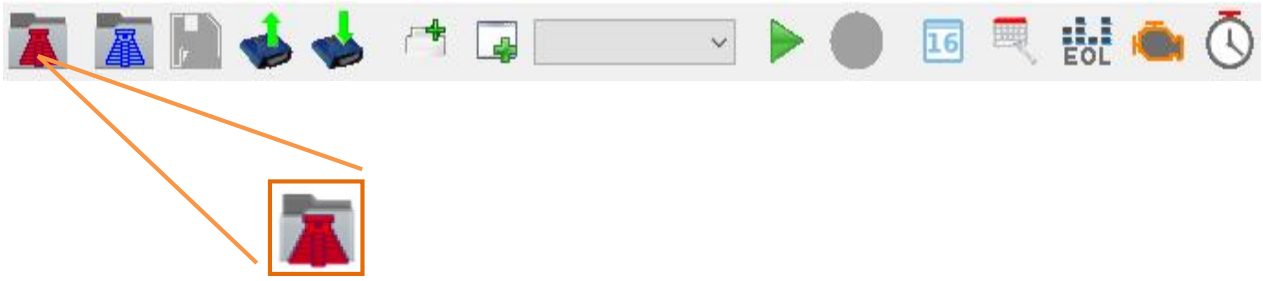
Usually, when modifying engine maps, it is suggested to download first the map from the ECU. Users could work on file saved on pc.

SUGGESTION: SAVE ON THE ECU ALL MAPS (ALSO IF EQUALS). THIS AVOID UNWANTED ENGINE STOPS IF A EMPTY MAP IS SELECTED BY MAP SWITCH.

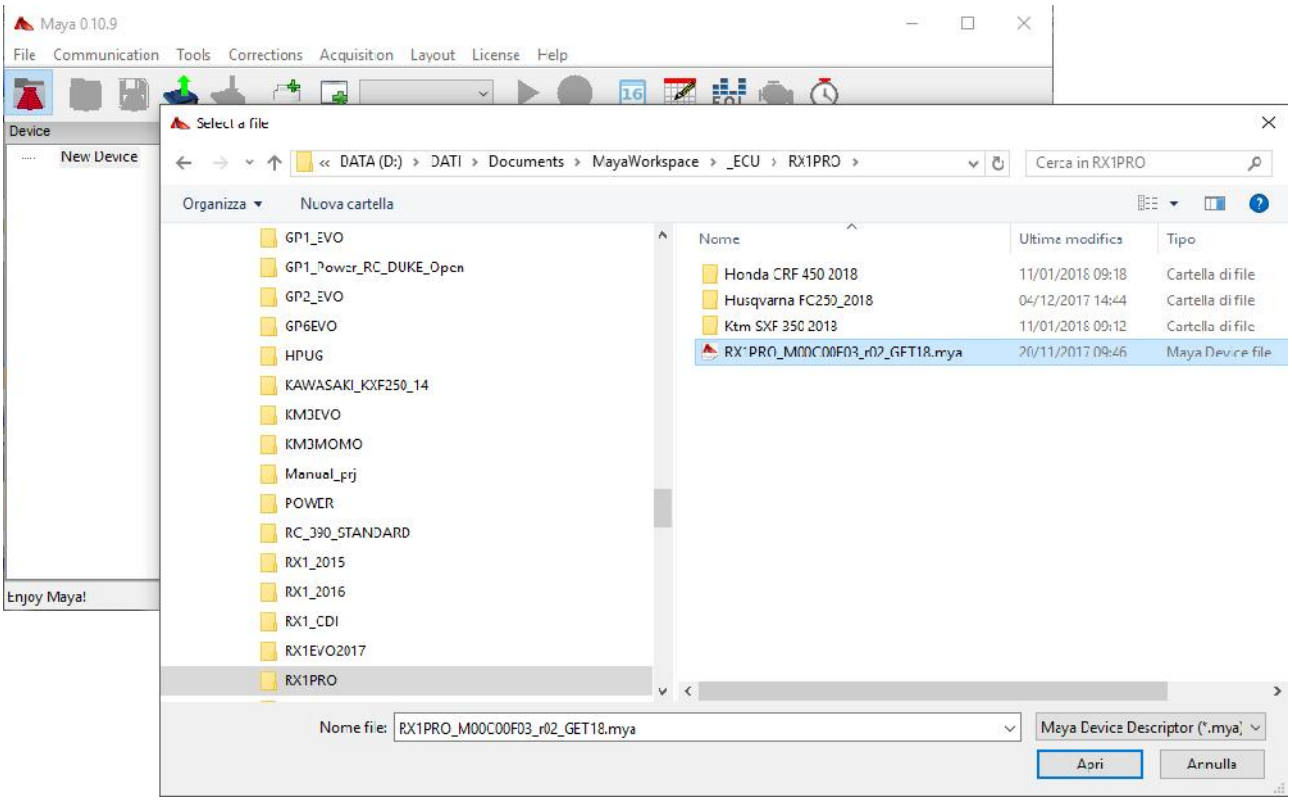
6.1 DEVICE load

You need to load a device to work with or without a connection with the ECU.
You need to copy the device contained in the ECU inside the Maya software:

- Start Maya with double click on the icon 
- Select Open Device… (in **File**) or selecting the icon in **Instruments bar**.

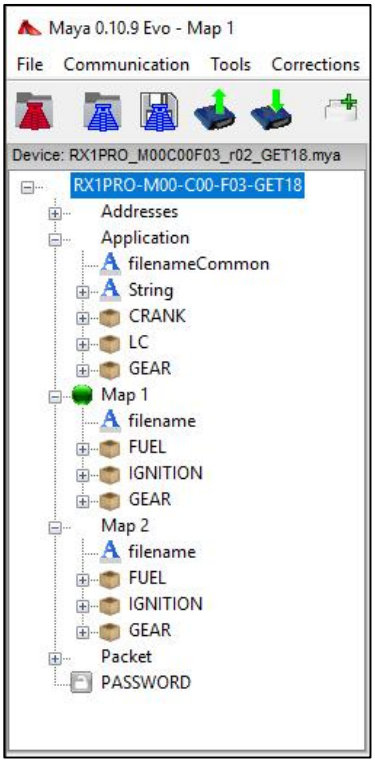


- Select desired device. If all steps have been done correctly (read chapter **2.1.2**), the device is in the correspondent ECU folder.



- Open the file by clicking **Open**

- You will see the device structure in activity area.



NOTE: you could load automatically the last used device. To enable this function you need to set <u>"On start-up, load"</u>:

- **Only Device:** load the **device** used in the previous session of **Maya**
- **Device and maps:** load **device** and **maps** used in the previous session of **Maya.**
- **Device, maps and layout:** load **device**, **maps** and **layout** used in the previous session of **Maya**.

<u>If you do not know the device stored in the connected ECU, you could load a device and require code from the ECU with the command "Get ECU Code" (see chapter 6.2)</u>

	**WARNING: ALWAYS LOAD RIGHT DEVICE FILE BEFORE CHANGE ECU PARAMETERS!!!**

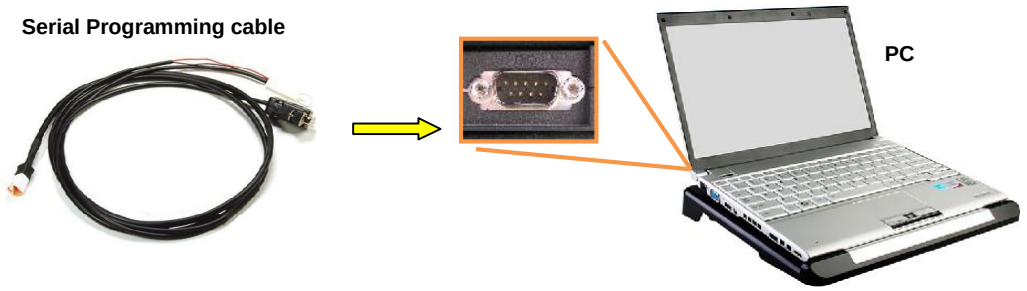
6.2 ECU – PC CONNECTION

Follow instruction below to connect ECU and PC.

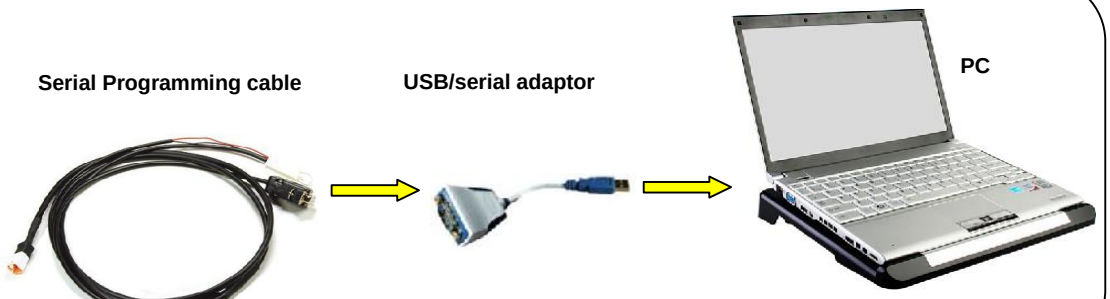
6.2.1 GP1-RX EVO/PRO ECUs

- Start PC and **Maya** (if not yet operating).
- Check that the communication port is set correctly in **preferences of Maya** (see chapter **2.2.2**).
- Connect the programming cable to PC (see possible configurations below).

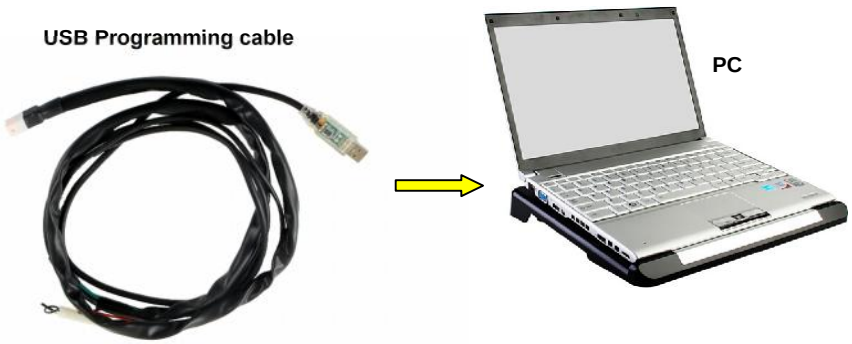
CONNECTION TO A SERIAL PORT



PC CONNECTION BY SEREAL/USB ADAPTOR

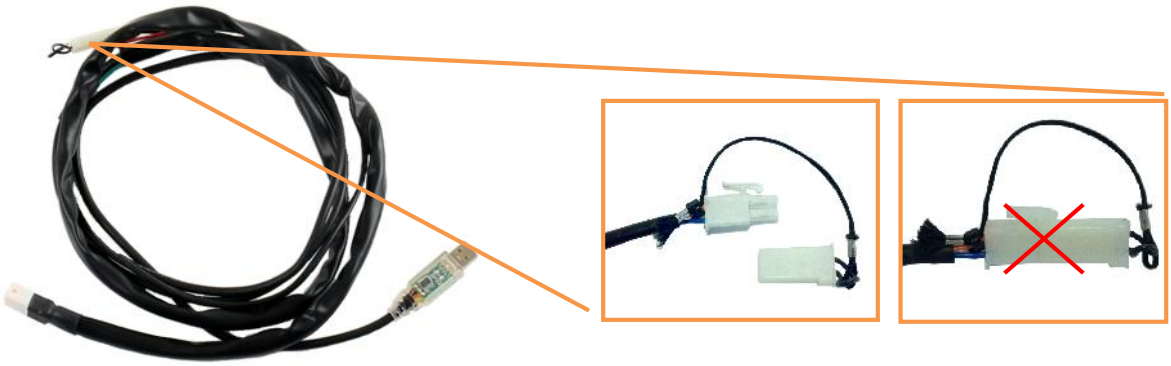


PC CONNECTION BY USB CABLE



- Connect ECU to the programming cable:

- Be sure that the programming connector is **not connected**.



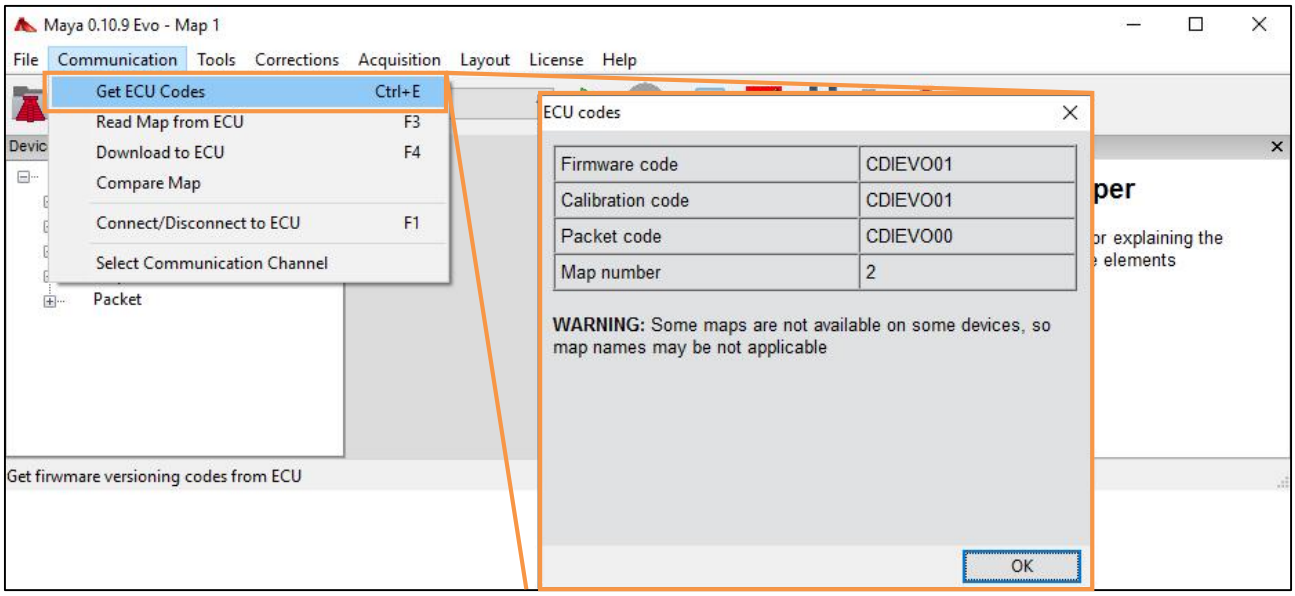
- Connect a power supply to programming cable to power the ECU (if the ECU is not powered by engine loom, or it is disconnected, or you are working in a battery less system).

⚠	**IN BATTERY LESS SYSTEMS IT IS SUGGESTED TO USE A AUXILIARY POWER. IN THIS SITUATION DISCONNECT THE FUEL PUMP.** **IF THE INJECTOR IS OPEN, THE CILINDER COULD BE LOADED WITH FUEL.**

⚠	**LEAVE ECULMB ECU'S (SUCH AS YAMAHA YZF R25-R3 APPLICATION) CONNECTED TO THE BIKE HARNESS AND SWITCH IGNITION KEY IN ON POSITION DON'T USE EXTERNAL POWER SUPPLY**

⚠	**CDI ECUs ARE DIRECTLY POWERED BY PC (THROUGH USB PORT): NO EXTERNAL POWER SUPPLY IS NEEDED**

- Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.



NOTE: this operation is not mandatory but it is useful to check all connections and communications.

NOTE: CODES WILL IDENTIFY THE DEVICE LOADED IN THE ECU.

If the ECU device is not known, you could load a device in Maya to see an answer from the ECU.

6.3 Load a Maya project and/or an engine map

To change engine map you need to edit parameters, this operation is possible only if you load a map in the software.
Three options:

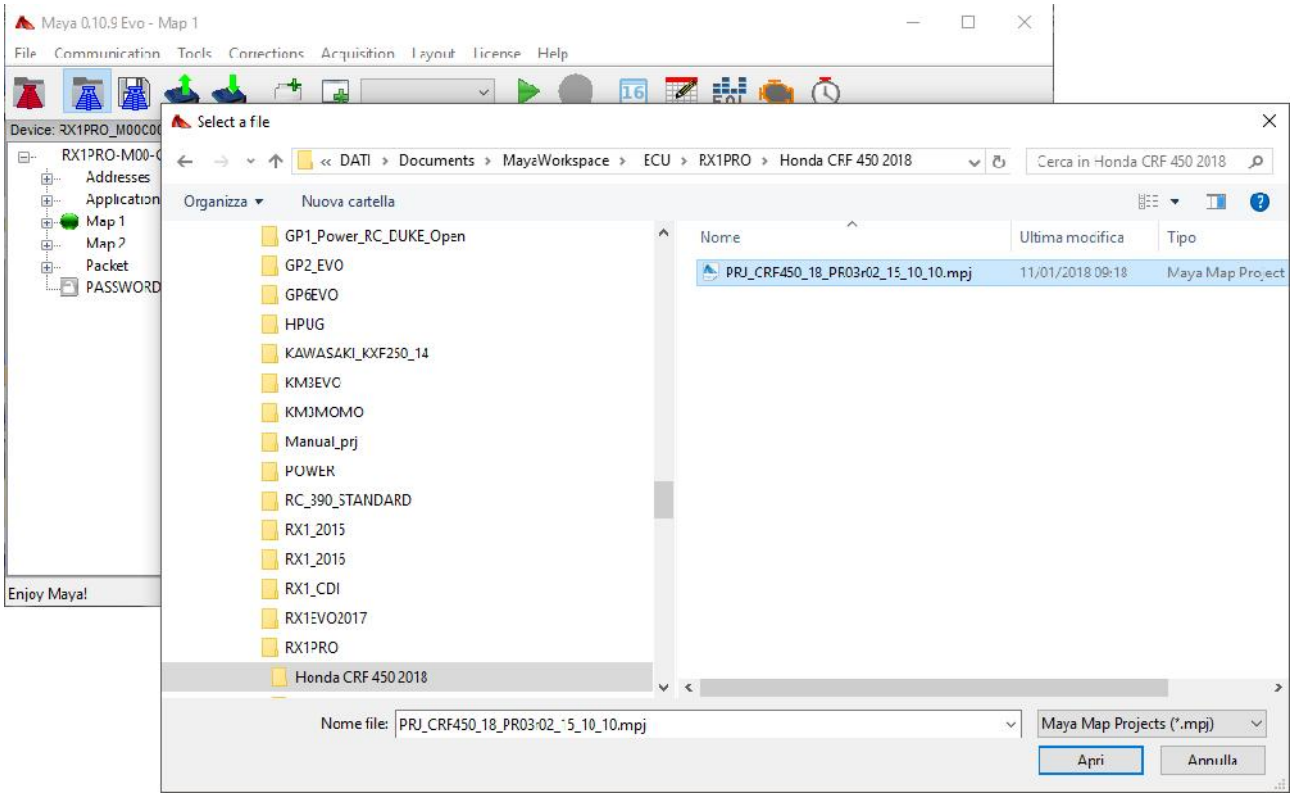
- Open a project file
- Open a map file
- Download a map from ECU connected to PC

6.3.1 Open a project file

Proceed as follows:

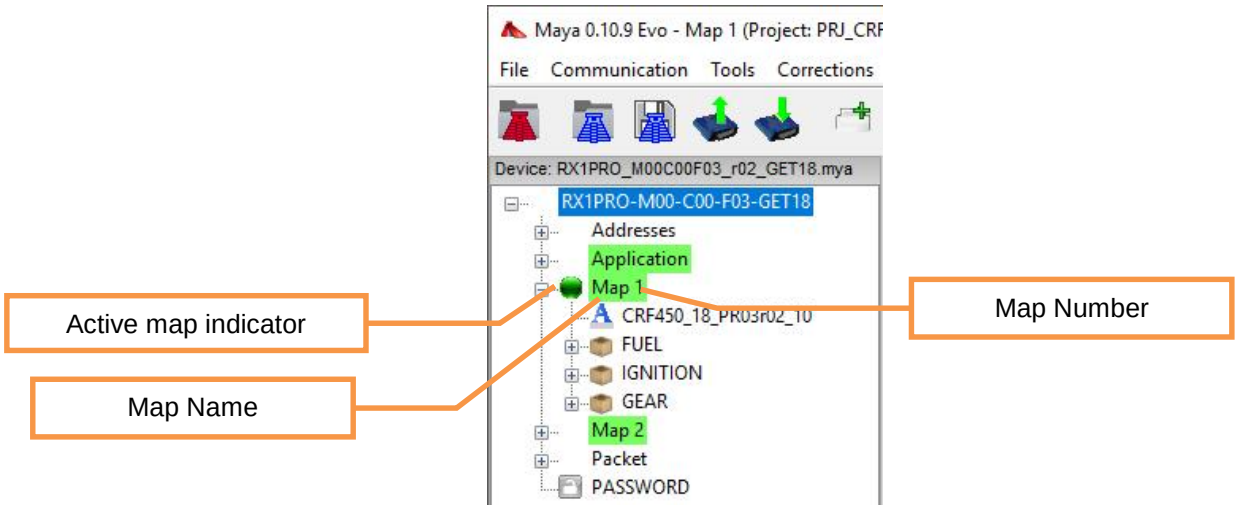
- Start Maya with double click on the icon
- Verify that a device is loaded and it is coherent with project you need.
- Click on **Open Map Project…** (in **File** menu) or in the icon in **Maya** toolbar.
  NOTE: if the option **Enable Hot keys …** in **Preferences** of **Maya** is enabled, you could do the same procedure with **CTRL+M**.

- Select a project file. If all steps have been done correctly, the device is in the correspondent ECU folder.



- Click OPEN to load the desired file

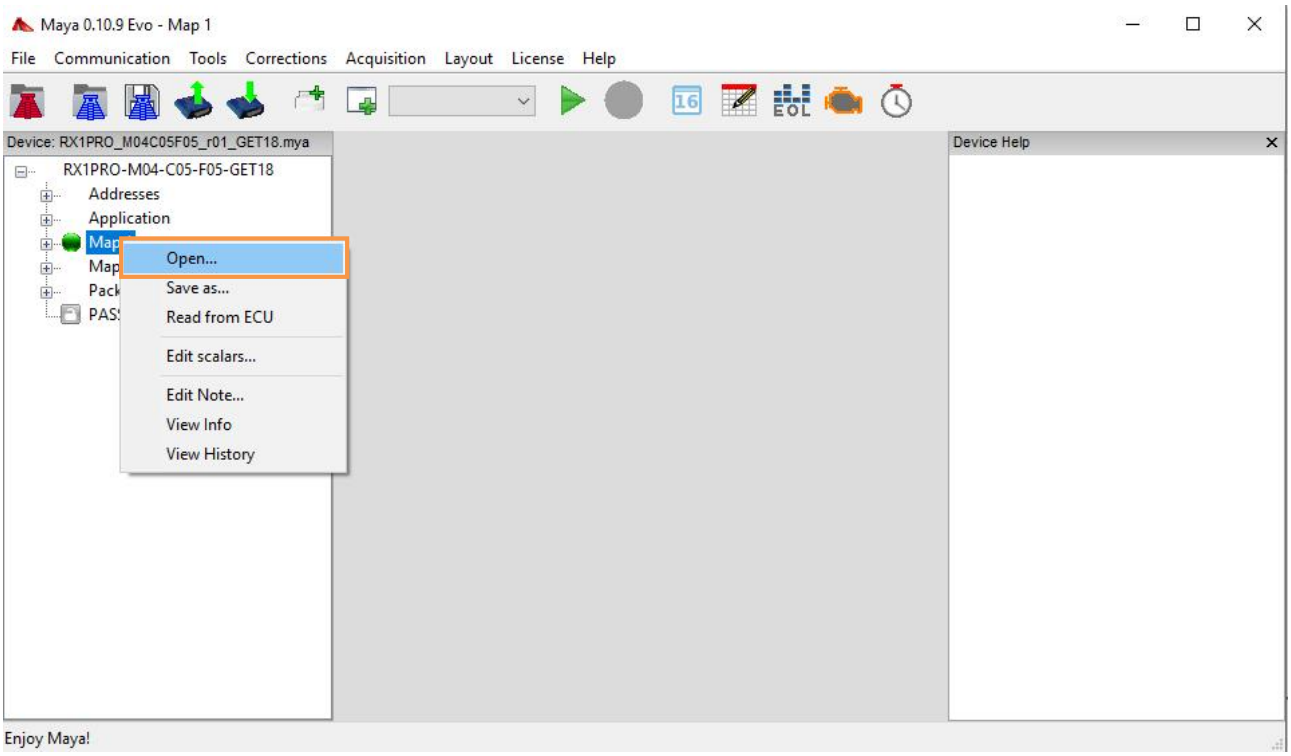
- The engine maps (stored in project file) will load automatically in **device** tree (in **Device Manager** area); the first of them will also be activated (marked with green indicator).



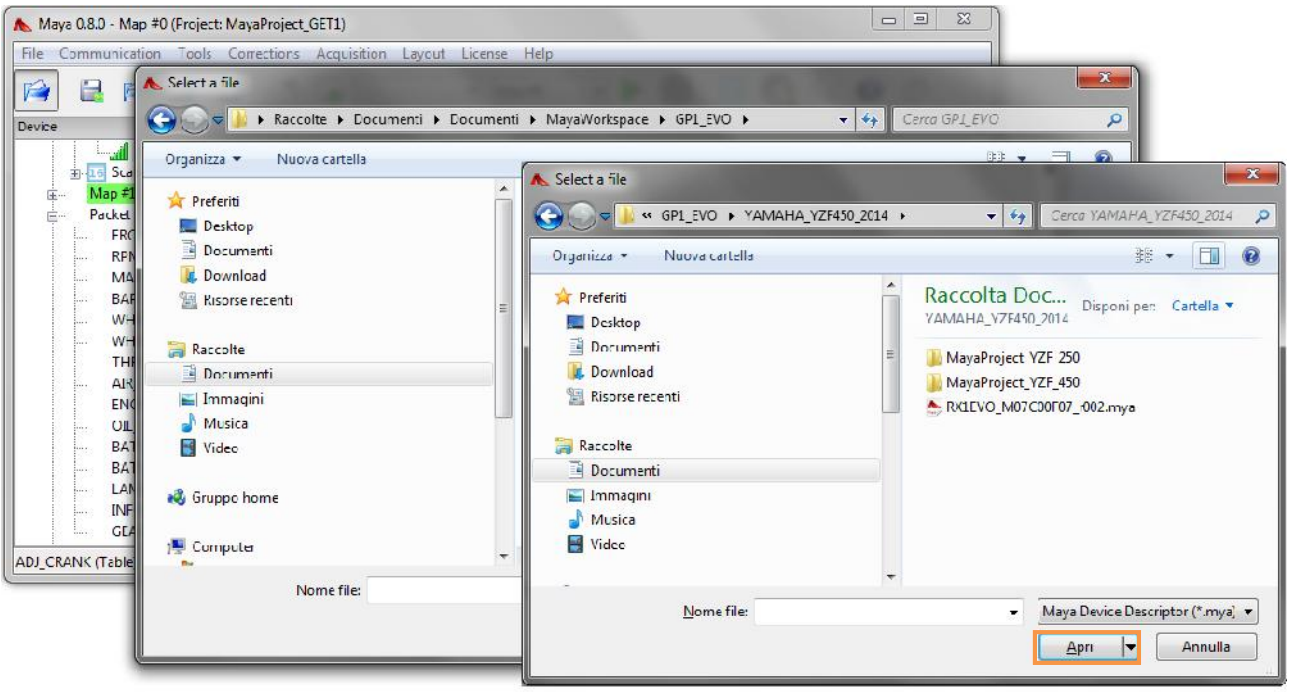
6.3.2 Open a map file

User can load a single engine map in **Maya**, however we suggest the use of **project** file. In fact, if loaded **device** requires the **Application Map**, users have to load both maps (**Application + Engine Map**) to avoid errors in **Maya**.
Proceed as follow:

- Start Maya with double click on the icon 
- Verify that a device is loaded and it is coherent with engine map you need. NOTE: if no device is loaded please load one (see chapter **6.1**)
- Open the context menu of desired map and click on **Open…**



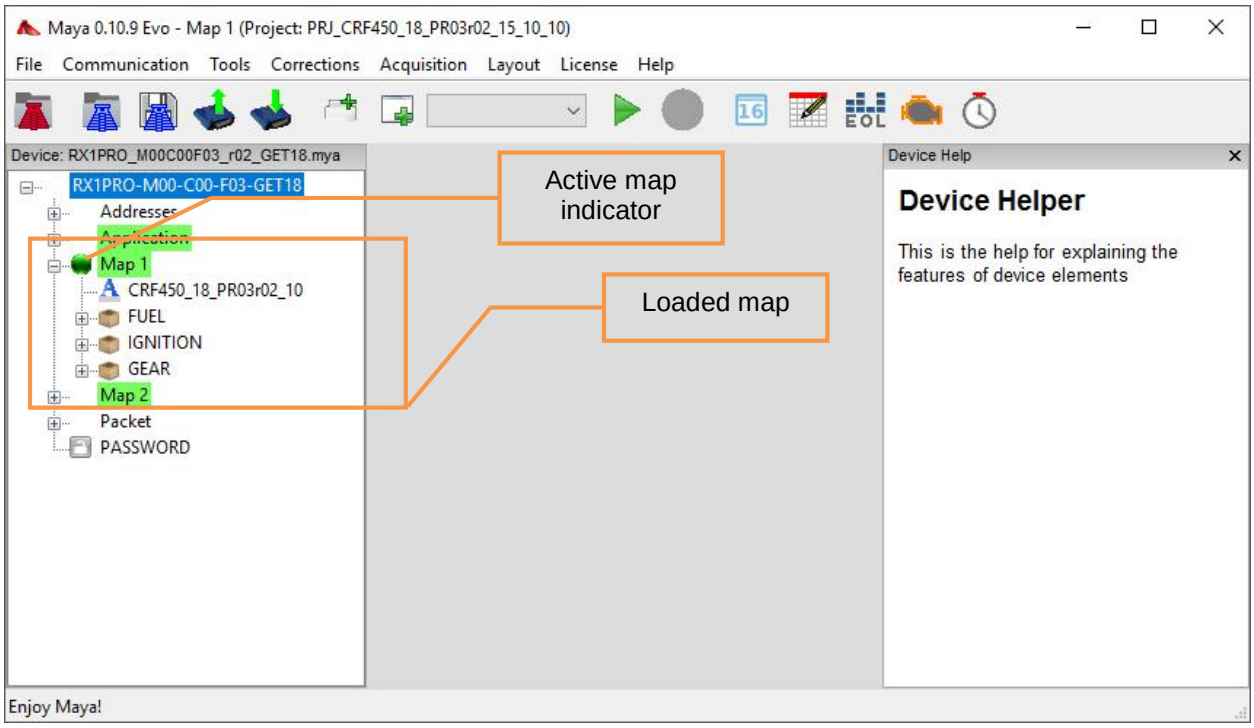
- Select a map file. If all steps have been done correctly (read chapter **2.1.2**), the device is in the correspondent ECU folder. If you are using a **ECU GP1 EVO** on a **Yamaha YZF 450** MY 2014 the file will be stored in: **MayaWorkSpace \ GP1 EVO \YAMAHA_YZF450_14**



NOTE: MANY MAP FILES COULD BE STORE IN THE SAME FOLDER

- Click OPEN to load the desired file

- The selected engine map is loaded in **device** tree (in **Device Manager** area) in active map (marked with green indicator).



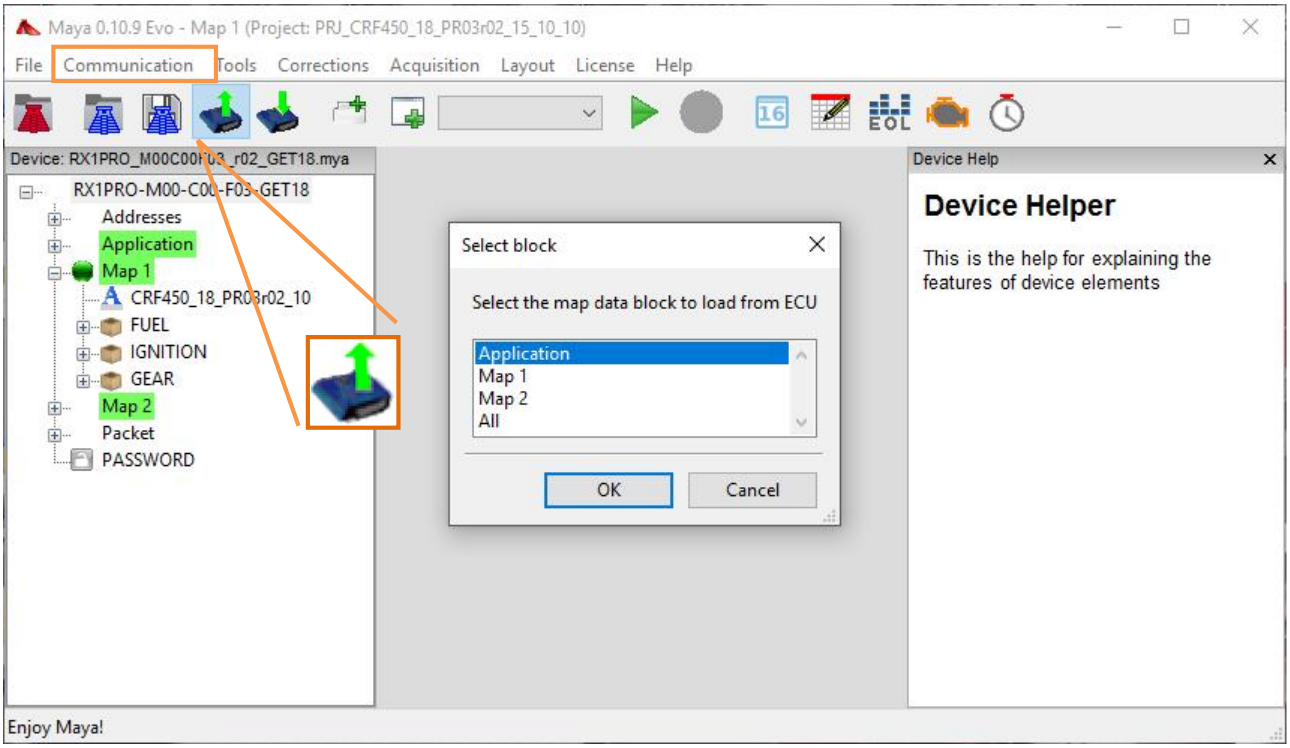
NOTE: when a map is loaded MAP ... is in green.

The same procedure could be use to save a map: right click on **MAP #...**, then **Save as….**

6.3.3 Download of map/s from ECU

Follows these steps:

- Start Maya with double click on the icon
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Use **Get ECU Codes** command to perform a fast check (see chapter **6.2** and **5.0**)
  NOTE: if no device is loaded please load one (see chapter **6.1**)
- Click **Read Map from ECU** (in **Communication** menu) or the icon in **Maya** toolbar**.**
  NOTE: if the option **Enable Hot keys …** in **Preferences** of **Maya** is enabled, you could do the same procedure with **F3**.



- After this step, **Maya** could ask which map you wish to download from ECU (see following picture). Options (left click) are:

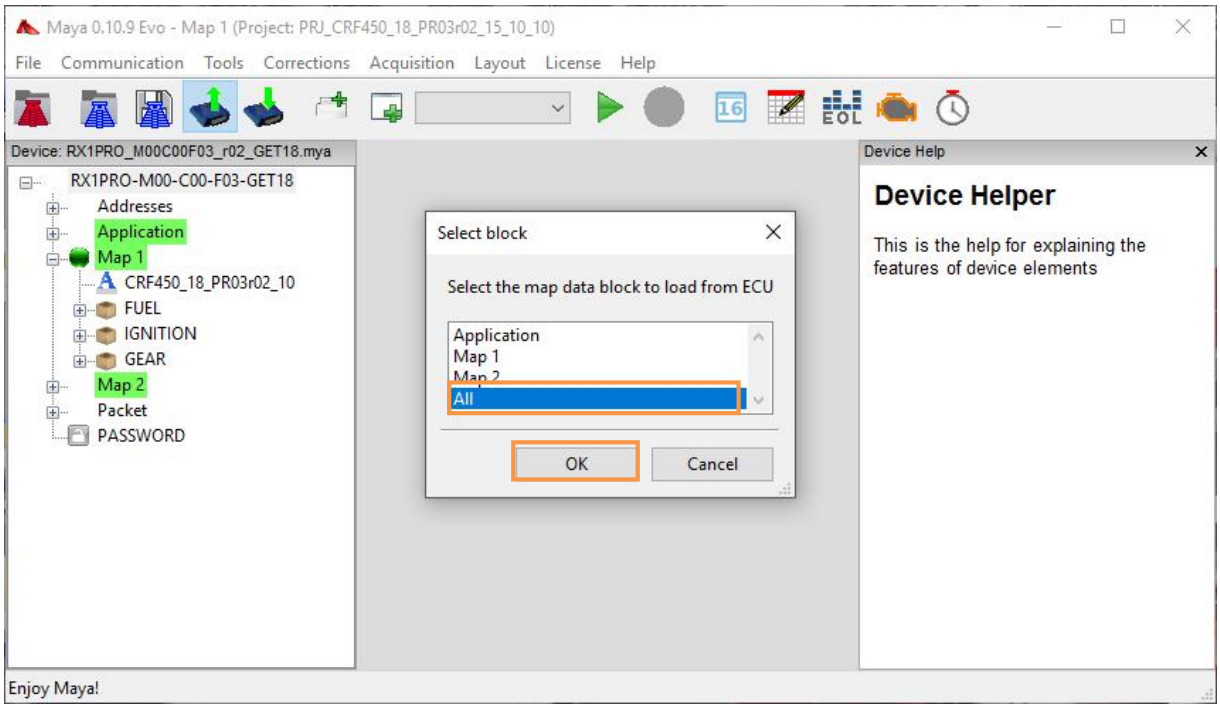
  Application: the **Application** map will be read from ECU and shown in **Application** branch of **Device Manager** tree to allow user changes.

  Map 1: the first map in the ECU will be read and shown in **MAP 1** branch of **Device Manager** tree to allow user changes. PLEASE NOTE: in some device versions the item name could be **MAP #0** or **0**

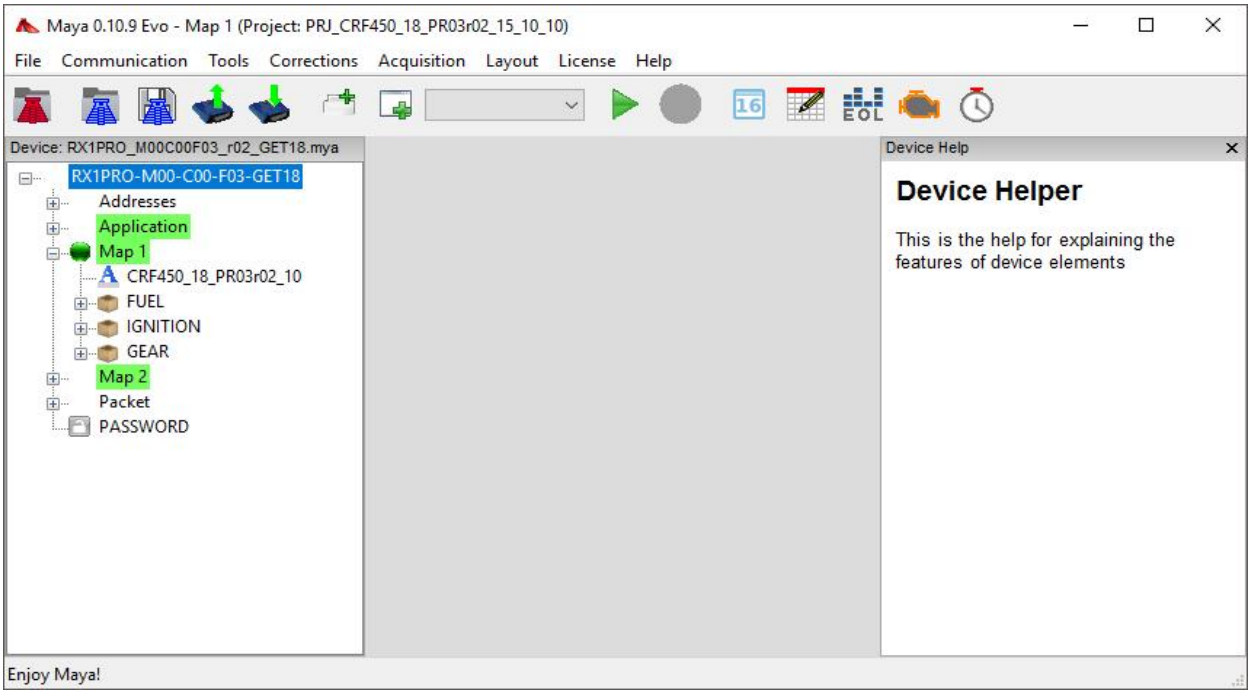
  Map 2: the second map in the ECU will be read and shown in **MAP 2** branch of **Device Manager** tree to allow user changes. PLEASE NOTE: in some device versions the item name could be **MAP #1** or **1**

  All: all maps be read from ECU and visualize in **Device Manager** tree to allow user changes.

  NOTE: THE NUMBER AND/OR MAP NAMED DEPENDS ON ON ECU TYPE

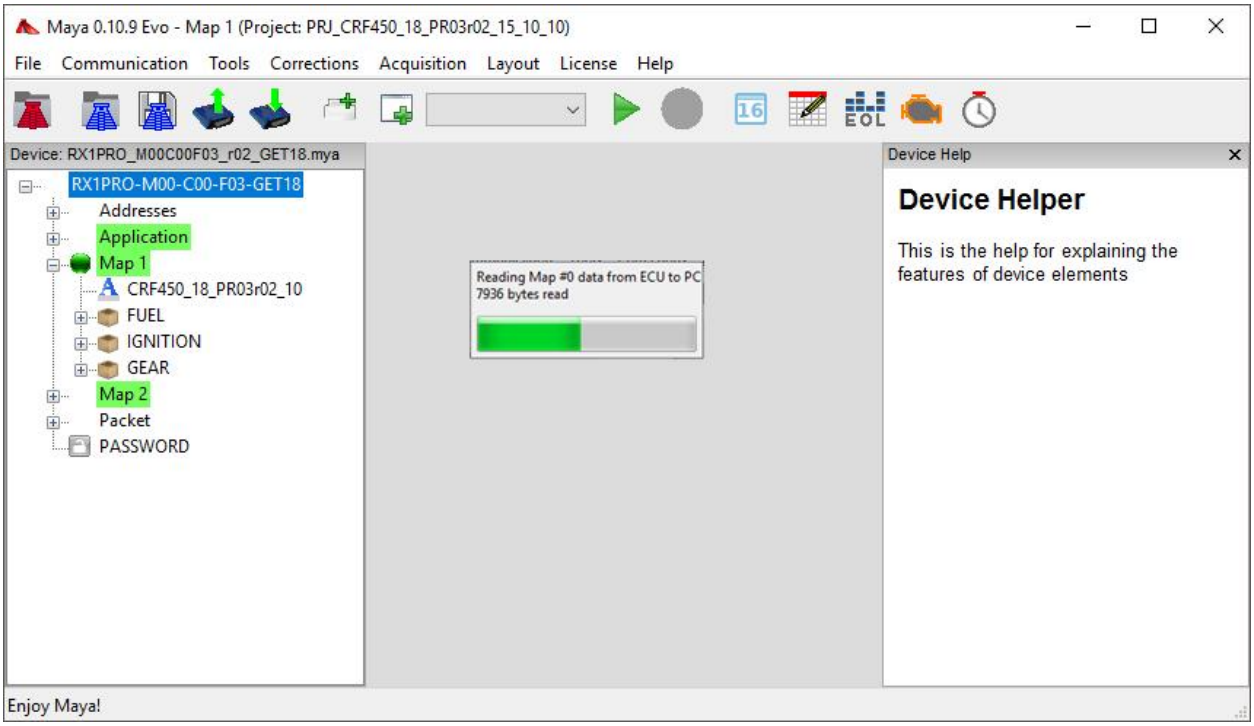


NOTE: IF A MAP IS ALREADY LOADED IN THE POSITION YOU WHISH TO USE, MAYA WILL INFORM THE USER AS FOLLOWS.



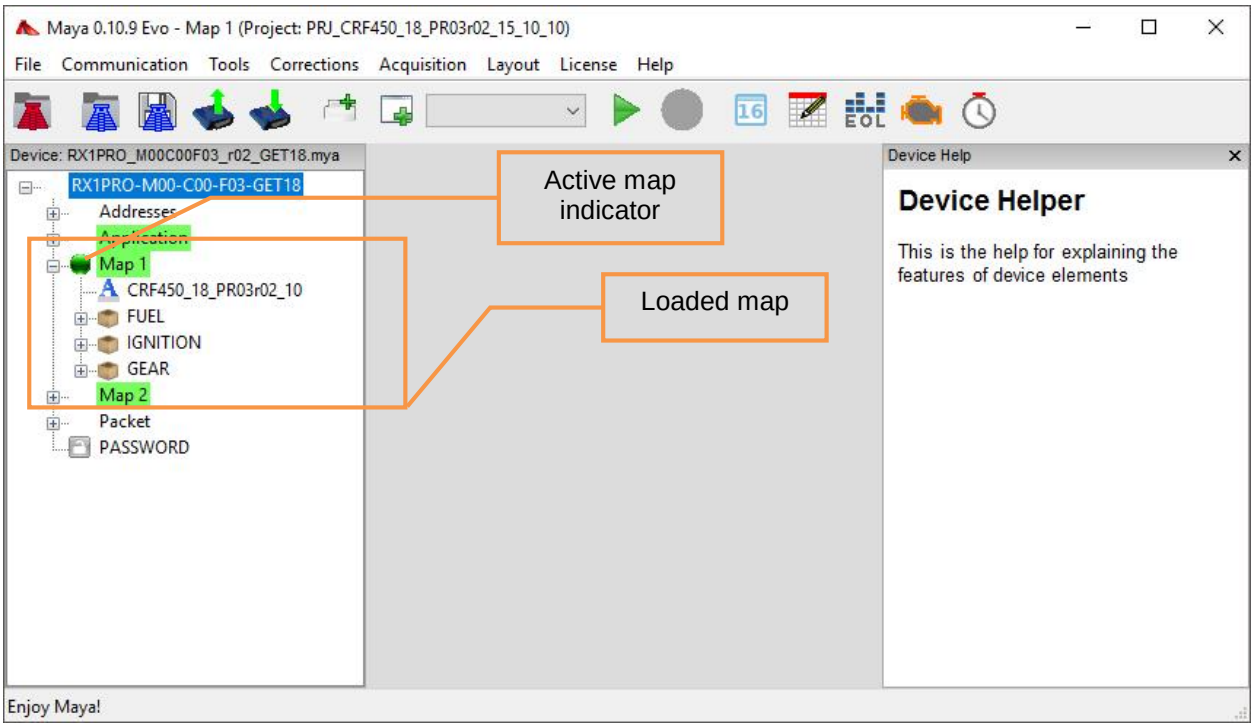
NOTE: if you want to overwrite data push YES.

- Confirm selection with **Ok** (low right in map selection window): the reading process is started. Wait until the end of operation.



NOTA: ECU must be powered

- Engine map in ECU is loaded in **device** tree (shown in **Device Manager**).

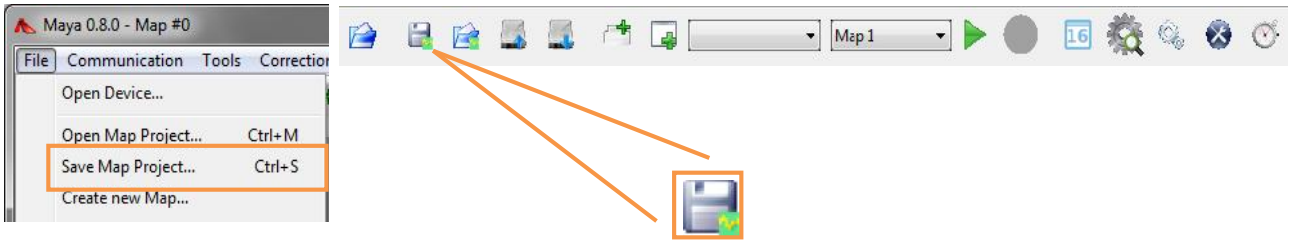


NOTE: when a map is loaded, MAP #... are in green

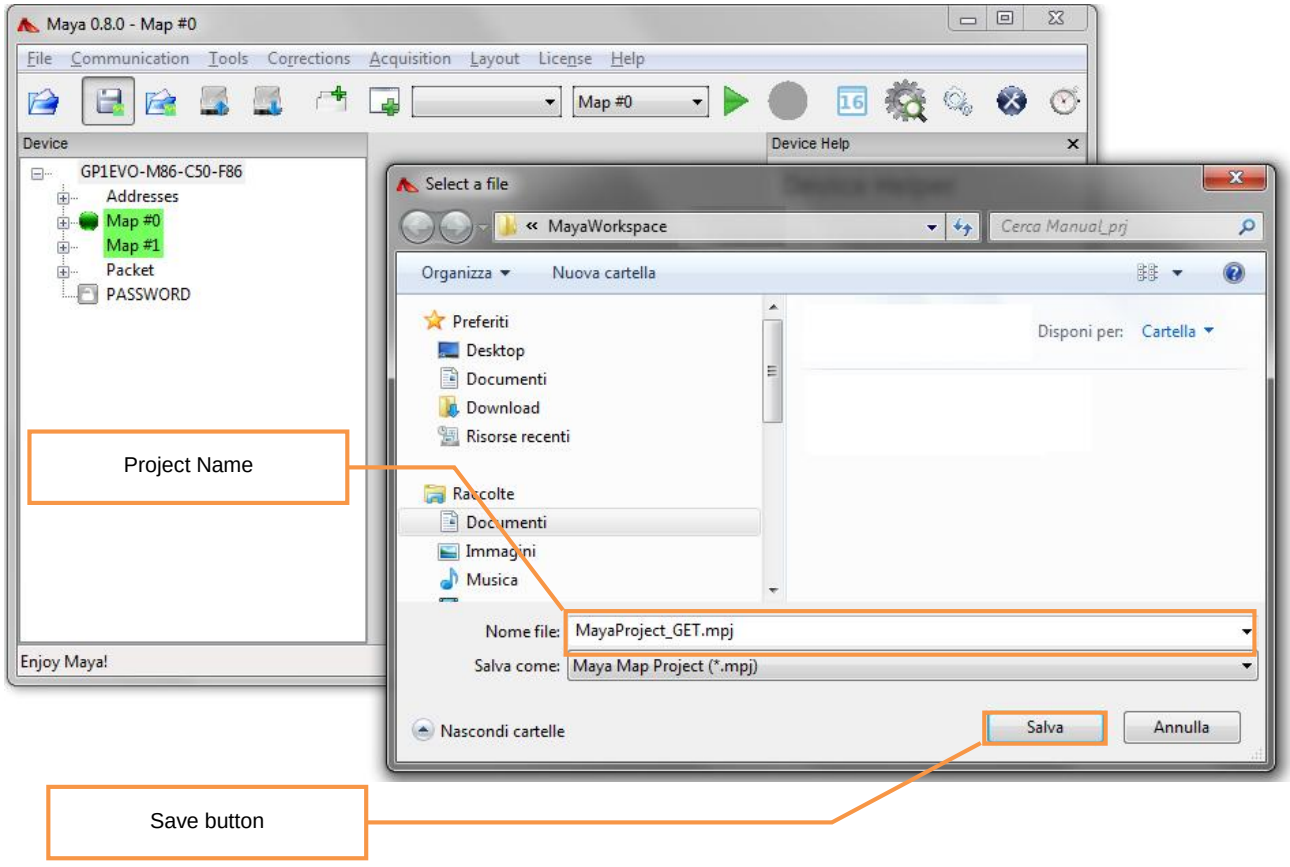
6.4 Save a project

After modification in engine maps, you could need to save them in a file (in PC or other storage devices).
With Maya running and maps already loaded, proceed as follow:

- Click on **Save Map…** (in **File**) or  in instrument bar**.**
  NOTE: If **Enable Hot keys …** is enabled in **Preferences**) the hot key is **CTRL+S**.



- Select the desired folder and project name, and push **Save**.
  NOTE: it is suggested to save project in **MayaWorkspace** .



THIS PROCEDURE WILL SAVE ALL MAPS LOADED IN MAYA TO A SINGLE FILE

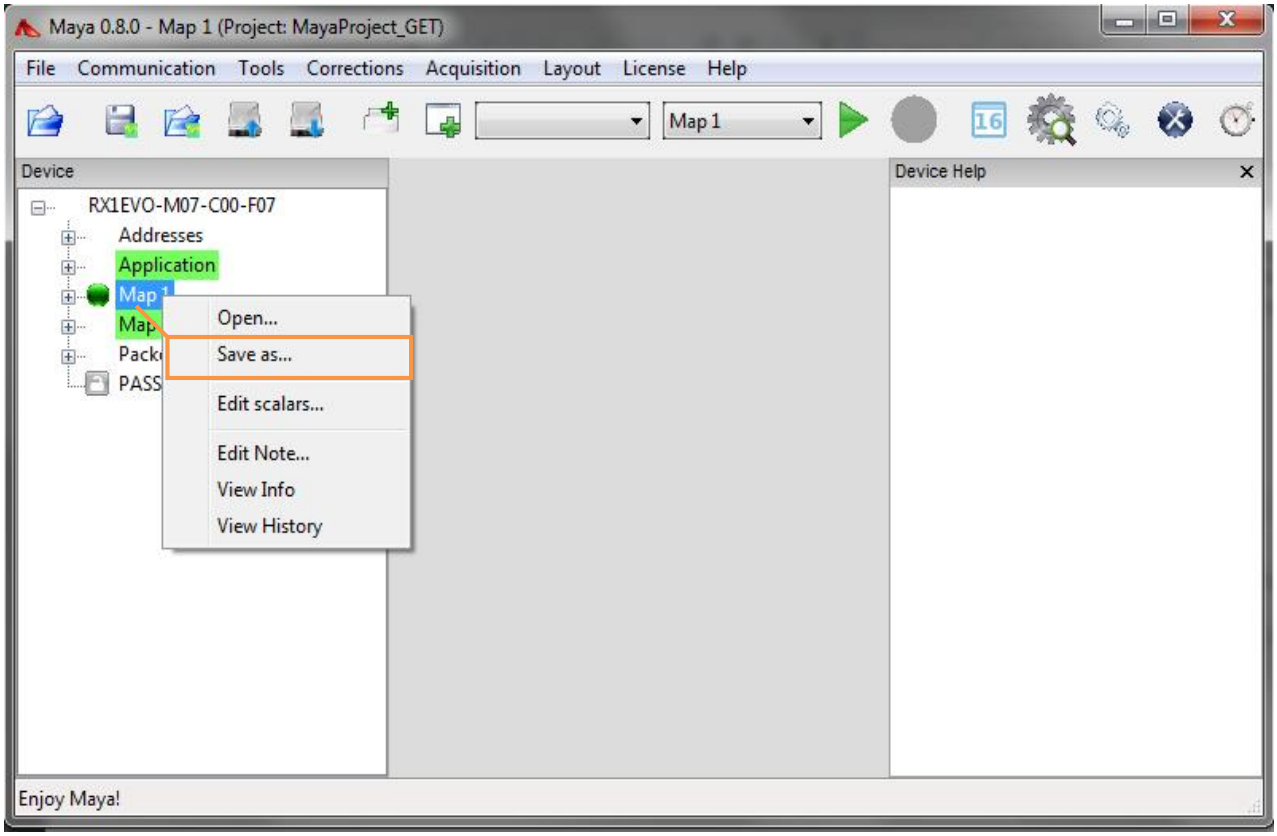
AVOID SPECIAL CHARACTER (e.g. % & / " ') FOR FILENAME (SPACE AND UNDERSCORE ARE ALLOWED)

6.4.1 Save a map

User can save a single engine map file, however we suggest the use of **project** file. In fact, if loaded **device** requires the **Application Map**, users have to load both maps (**Application + Engine Map**) to avoid errors in **Maya**.

Proceed as follows:

- You could save a map in a different mode: right click on **MAP ...**, then **Save as….** and repeat the same steps of previous chapter.



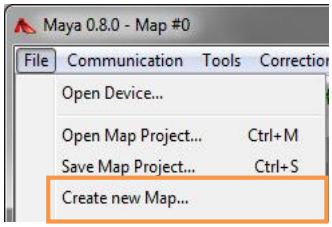
Note: this operation will save the selected map, not the active map.

WARNING:
IN THIS WAY ONLY AN ENGINE MAP FILE HAS BEEN SAVED !!! THE PROJECT FILE HASN'T BEEN SAVED.
AVOID SPECIAL CHARACTER (e.g. % & / " ') FOR FILENAME (SPACE AND UNDERSCORE ARE ALLOWED)

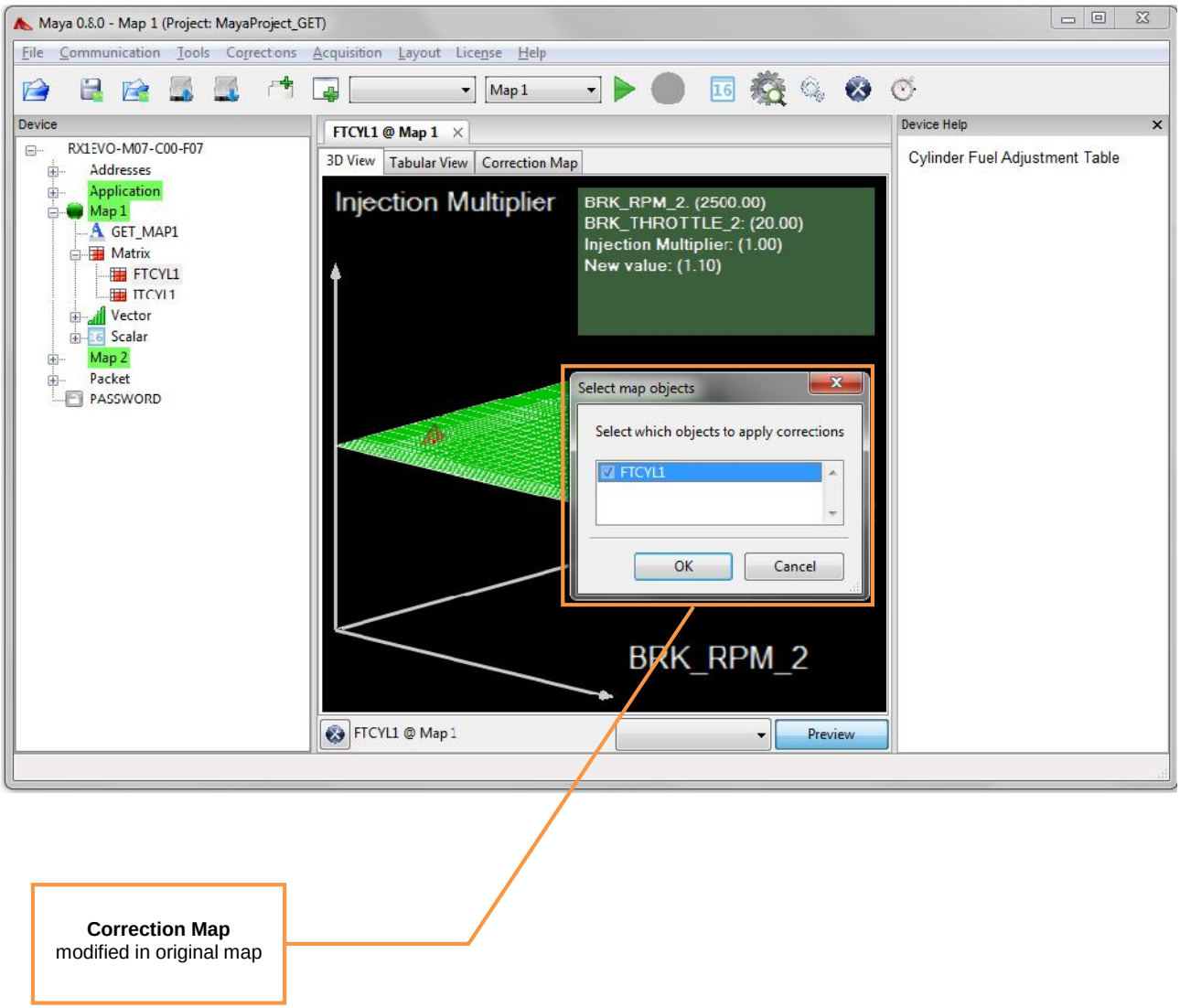
6.5 Creation of a map

After modification in engine maps, you could need to save it in a file (in PC or other storage devices).
With Maya running and maps already loaded, proceed as follow:

- Check that map you need to save is active (green indicator)
  Click on **Create Map…** (in **File**) or in instrument bar.

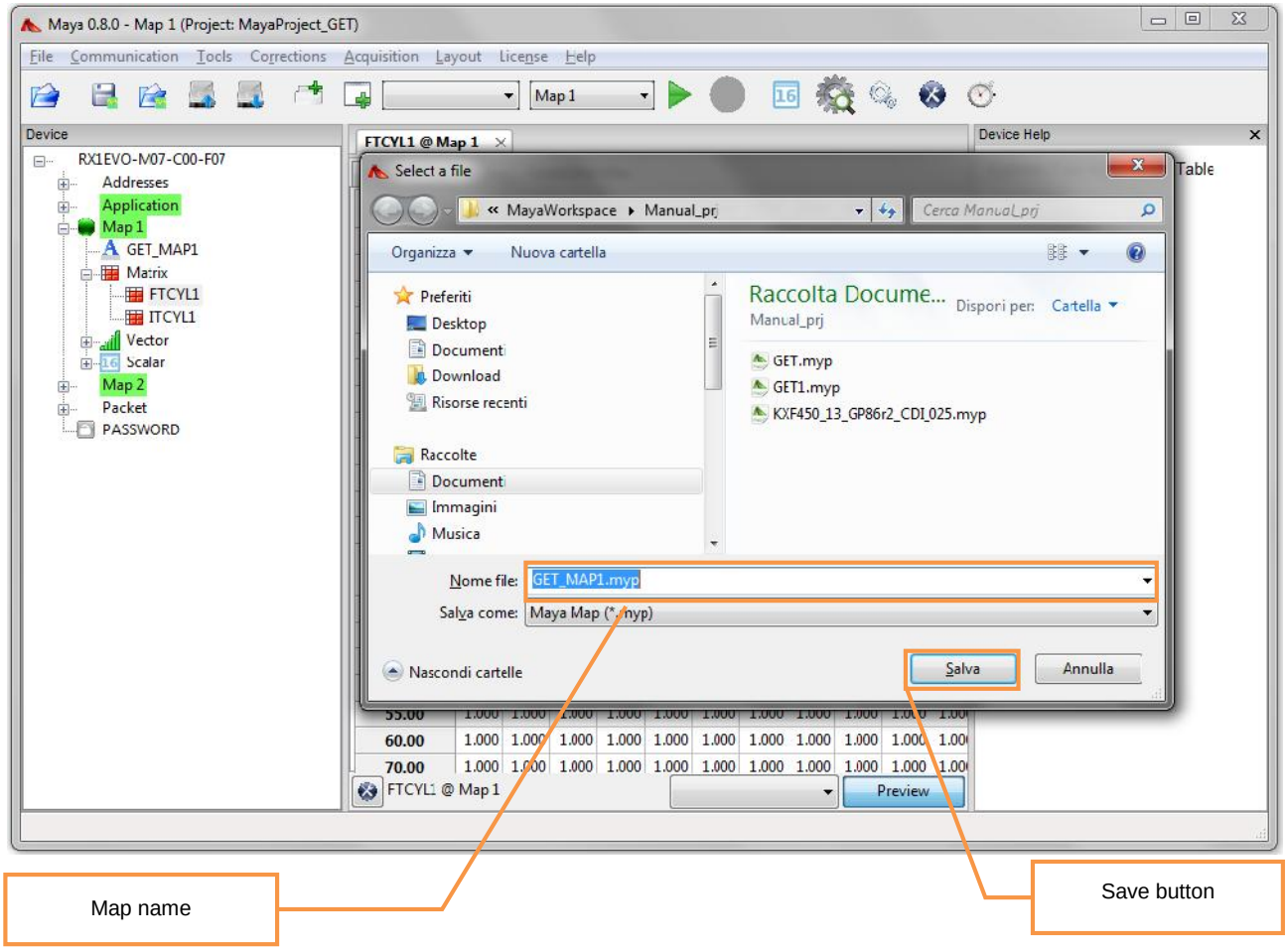


- Select matrix that you need to save in new map (**Maya** suggest automatically the list of modified matrix).



Correction Map
modified in original map

- Select the desired folder and map name, and push **Save**.
  NOTE: it is suggested to save in **MayaWorkspace** .



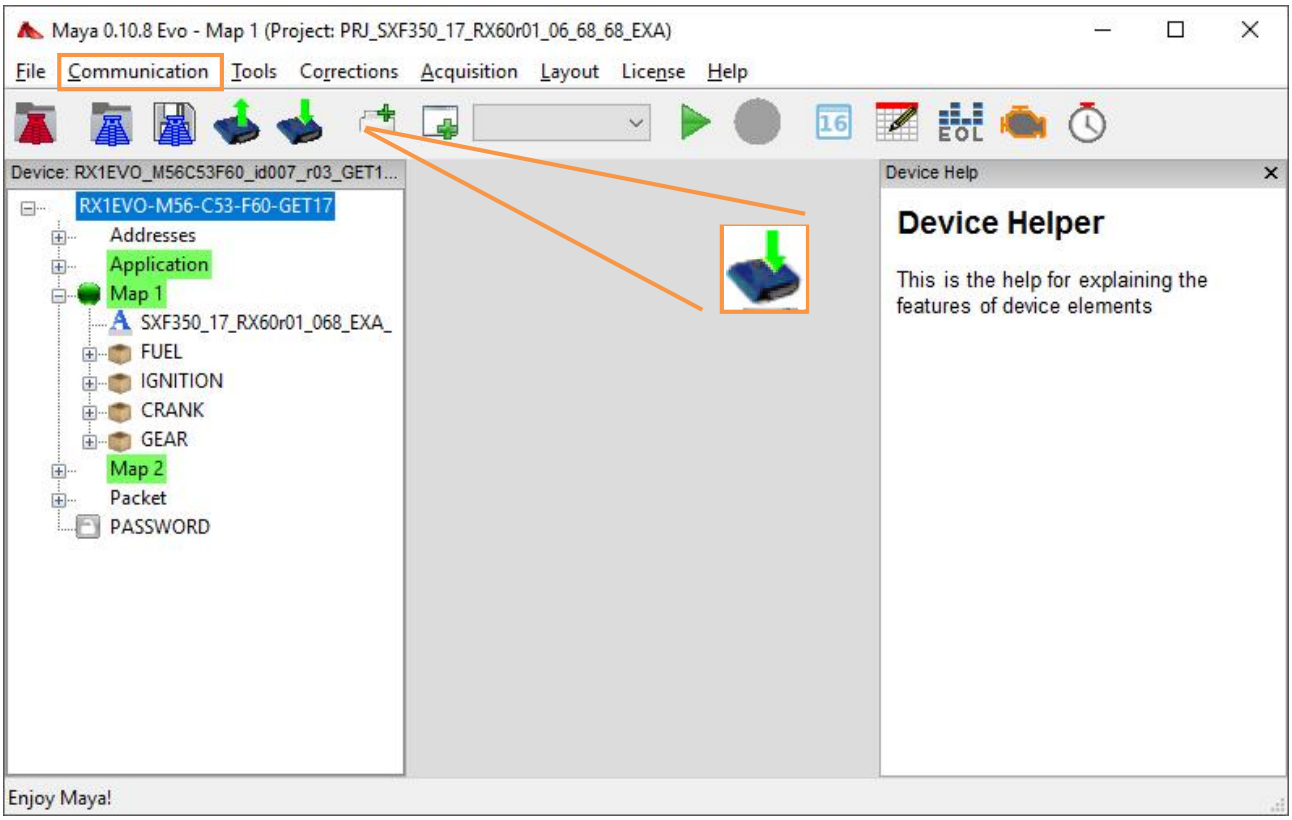
6.6 Transfer an engine map from Maya to ECU

This operation is needed to transfer one or more maps to ECU.
From this operation is excluded the End Of Line, chapter **5.1.3** e **5.1.5**.

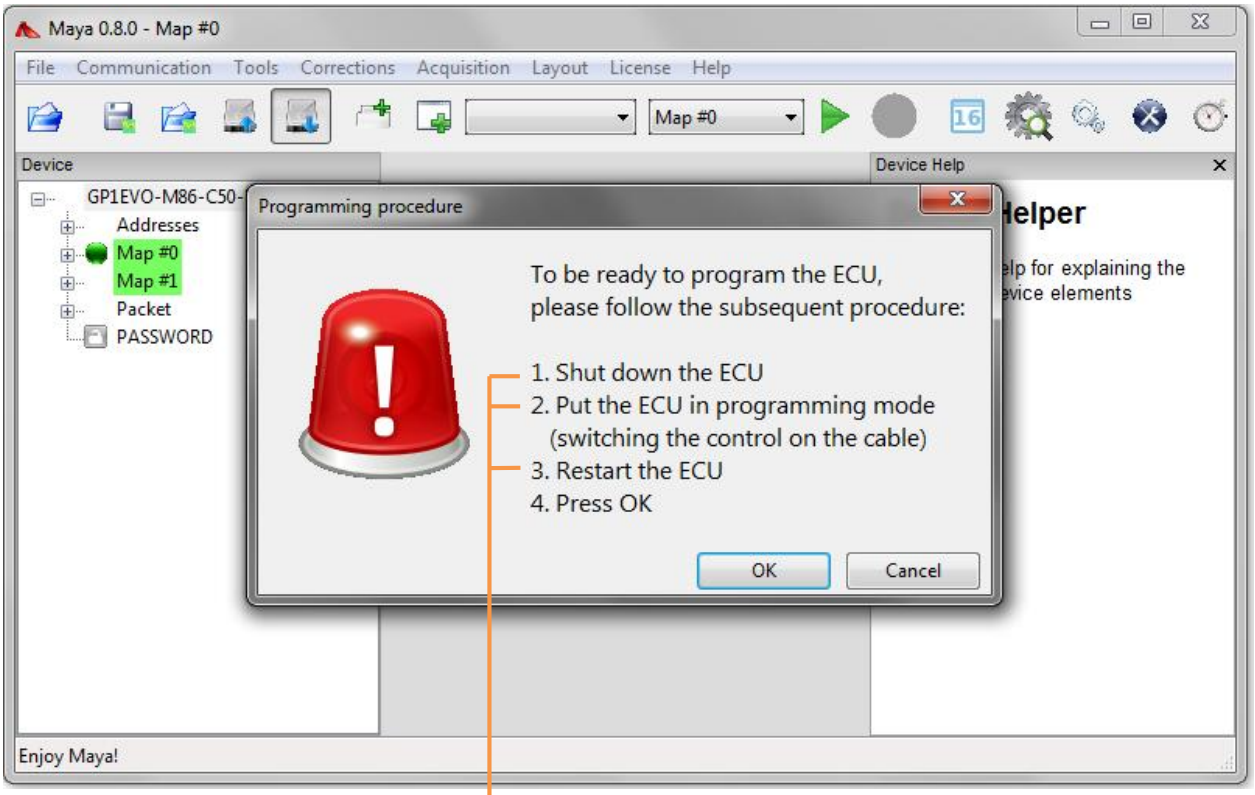
6.6.1 Transfer a engine map from Maya to GP1 EVO ECU

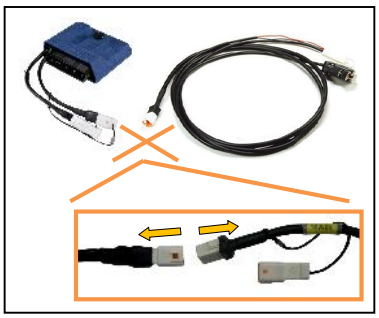
Maya must be on and maps need to be loaded

- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Click on **Download to ECU** (in **Communication**) or in the icon  in instrument bar**.**
  NOTE: if **Enable Hot keys …** are enabled you could press **F4**.

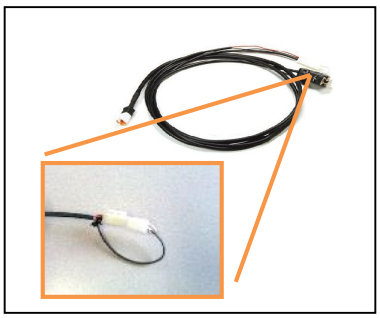


- Switch to “programming” the ECU following instructions given by **Maya**.

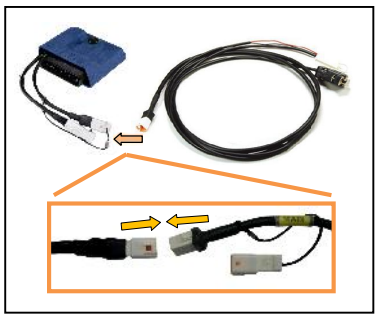




Switch off ECU (disconnect the programming cable or remove auxiliary power)



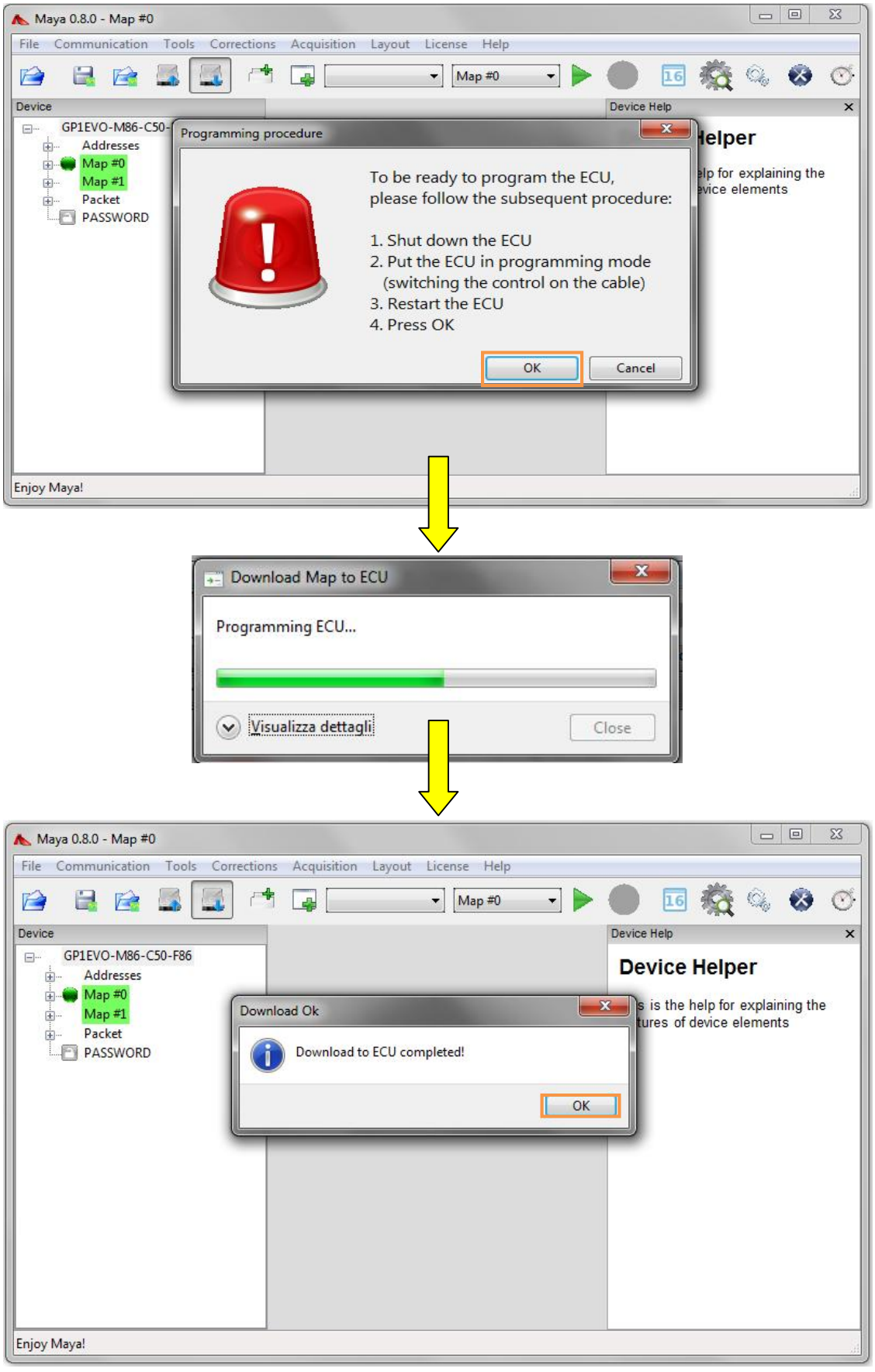
Switch ECU in programming mode (close programming connector)



Reconnect the programming cable (or auxiliary power) to ECU

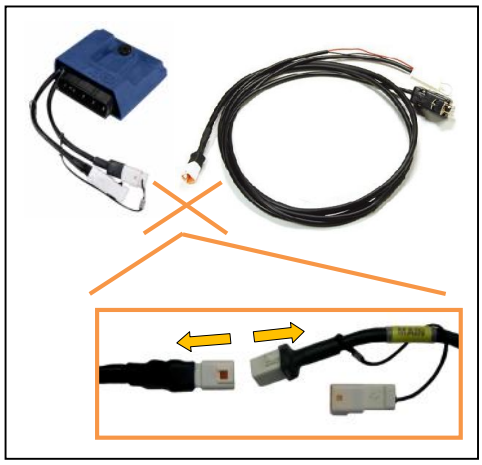
OK

- Push **Ok** to start programming and wait until end of operations.

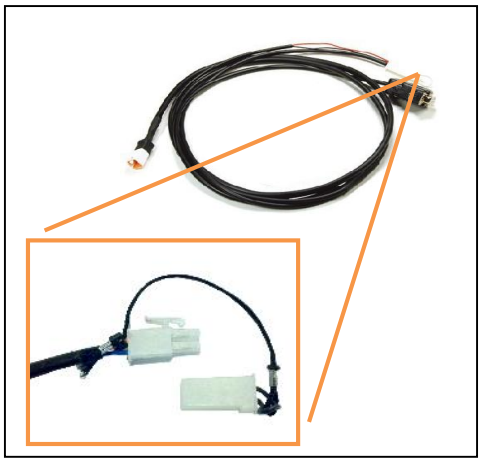


NOTE: if problems occur during this process DO NOT START THE ENGINE and check the correct connection between ECU and PC, the position of programming connector (chap. 6.2) and the communication port is set correctly (see chap. 2.2.2.1).

- At the end of programming, switch off ECU (removing auxiliary power or programming cable from ECU), and reconnect programming connector



Switch off the ECU (disconnect the programming connector or remove auxiliary power)



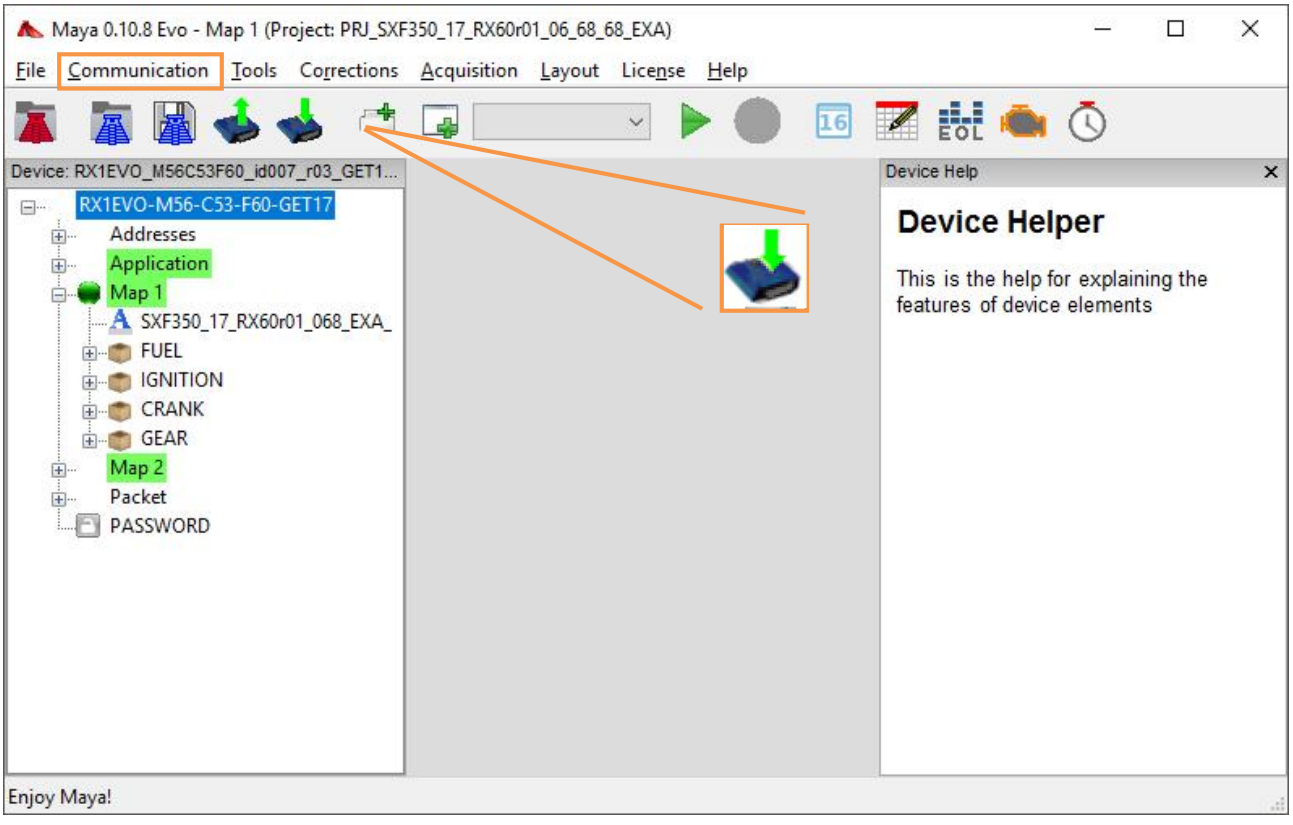
Disconnect programming connector

BEFORE REWRITING THE ECU MAKE SURE THAT MAP 1 AND MAP 2 INCLUDES DATA. IF EMPTY MAP IS SELECTED BY THE RIDER THE ENGINE COULD BE STOP RUNNING.

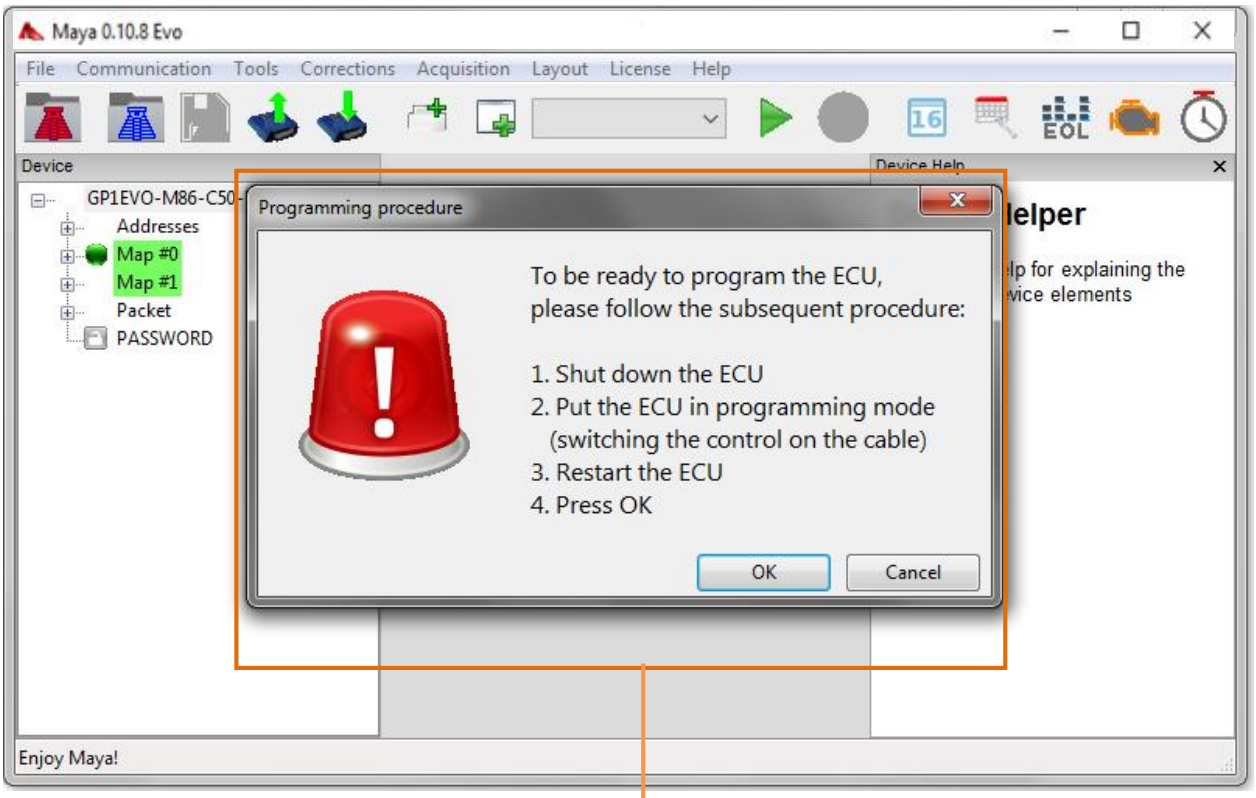
6.6.2 Transfer a engine map from Maya to RX1 (EVO-PRO) ECU

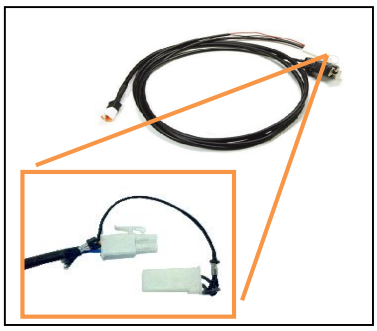
Maya must be on and maps need to be loaded

- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Click on **Download to ECU** (in **Communication**) or in the icon  in instrument bar**.**
  NOTE: if **Enable Hot keys …** are enabled you could press **F4**.

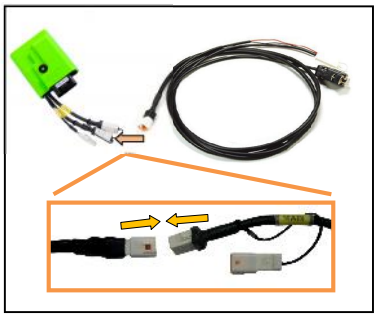


- Switch to “programming” the ECU following instructions given by **Maya**.





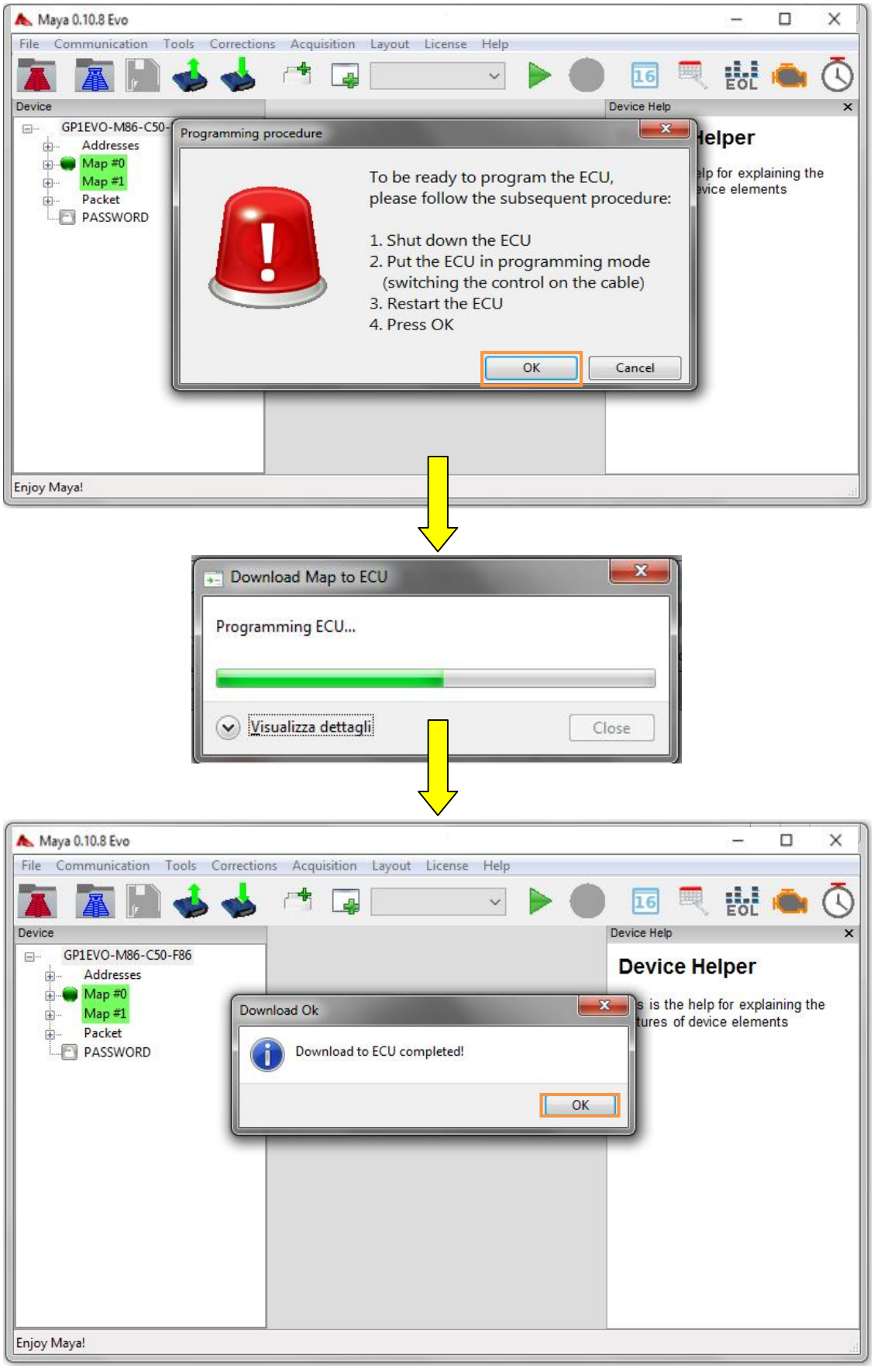
Disconnect programming connector and make sure that ECU has been powered



Connect programming cable to 'ECU

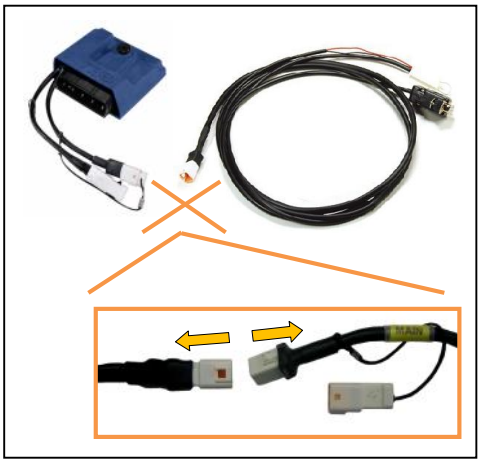
OK

- Push **Ok** to start programming and wait until end of operations.



NOTE: if problems occur during this process DO NOT START THE ENGINE and check the correct connection between ECU and PC, the position of programming connector (chap. 6.2) and the communication port is set correctly (see chap. 2.2.2.1).

- At the end of programming, switch off ECU (removing auxiliary power or programming cable from ECU), and reconnect programming connector



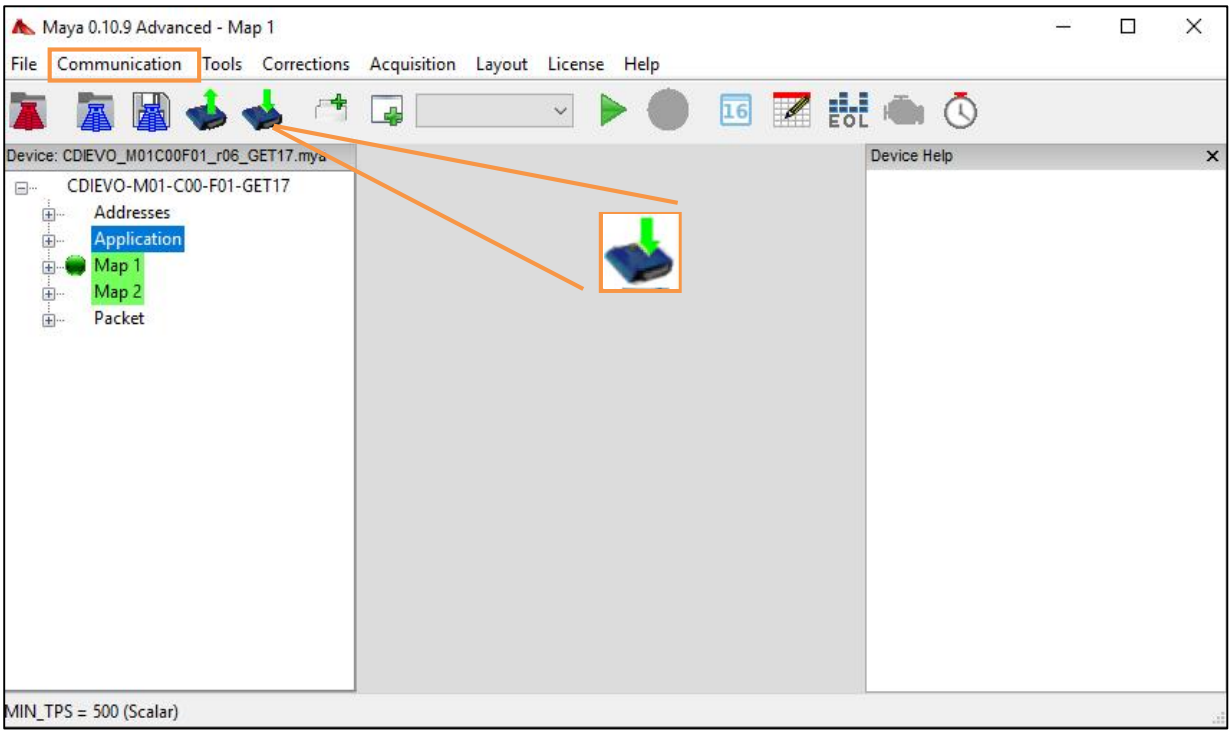
Disconnect the programming connector

	**BEFORE REWRITING THE ECU MAKE SURE THAT MAP 1 AND MAP 2 INCLUDES DATA. IF EMPTY MAP IS SELECTED BY THE RIDER THE ENGINE COULD BE STOP RUNNING.**

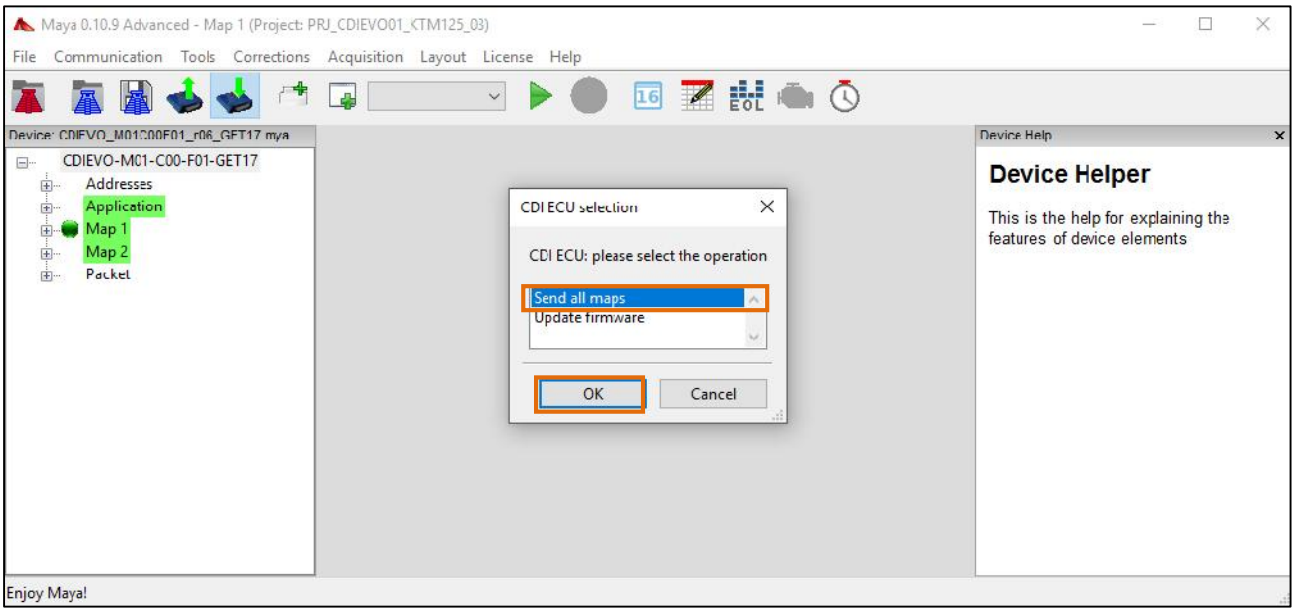
6.6.3 Transfer a engine map from Maya to CDI ECU

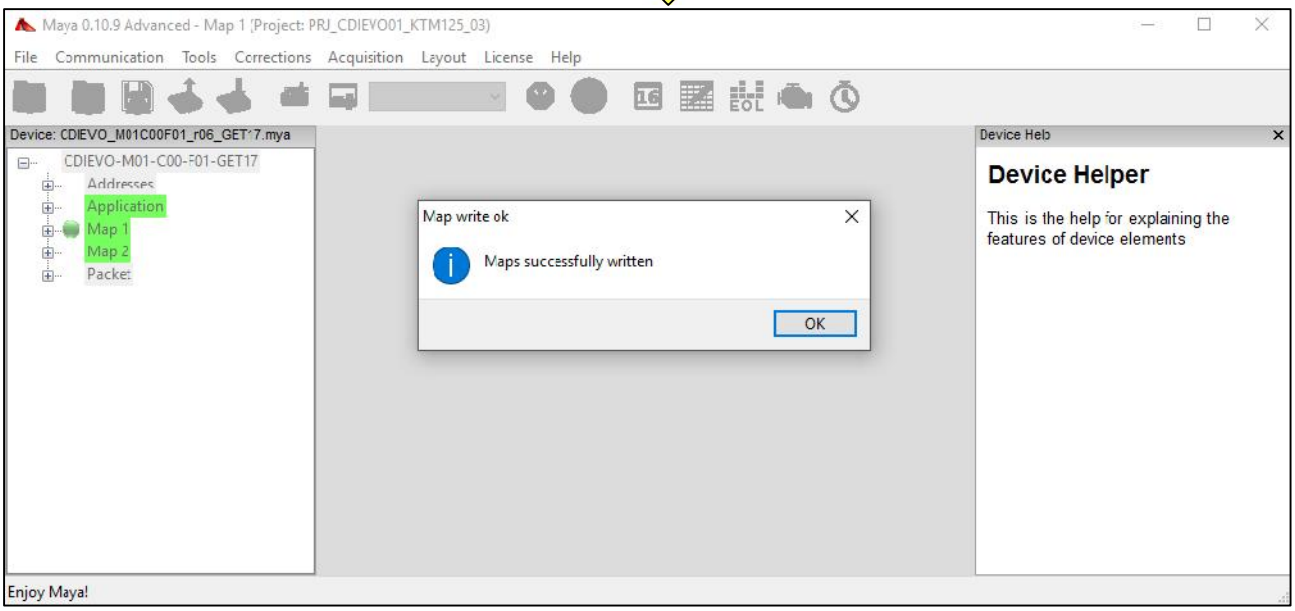
Maya must be on and maps need to be loaded

- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Click on **Download to ECU** (in **Communication**) or in the icon  in instrument bar**.**
  NOTE: if **Enable Hot keys …** are enabled you could press **F4**.



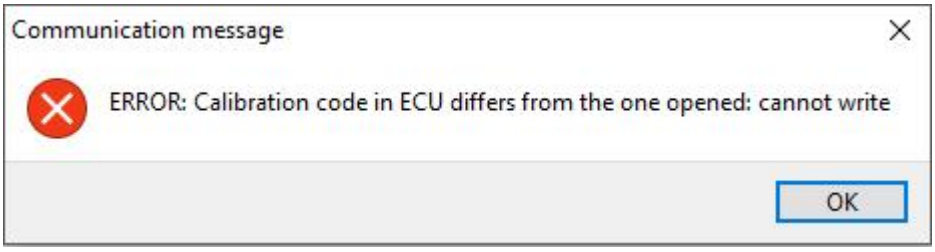
- Select **Send all maps** and press **OK.** Wait until programming has been finished.





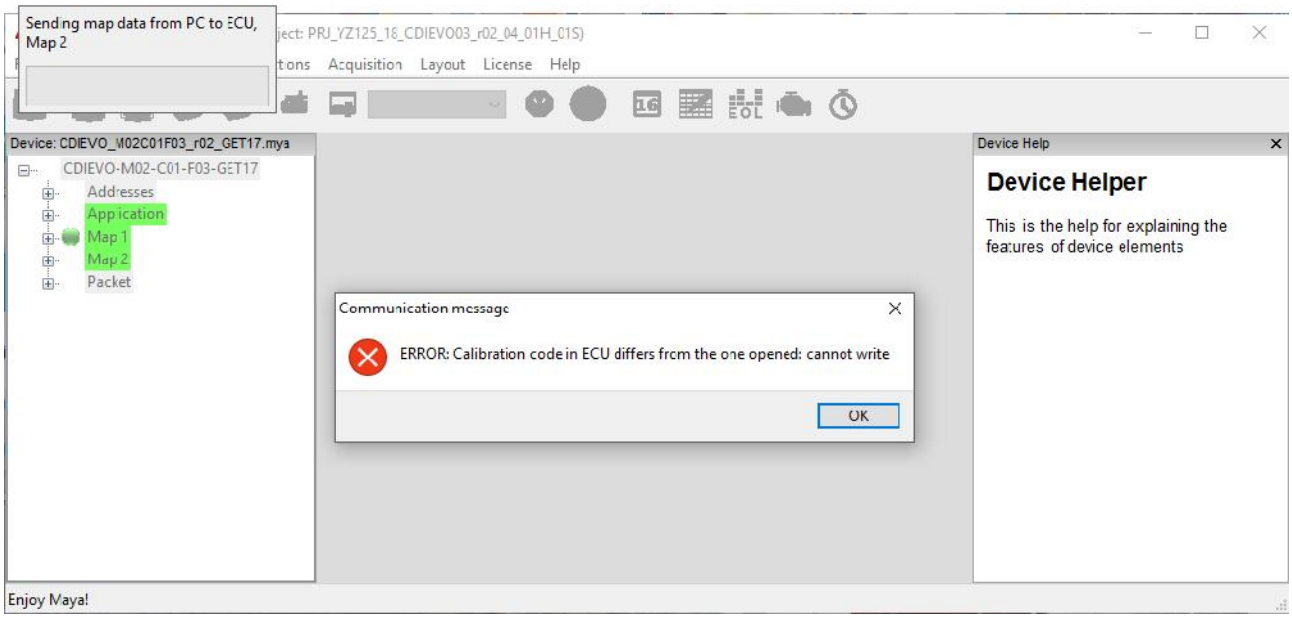
- Disconnect ECU programming cable and start engine.

IF MESSAGE BELOW IS DISPLAYED,DEVICE FILE AND MAPS ARE WRONG (IN THIS CASE REFER TO CHAPTER 6.1) OR FIRMWARE UPDATE IS NEEDED (SEE NEXT CHAPTER).



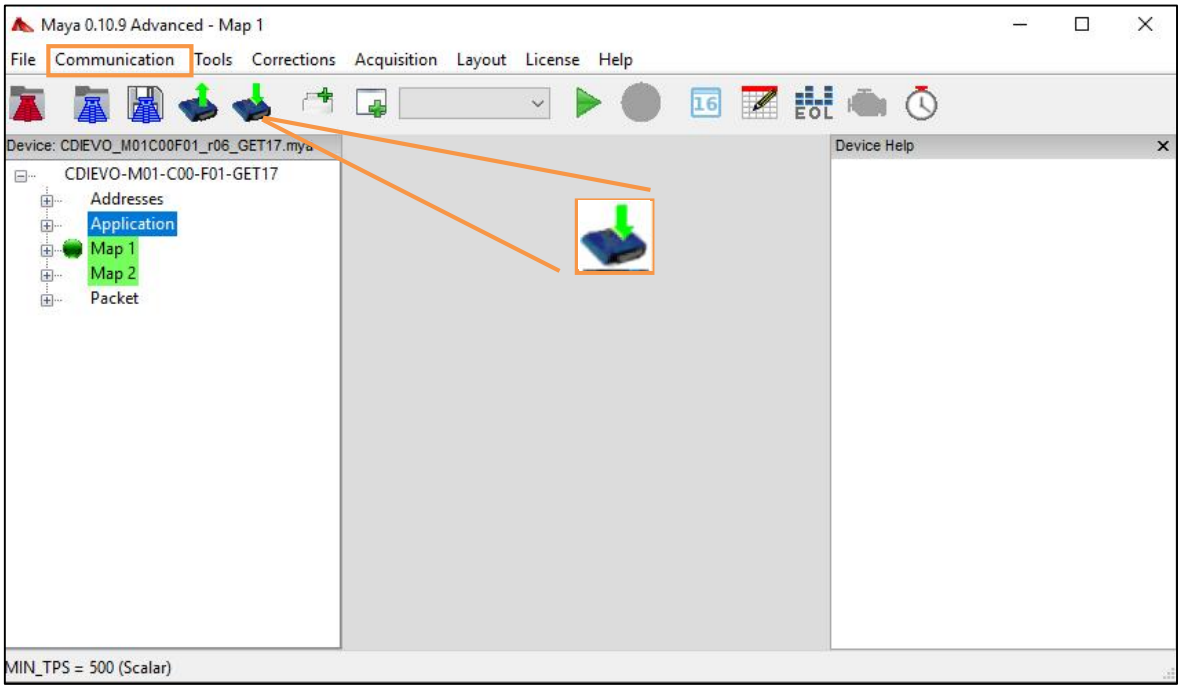
6.6.3.1 Update firmware on CDI ECU

CDI ECUs can be updated by **Maya**.
Start update only **if you're sure that loaded device and maps files are suitable for connected ECU, and picture below is displayed when you're trying to update maps**.

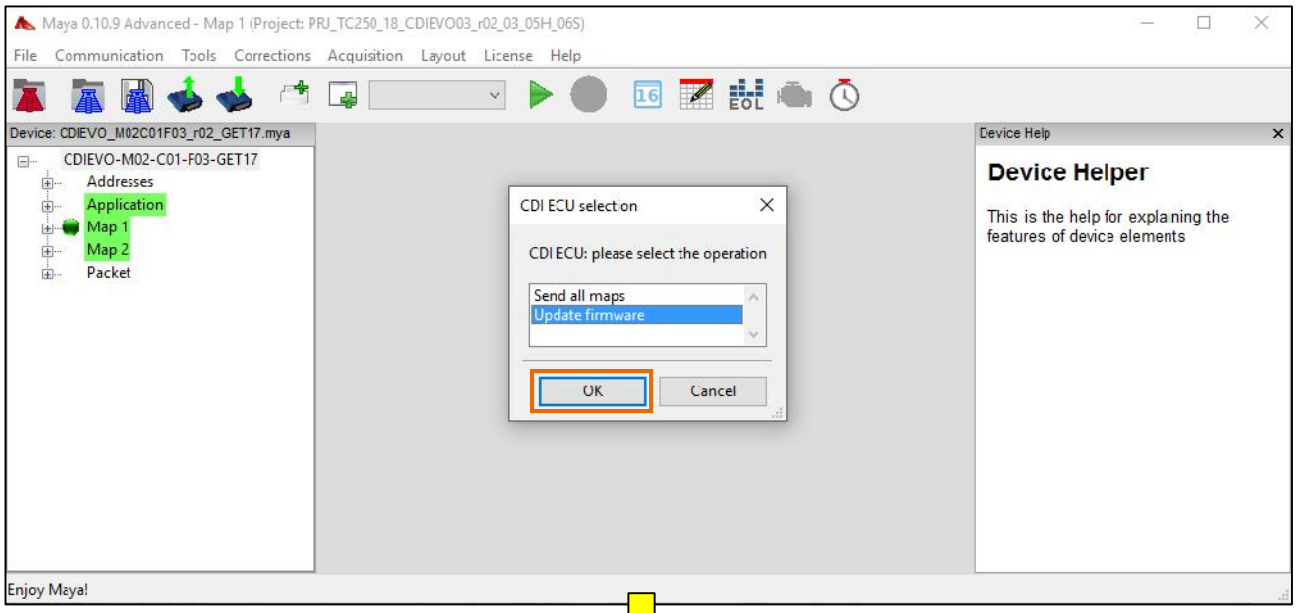


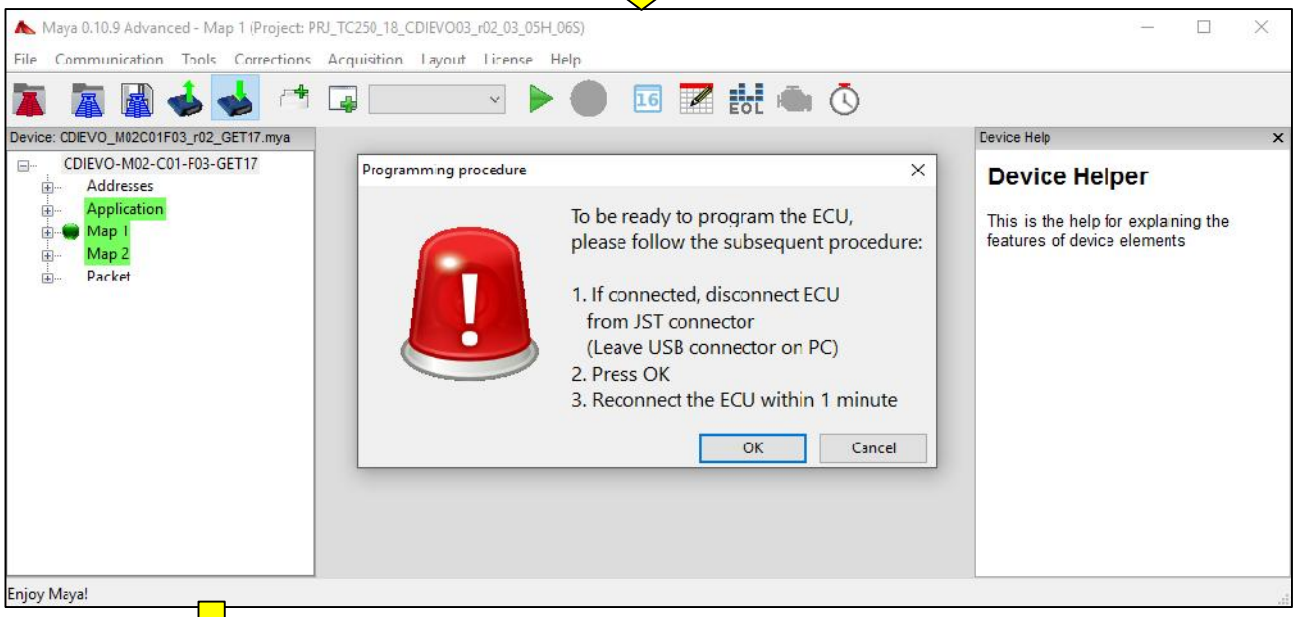
Proceed as follows:

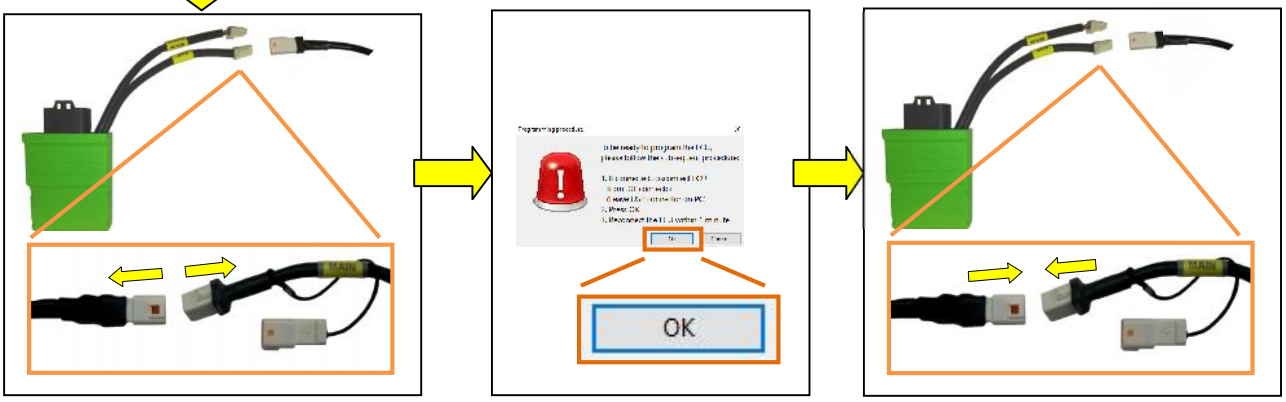
- Make sure that ECU has been connected to PC (see chapter **6.2**).
- Click **Download to ECU** in **Communication** menu or in the icon  in **Maya** toolbar**.**
  NOTE: : if **Enable Hot keys …** are enabled you could press **F4**.



- Select **Update firmware** and press **OK.** Follow displayed instructions:

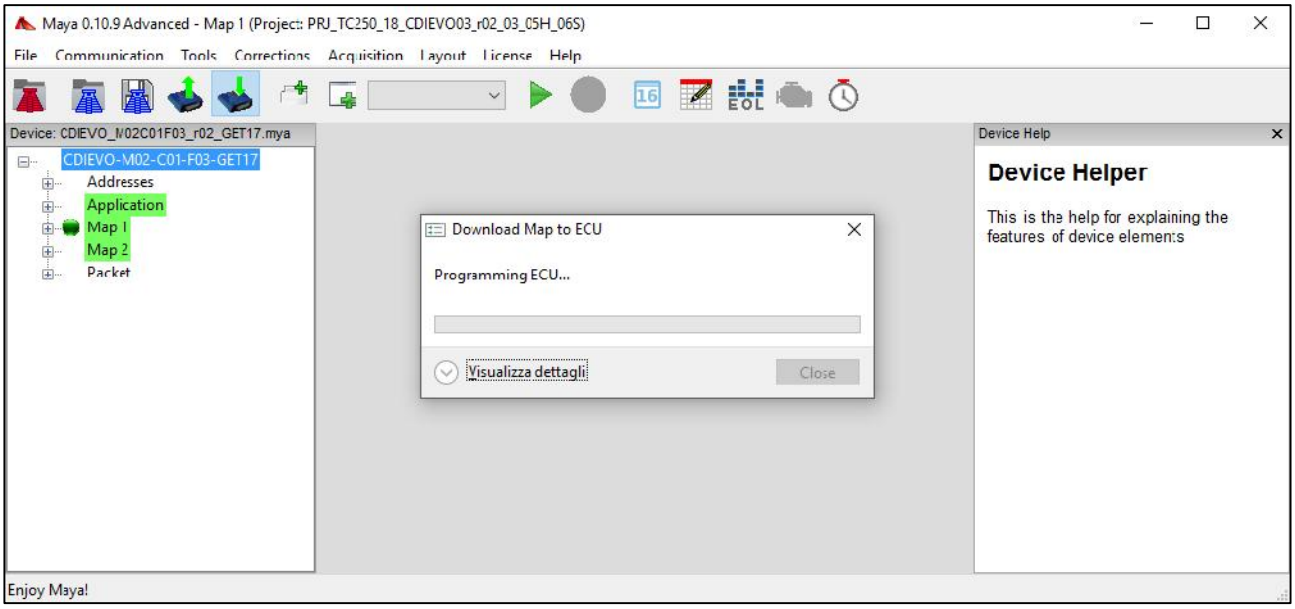




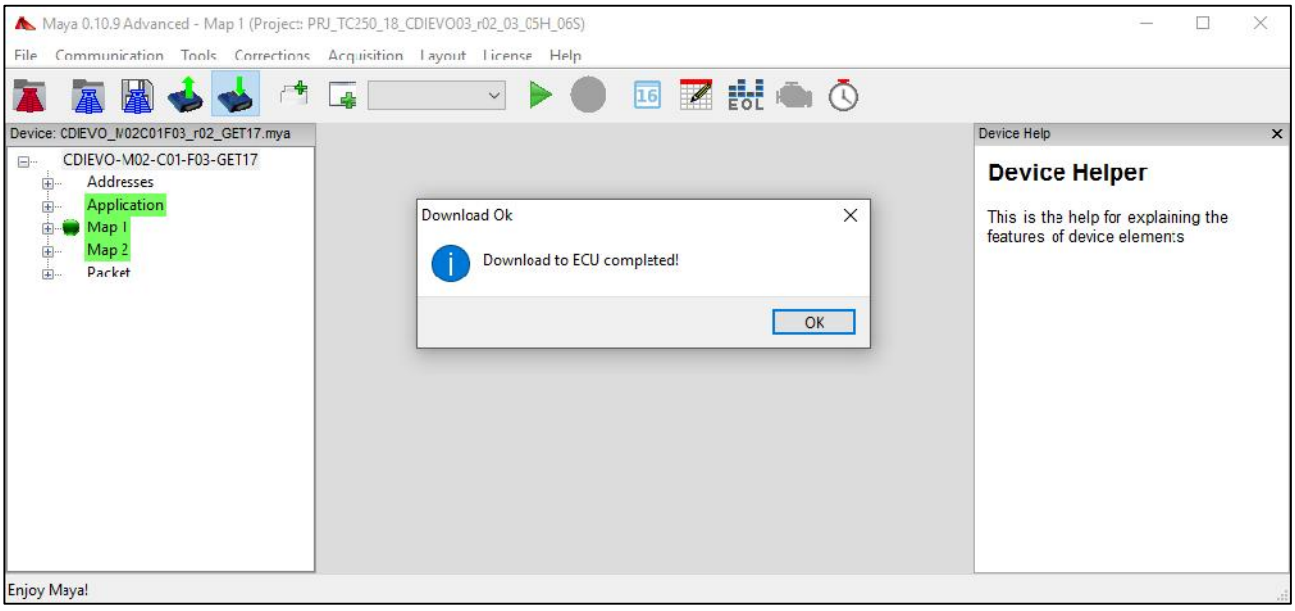


Disconnect programming cable | Press **OK** button | Reconnect programming cable

- When ECU has been reconnected firmware update will start:



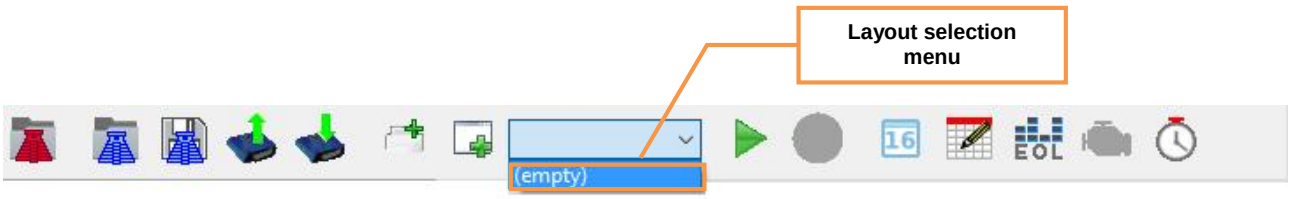
- At the end of update following message will be displayed:



NOW UPLOAD MAPS AS INDICATED IN PREVIOUS CHAPTER

6.7 Customize Maya aspect

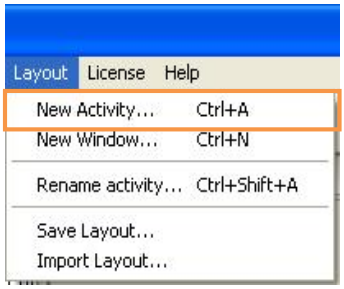
It is possible to customize **Maya** aspects.
After defining desired **layout**, it is suggested to select **Device, maps and layout** in **Preferences** of **Maya** (see chapter **3.1.1.1**). Vice versa, it will be necessary to load customization manually, both in **Activity** and other additional windows.

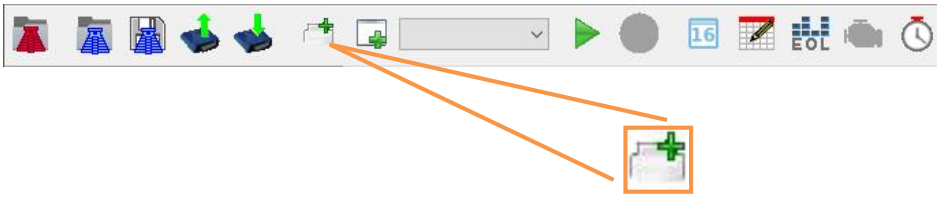


6.7.1 Activity area customization

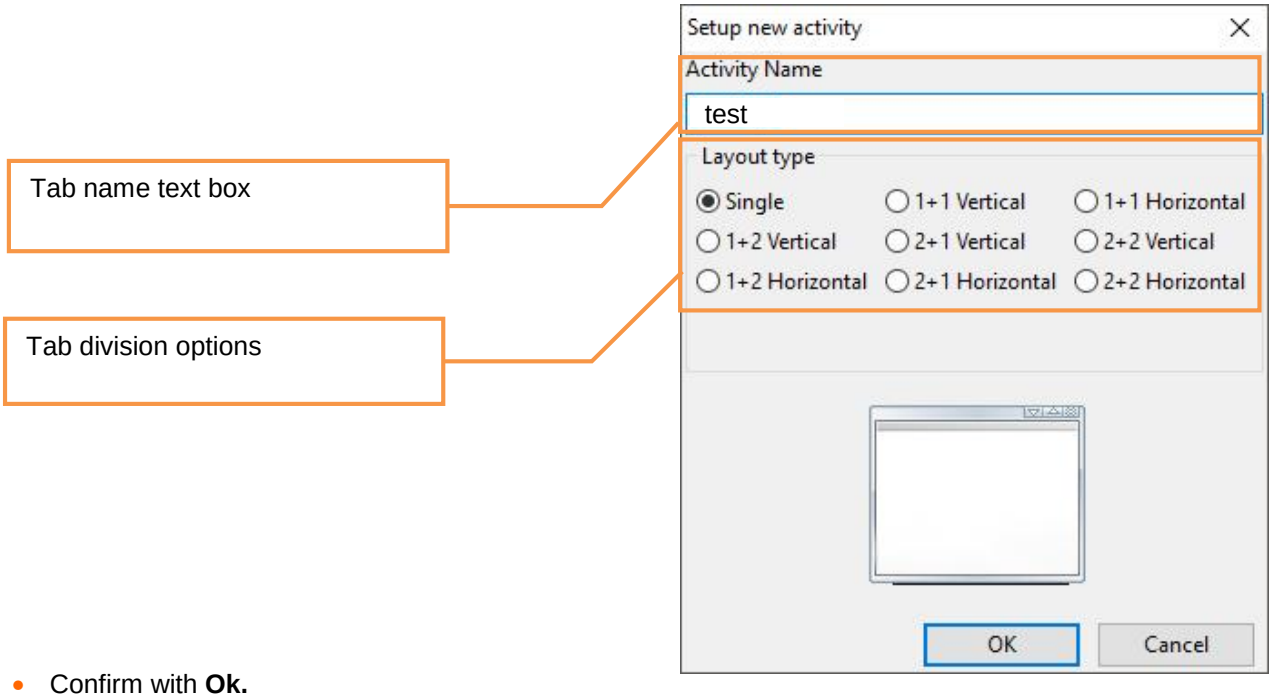
You could add a custom tab in **Activity** of **Maya**:

- Select **New Activity** (in **Layout** menu) or in the icon 
  In instrument bar.
  NOTE: if **Enable Hot keys …** are enabled you could use **CTRL+A**.



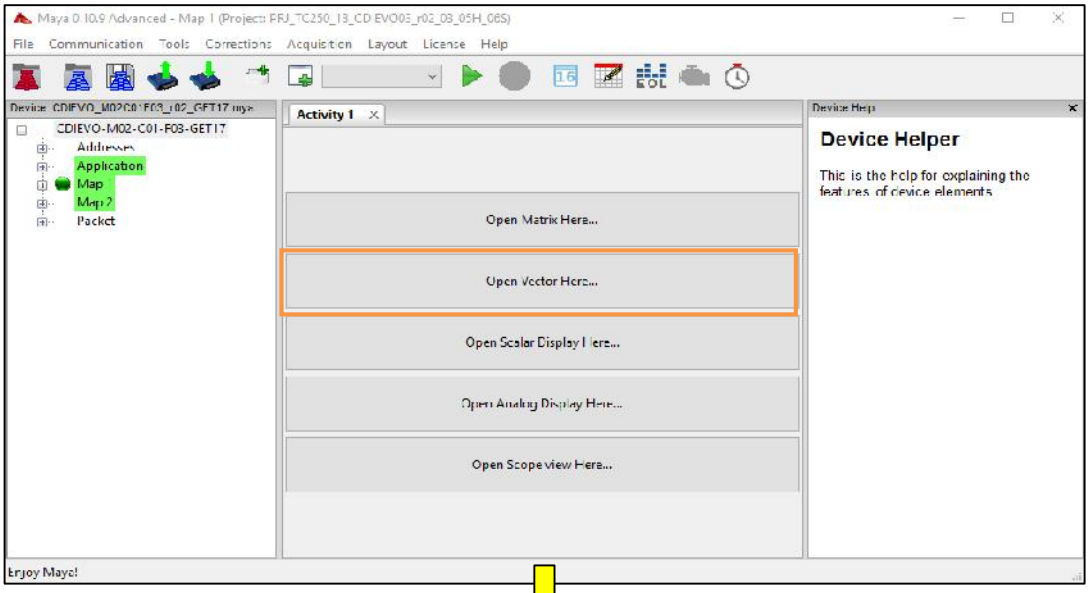


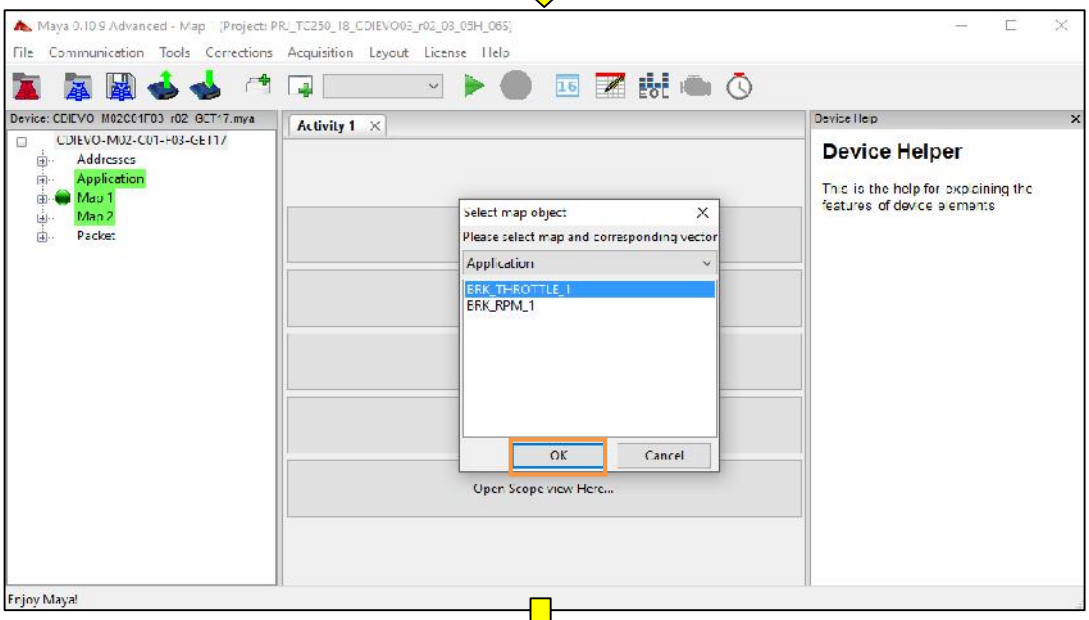
- Type a name (in text box) and desired division in new tab with options in **Setup new Activity.**

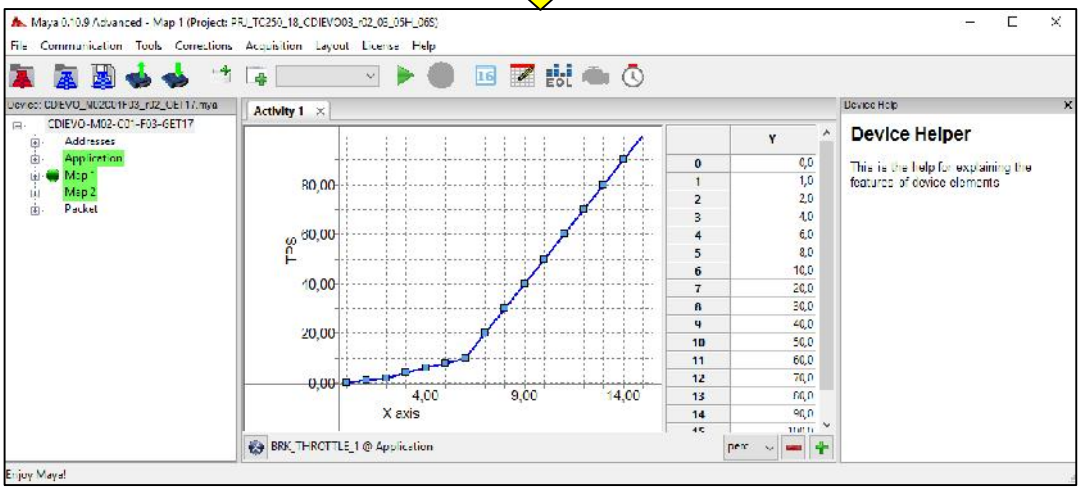


- Confirm with **Ok.**

- Select object (or objects) to visualize in new tab: Maya will guide the user through the selection of objects available for **device**.
  WARNING: IF YOU SELECT VECTORS OR MATRIX THESE WILL BE VISUALIZED RELATED TO ACTIVE MAP IN DEVICE TREE



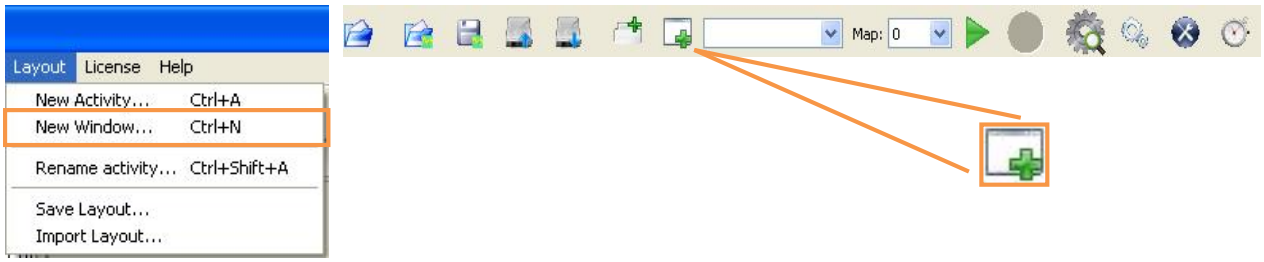




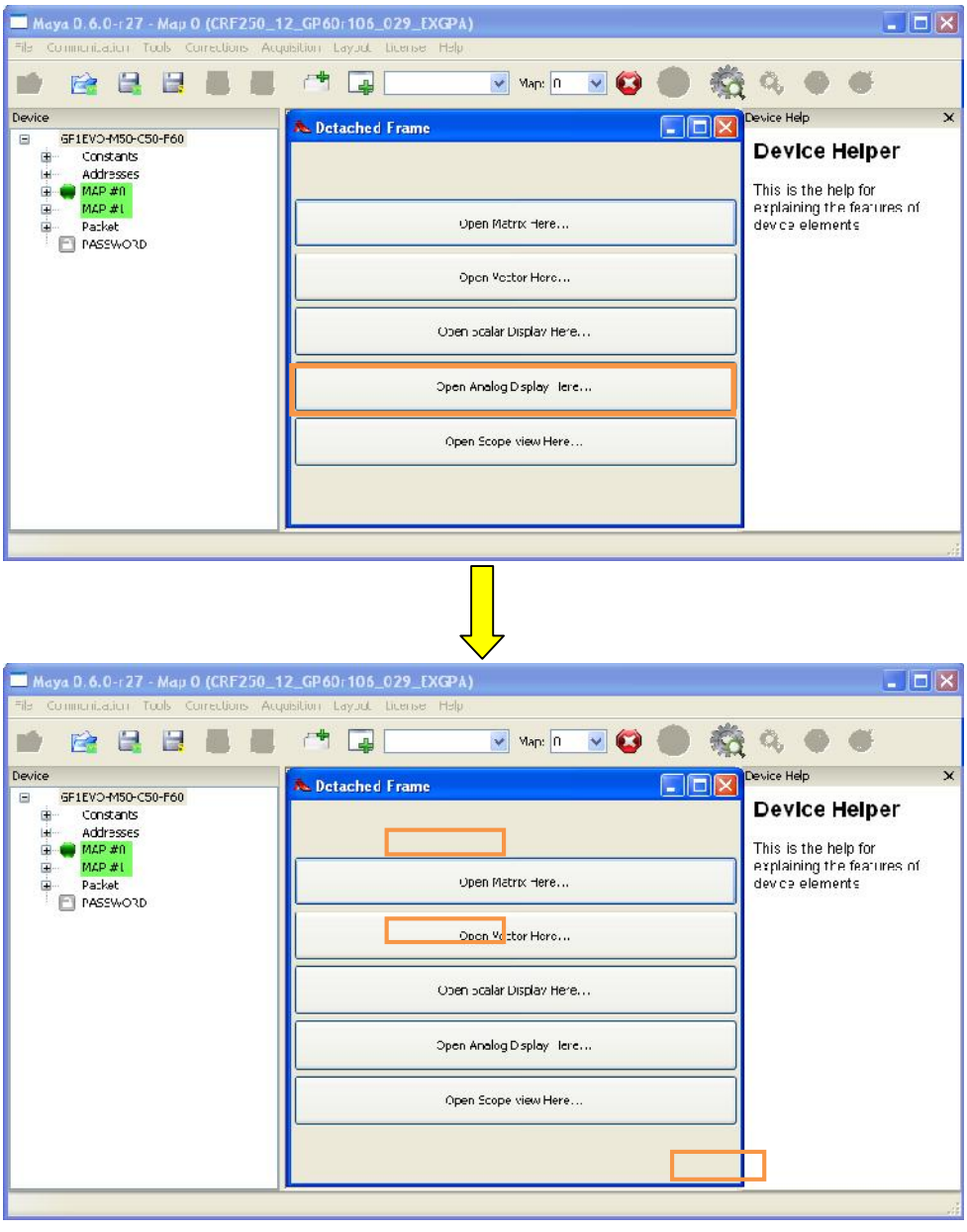
6.7.2 Customization of Maya by adding a window

To add a window follow these instructions:

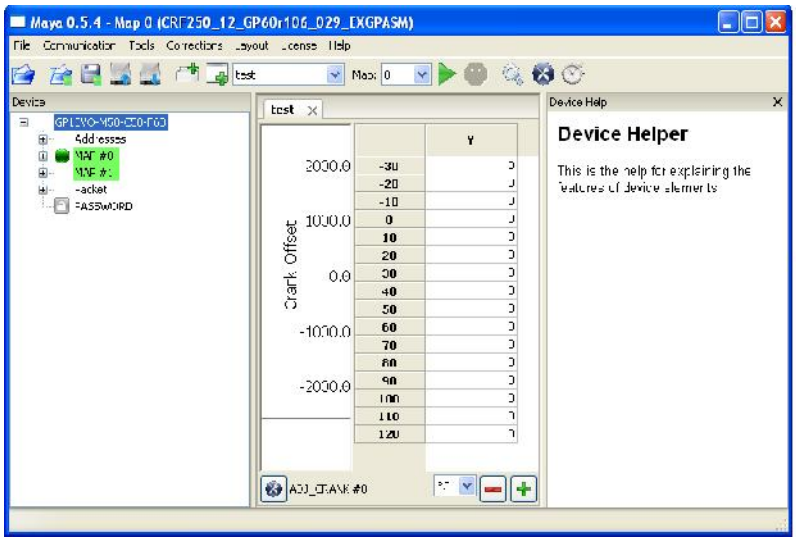
- Select **New Window** (in **Layout**) or click 
  In instrument bar.
  NOTE: if **Enable Hot keys …** is enable you could use **CTRL+N**.

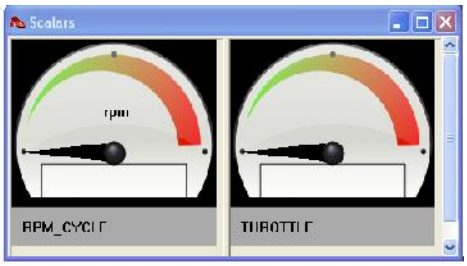


- Select the type of object to visualize (in our example Analog Display). Select which object you want to visualize (in our example **RPM_CYCLE** and **THROTTLE**). Confirm with **Ok**.



- The new window is not linked with the main window in **Maya** and it could be moved.



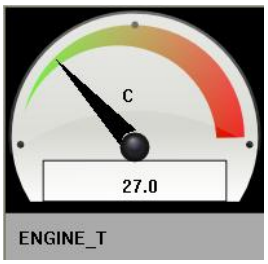


6.7.3 The MAYA gauges

Maya you could visualize channel both graphically and numerically. Gauges could be in **Activity** area or in a separated view.

6.7.3.1 Analog display

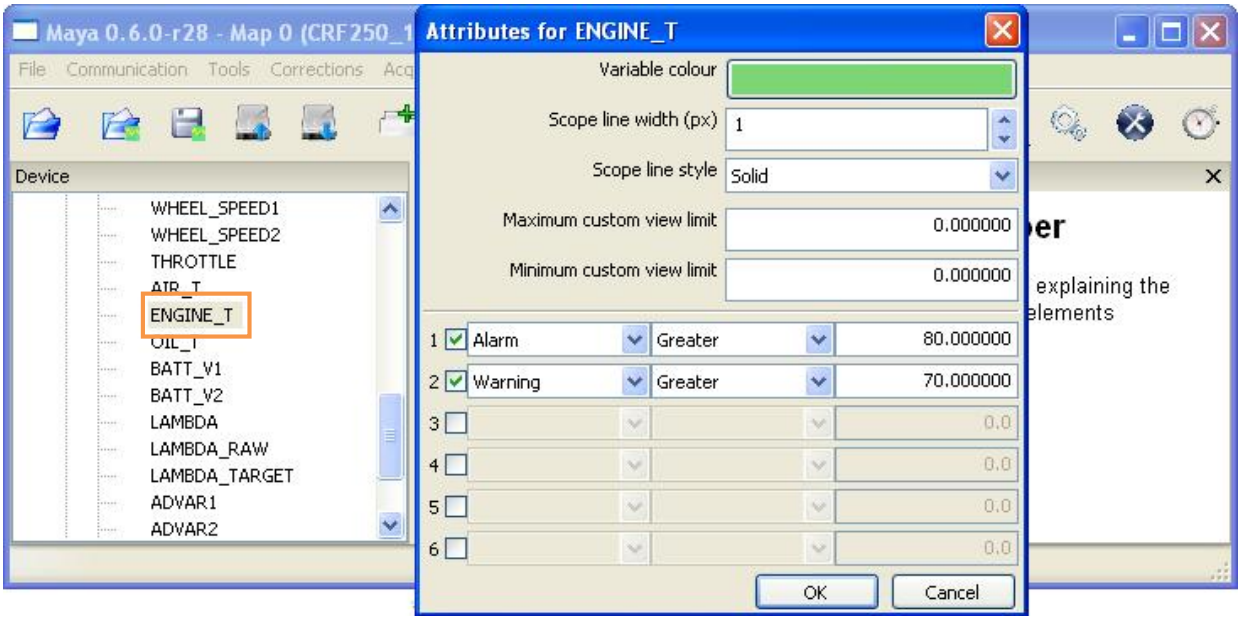
Analog Display are graphical visualization in **Maya**.



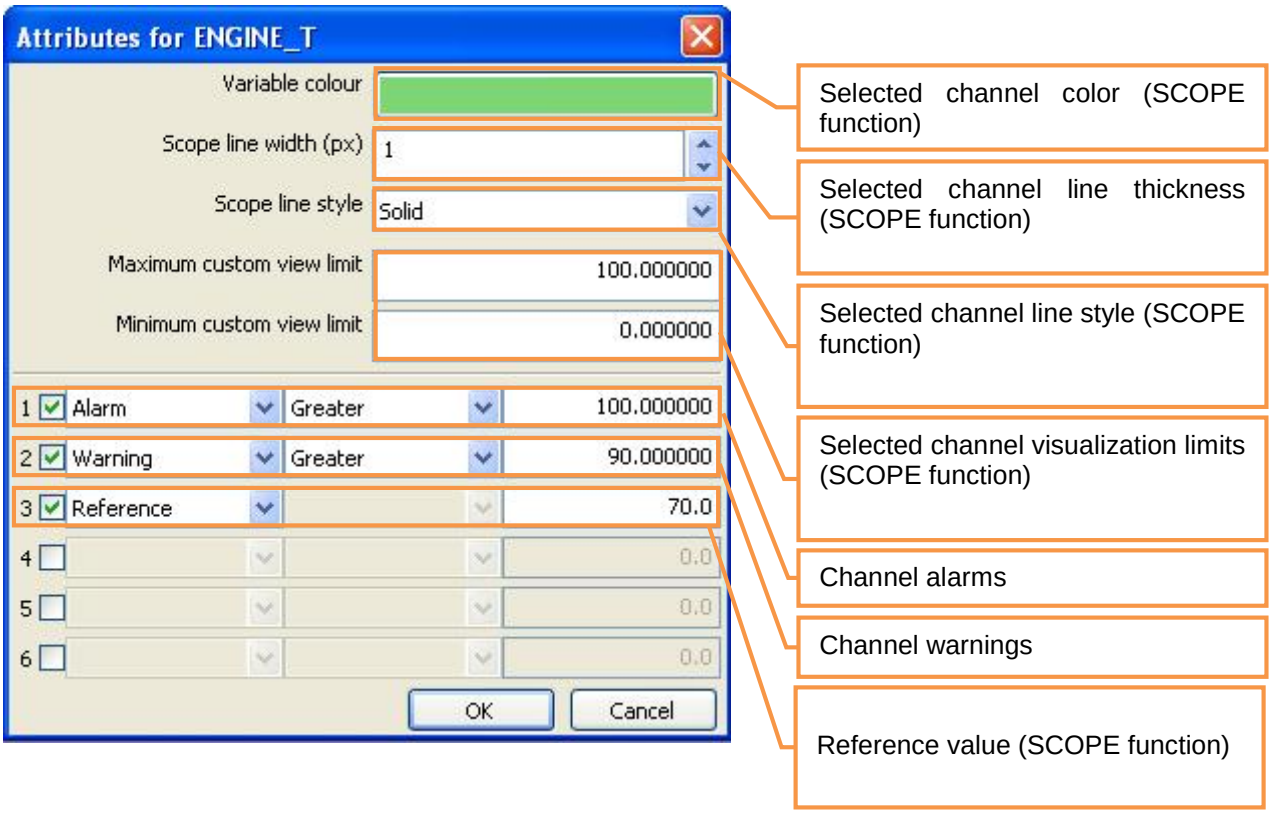
These gauges could be viewed in **Activity** area in Maya or in an independent window.
Their visualization could be modified using **Packet** properties in loaded device (see **4.1.4**).
With the modification of scalar you could set alarm threshold, pre-alarms and reference during real time visualization of EC parameters.
WARNING: THE NUMBER OF PARAMETERS IS DEPENDENT TO LICENCE.

If you modify properties read following instruction:

- Start Maya with double click on the icon
- Connect ECU to PC (chapter **6.2**).
- Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTA: if any device is loaded it is necessary yo load one (see chapter **6.1**).
- Expand **Packet** tree and double click on desired voice: a window of the channel will appear.

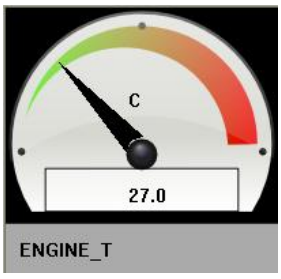


- In property window you could set color (only for SCOPE function), line thicknesses (only for SCOPE function), line style (only for SCOPE function), visualization limits (only for SCOPE function) and alarms (alarms and prealarms with threshold). It is possible to define a value for each channel (only for SCOPE function).

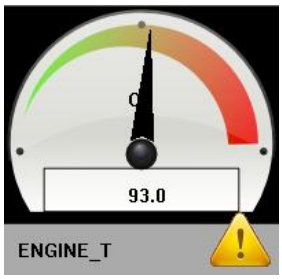


NOTE: to activate alarms threshold, prealarm and reference it is necessary to select the cell beside of the row.
Alarm and **Warning** enable the condition that define the event:
None: no alarms or warnings
Greater or Equal: alarm or warning is enabled when the channel value is equal or greater than a specified value
Greater: alarm or warning is enabled when the channel value is greater than a specified value
Equal: alarm or warning is enabled when the channel value is equal to a specified value
Lower: alarm or warning is enabled when the channel value is lower than a specified value
Lower or Equal: alarm or warning is enabled when the channel value is equal or lower than a specified value

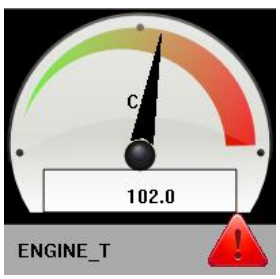
- close the window by click on **OK**. If the visualization is set to **Analog display** (ad discussed in previous chapter with **ECU connected to PC**) and the button is pressed, the result is the one in the pictures below:



Channel below thresholds



Warning

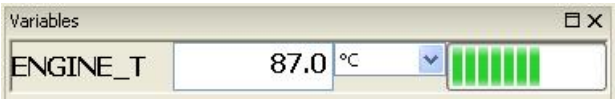


Alarm

6.7.3.2 Scalar display

Scalar Display are numeric visualization of scalars in **Maya**.

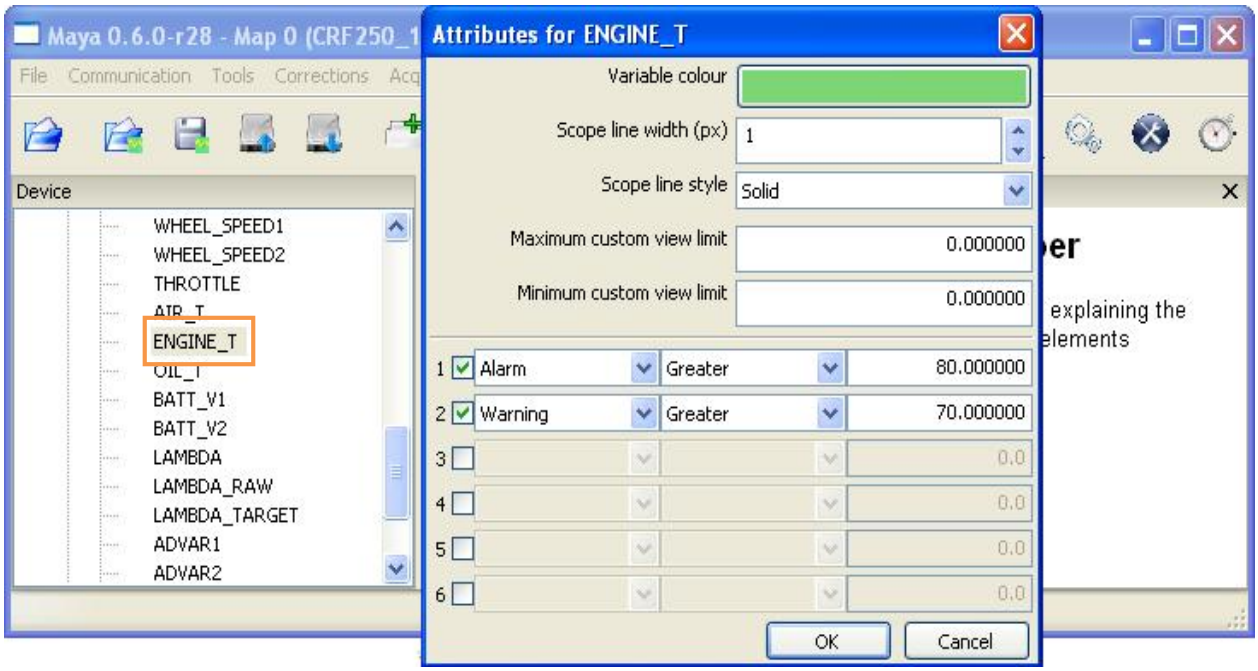
From procedures explained previously, these visualization can be seen inside **Activity** area or in an independent window.



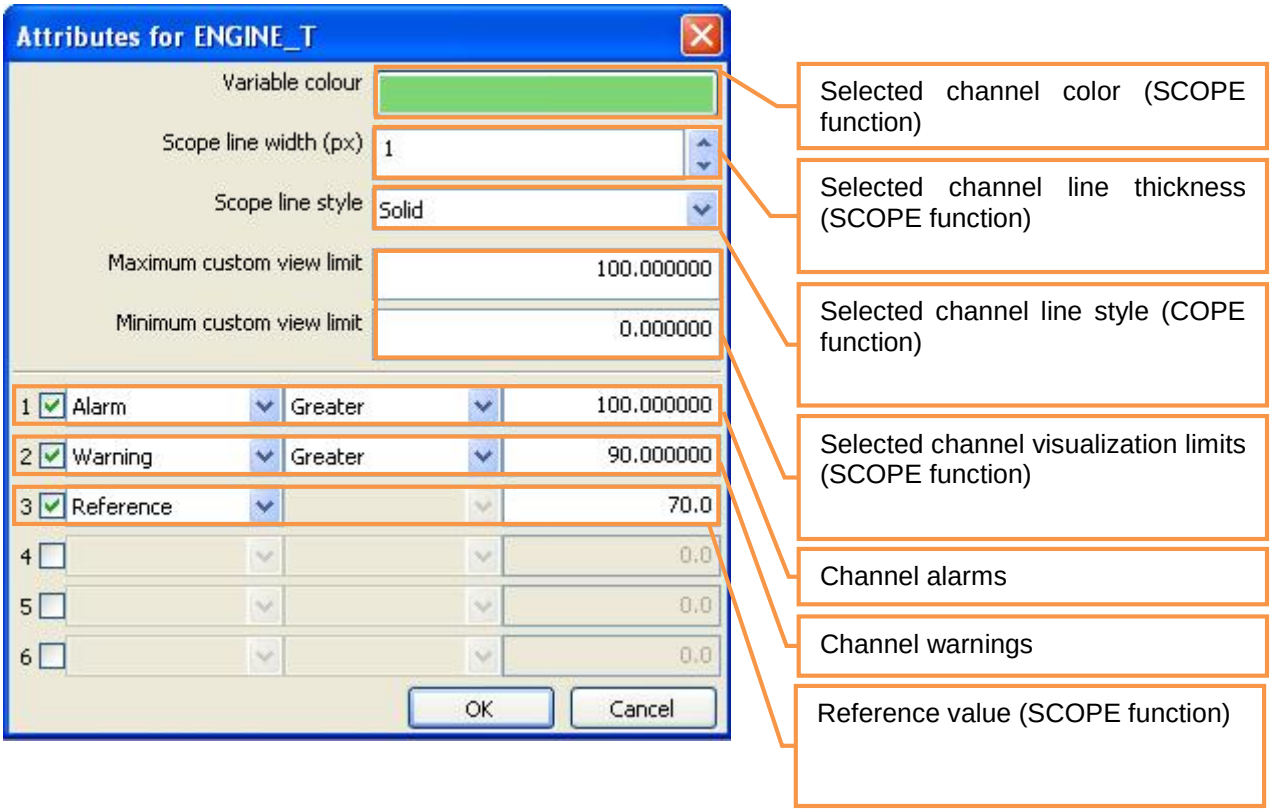
The visualization could be customized using property in **Packet** of loaded device (see **4.1.4**).
You could set alarm thresholds, warning threshold during real time monitoring of ECU connected to PC.
Warning: the number of visualized parameters could vary accordingly to loaded device and **Maya** licence.

If you need to customize visualization follows these instructions:

- Start **Maya**
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if any device is loaded it is necessary to load one (see chapter **6.1** and **5.0**).
- Expand **Packet** tree and double click on desired voice: a window of the channel will appear.



- In property window you could set color (only for SCOPE function), line thicknesses (only for SCOPE function), line style (only for SCOPE function), visualization limits (only for SCOPE function) and alarms (alarms and prealarms with threshold). It is possible to define a value for each channel (only for SCOPE function).

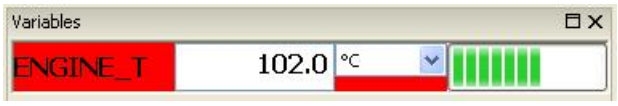


NOTE: to activate alarms threshold, prealarm and reference it is necessary to select the cell beside of the row.
Alarm and **Warning** enable the condition that define the event:
None: no alarms or warnings
Greater or Equal: alarm or warning is enabled when the channel value is equal or greater than a specified value
Greater: alarm or warning is enabled when the channel value is greater than a specified value
Equal: alarm or warning is enabled when the channel value is equal to a specified value
Lower: alarm or warning is enabled when the channel value is lower than a specified value
Lower or Equal: alarm or warning is enabled when the channel value is equal or lower than a specified value

- Close the window by click on **OK**. If the visualization is set to **Analog display** (ad discussed in previous chapter with **ECU connected to PC**) and the button is pressed, the result is the one in the pictures below:

Channel within limits

Channel warning

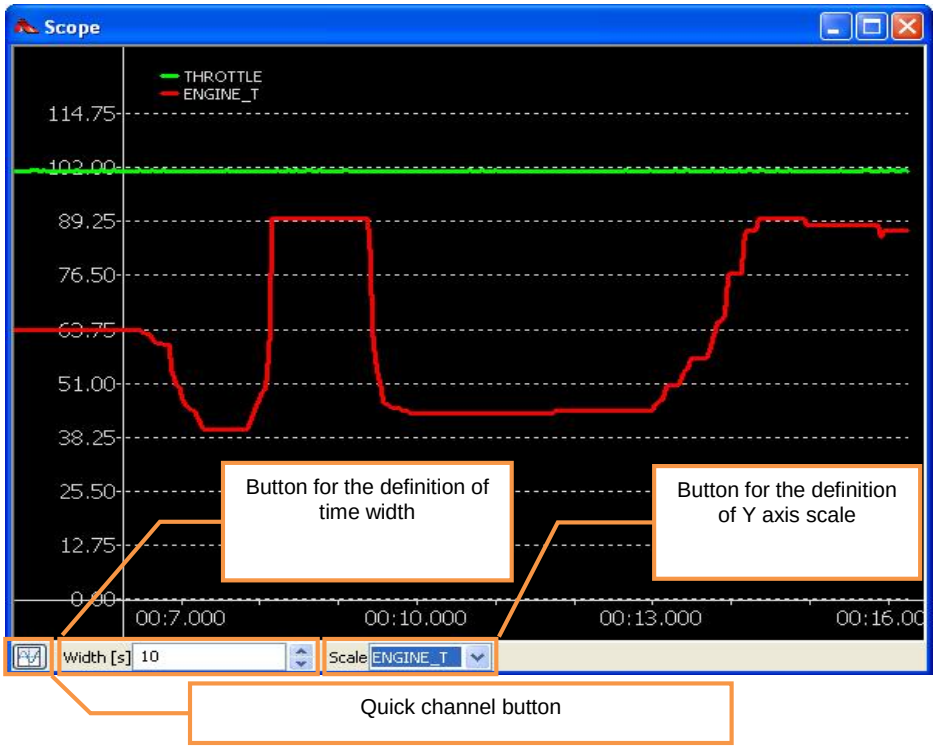


Channel alarm

6.7.3.3Scope (only ADVANCE licence)

With **Scope** in **Maya** you could visualize components of **Packet device** as a time linear graph.

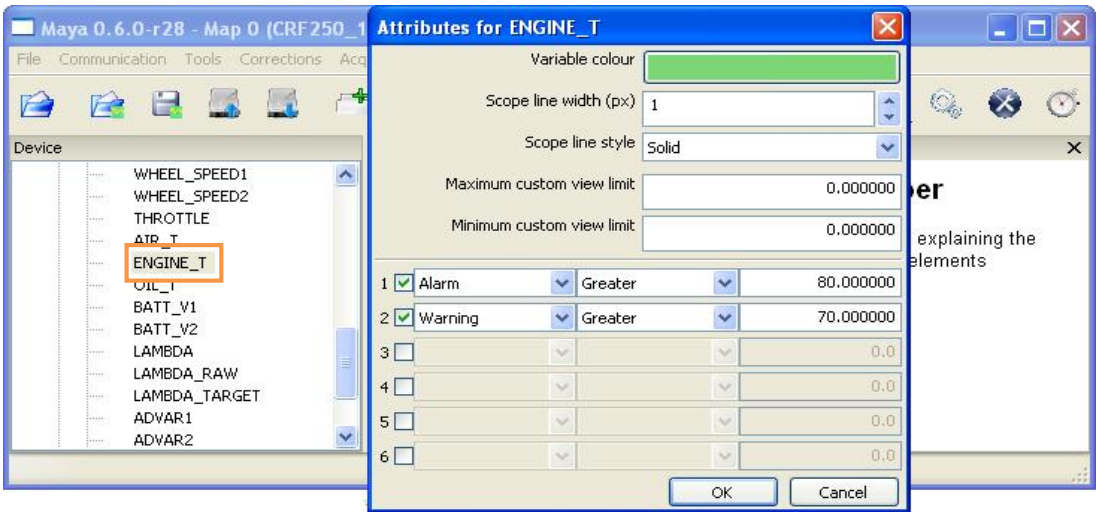
Update of values is continuous and you could visualize live the engine parameters.
SCOPE, as **Analog Display** and **Scalar Display**, could be visualized in **Activity** of **Maya** or in a separate window.
Selection modes are the same of **Analog** and **Scalar** with some small differences.
With **SCOPE** you could select the width of visualization (**Width**) and the channel to set the Y origin in the graph (**Scale**).
Scalar visualization could be customized as seen in **4.1.4**.



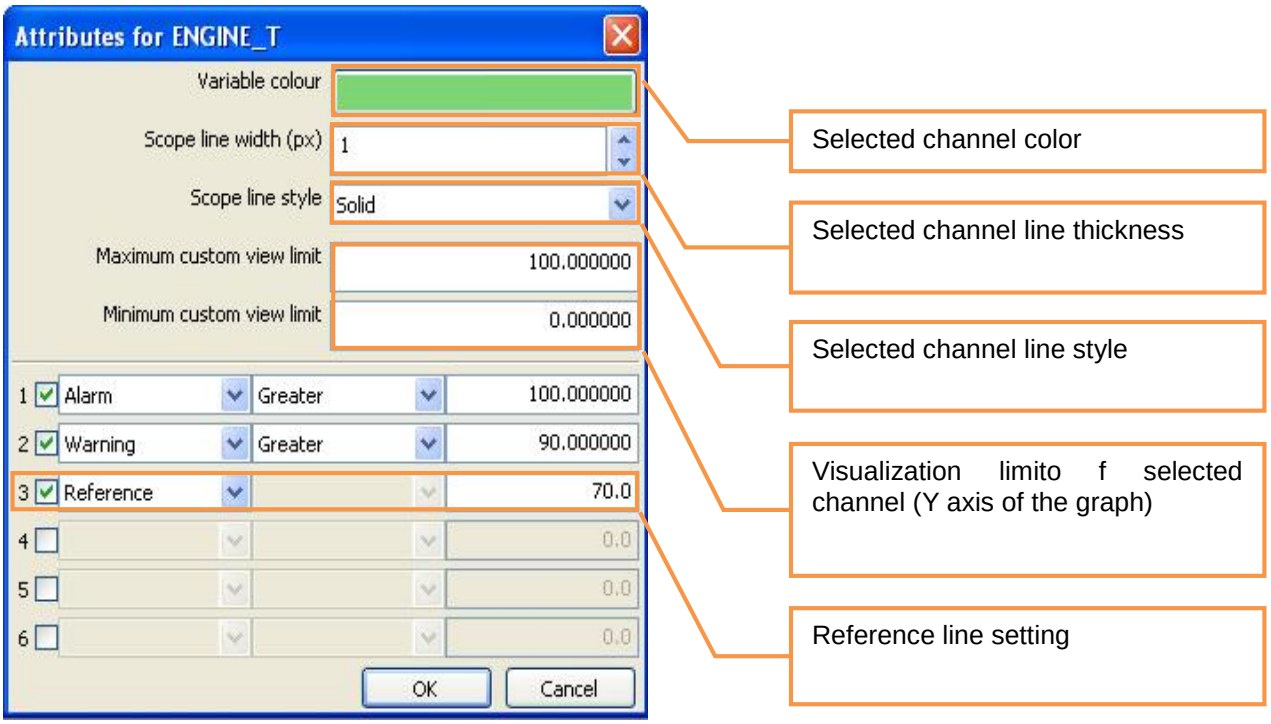
You could set alarm thresholds, warning threshold and reference value during real time monitoring of ECU connected to PC.
Warning: the number of visualized parameters could vary accordingly to loaded device and **Maya** licence.

If you need to customize visualization follows these instructions:

- Start Maya with double click on the icon
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Load a device (if necessary) and check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if any device is loaded it is necessary to load one (see chapter **6.1**).
- Expand **Packet** tree and double click on desired voice: a window of the channel will appear.

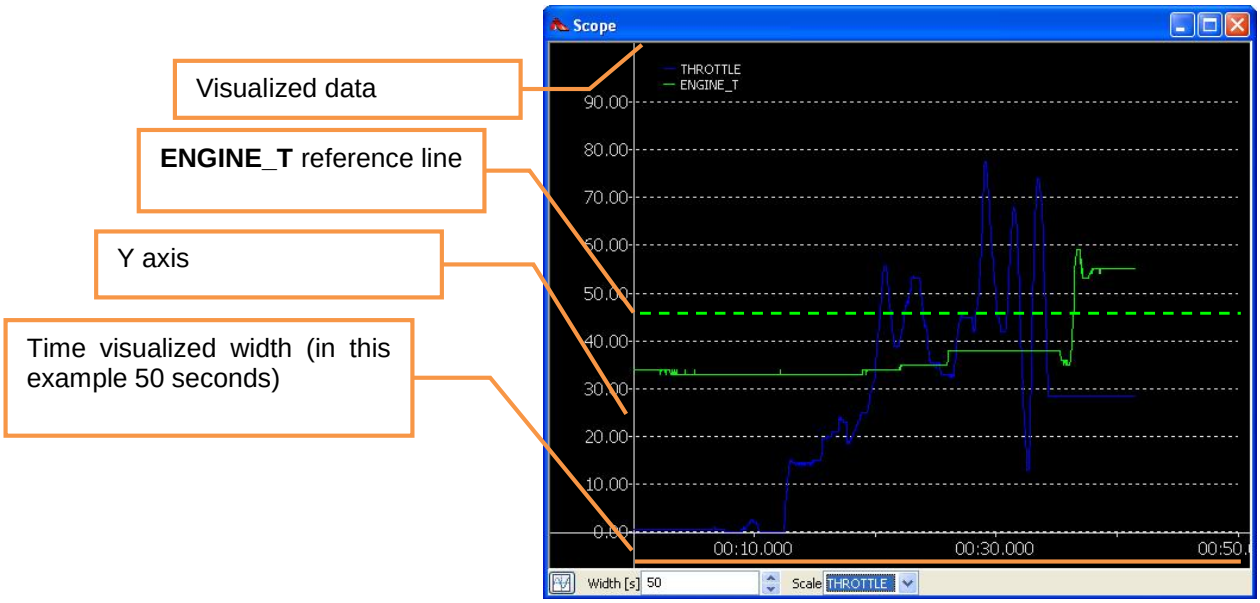


- In property window you could set colour (**Variable colour**), line thickness (**Scope line width**), style of the line (**Scope line style**), visualization limit (**Maximum custom view limit** and **Minimum custom view limit**). Alarms and warnings are not included in **SCOPE** (but can be seen with **Analog** and **Scalar display**). It is possible to define a reference value (using **Reference** in channel properties).



NOTE: to activate alarms threshold, prealarm and reference it is necessary to select the cell beside of the row.
With **Scope line style** you could set graph aspect:
Solid: solid line
Long dashed: long dash line
Short dashed: short dash line
Dotted: dotted line
Dot-dash: dot-dash line

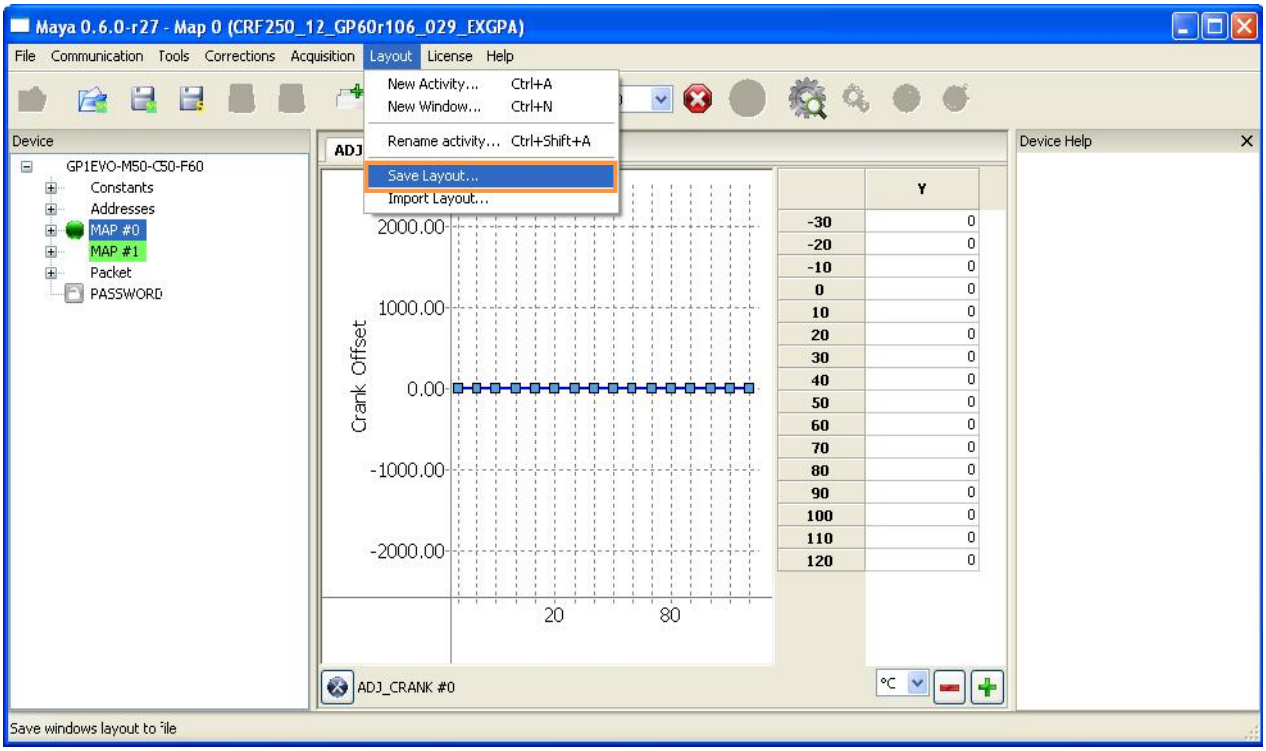
- Close the window by click on **OK**. Activate **SCOPE** function in **Activity** area or in a separated window (see chapter **6.7.1** and **6.7.2**) and channels just set (as described previously with **ECU connected with PC**). Push ▶ (live visualization); select, for example, Engine Temp and Throttle position the result will be similar to this:



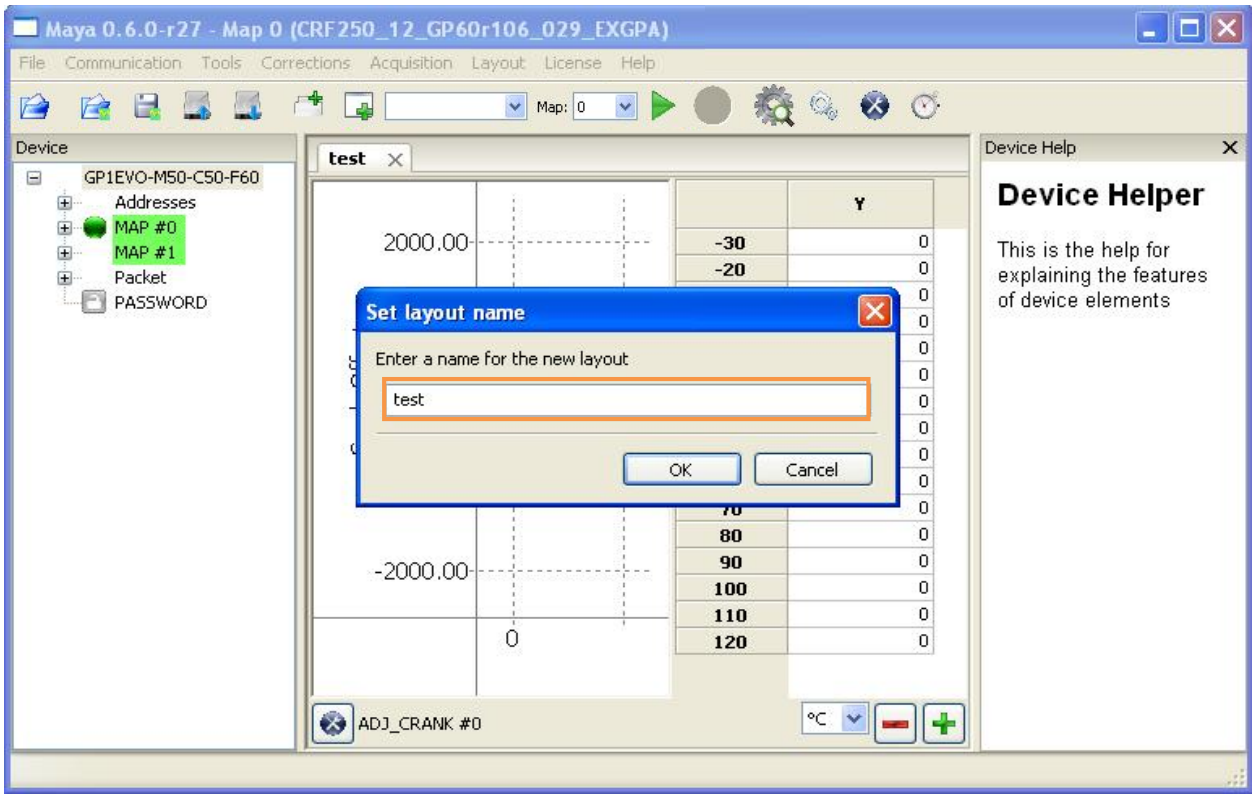
6.7.4 Saving a custom Layout

You could need to save the defined Layout.
It is suggested to make all changes and after this save the Layout.

- Save new layout by click on **Save Layout…** in **Layout** menu.

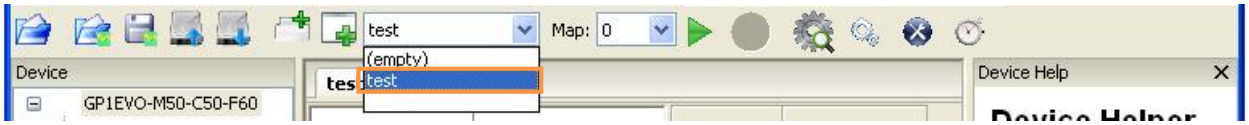


- Rename to the new **Layout** to save in the defined folder (**Layout** of **MayaWorkspace**).



NOTE: if you modify a custom layout Maya will ask again the name before saving.

- Select **Layout** just created in drop menu **Select Menu** (**Maya** will load this layout at the next starting).



6.8 Real time view for Engine parameter

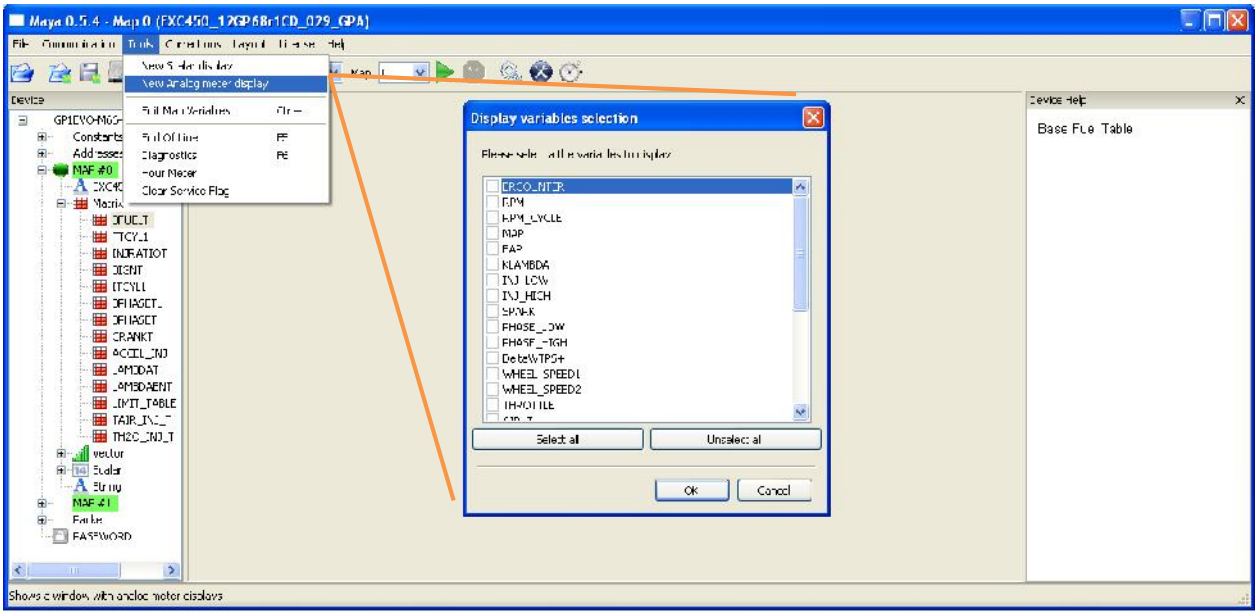
Real Time View is available in two modes:

- **Analog meter Display**
- **Scalar Display**

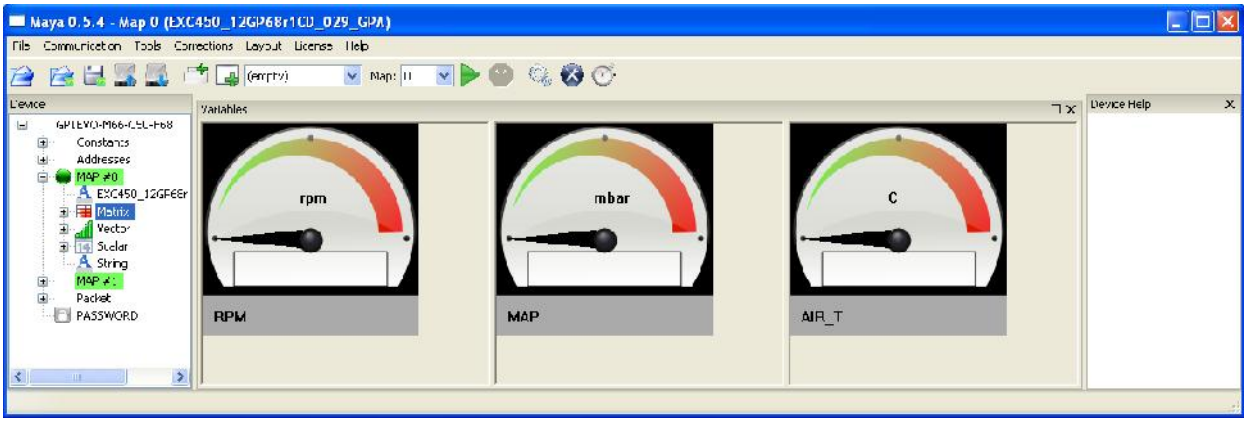
6.8.1 Analog meter Display

For **Analog meter Display** proceed as follows:

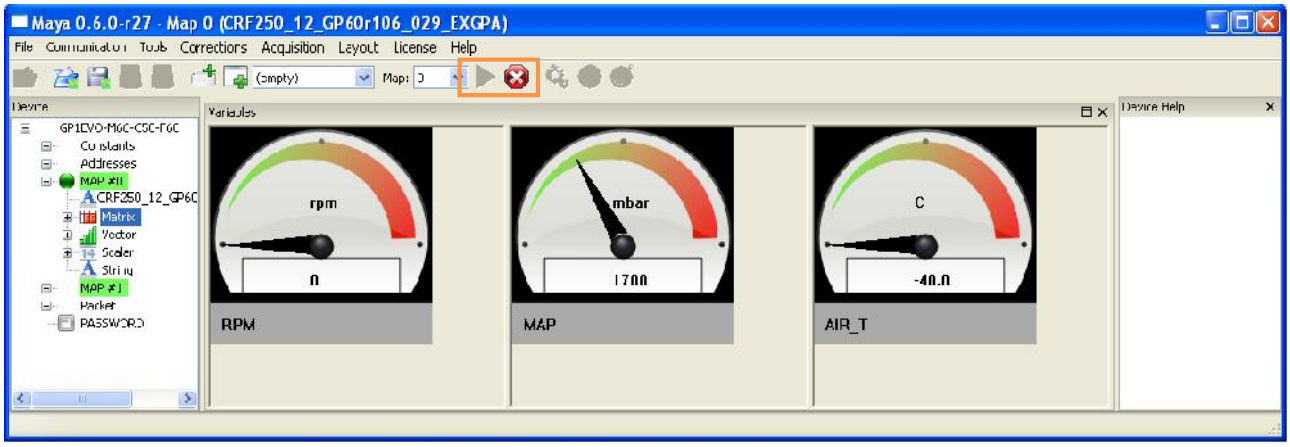
- Start Maya
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if no device is loaded please load one (see chapter **6.1**)
- Open **Tools** menu and select the voice **New Analog Meter Display**: a window will appear. You can select available live parameters.



- Select parameter/s and click **OK**: values will appear in **Activity** area.



- Start **Real Time View** pushing 

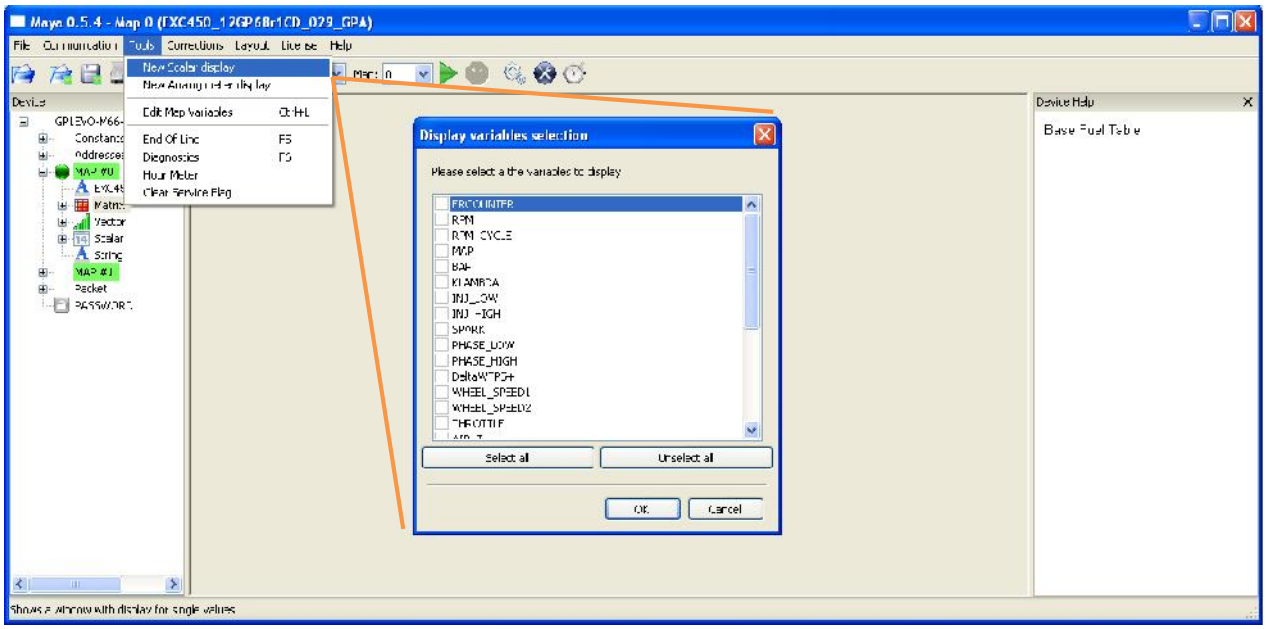


- Stop **Real Time View** pushing 

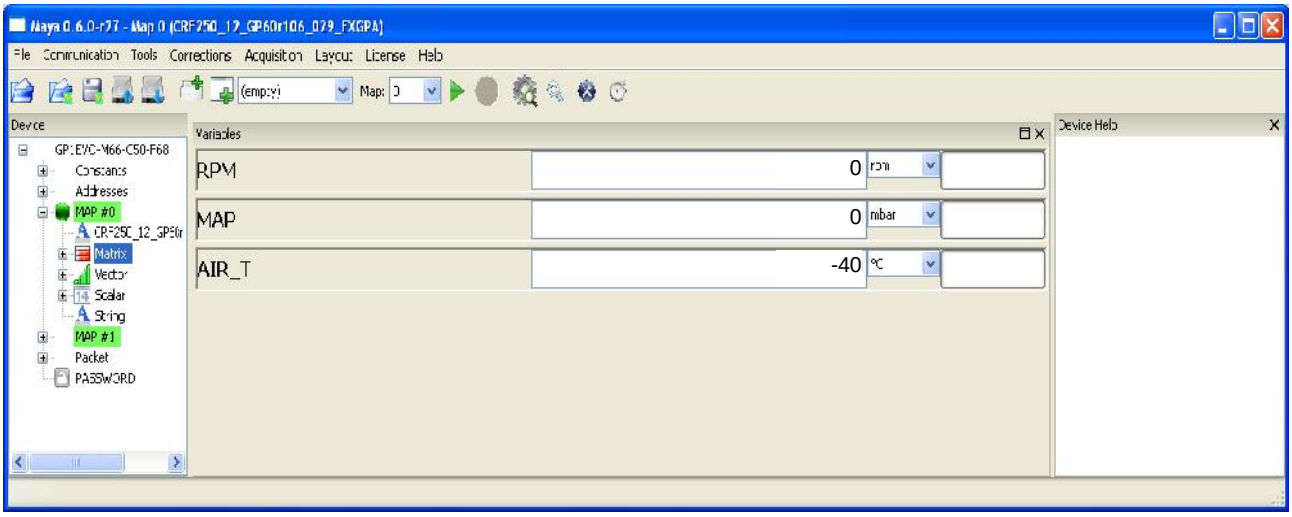
Parameters depend on device type and Maya licence.
User could change alarm and warning thresholds (see chapter **6.7.3.1**)

6.8.2 Numeric visualization

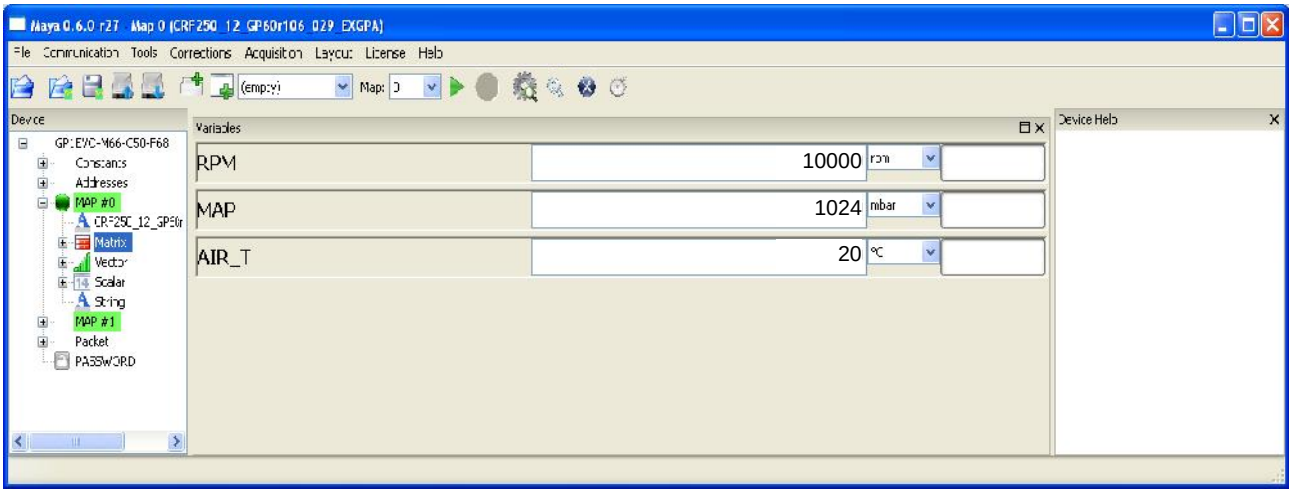
- Start **Maya**
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if no device is loaded please load one (see chapter **6.1**)
- Open **Tools** menu and select the voice **New Scalar Display**: a window will appear. You can select available live parameters.



- Select parameter/s and click **OK**: values will appear in **Activity** area.



- Start **Real Time View** pushing 



- Stop **Real Time View** pushing 

Parameters depend on device type and Maya licence.
User could change alarm and warning thresholds (see chapter **6.7.3.2**)

6.8.3 Scope (only ADVANCE licence)

With **Scope** in **Maya** you could visualize components of **Packet device** as a time linear graph.

- Start **Maya**
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if no device is loaded please load one (see chapter **6.1**)
- Activate **SCOPE** in **Activity** area or in a separated window (see **6.7.1** and **6.7.2**).

- Push button ▶ selecting, for example, Engine Temp and Throttle:

- Stop **Real Time View** pushing

Parameters depend on device type and Maya licence.
User could change alarm and warning thresholds (see chapter **6.7.3.3**)

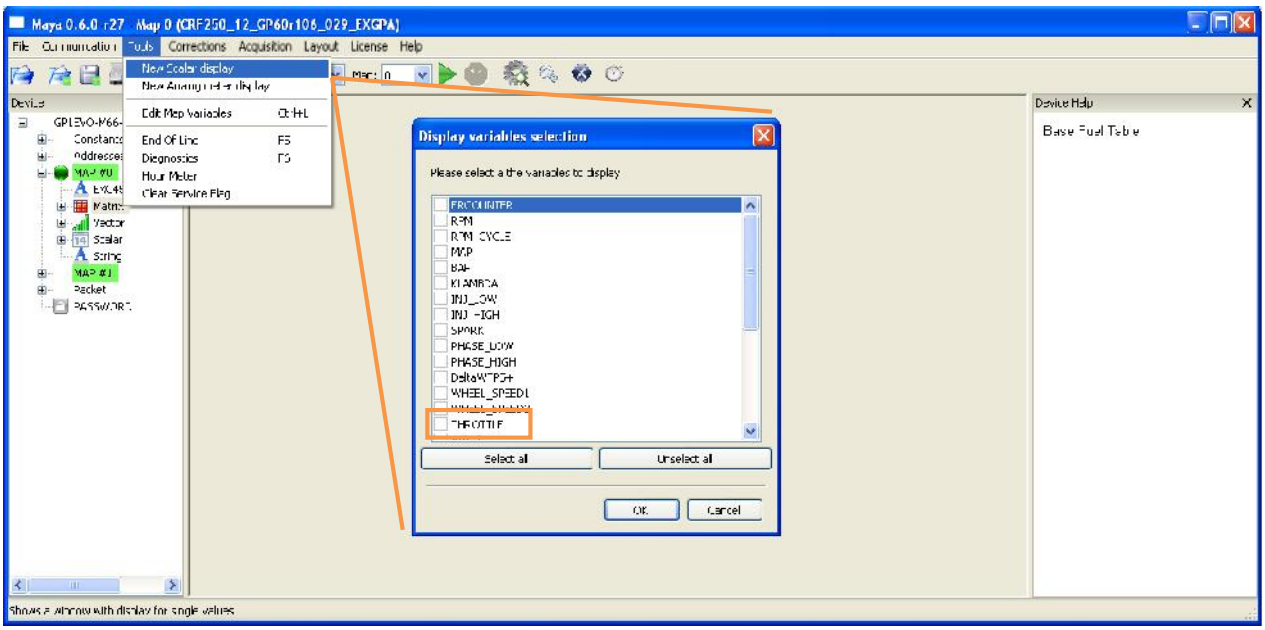
6.9 TPS (Throttle Position Sensor) inspection and calibration

TPS sensor is crucial in engine maps and ECU management: as seen in previous chapters, this value is the main parameter for matrix and vectors for engine maps.
Usually the data can vary between engines (also same maker and model): it is necessary to a specific calibration to ensure a perfect ECU functioning.

6.9.1 TPS calibration check

To verify a perfect TPS calibration proceed as follows:

- Start **Maya**
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if no device is loaded please load one (see chapter **6.1**)
- Open **Tools** and select the voice **New Scalar Display**: a window for the selection of available parameters will appear.



- Select throttle parameter (**THROTTLE**) and confirm with **OK**: the visualizer will appear in **Activity**.
- Start **Real Time View** with and verify that the value is between 0 (closed throttle) and 100 (full throttle).
- Stop **Real Time View** by clicking

If values respect limits the sensor calibration is correct, if not you need to calibrate the sensor.

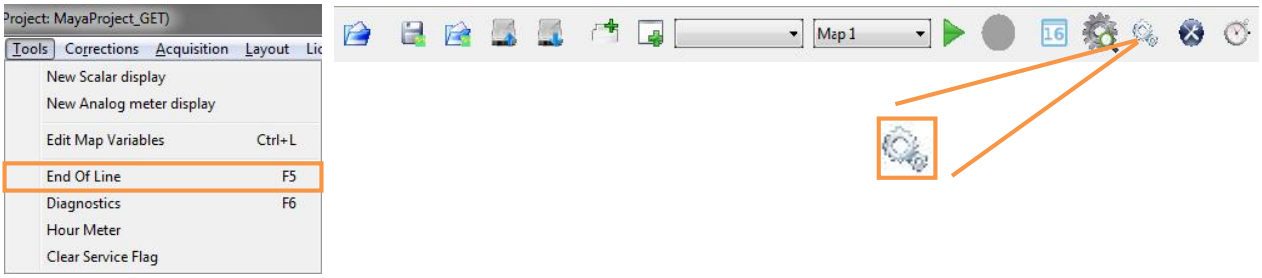
6.9.2 TPS calibration

6.9.2.1TPS calibration on 8-bit resolution ECUs (i.e GP1/RX1 EVO)

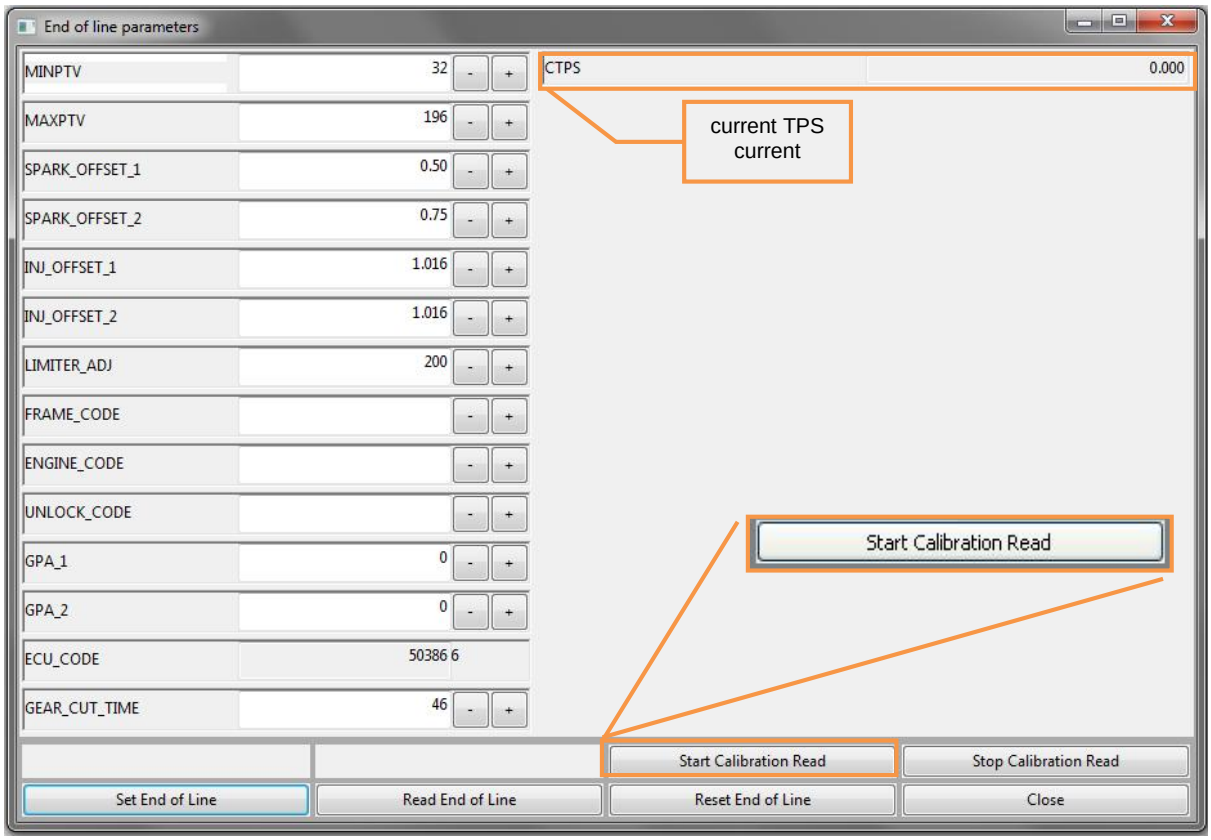
Start **Maya**

- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if no device is loaded please load one (see chapter **6.1**)
- Click on **End Of Line** (in **Tools**) or in the icon in instrument bar of **Maya**.

  NOTE: if **Enable Hot keys …** are enabled you could use also **F5**.

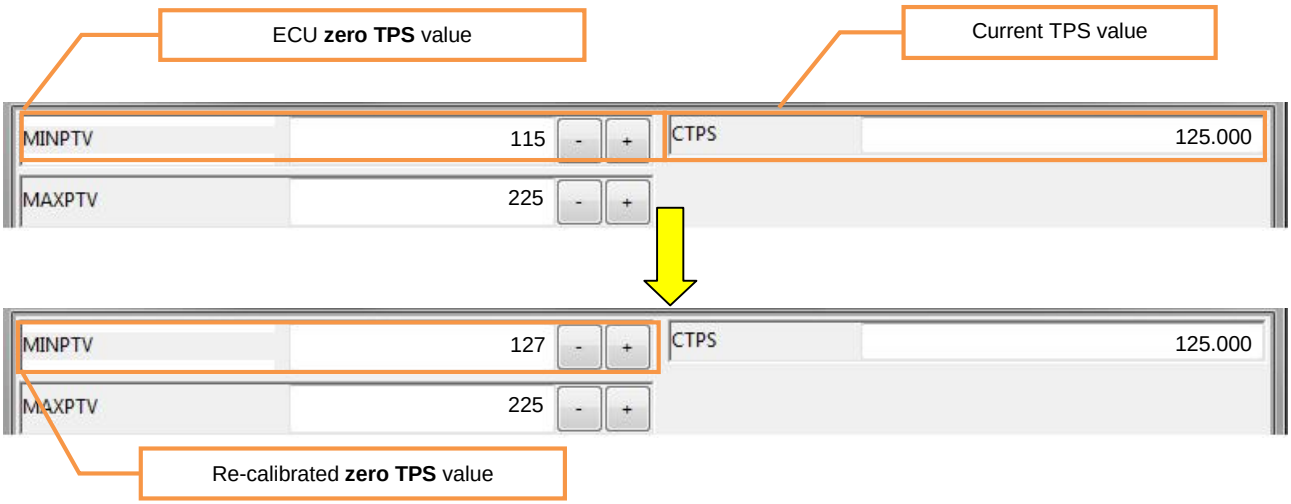


- Push **Start Calibration Read <u>with fully closed throttle</u>:** the logged value will be in **CTPS**.

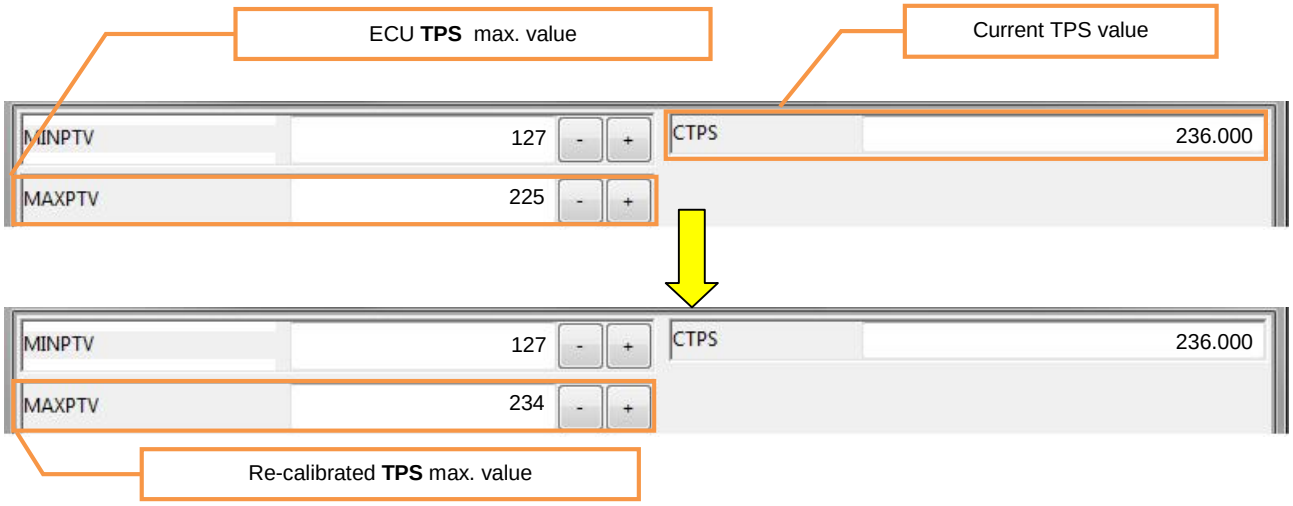


<u>NOTE: to get a better value, open and close a few times the throttle in order to reduce mechanical plays on sensor reading.</u>

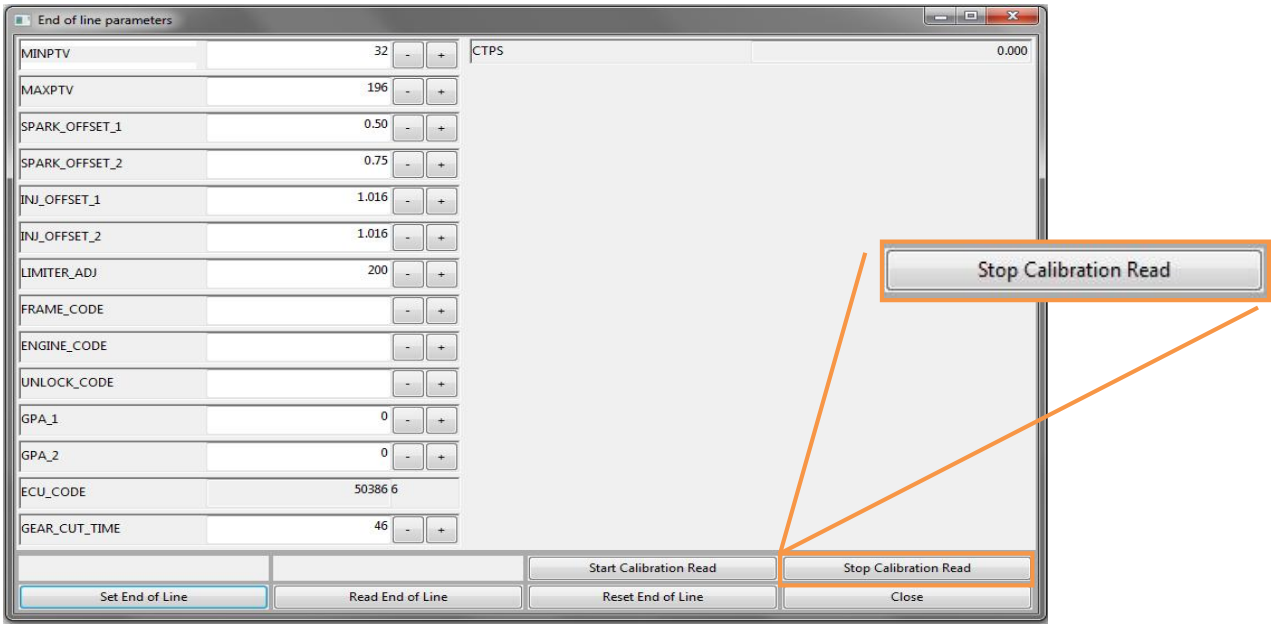
- Verify that the value in **MINPTV** (zero TPS, called also **MIN_TPS**) is greater than **CTPS** of 2 points. If you see differences, type the logged value (**CTPS**) **increased** of 2 points in **MINPTV** cell.
  You could type directly the value or push **+** / **-**



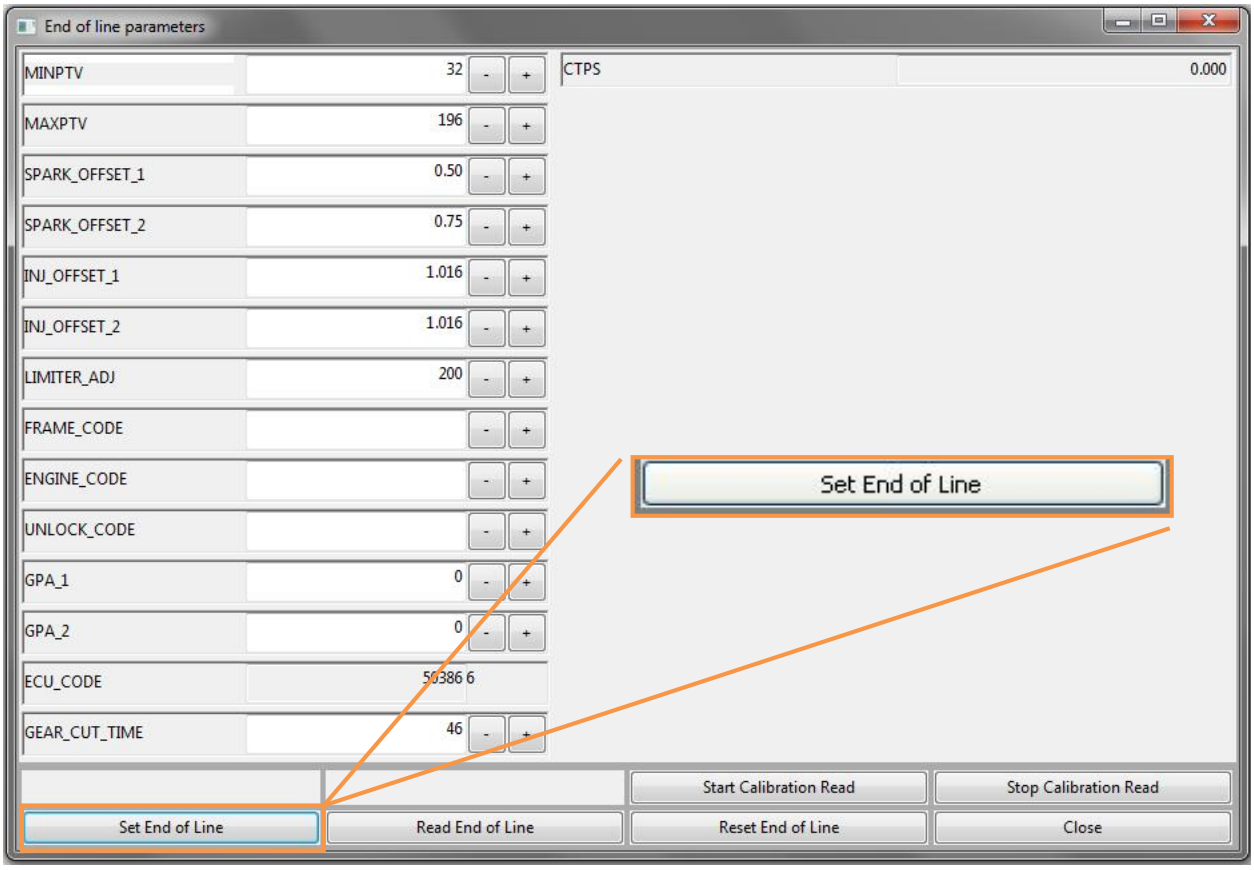
- Open completely throttle (**full gas**): current logged value will appear in **CTPS**. Update, if necessary, value in **MAXPTV** (called also **MAX_TPS**)but, in this case, the value have to be **decreased** of 2 units.



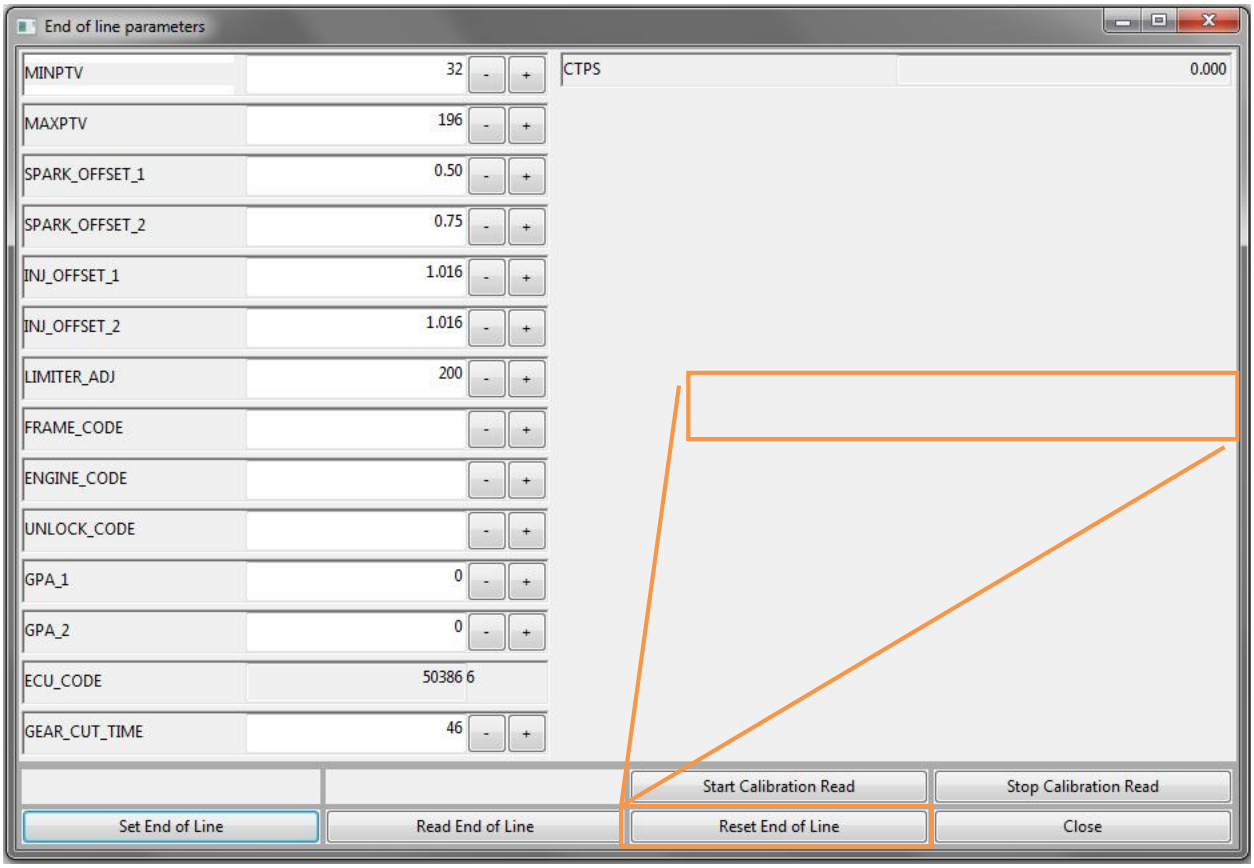
- At the end of procedures, click on **Stop Calibration Read**



- Click on **Set End Of Line** to update parameters stored in ECU**.**



- If you want to get back to original parameters, push **Reset End of Line**.



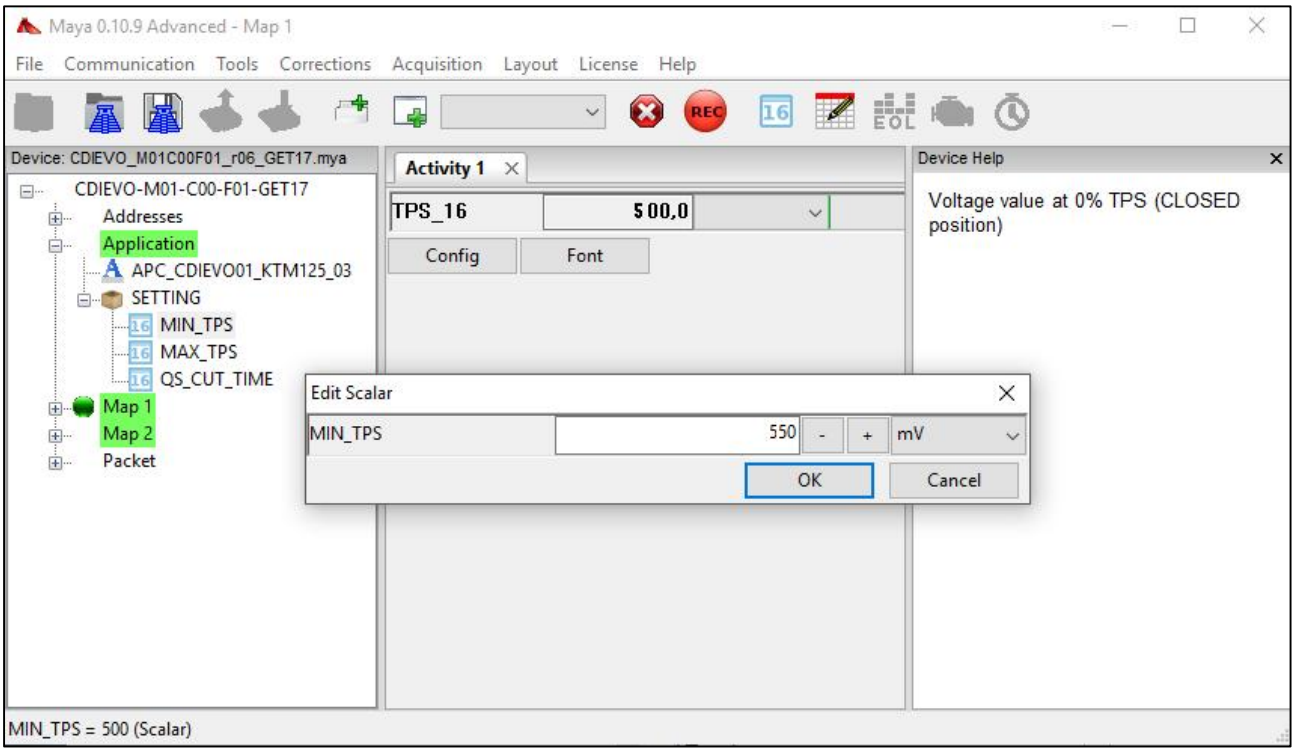
6.9.2.2 TPS calibration on 12-bit res. ECUs (i.e RX1/PRO ECULMB)

New GET ECUs generation (such as RX1 PRO and ECULMB families) increases TPS resolution input.
This feature ensure more accuracy in TPS reading.
New resolution requires a slightly different calibration offset.
Follow same procedure described at previous chapter but increasing minimum TPS value of 15 units, and decreasing maximum TPS value of 15 units.

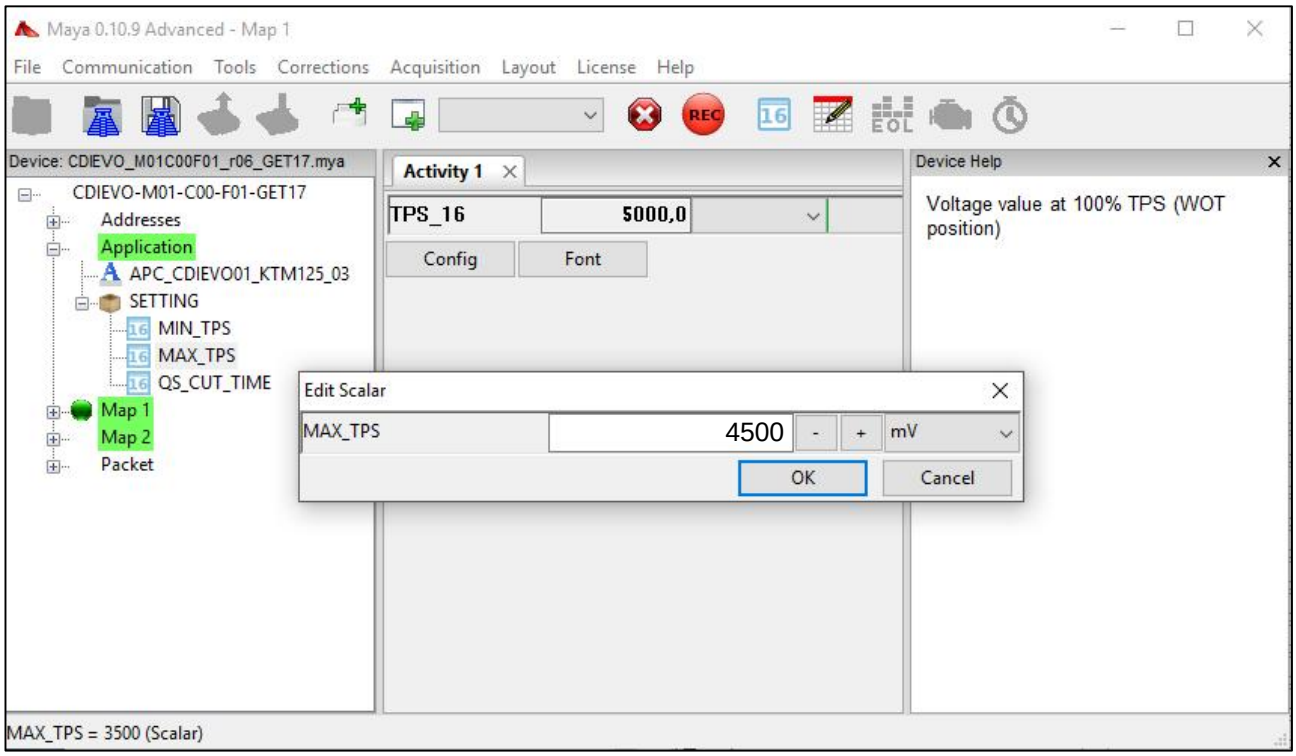
6.9.2.3 TPS calibration on CDI ECUs

TPS calibration of CDI ECUs is different than other devices.
Proceed as follows:

- Run Maya.
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if no device is loaded please load one (see chapter **6.1**)
- Create a new Activity Window and then open a New Scalar Display to view throttle position sensor voltage value (useful during calibration), then start ECU reading (see chapter **6.7** and **6.8**).
  NOTE: this example shows TPS_16 scalar display. This may change if different device is loaded (check scalar function in Device Help window)
- Close throttle valve and double click on **MIN_TPS** scalar (under Application Map). Insert TPS_16 scalar display value plus 50 units (in our example 550).



- Open completely throttle valve and double click on **MAX_TPS** scalar (under Application Map). Insert TPS_16 scalar display value minus 50 units (in our example 4500).



- Send Maps to ECU Open (see chapter **6.1**).

6.10 Change fuel injected quantity

Modification of injected fuel could be done:

- By **E**nd **O**f **L**ine in ECU
- From correction fuel matrix
- From base fuel map

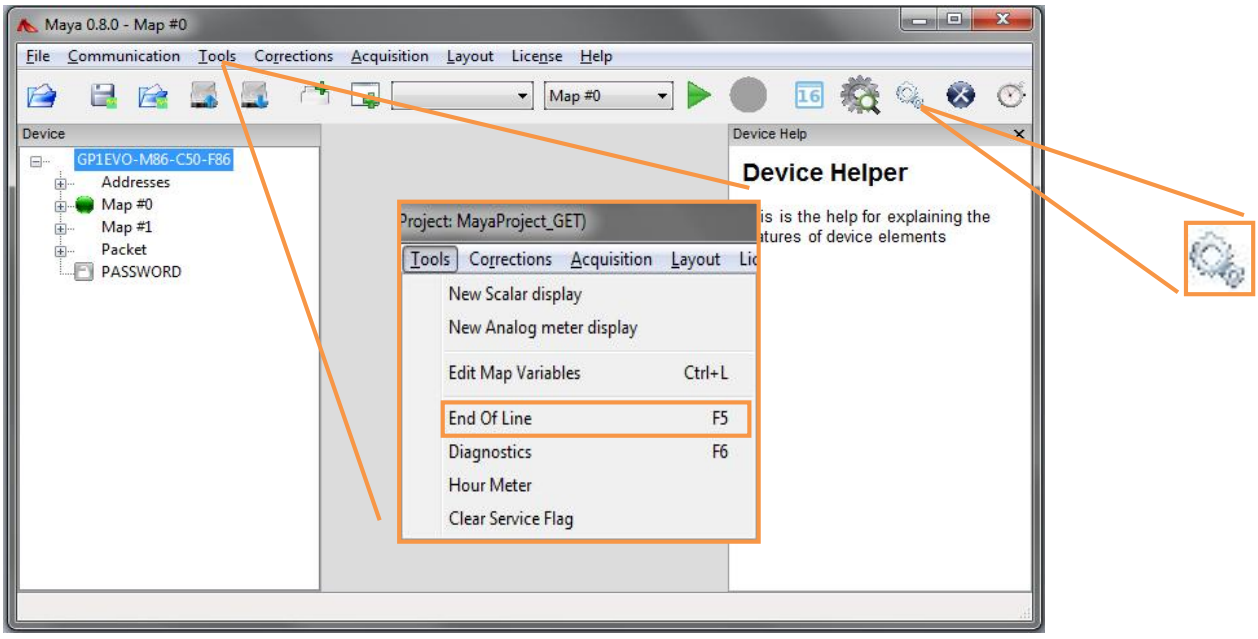
Please remember that fuel quantity is modified adjusting opening time of injectors and it could be executed independently for engine map in device.
It is suggested to use GAINS to adjust injected fuel quantity.

6.10.1 End Of Line modification (EVO and ADVANCE licence)

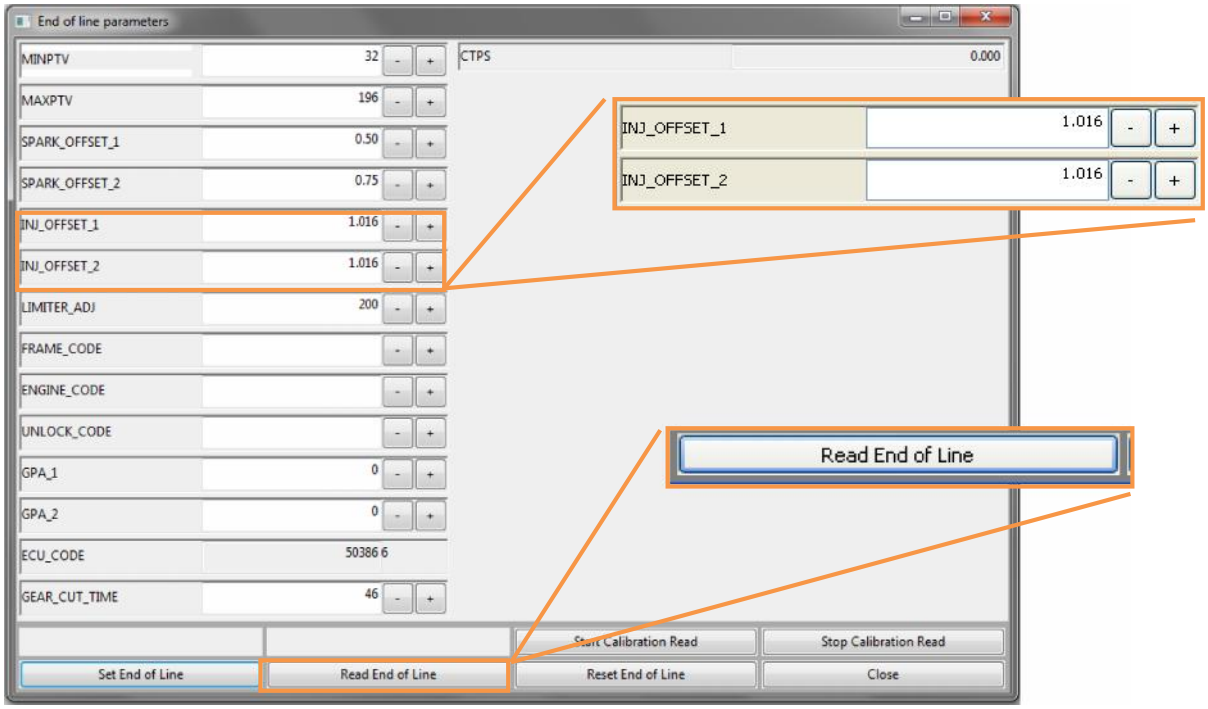
The modification on **E**nd **O**f **L**ine will be through all engine range and it is linked to ECU. Modifications done to E.O.L. couldn't be saved in PC because they are normally in the ECU memory.
For this reason the ECU needs to be connected to PC (see chapter **6.2**).

6.10.1.1 EOL modification on ECU GP1 EVO (lic. EVO and ADVANCE)

- Start Maya with double click on the icon
- Connect ECU to PC (chapter **6.2**).
- Load a device (if necessary) and check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if any device is loaded it is necessary to load one (see chapter **6.1**).
- Click on **End Of Line** (in menu **Tools**) or on the icon EOL in **Maya** toolbar.
  NOTE: if **Enable Hot keys …** are enabled you could use also **F5**.



- Click on **Read End Of Line** to update parameters of end of line visualized in the window **End Of Line parameters**.



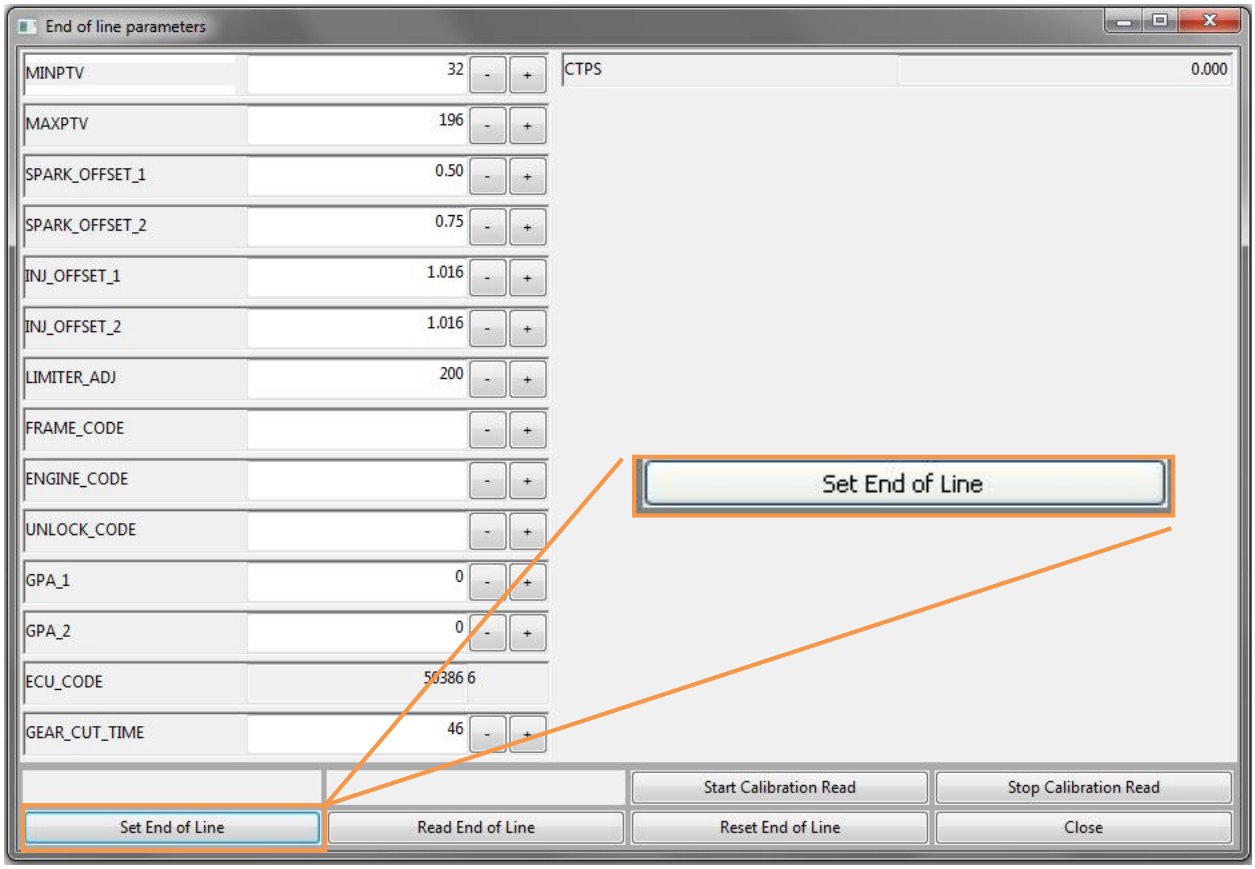
- Increase or decrease (as per your needs) values in **INJ_OFFSET_1** (if you wish to change **MAP #0**) or **INJ_OFFSET_2** (if you wish to change **MAP #1**).
  Variation could be done pushing **+** and **–** or typing values from keyboard. Table below indicates correspondence between values in **INJ_OFFSET** and percentage of injected fuel quantity (approximated values)

Value for INJ_OFFSET	Increase/Decrease (%)
0.898	- 10 %
0.906	- 9.5 %
0.914	- 9 %
0.922	- 8 %
0.930	- 7 %
0.938	- 6 %
0.945	- 5.5 %
0.953	- 5 %
0.961	- 4 %
0.969	- 3 %
0.977	- 2.5 %
0.984	- 2 %
0.992	- 1 %
1.000	0 %
1.008	+1 %
1.016	+1.5 %
1.023	+2 %
1.031	+3 %
1.039	+4 %
1.047	+4.5 %
1.055	+5.5 %
1.063	+6 %
1.070	+7 %
1.078	+8 %
1.086	+8.5 %
1.094	+9.5 %

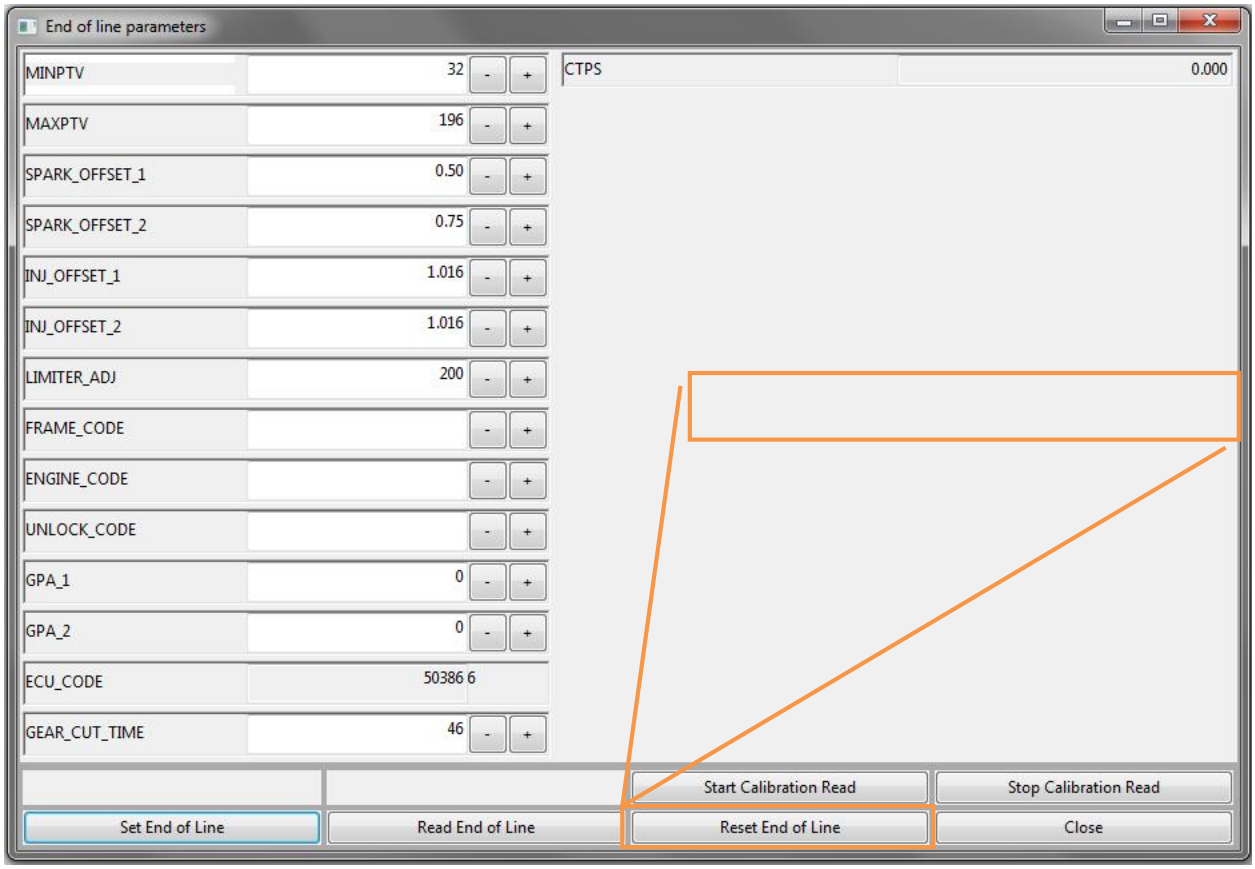
Value for INJ_OFFSET	Increase/Decrease (%)
1.102	+10 %
1.109	+11%
1.117	+11.5%
1.125	+12.5%
1.133	+13.5%
1.141	+14%
1.148	+15%
1.156	+15.5%
1.164	+16.5%
1.172	+17.2%
1.180	+18%
1.188	+19%
1.195	+19.5%
1.203	+20 %
1.211	+21%
1.219	+22%
1.227	+22.5%
1.234	+23.5%
1.242	+24%
1.250	+25%
1.258	+25.8%
1.266	+26.5%
1.273	+27%
1.281	+28%
1.289	+29%
1.297	+30%

PLEASE REMEMBER THAT MODIFICATION ARE SUMMED OR DETRACTED TO INJECTOR OPENING DEFINED IN BASE FUEL MAPS AND IN CORRECTION FUEL TABLE (FTCYL1)

- At the end of modification click on **Set End Of Line** to update parameters stored in ECU.



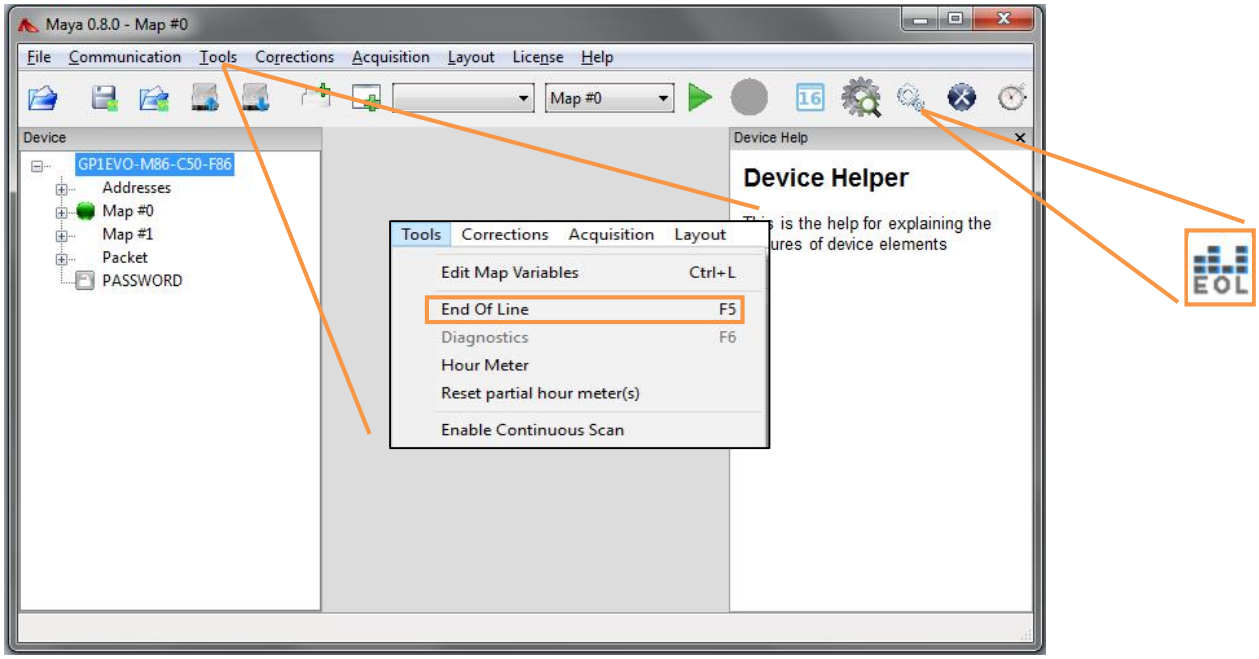
- If you want to get back to default data, press **Reset End of Line**.



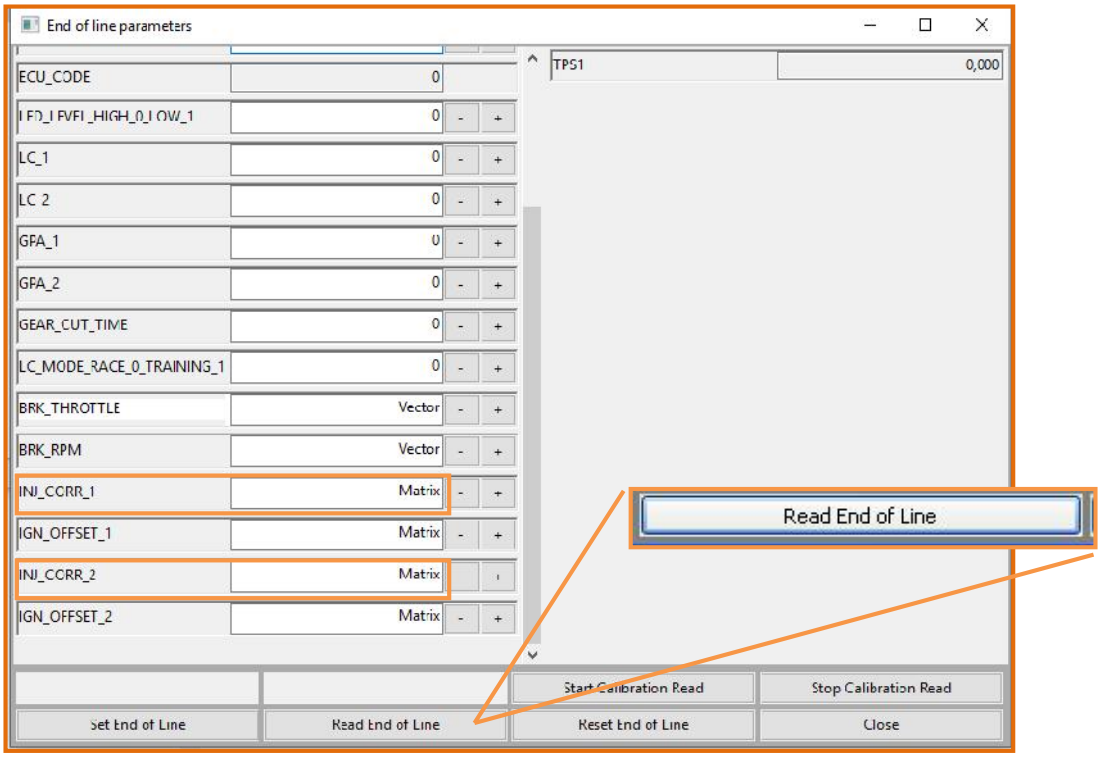
WARNING: this operation will reset all EOL settings

6.10.1.2 EOL modification on ECU RX1 PRO (lic. EVO and ADVANCE)

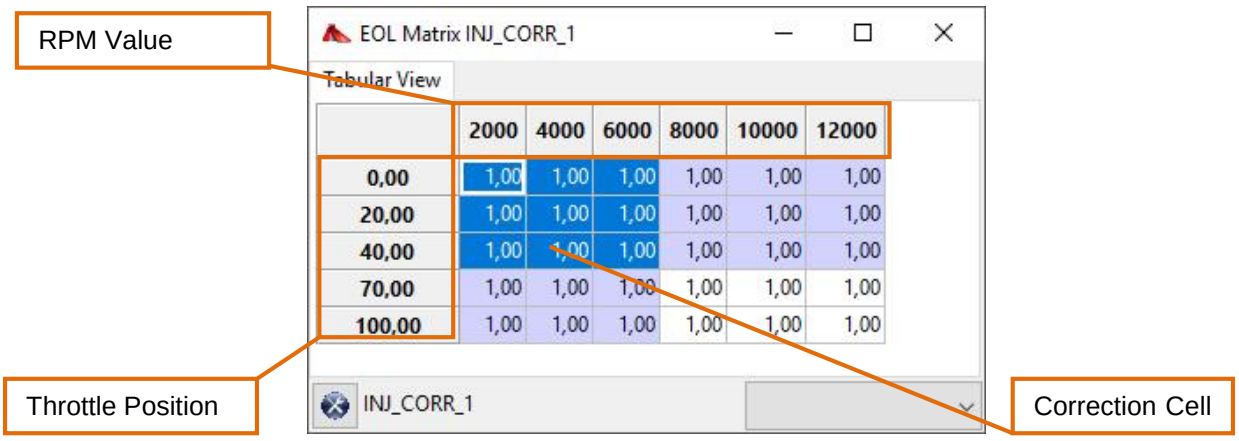
- Start Maya with double click on the icon
- Connect ECU to PC (chapter **6.2**).
- Load a device (if necessary) and check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if any device is loaded it is necessary to load one (see chapter **6.1**).
- Click on **End Of Line** (in menu **Tools**) or on the icon EOL in **Maya** toolbar.
  NOTE: if **Enable Hot keys …** are enabled you could use also **F5**.



- Click on **Read End Of Line** to update parameters of end of line visualized in the window **End Of Line parameters**.



- Double click on **Matrix** label at right of **INJ_CORR_1** (to change fuel quantity in Map 1) or **INJ_CORR_MAP_2** (to change fuel quantity in Map 2). Matrix below will be displayed:



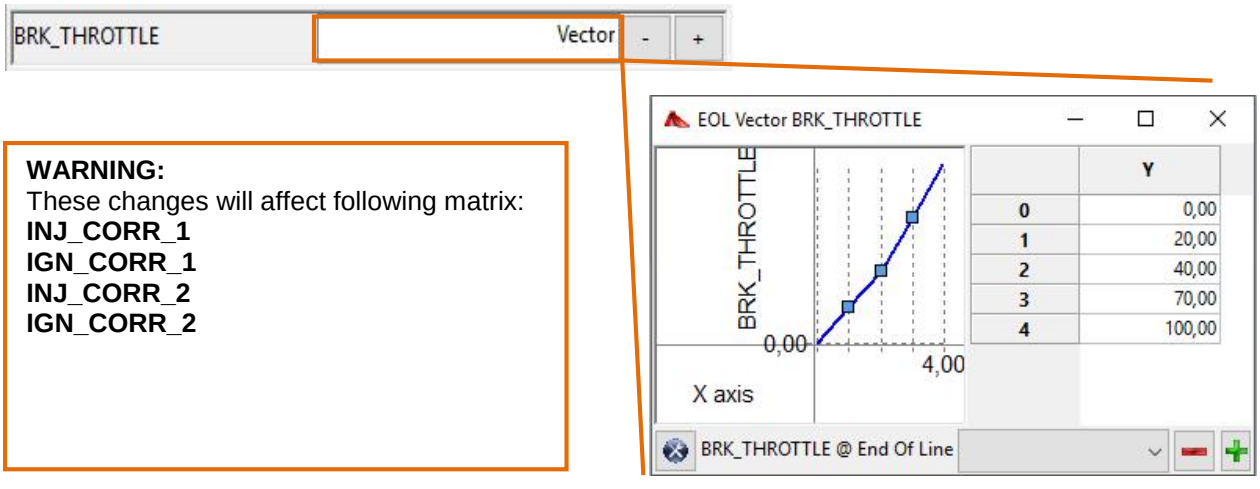
Select one correction cell (or more) and increase or decrease (as per your needs) values by typing values from keyboard, or by using Maya Hotkeys (**q** = -5% ; **w** = +5% ; **a** = -1% ; **s** = +1%). Table below indicates correspondence between table values and percentage of injected fuel quantity:

Value for INJ_OFFSET	Increase/Decrease (%)
0.90	- 10 %
0.91	- 9 %
0.92	- 8 %
0.93	- 7 %
0.94	- 6 %
0.95	- 5 %
0.96	- 4 %
0.97	- 3 %
0.98	- 2 %
0.99	- 1 %
1.00	0 %
1.01	+1 %
1.02	+2 %
1.03	+3 %
1.04	+4 %
1.05	+5 %
1.06	+6 %
1.07	+7 %
1.08	+8 %
1.09	+9 %

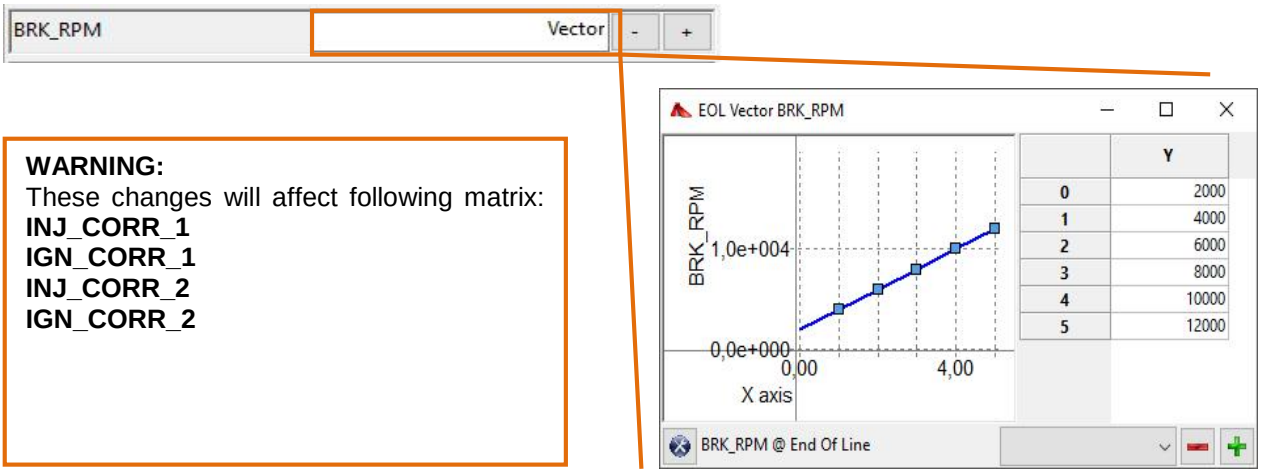
Value for INJ_OFFSET	Increase/Decrease (%)
1.10	+10 %
1.11	+11 %
1.12	+12 %
1.13	+13 %
1.14	+14 %
1.15	+15 %
1.17	+17 %
1.18	+18 %
1.19	+19 %
1.20	+20 %
1.21	+21 %
1.22	+22 %
1.23	+23 %
1.24	+24 %
1.25	+25 %
1.26	+26 %
1.27	+27 %
1.28	+28 %
1.29	+29 %
1.30	+30 %

PLEASE REMEMBER THAT MODIFICATION ARE SUMMED OR DETRACTED TO INJECTOR OPENING DEFINED IN BASE FUEL MAPS AND IN CORRECTION FUEL TABLE (FTCYL1)

PLEASE NOTE: Correction Cells are in function of RPM value and throttle position (like a normal map matrix). User can change these reference values by double click on BRK_RPM and BRK_THROTTLE **vector** label.

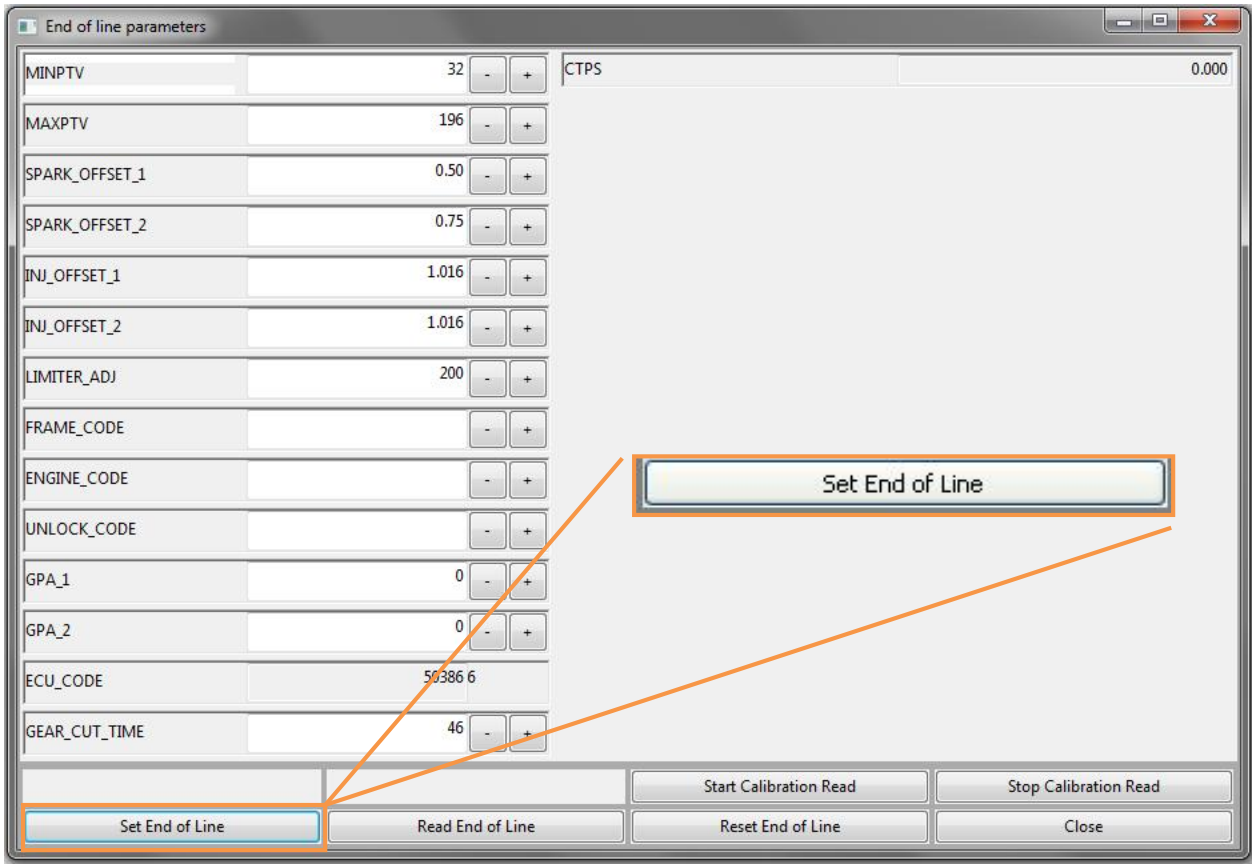


WARNING:
These changes will affect following matrix:
INJ_CORR_1
IGN_CORR_1
INJ_CORR_2
IGN_CORR_2



WARNING:
These changes will affect following matrix:
INJ_CORR_1
IGN_CORR_1
INJ_CORR_2
IGN_CORR_2

- At the end of modification click on **Set End Of Line** to update parameters stored in ECU.

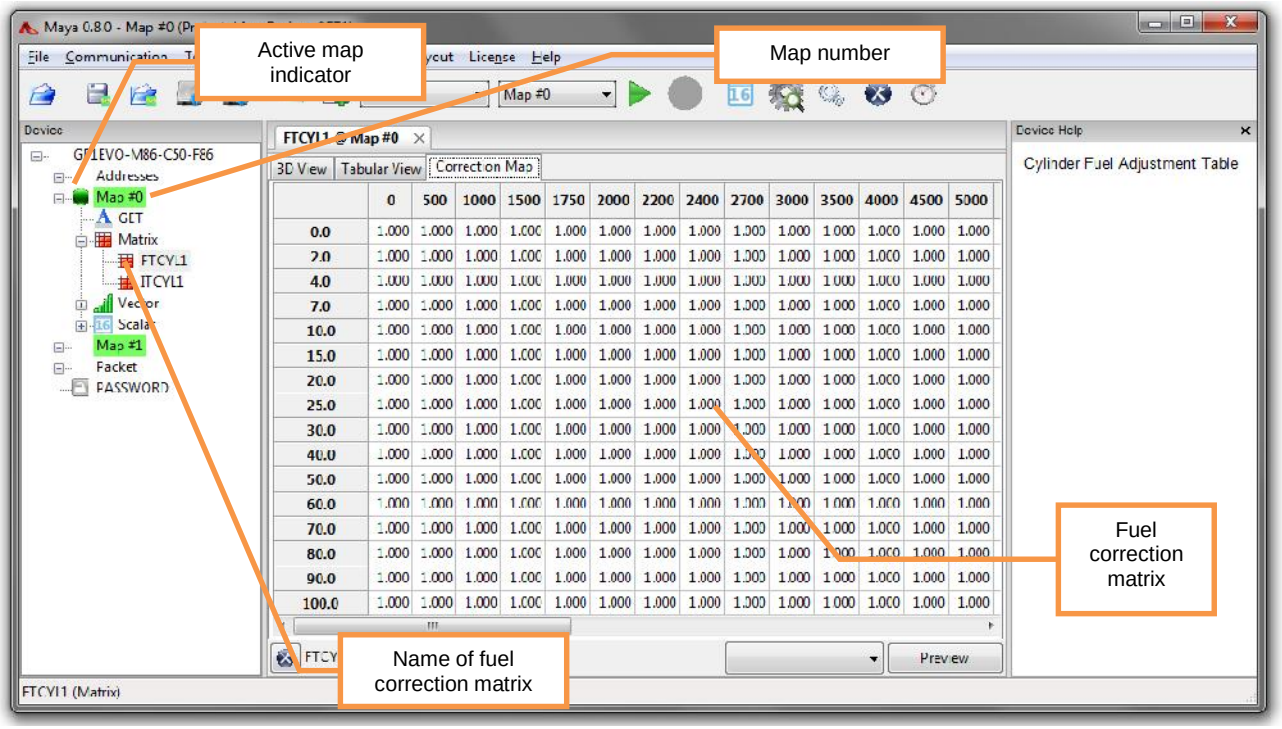


- If you want to get back to default data, press **Reset End of Line**.
WARNING: this operation will reset all EOL settings

6.10.2 Modification of fuel matrix correction (lic. EVO and ADVANCE)

In **FTCYL1** you could modify **break points** in specific engine working points.
With this specific intervention the user could adjust the map in specific rpm and TPS position. Modification could then be stored in PC.
Proceed as follows:

- Start Maya with double click on the icon
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if no device is loaded please load one (see chapter **6.1**)
- Download the map you wish to modify from ECU (see chapter **6.3.3**).
- Verify that the map is active (symbol near **MAP #...**).
- Double click on **FTCYL1** of the map you need: correction table will be visualized in **Activity** area.



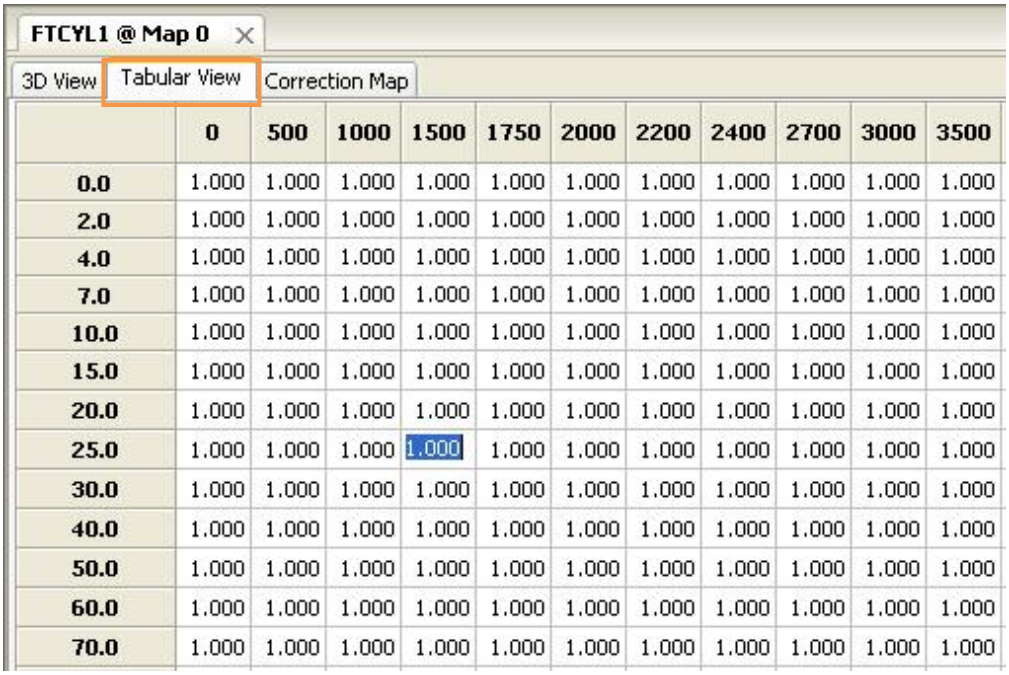
To change values you could:

- Work in **Tabular View**: values modified in this table are written in active map
- Modify values in **Correction Map**: you can create a new table with modified values.
- Modify **3D graph** in the matrix

6.10.2.1 Modify Tabular View (lic. EVO and ADVANCE)

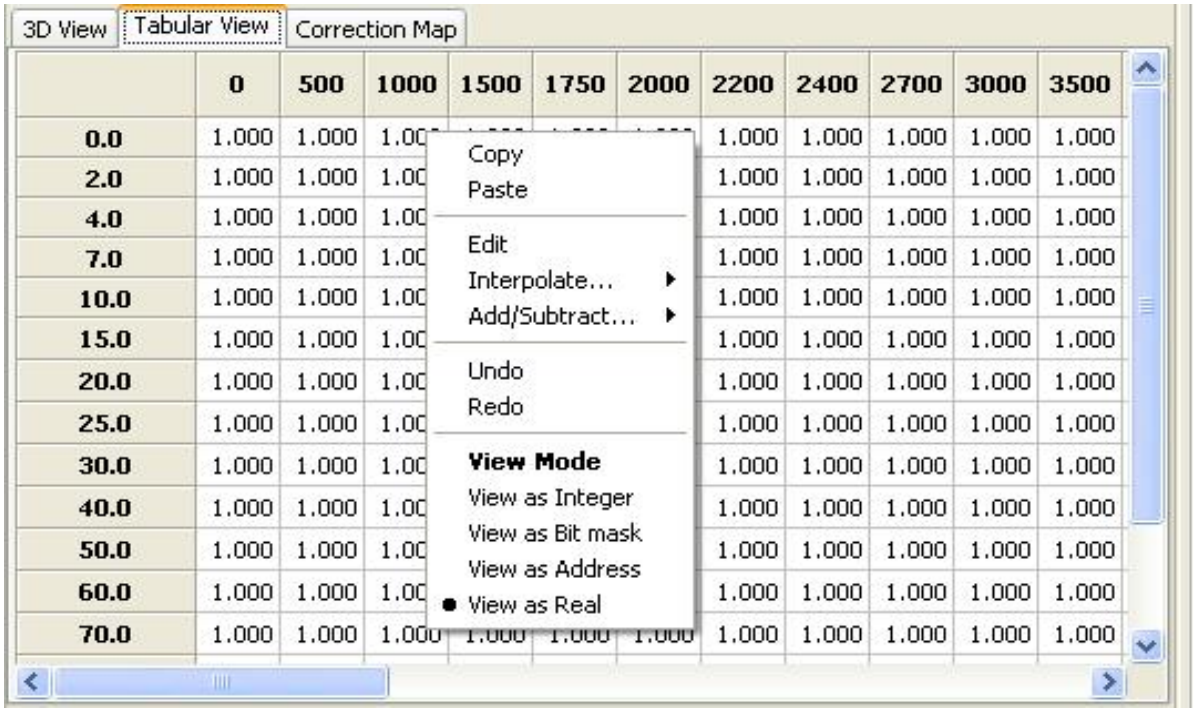
As discussed, modification in **Tabular View** modify directly the selected matrix and could be visible in 3D graph immediately.
Proceed as follows:

- Verify that the correct matrix is open
- Select **Tabular view** and desired cell (double left click), type the value with the keyboard:



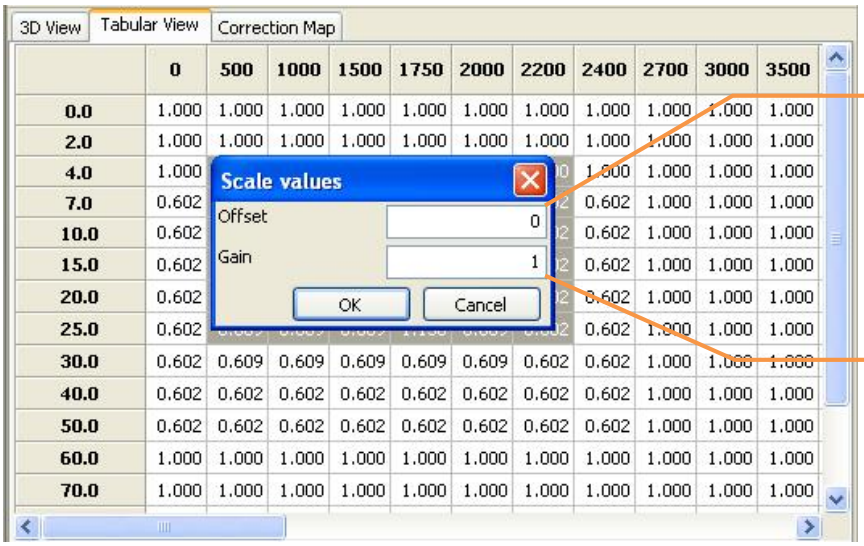
	0	500	1000	1500	1750	2000	2200	2400	2700	3000	3500
0.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
4.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
7.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
10.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
15.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
20.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
25.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
30.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
40.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
50.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
60.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
70.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

- Correction could be done also with context menu selecting desired cell and then right click: you will see the following menu.



With this procedure you could select more than one cell and modify more values together.
Using **Add/Subtract** (or corresponding Hotkey) the user could increase/decrease values as desired.

Using **Edit Maya** will show the following menu:



The final value contained in the cell will be:

new_value=(old_value x **Gain) + Offset**

new_value : new value in the selected cell
old_value : initial value in the selected cell
Gain : value typed in **Gain** of **Edit** window
Offset : value typed in **Offset** of **Edit** window

Table below shows different values of **Gain** and final values of the cell (initial value=1):

GAIN	Percentage add/decrease (%)	Final value
0.90	**-10 %**	**0.898**
0.92	**- 8 %**	**0.922**
0.94	**- 6 %**	**0.938**
0.96	**- 4 %**	**0.961**
0.98	**- 2 %**	**0.977**
0.99	**- 1 %**	**0.992**
1	**0 %**	**1.000**
1.01	**+ 1 %**	**1.01**
1.02	**+ 2 %**	**1.02**
1.04	**+ 4 %**	**1.04**
1.06	**+ 6 %**	**1.06**
1.08	**+ 8 %**	**1.08**
1.1	**+ 10 %**	**1.10**

PLEASE NOTE: values are approximated

Usually **Offset** is used in correction and Ignition advance tables (**Ignition**) and Spark advance tables.
To calculate **Gain** value to type you could use the following formula:

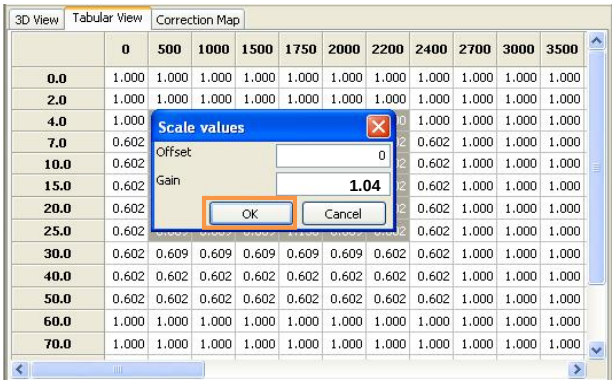
$$GAIN = \frac{\pm\, desired\, percentage}{100} + 1$$

Desired percentage: it the needed value (example: +7% or -3%)

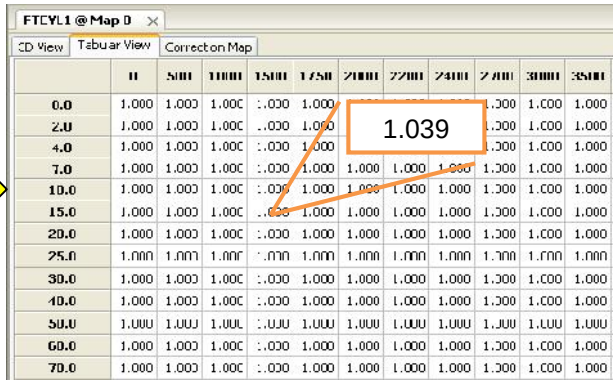
Max and min values are:

Parameter	GAIN value	Correspondent percentage value
Minimum GAIN	0.00	- 100 %
Maximum GAIN	1.99	+ 100 %

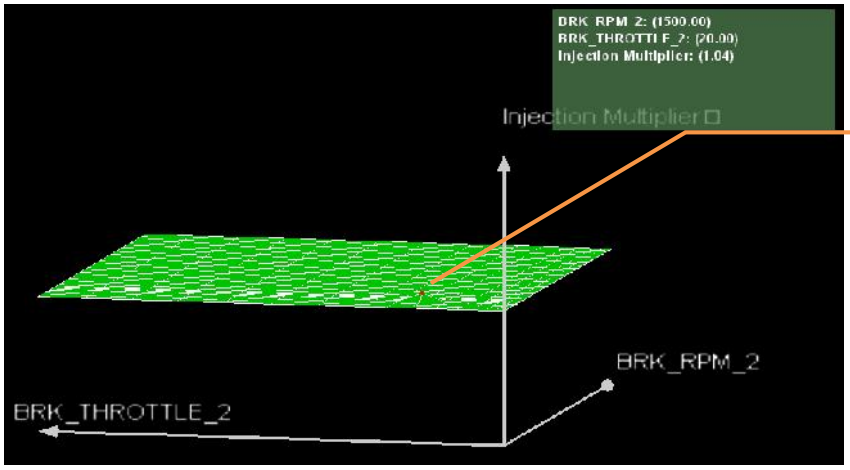
Once defined **Gain ,** push **OK** to confirm modification.



Gain value =1.04
(+ 4%)



Cell value =1.039
(+ 4%)



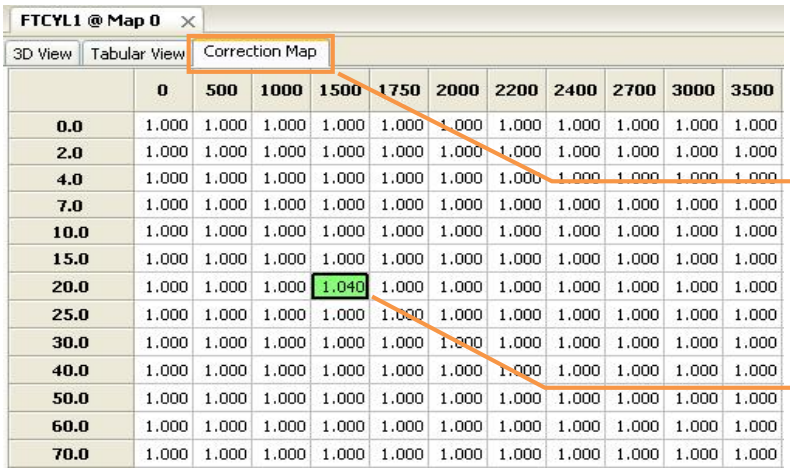
Modified cell in 3D graph

- Send the modified map to ECU (see **6.6**)

6.10.2.2 Modification of Correction Map (lic. EVO and ADVANCE)

Modifying **Correction Map** you could, as discussed, modify maps without changing original base map. The correction map is a sort of “draft”. At the end of modifications, creating a new map will store everything. Proceed as follows:

- Verify that the correct matrix is open
- Select **Correction Map** and proceed with changes as per previous chapter.



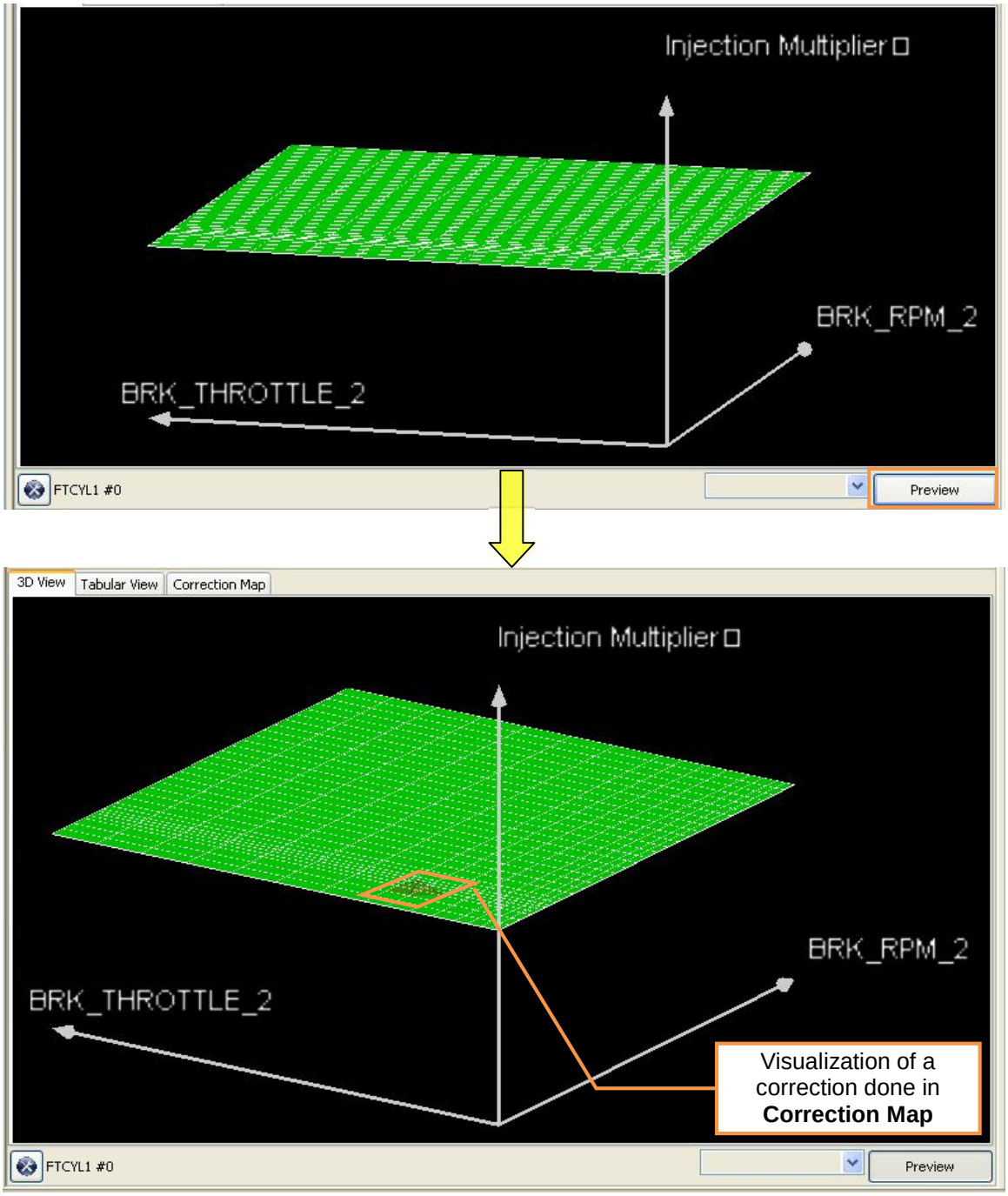
	0	500	1000	1500	1750	2000	2200	2400	2700	3000	3500
0.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
4.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
7.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
10.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
15.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
20.0	1.000	1.000	1.000	1.040	1.000	1.000	1.000	1.000	1.000	1.000	1.000
25.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
30.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
40.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
50.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
60.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
70.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Correction Map

Modified cell
(automatically in green)

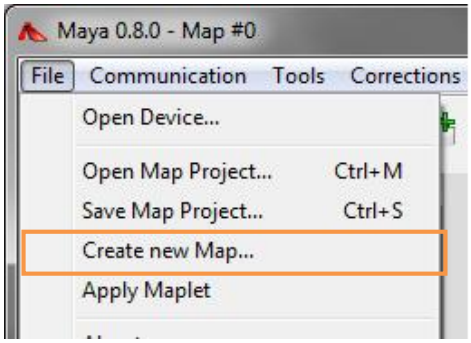
NOTE: green cells show that the value has been increased, yellow cells show that the value has been reduced.

Changes in **Correction Map** are in red (green is used for correction in **Tabular View**) in **3D graph** only after the user selects **Preview**.

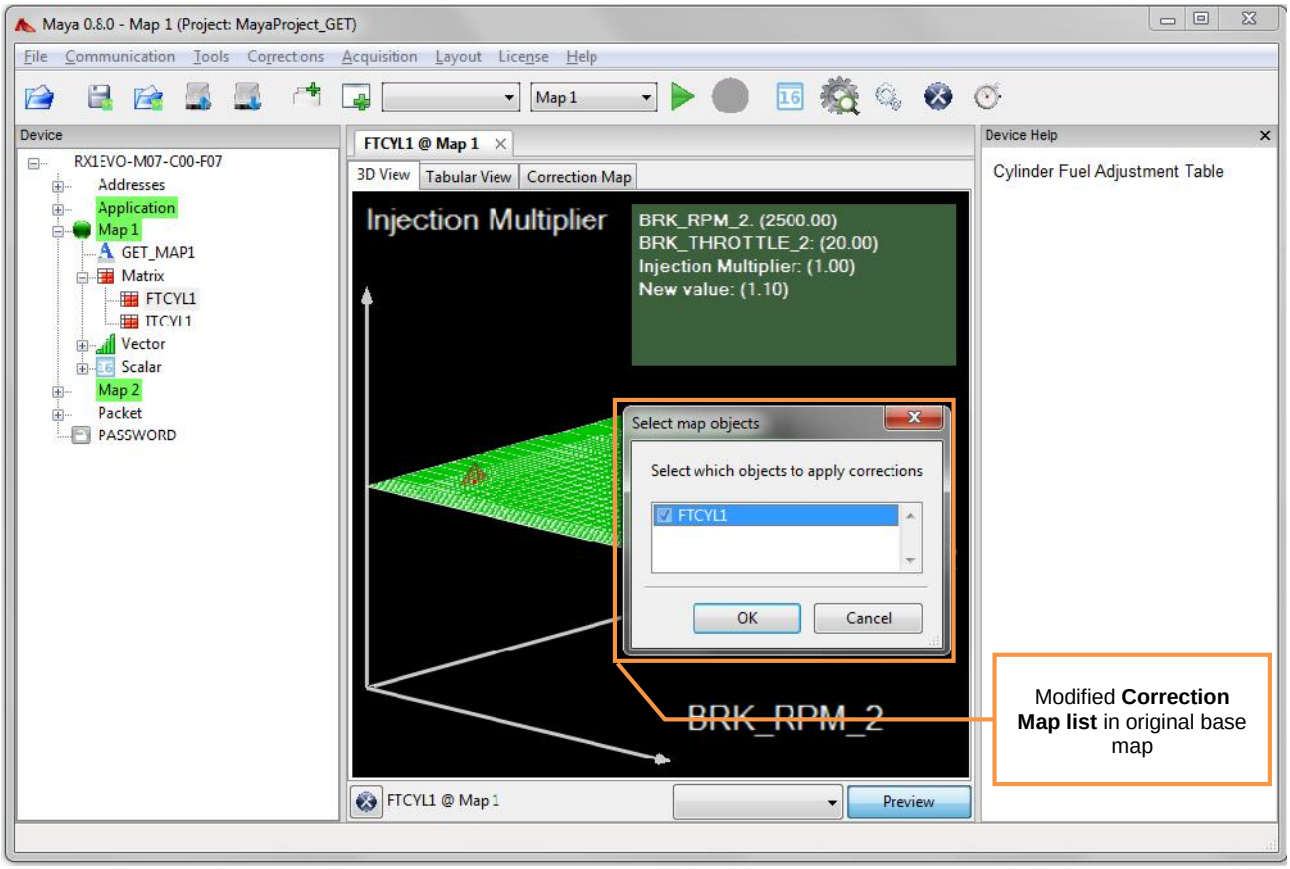


To store correction create a new map:

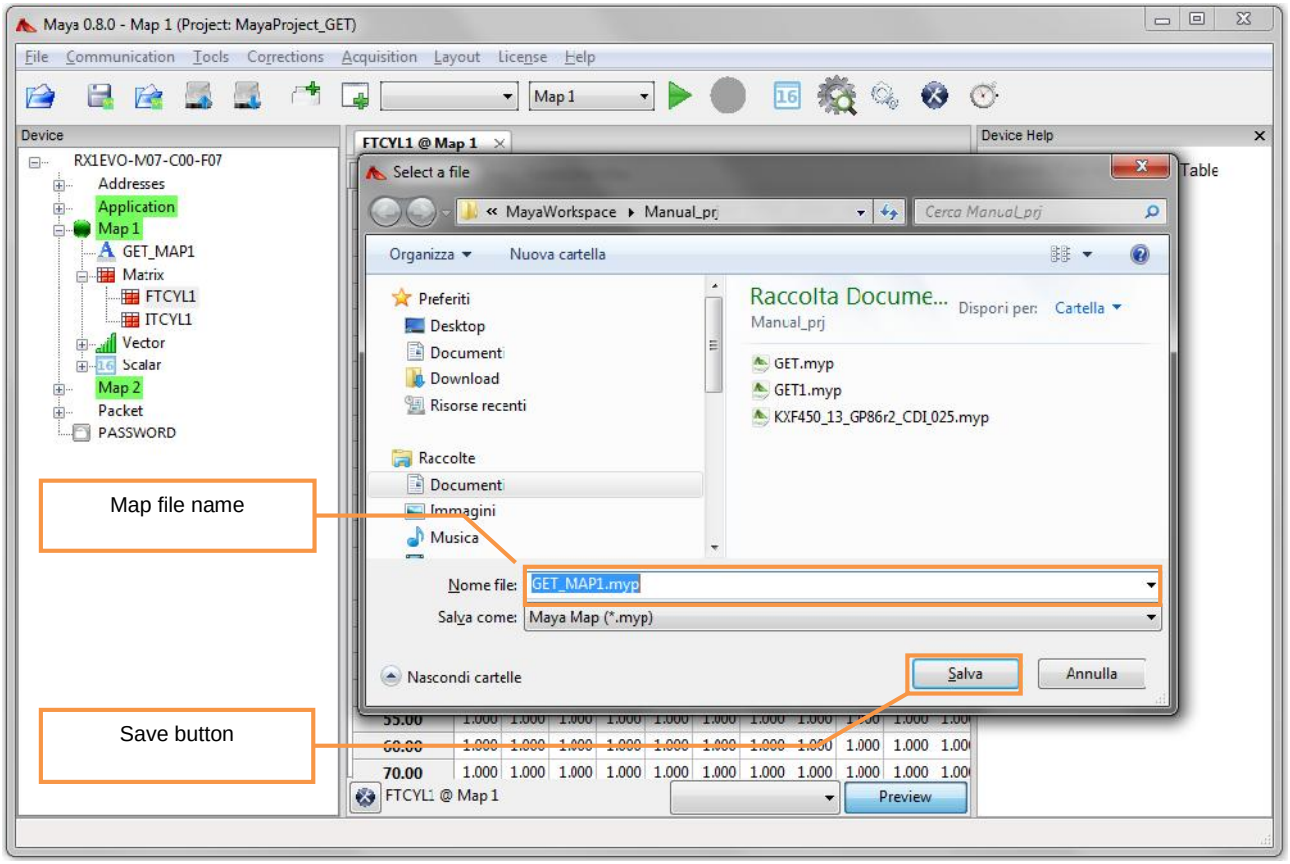
verify that the map you wish to save is active (symbol). Click on **Create Map…** (in menu **File**).



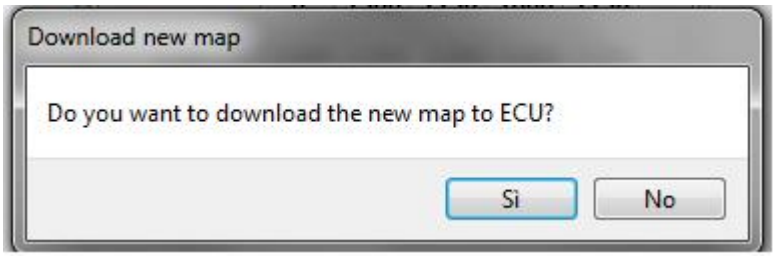
- Select matrix/matrixes you wish to save in new map (**Maya** suggest the list of modified matrixes automatically).



- Select folder and name of map, confirm with **Save**.
NOTE: we suggest to use the folder in **MayaWorkspace** .



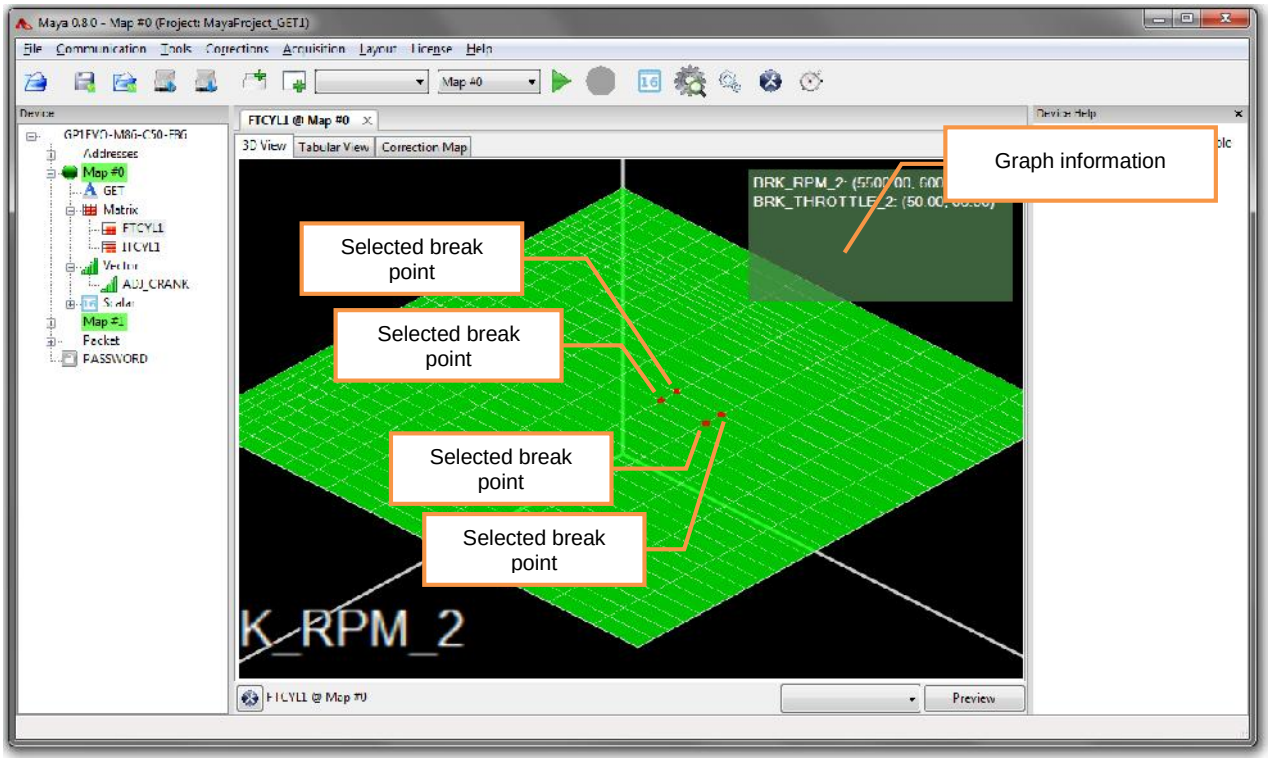
- At the end of this procedure the software suggest to save in the ECU the map: click on **Yes** to start the operation (in this case all condition in chapter **6.6.1** need to be satisfied).

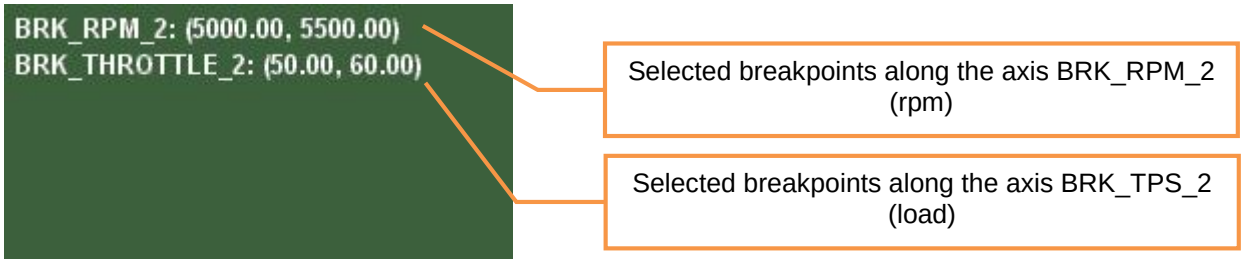


6.10.2.3 Modify a 3D graph (lic. EVO and ADVANCE)

Modification of values directly in **3D graph** acts directly in active map (as seen for **Tabular View**).
Proceed as follows:

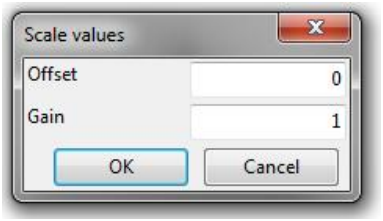
- Verify that the correct matrix is open
- Select **3D View** and desired graph area (left click): **break points** will be highlighted in red and values will be reported in graph informations.



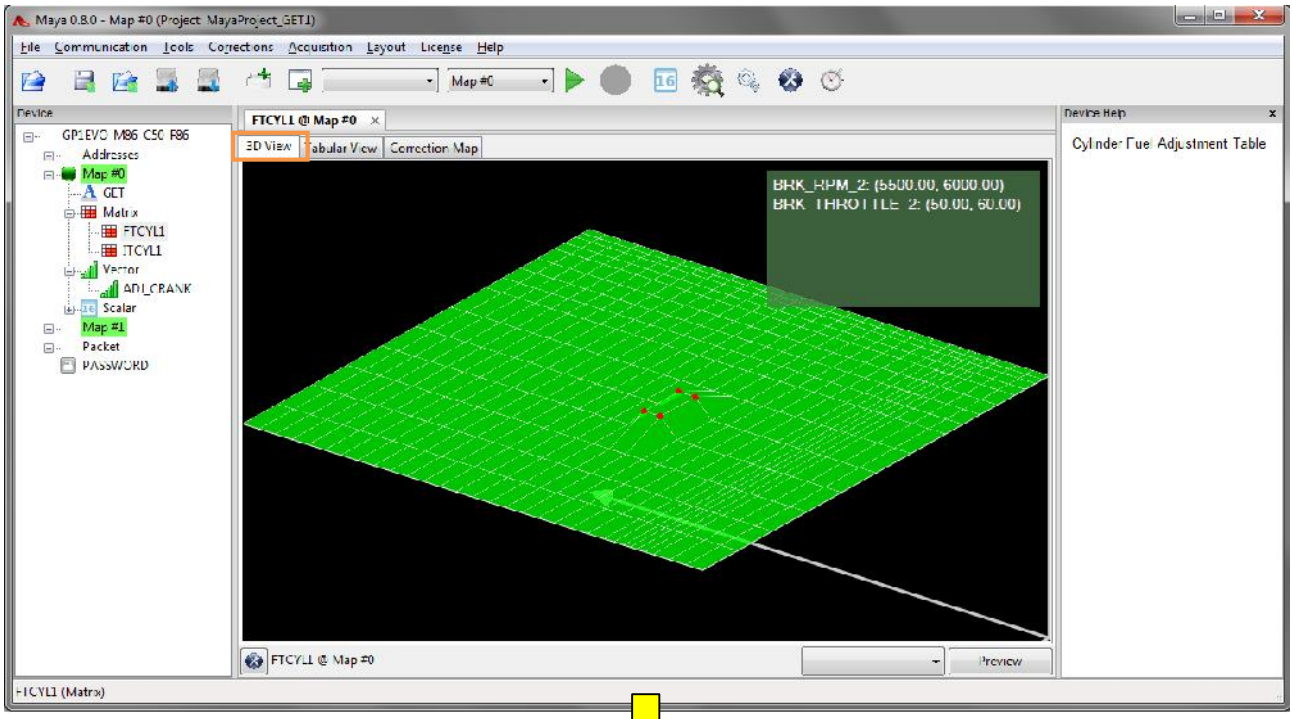


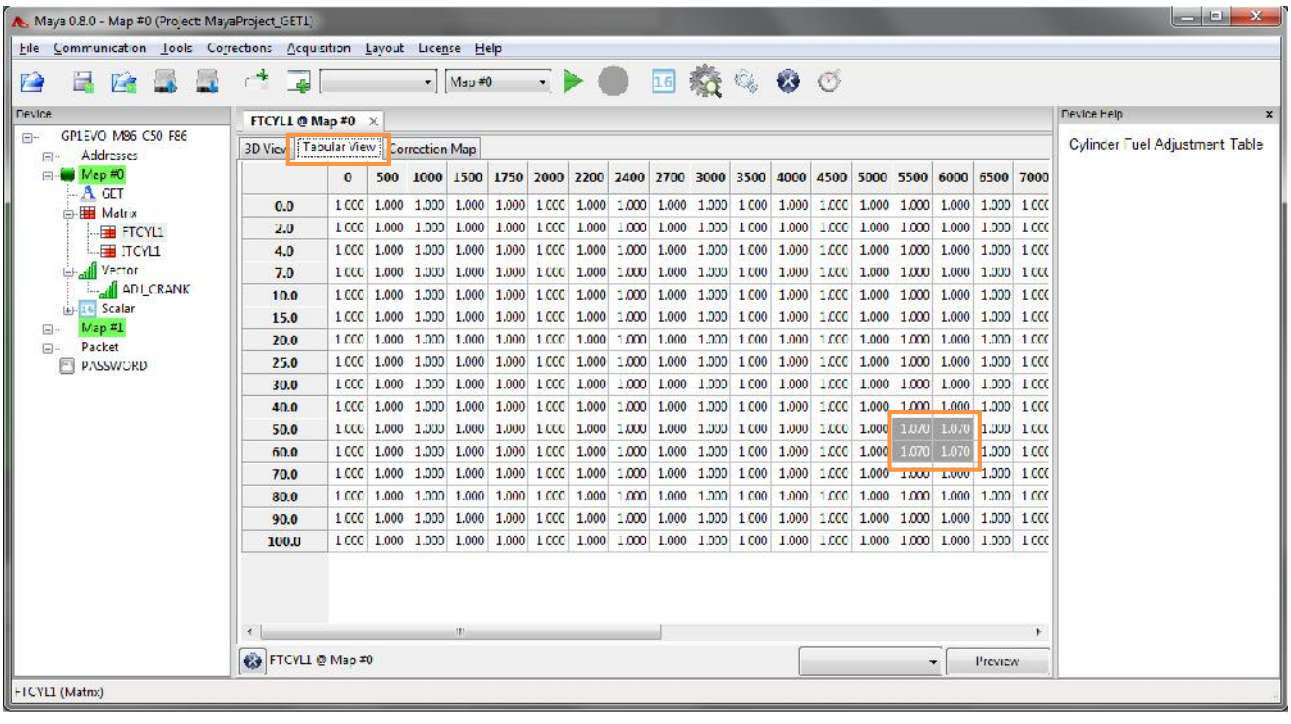
NOTE: to easy the selection of break points it is possible to zoom in or zoom out the graph scrolling with the mouse, the rotation could be done moving the mouse while pressing right click.

- To modify original values of **break points** it is possible to use hot keys or context menu using **Edit** (see chapter **6.10.2.1**).



- The graph will be updated and consequently also the relative table (**Tabular View**).





- Send the map to ECU (see **6.6**)

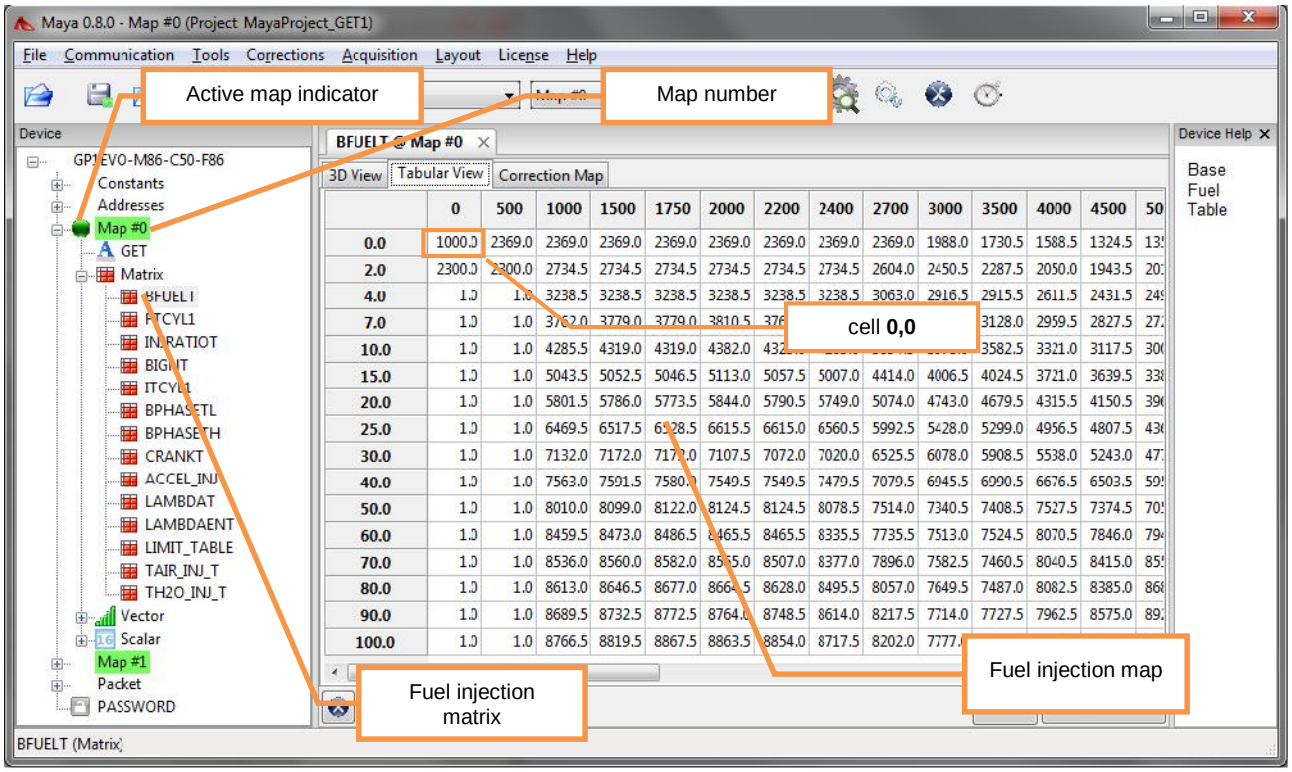
6.10.3 Fuel injection matrix modification (lic. ADVANCE)

Differently from other correction seen before, this matrix has got the total control over fuel injected: each modification have to be done really carefully.
Usually this matrix is modified during development of a vehicle or after heavy mechanical engine tuning.

6.10.3.1 Fuel injection matrix modification in ECU GP1EVO

Proceed as follows:

- Start Maya with double click on the icon
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if any device is loaded it is necessary to load one (see chapter **6.1**).
- Download the map from ECU (see chapter **6.3.3**).
- Verify that the map you wish to modify is active (symbol near **MAP #...**).
- Double click on **BFUELT**: the software will show you the table for fuel injected time in **Activity** area



Column **0** and **500** contains values **1.0** since third row: this is because, at idle, **breakpoints** are never reached. The cell **0,0** (working during crank – see chapter **6.10**) and the three cells nearby this (in some way are linked to engine cranking).

- Apply needed modifications as discussed in previous chapters:
  6.10.2.1: **Tabular View** parameter modification
  6.10.2.2: Correction Map modification
  6.10.2.3: 3D View matrix modification
- Send the map to ECU (see **6.6**)

6.11 Change spark advance

Spark advance modification could be done in many different ways:

- With **E**nd **O**f **L**ine of ECU
- From matrix for advance correction
- From matrix for base advance map

Changes for spark advance could be done independently for maps inside the device.

6.11.1 EOL modification (lic. EVO and ADVANCE)

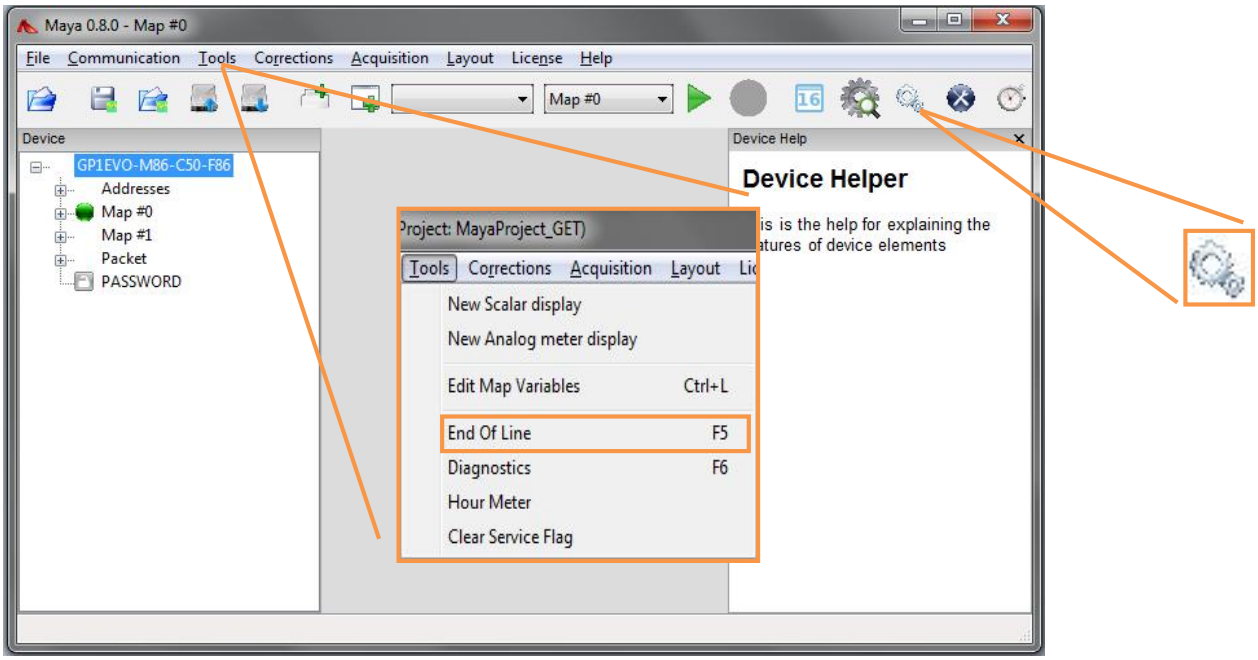
Modification of **E**nd **O**f **L**ine works through all working range of the engine and it is linked to the type of used ECU. Changes couldn't be stored in your PC (see chapter **1.0**).
To change something in End Of Line the ECU must be connected to PC (see chapter **6.2**).

6.11.1.1 EOL modification on ECU GP1 EVO (lic. EVO and ADVANCE)

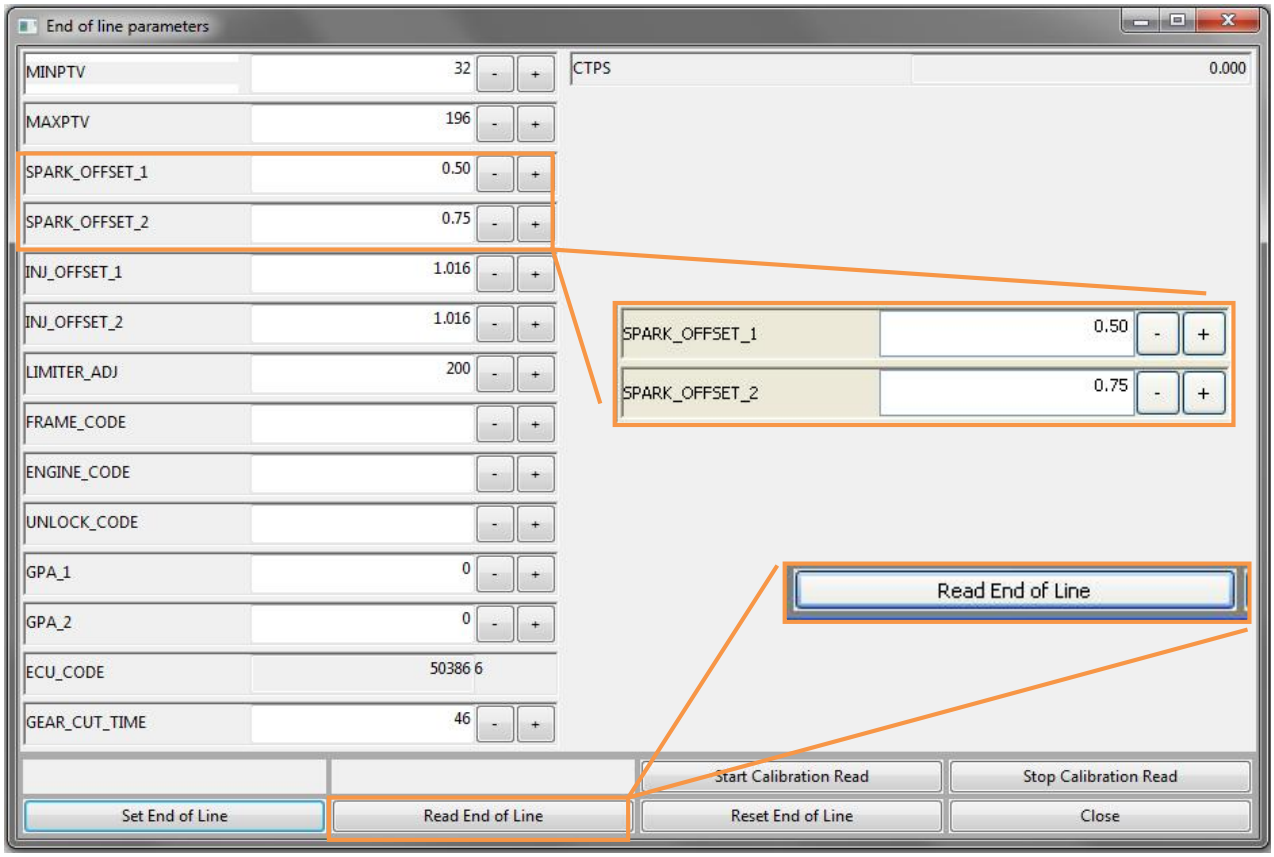
To modify **E**nd **O**f **L**ine in ECU GP1 EVO proceed as follows:

- Start Maya with double click on the icon 
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTA: if any device is loaded it is necessary to load one (see chapter **6.1**).
- Click on **End Of Line** (in **Tools**) or in the icon  in instrument bar of **Maya**.

  NOTE: if **Enable Hot keys …** are enabled you could use also **F5**.



- Click on **Read End Of Line** to update parameters of EOL visualized in the window.



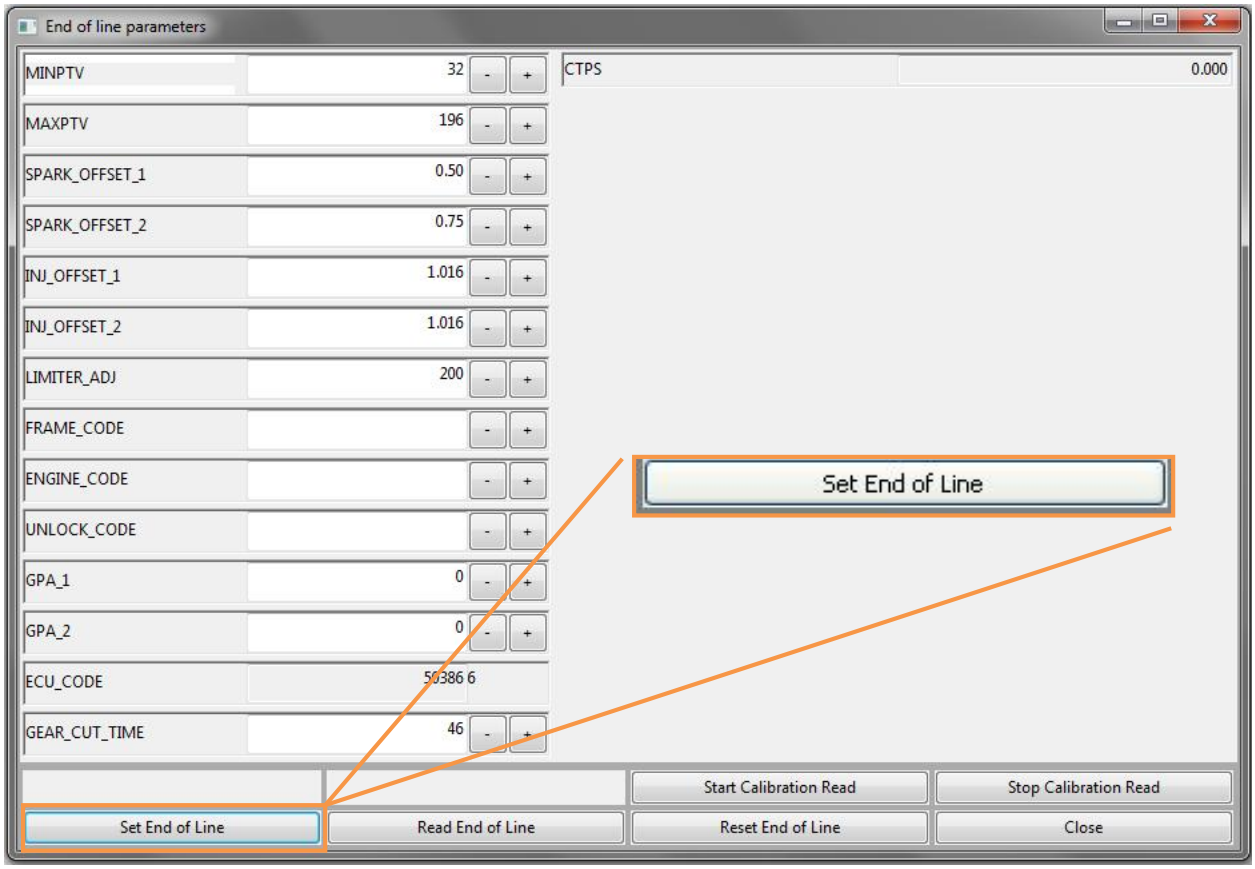
- Increase or decrease (as needed) values in **SPARK_OFFSET_1** (for **MAP #0**) or **SPARK_OFFSET_2** (for **MAP #1**).
  Variation could be done using **+** and **–** or using keyboard.
  Range of spark advance and available increments are in this table:

Minimum SPARK_OFFSET value	**- 30°**
Maximum SPARK_OFFSET value	**+ 5°**
Increase	**± 0.25°**

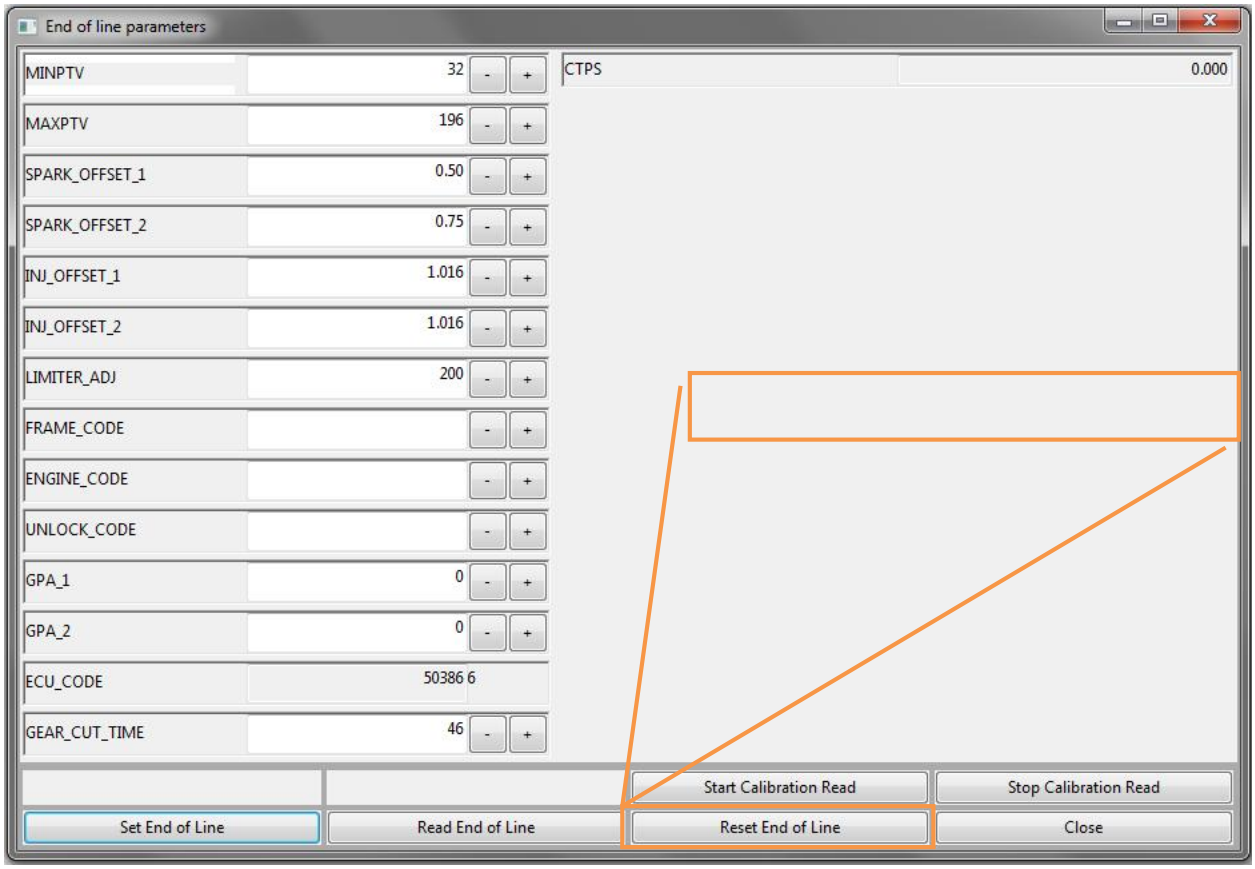
Negative values will delay the spark moment (the spark will be closer to T.D.C.).
Positive values will anticipate the spark moment (the spark will be far from T.D.C.).

WARNING: MODIFICATION ARE SUMMED OR SUBTRACTED TO VALUES CONTAINED IN BASE ADVANCE MAPS AND ADVANCE CORRECTION TABLE (ITCYL1)

- At the end of modification click on **Set End Of Line** to update parameters stored in ECU.



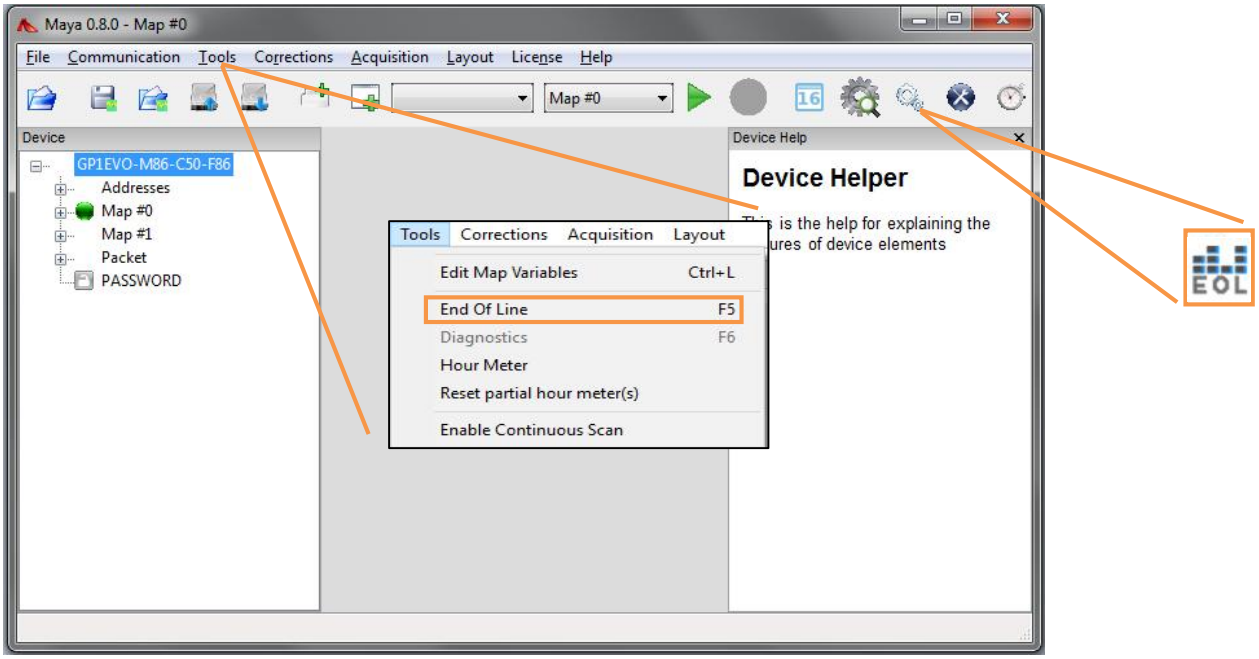
- If you want to get back to default data, press **Reset End of Line**.



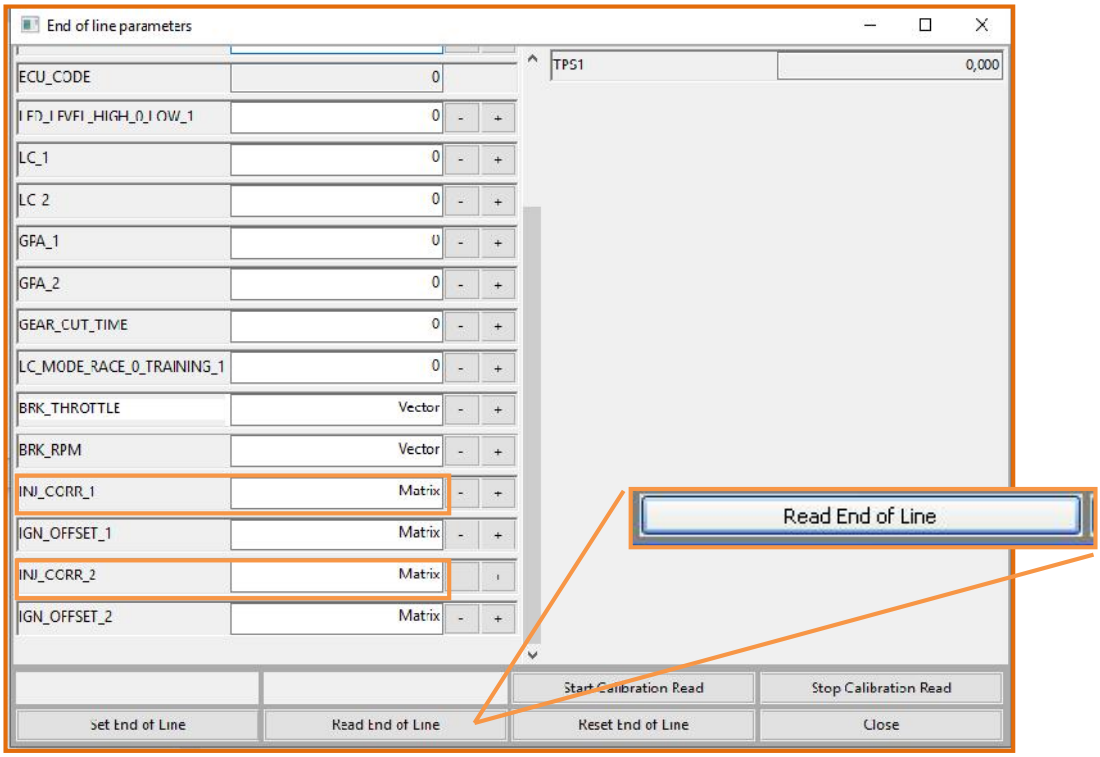
WARNING: this operation will reset all EOL settings

6.11.1.2 EOL modification on ECU RX1 PRO (lic. EVO and ADVANCE)

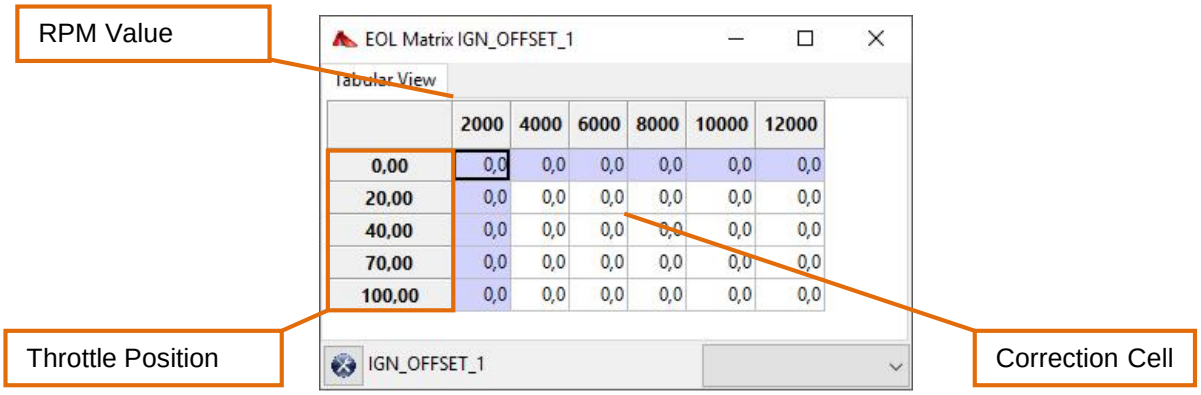
- Start Maya with double click on the icon
- Connect ECU to PC (chapter **6.2**).
- Load a device (if necessary) and check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if any device is loaded it is necessary to load one (see chapter **6.1**).
- Click on **End Of Line** (in menu **Tools**) or on the icon EOL in **Maya** toolbar.
  NOTE: if **Enable Hot keys …** are enabled you could use also **F5**.



- Click on **Read End Of Line** to update parameters of end of line visualized in the window **End Of Line parameters**.



- Double click on **Matrix** label at right of **INJ_CORR_1** (to change fuel quantity in Map 1) or **INJ_CORR_MAP_2** (to change fuel quantity in Map 2). Matrix below will be displayed:



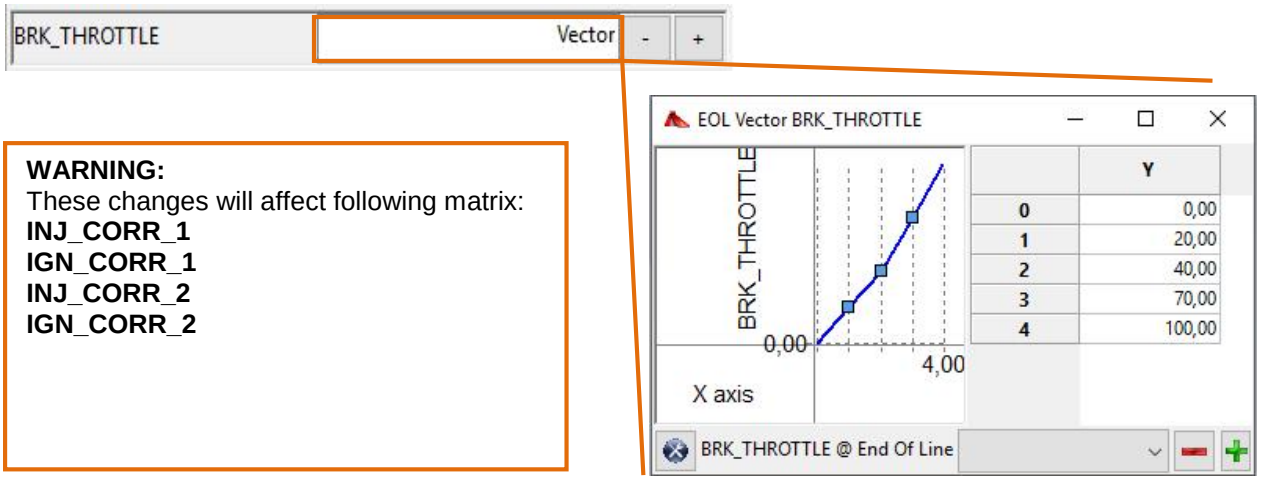
Select one correction cell (or more) and increase or decrease (as per your needs) values by typing values from keyboard, or by using Maya Hotkeys (**q** = -5° ; **w** = +5° ; **a** = -1° ; **s** = +1°).
Range of spark advance and available increments are in this table:

Minimum SPARK_OFFSET value	**- 30°**
Maximum SPARK_OFFSET value	**+ 5°**

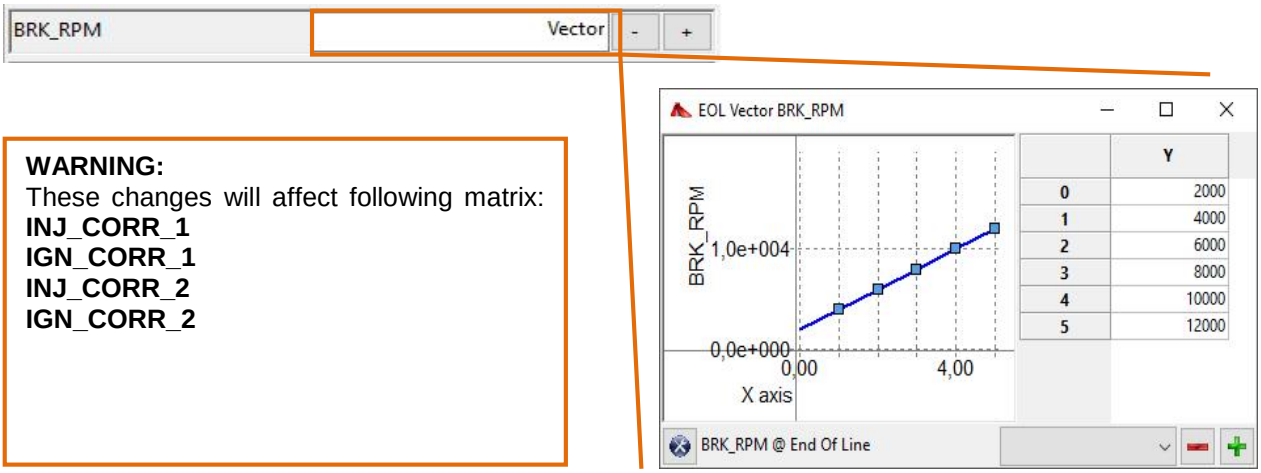
Negative values will delay the spark moment (the spark will be closer to T.D.C.).
Positive values will anticipate the spark moment (the spark will be far from T.D.C.).

WARNING: MODIFICATION ARE SUMMED OR SUBTRACTED TO VALUES CONTAINED IN BASE ADVANCE MAPS AND ADVANCE CORRECTION TABLE (ITCYL1)

PLEASE NOTE: Correction Cells are in function of RPM value and throttle position (like a normal map matrix). User can change these reference values by double click on BRK_RPM and BRK_THROTTLE **vector** label.

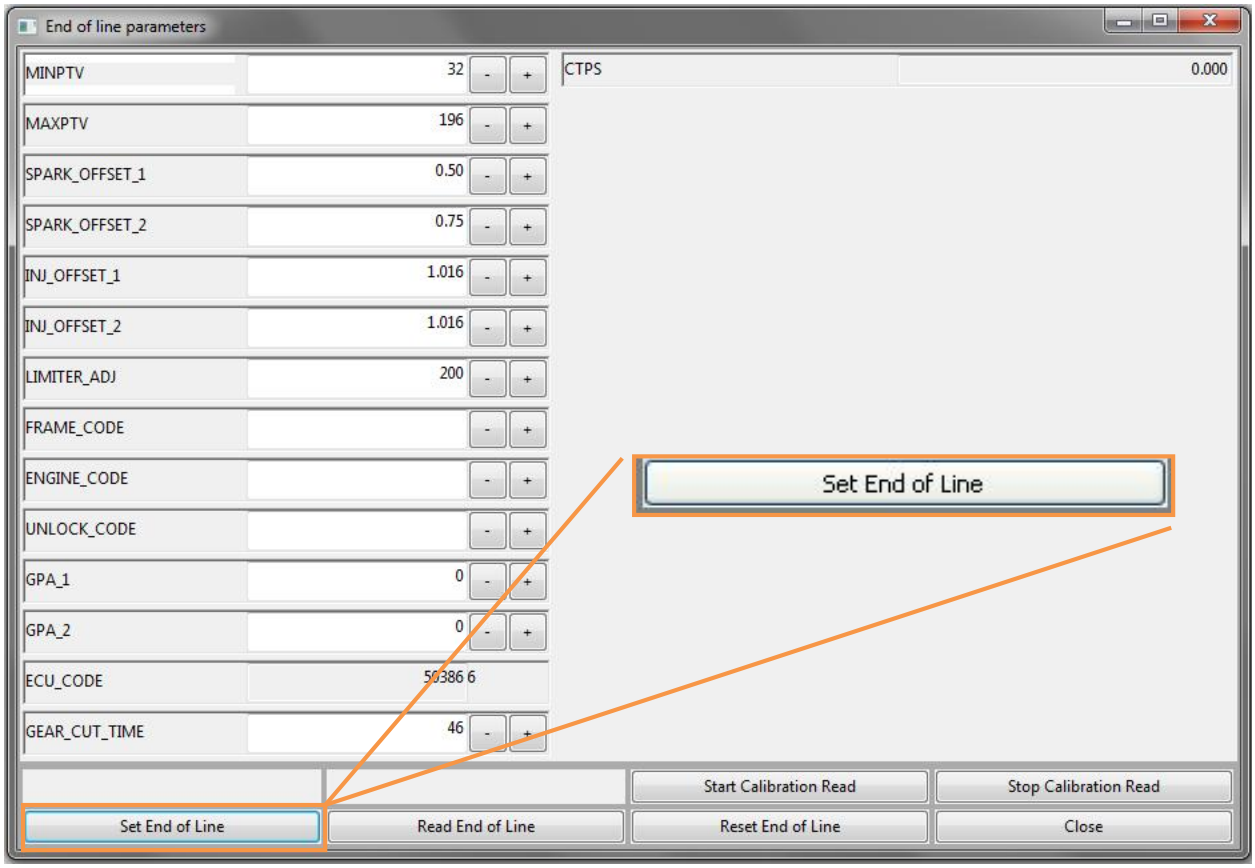


WARNING:
These changes will affect following matrix:
INJ_CORR_1
IGN_CORR_1
INJ_CORR_2
IGN_CORR_2



WARNING:
These changes will affect following matrix:
INJ_CORR_1
IGN_CORR_1
INJ_CORR_2
IGN_CORR_2

- At the end of modification click on **Set End Of Line** to update parameters stored in ECU.

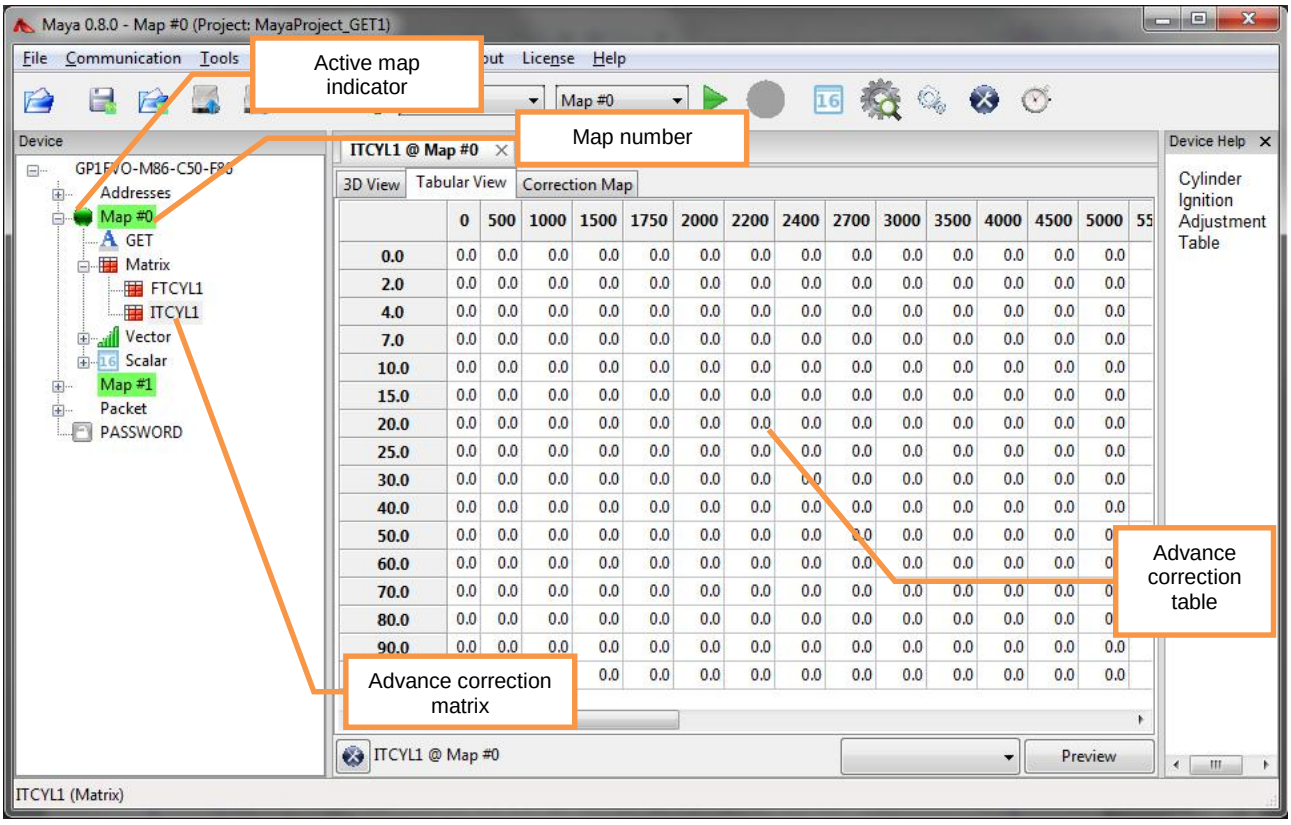


- If you want to get back to default data, press **Reset End of Line**.
WARNING: this operation will reset all EOL settings

6.11.2 Advance correction matrix modification (lic. EVO and ADVANCE)

With modification to advance correction matrix (**ITCYL1**) you could change specific **break points** in engine working range (rpm and throttle).
Changes could be saved on PC.
Proceed as follows:

- Start Maya with double click on the icon
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTA: if any device is loaded it is necessary to load one (see chapter **6.1**).
- Download from ECU the map you wish to modify (see chapter **6.3.3**).
- Verify that the map is active (symbol near **MAP #...**).
- Double click on **ITCYL1** of the map you need: correction table will be visualized in **Activity** area.



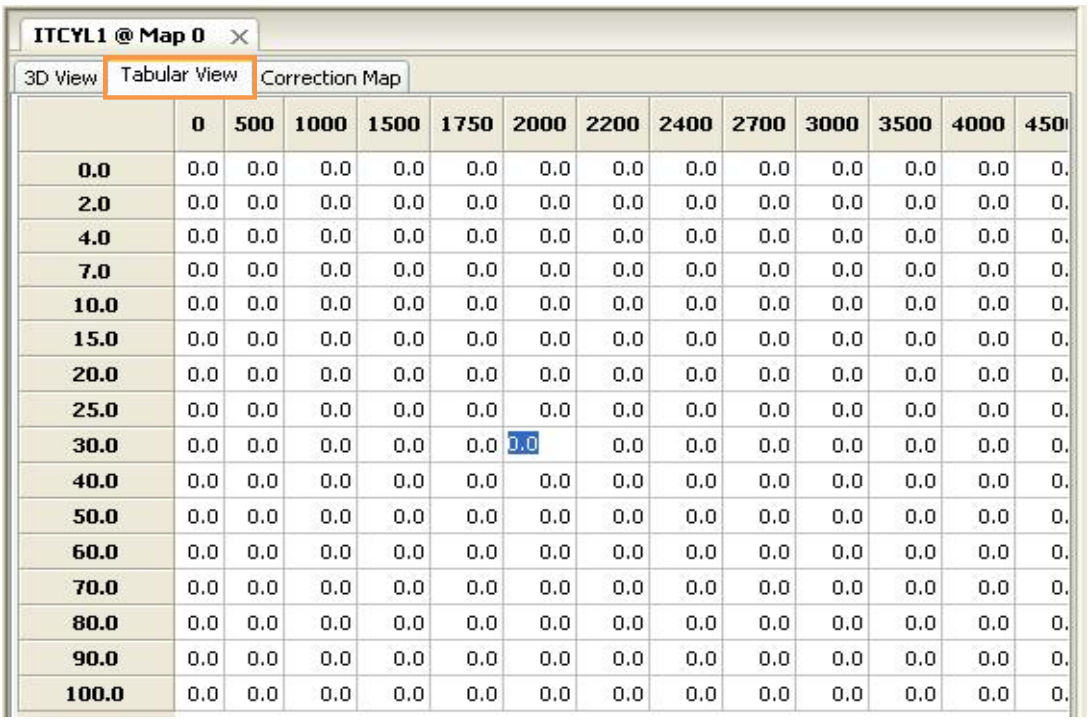
To change values you could:

- Work in **Tabular View**: values modified in this table are written in active map
- Modify values in **Correction Map**: you can create a new table with modified values.
- Modify **3D graph** in the matrix

6.11.2.1 Modify Tabular View (lic. EVO and ADVANCE)

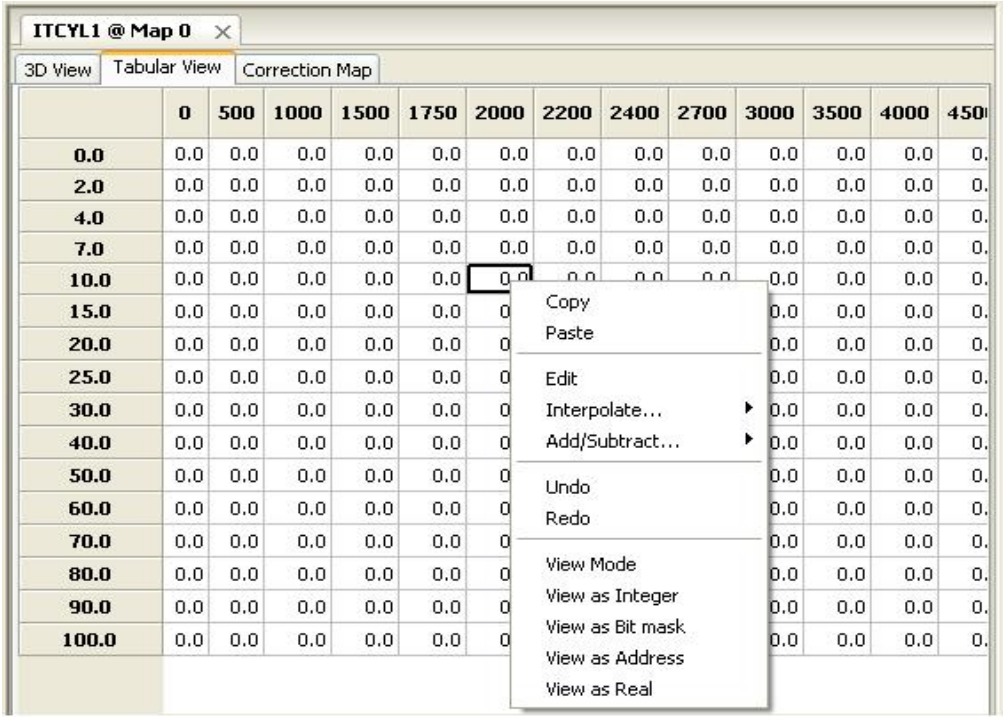
As discussed, modification in **Tabular View** modify directly the selected matrix and could be visible in 3D graph immediately.
Proceed as follows:

- Verify that the correct matrix is open
- Select **Tabular view** and desired cell (double left click), type the value with the keyboard:



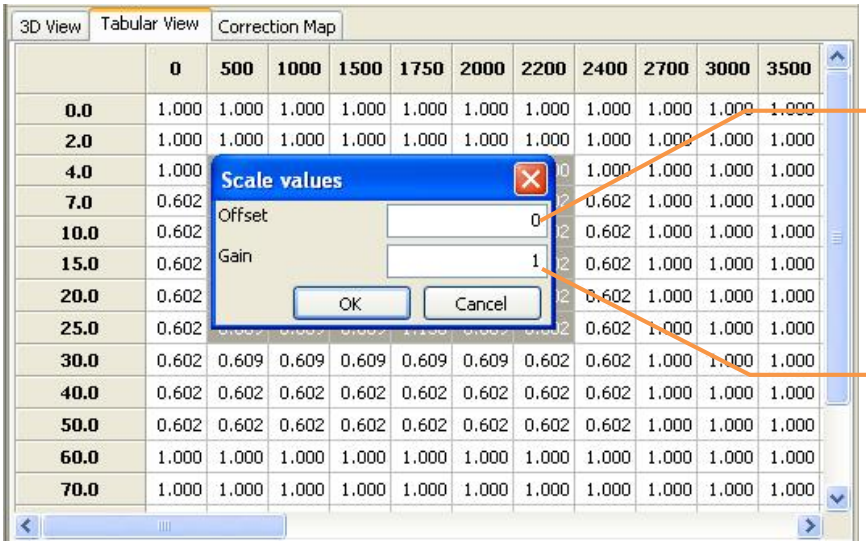
	0	500	1000	1500	1750	2000	2200	2400	2700	3000	3500	4000	450
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
70.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.

- Correction could be done also with context menu selecting desired cell and then right click: you will see the following menu.



With this procedure you could select more than one cell and modify more values together.
Using **Add/Subtract** (or corresponding Hotkey) the user could increase/decrease values as desired.

Using **Edit Maya** will show the following menu:



The final value contained in the cell will be:

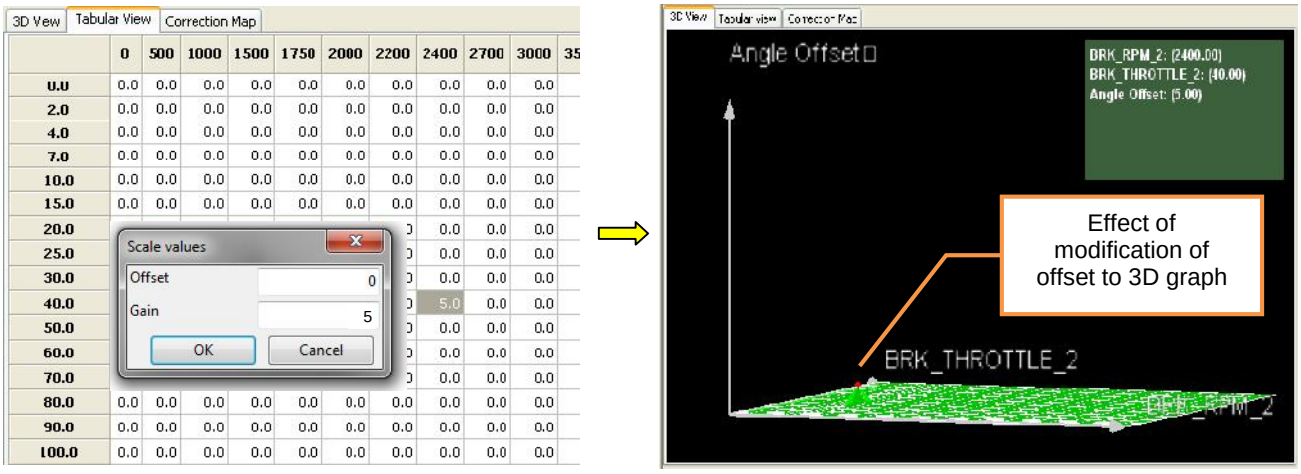
new_value=old_value + Offset

new_value : new value in the selected cell
old_value : initial value in the selected cell
Offset : value typed in **Offset** of **Edit** window

Table below shows the range of value and steps:

OFFSET	Value
OFFSET minimum	- 64 °
OFFSET maximum	+ 64 °

Once defined **Offset** push **OK** to confirm.

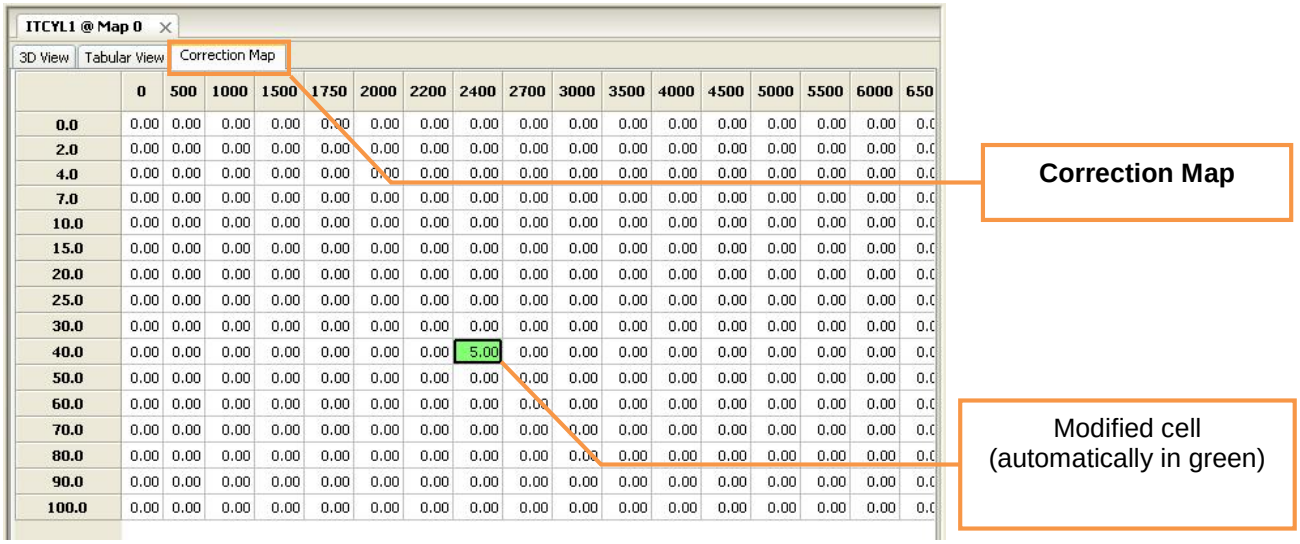


- Send the map to ECU (see **6.6**)

6.11.2.2 Modification of Correction Map (lic. EVO and ADVANCE)

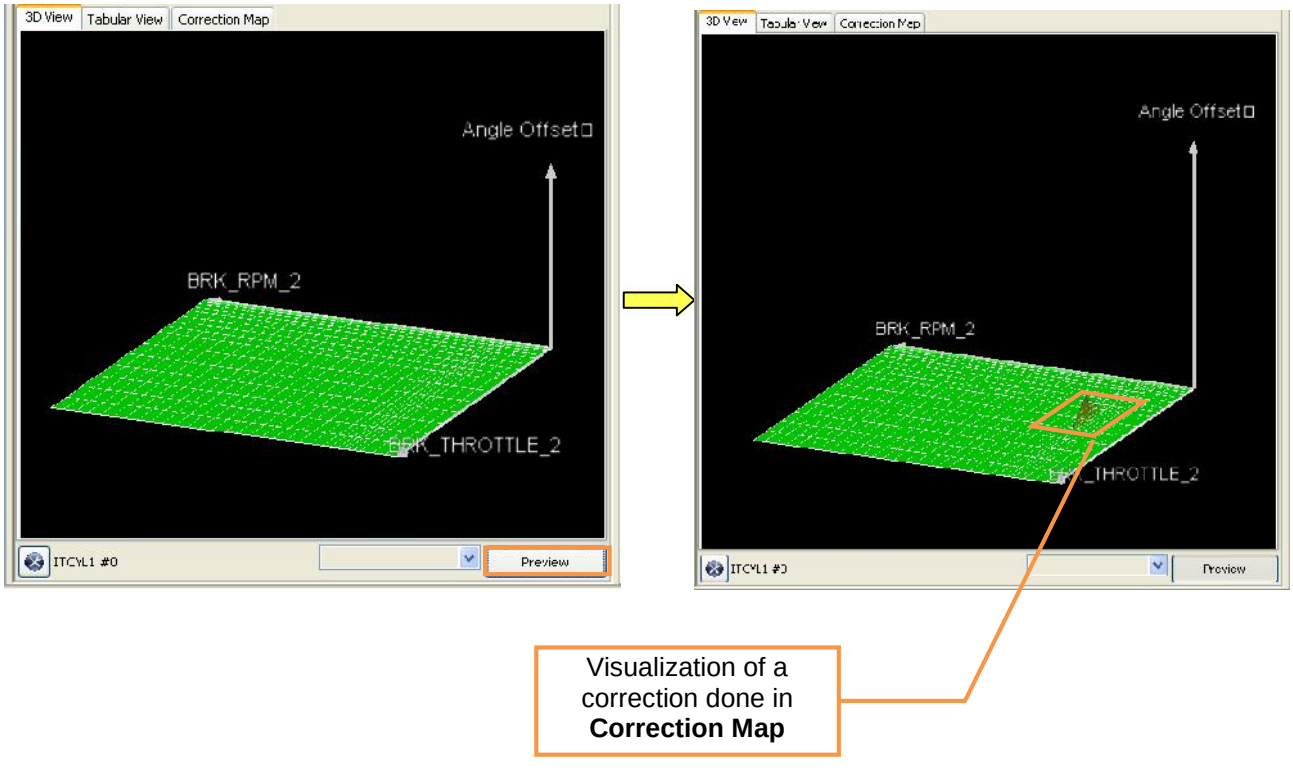
Modifying **Correction Map** you could, as discussed, modify maps without changing original base map. The correction map is a sort of “draft”. At the end of modifications, creating a new map will store everything. Proceed as follows:

- Verify that the correct matrix is open
- Select **Correction Map** and proceed with changes as per previous chapter.



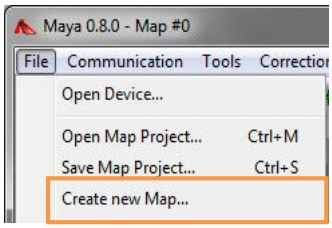
NOTE: green cells show that the value has been increased, yellow cells show that the value has been reduced.

Changes in **Correction Map** are in red (green is used for correction in **Tabular View**) in **3D graph** only after the user selects **Preview**.

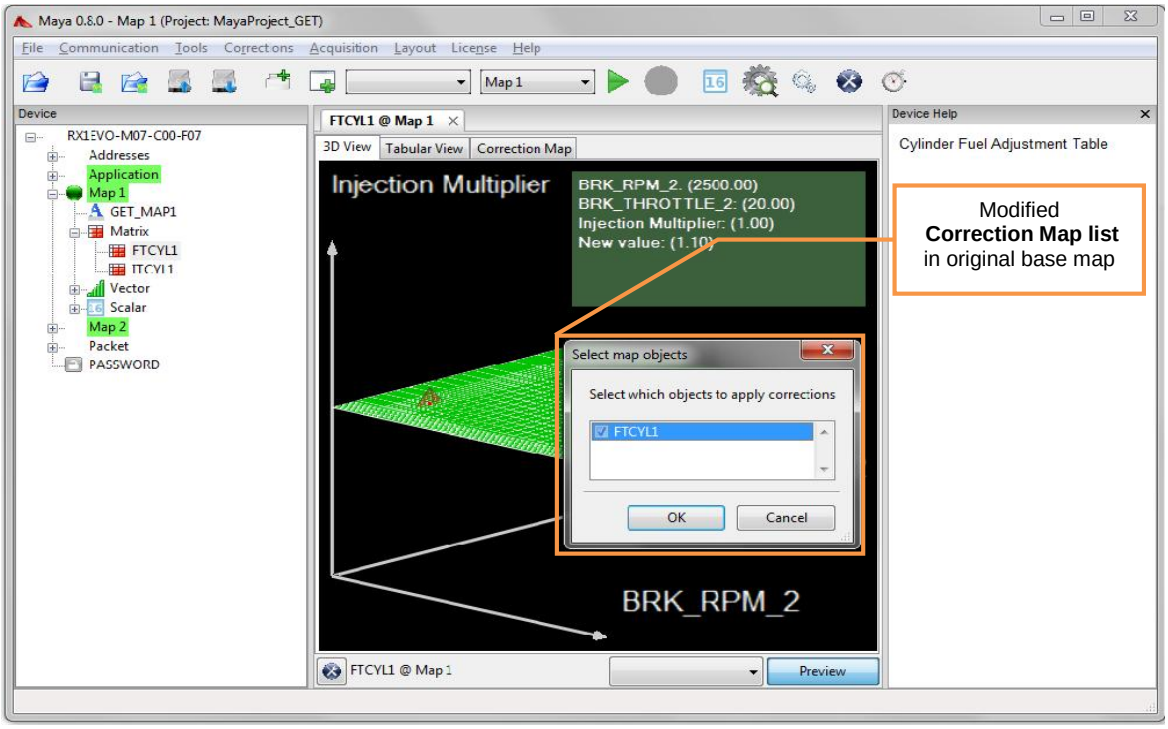


To store correction create a new map:

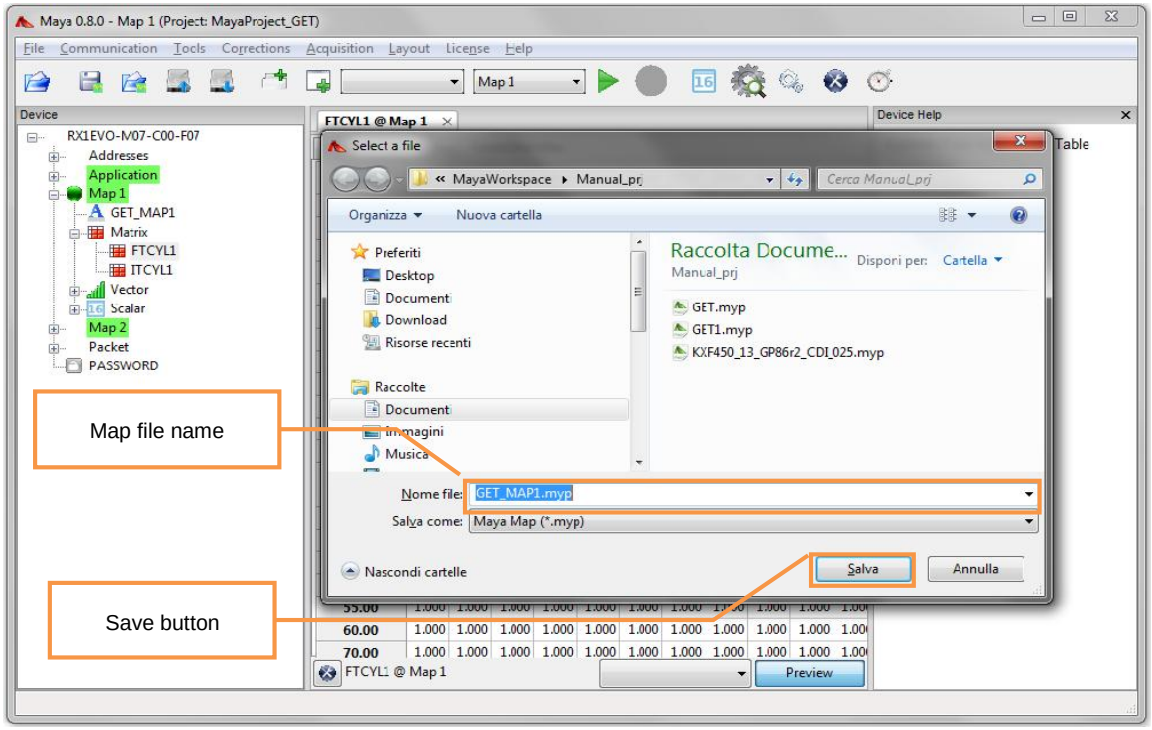
- verify that the map you wish to save is active (symbol). Click on Create Map… (in menu File).



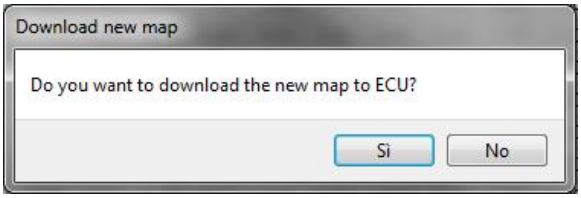
- Select matrix/matrixes you wish to save in new map (**Maya** suggest the list of modified matrixes automatically).



- Select folder and name of map, confirm with **Save**.
  NOTE: we suggest to use the folder in **MayaWorkspace** .



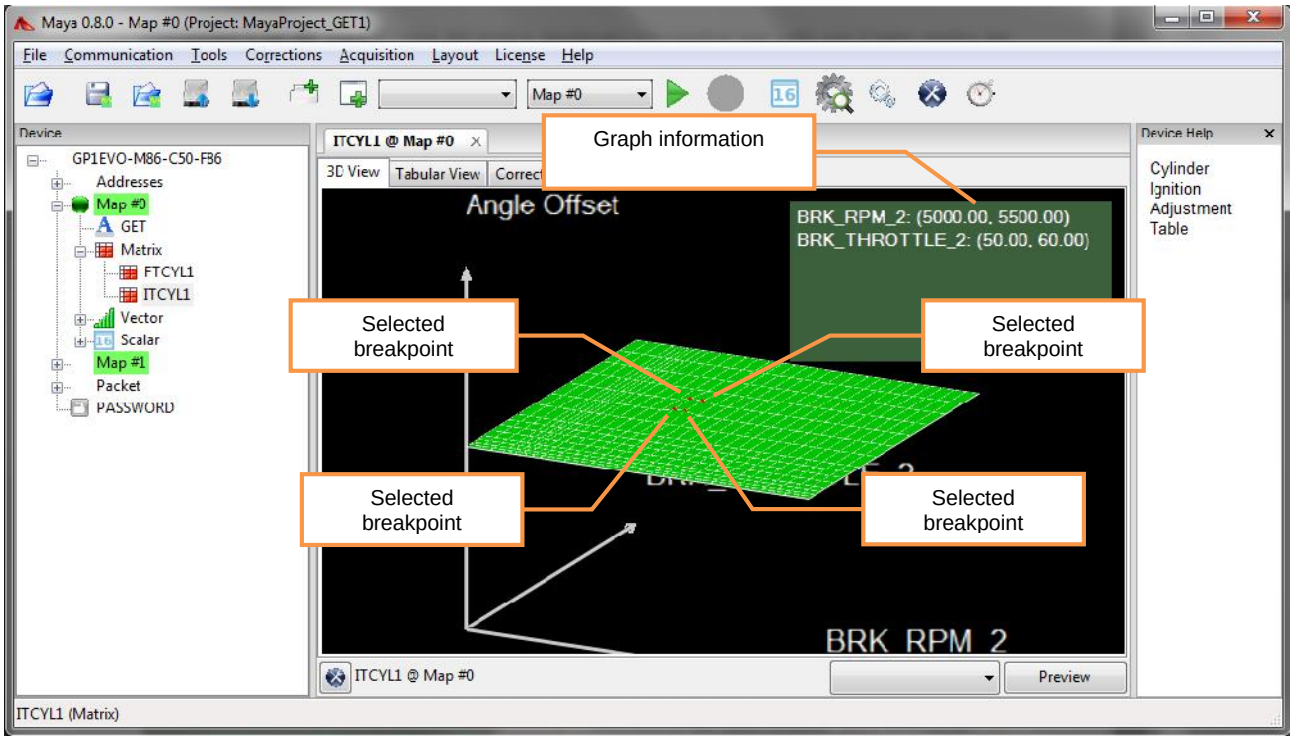
- At the end of this procedure the software suggest to save in the ECU the map: click on **Yes** to start the operation (in this case all condition in chapter **6.6.1** need to be satisfied), select **No** to get back to **Maya**.

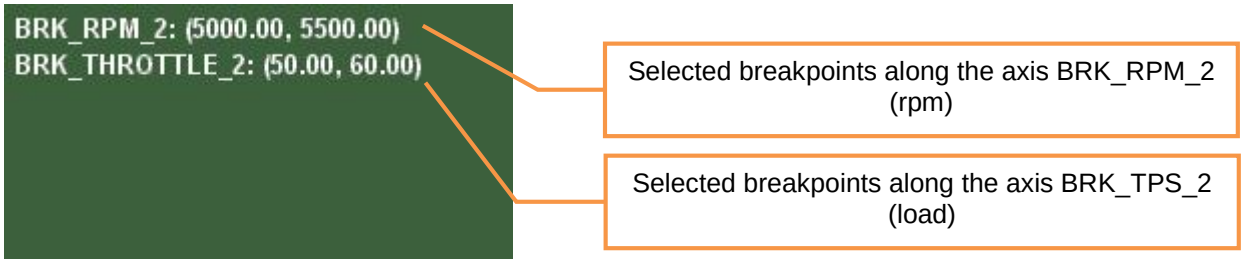


6.11.2.3 Modify a 3D graph (lic. EVO and ADVANCE)

Modification of values directly in **3D graph** acts directly in active map (as seen for **Tabular View**).
Proceed as follows:

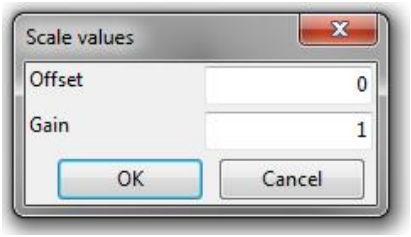
- Verify that the correct matrix is open
- Select **3D View** and desired graph area (left click): **break points** will be highlighted in red and values will be reported in graph informations.



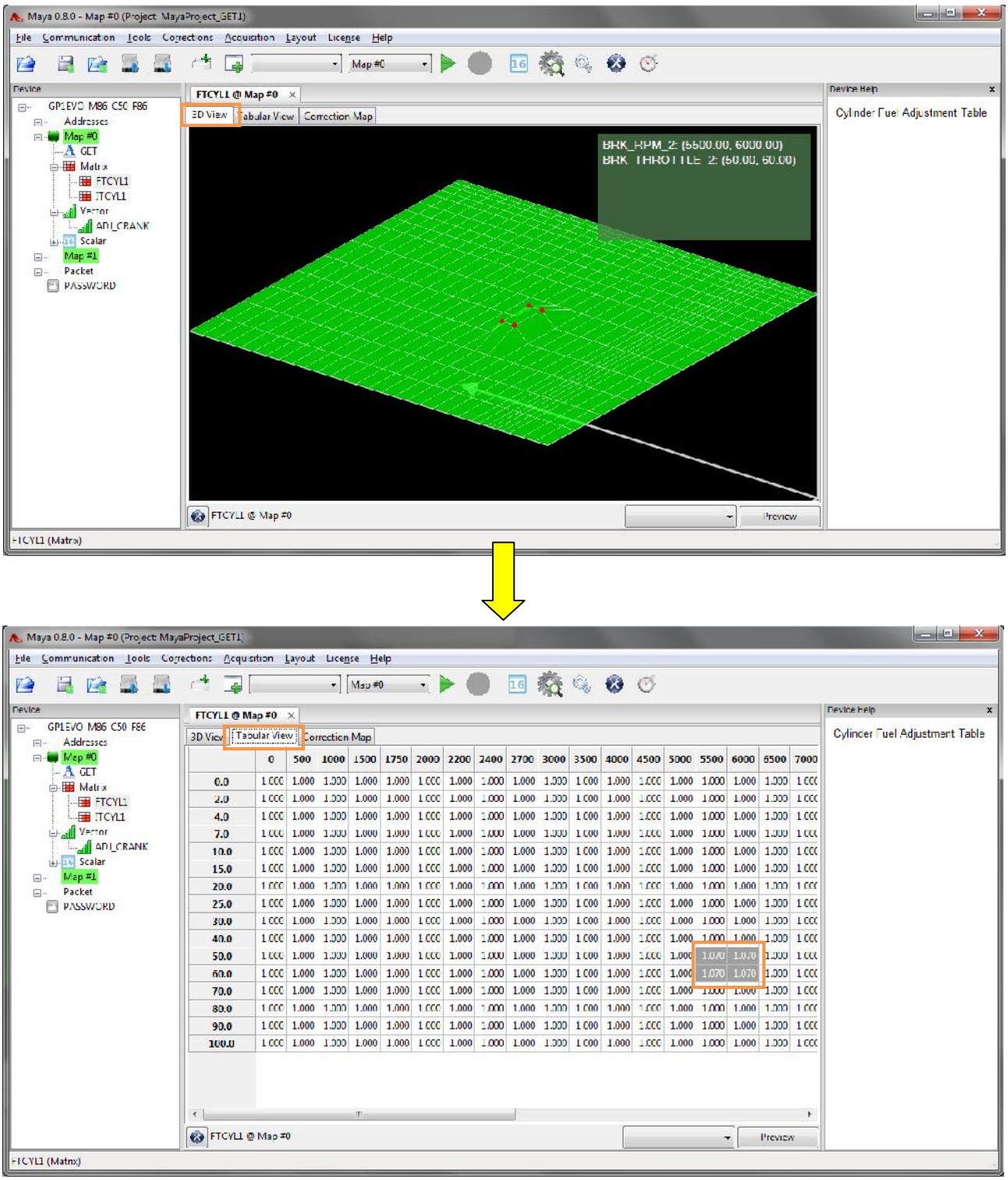


NOTE: to easy the selection of break points it is possible to zoom in or zoom out the graph scrolling with the mouse, the rotation could be done moving the mouse while pressing right click.

- To modify original values of **break points** it is possible to use hot keys or context menu using **Edit** (see chapter **6.11.2.1**).



- The graph will be updated and consequently also the relative table (**Tabular View**).



- Send the map to ECU (see **6.6**)

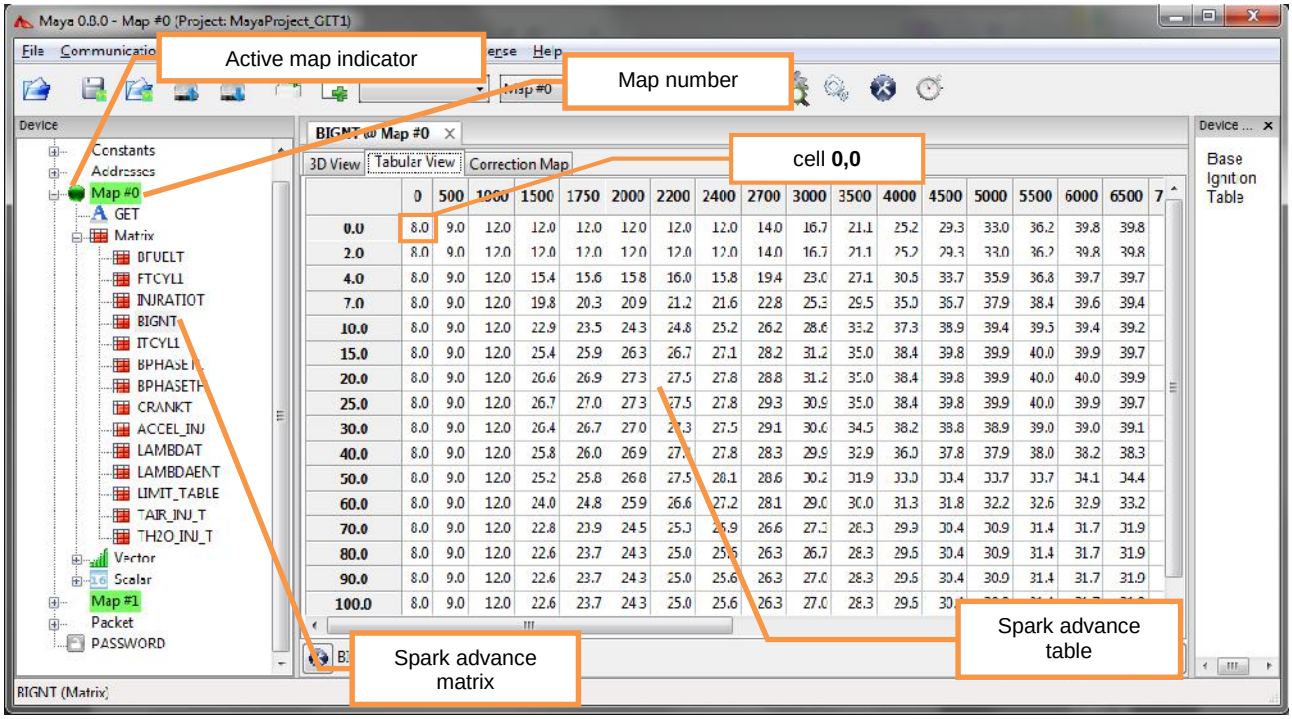
6.11.3 Modification of advance matrix (lic. ADVANCE)

Differently from other correction seen before, this matrix has got the total control over advance values: each modification have to be done really carefully.
Usually this matrix is modified during development of a vehicle or after heavy mechanical engine tuning.

6.11.3.1 Modification of advance matrix in ECU GP/RX/ HPUH/CDI/ECULMB

Proceed as follows:

- Start Maya with double click on the icon 
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if any device is loaded it is necessary to load one (see chapter **6.1**).
- Download the map from ECU (see chapter **6.3.3**).
- Verify that the map you wish to modify is active (symbol  near **MAP #...**).
- Double click on **BIGN**: the software will show the table for spark advance in **Activity** area



Column **0** and **500** contains values **1.0** since third row: this is because, at idle, **breakpoints** are never reached. The cell **0,0** (working during crank – see chapter **6.12**) and the three cells nearby this (in some way are linked to engine cranking).

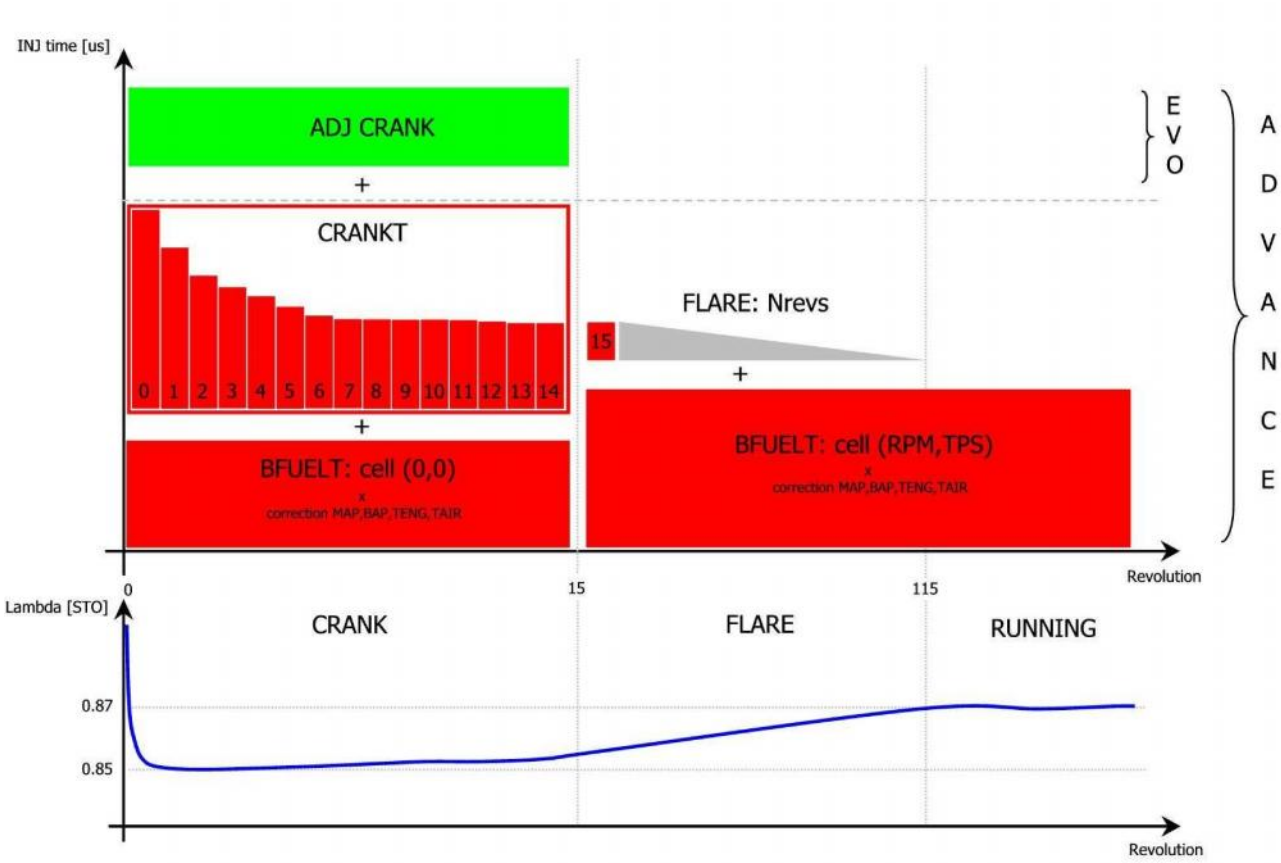
- Apply needed modifications as discussed in previous chapters:
  6.11.2.1: **Tabular View** parameter modification
  6.11.2.2: Correction Map modification
  6.11.2.3: 3D View matrix modification
- Send the map to ECU (see **6.6**)

6.12 Manage engine cranking (CRANK strategy)

The engine first revolutions are called **CRANK**. **CRANK** strategy manage ECU during first 16 revolutions of crank shaft and parameter are defined in specific injection maps.
It is obvious that a correct CRANK regulations helps to:

- Start easily the engine
- Avoid unwanted and dangerous situations (as for examples in kick-starter engines)

CRANK strategy permit to modify the injected fuel quantity (belonging to engine temperature). This strategy will make some corrections defined by starting procedure and environmental parameters.
After **CRANK**, the engine will operate as defined in base fuel map (**BFUELT** matrix in GP1EVO) and from all correction parameters in engine map (fuel correction, air temp, environmental pressure, etc…). The quantity of revolutions needed for this phase is defined in scalar **FLARE.**
The following picture resumes CRANK strategy:



The fuel quantity during **CRANK** is regulated by the value in cell **0,0** (first row, first column) of **BFUELT** matrix, by the matrix **CRANKT** and vector **ADJ_CRANK**.
FLARE will "synchronized" last value of fuel injected during CRANK to "normal" working parameters. During this phase, ECU will calculate fuel injected quantity using breakpoint (rpm, load, etc...) reached by the engine.
As a reference, LAMBDA sensor value is in the same picture: no peaks or steps mean that **CRANK** strategy is set correctly.

6.12.1 CRANK management

CRANK is managed by two different voices in injection map:

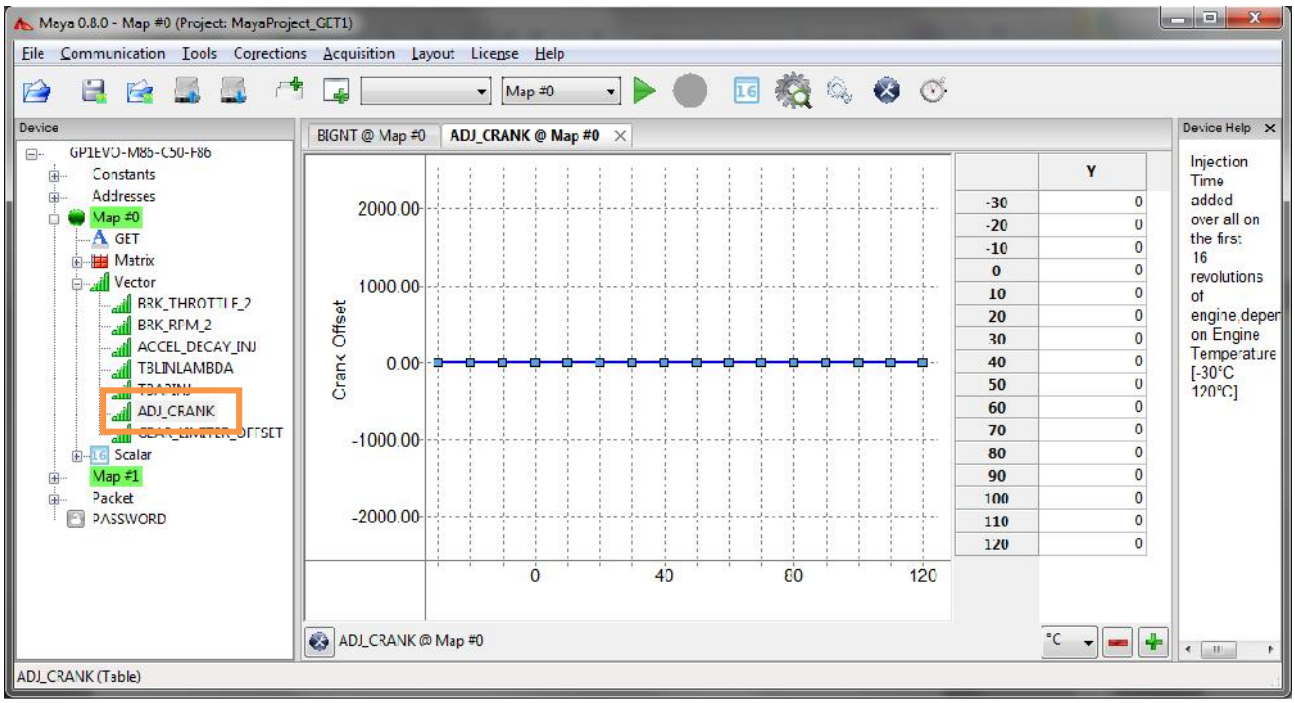
- **ADJ_CRANK** vector (only for EVO and ADVANCE)
- **CRANKT** matrix (only for ADVANCE)
- **FLARE** scalar (only for ADVANCE)

It is suggested to set same parameters of CRANK both in **MAP #0** and **MAP #1**.

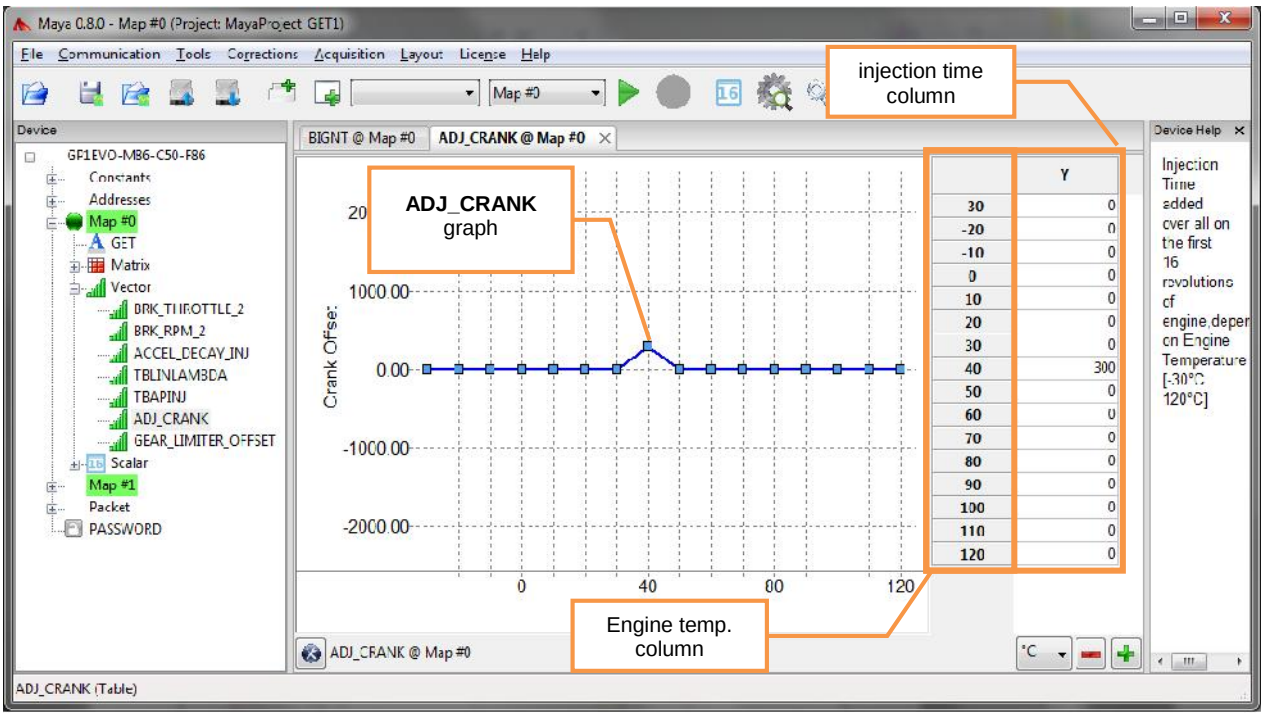
6.12.1.1 ADJ_CRANK vector (licences EVO and ADVANCE)

ADJ_CRANK vector is situated inside VECTOR tree in maps (MAP0 and MAP1) loaded in **Maya**:

- Start Maya with double click on the icon
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if no device is loaded please load one (see chapter **6.1**)
- Download the map you need from ECU (see chapter **6.3.3**).
- Check that map you need to modify is active (green indicator)
- Double click on **ADJ_CRANK**: you will visualize the correction values on **Activity** area.



- Increase or decrease injected fuel quantity during **CRANK** (type the additional opening time of the injector in milliseconds). **ADJ_CRANK** will adjust injection (column **Y** in the table) according to engine temperature. Temperature steps are 10 °C: if the engine is at 19°C, ECU will start the strategy at row **10** (not **20**).



NOTE: reducing values in **Y** you will lean the mix, increasing values you will enrich the mix.
The modification could be done graphically or in context menu (see chapter **3.4.4** e **3.4.5**).

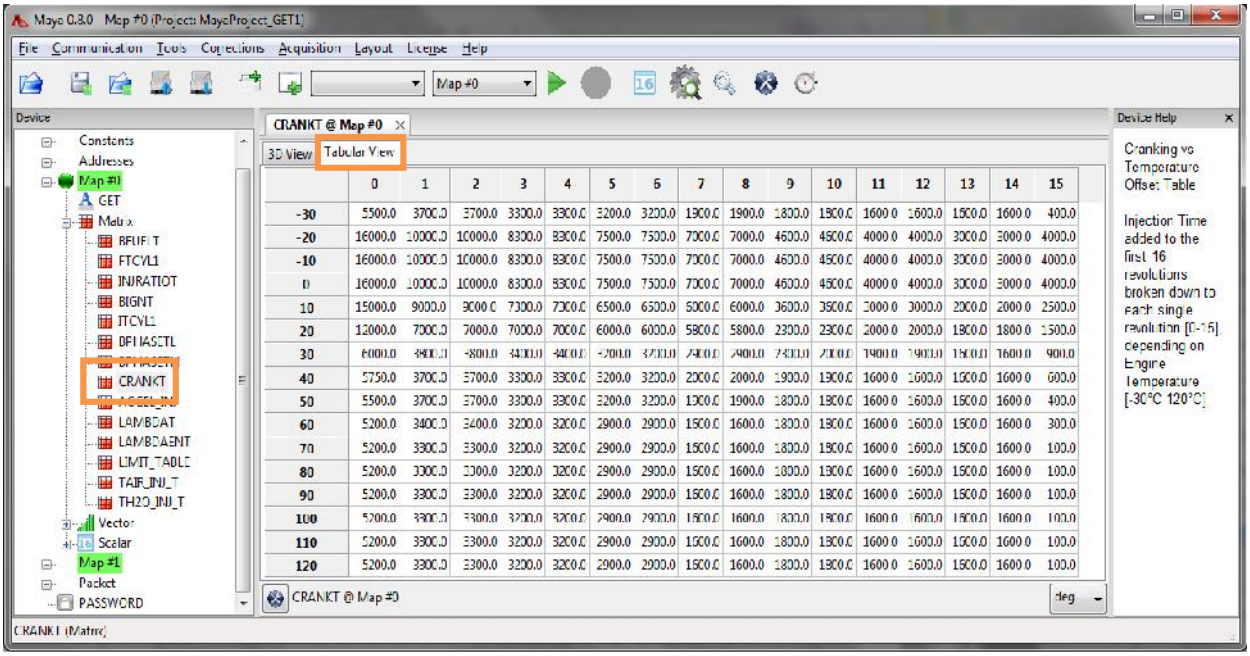
ATTENTION: a extremely lean mix could give problems to cranking and/or hard starting pedal kicks. A really rich mix will give problems of wet spark.

- Send the map to ECU (see **6.6**).

6.12.1.2 CRANKT matrix (only ADVANCE)

CRANKT matrix (or table **CRANKT**) is situated inside MATRIX tree in maps (MAP0 and MAP1) loaded in **Maya**.

- Start Maya with double click on the icon
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if any device is loaded it is necessary to load one (see chapter **6.1**).
- Download the map from ECU (see chapter **6.3.3**).
- Verify that the map you wish to modify is active (symbol near **MAP #...**).
- Double click on **CRANKT**: the software will show the table for spark advance in **Activity** area



- Increase or decrease injected fuel quantity during **CRANK** (type the additional opening time of the injector in milliseconds). **Columns** represent **engine rpm**, **rows** represent **engine temp** (°C), values in **cells** represent offset value (to add) to **injector opening time** (define in BFUELT in cell 0,0) in a specific engine rpm and temperature.
  You could visualize the correction clicking on **Tabular View** (as demonstrated in picture above).
  3D visualization of **CRANKT** is possible by clicking on **3D View**.
  Reducing values you will lean the mix, increasing values you will enrich the mix.
  Temperature steps are 10 °C: if the engine is at 19°C, ECU will start the strategy at row **10** (not **20**).
- Send the map to ECU (see **6.6**)

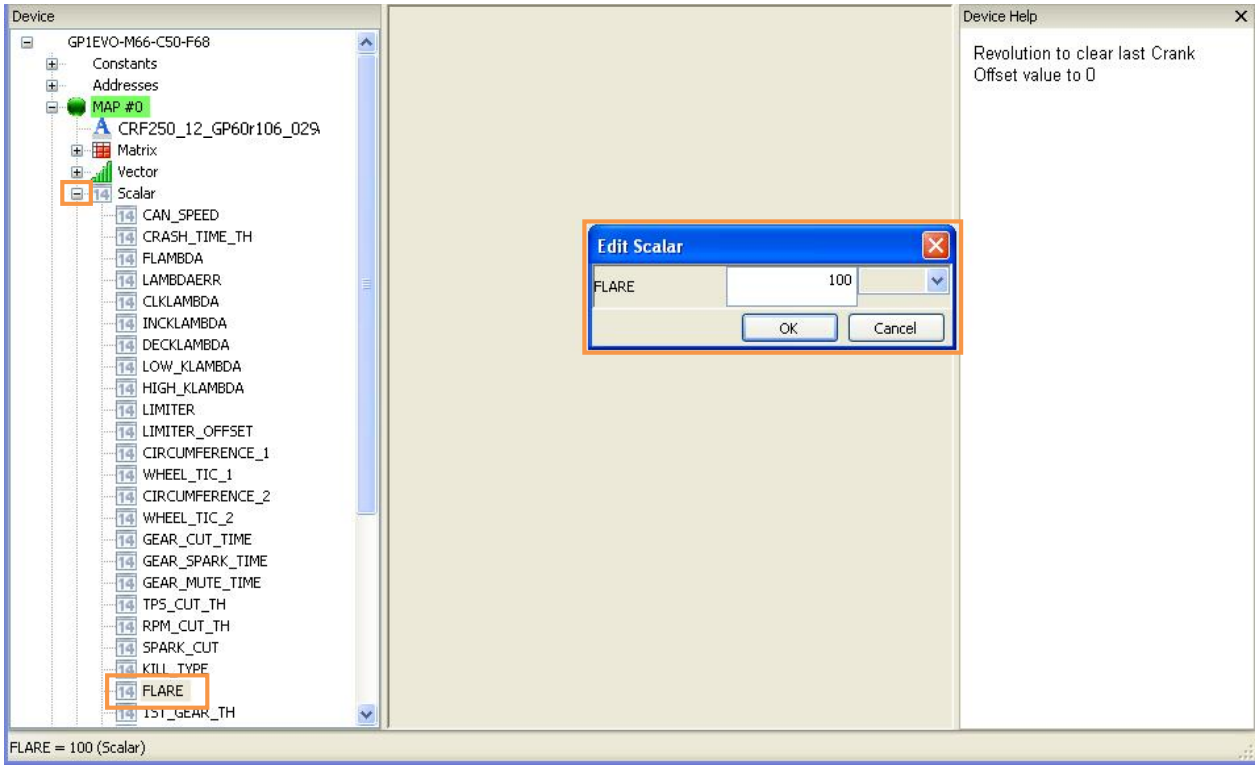
ATTENTION: a extremely lean mix could give problems to cranking and/or hard starting pedal kicks. A really rich mix will give problems of wet spark.

The last value in **CRANKT** (column 15) will be used by the ECU also in subsequent revolutions, but will be progressively decreased. After a certain number of revolution it will become zero. This moment is called **FLARE** and it is adjustable by modifying this scalar.

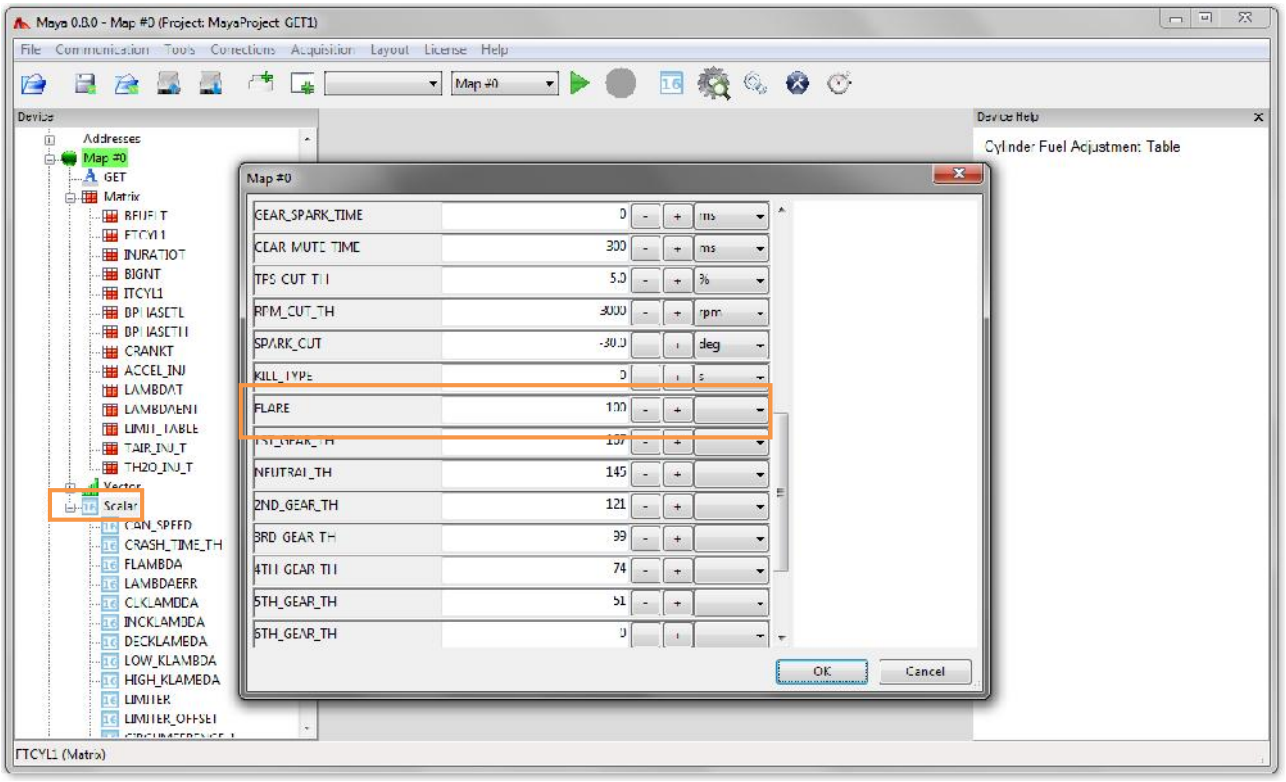
6.12.1.3 FLARE scalar (only ADVANCE)

FLARE define the number of revolution after that **CRANK** is not any more applied.
This parameter (usually between 80 and 110) is adjustable following these instructions:

- Start Maya with double click on the icon
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if any device is loaded it is necessary to load one (see chapter **6.1**).
- Download the map from ECU (see chapter **6.3.3**).
- Verify that the map you wish to modify is active (symbol near **MAP #...**).
- Expand scalar tree (clicking once the cross at the left of **Scalar**) and look for **FLARE**. Double click on this scalar and you will see this window:



NOTE: scalar values could be modified also from a single window (double left click on **Scalar**):



- Send the map to ECU (see **6.6**)

WARNING: too short or too long **FLARE** times **<u>can cause unwanted switch off and/or unstable idle</u>**.

6.13 Enrichment adjustment during acceleration

This strategy is only available for ADVANCE licence or superior (licence EVO is not able to modify this parameter.
Enrichment is done using a specific strategy that read the **DwTPS+**. This value express the influence of the opening speed of throttle over the engine behaviour.
Sudden variation of throttle will affect engine especially at low revs because at high revs the inertia of inlet gasses will minimize these effects.
This calculation will be made by ECU and will define the condition in which the engine is running; in the following table you could see an example that relate **TPS** with calculation results (**WTPS**) done by the ECU.

TPS	0	2	4	6	8	10	12	14	16	18	25	30	45	60	80	100
WTPS	0	10	20	30	40	50	55	60	65	70	75	80	85	90	95	100

Let's calculate some differences (**DwTPS+**) between **WTPS** values:

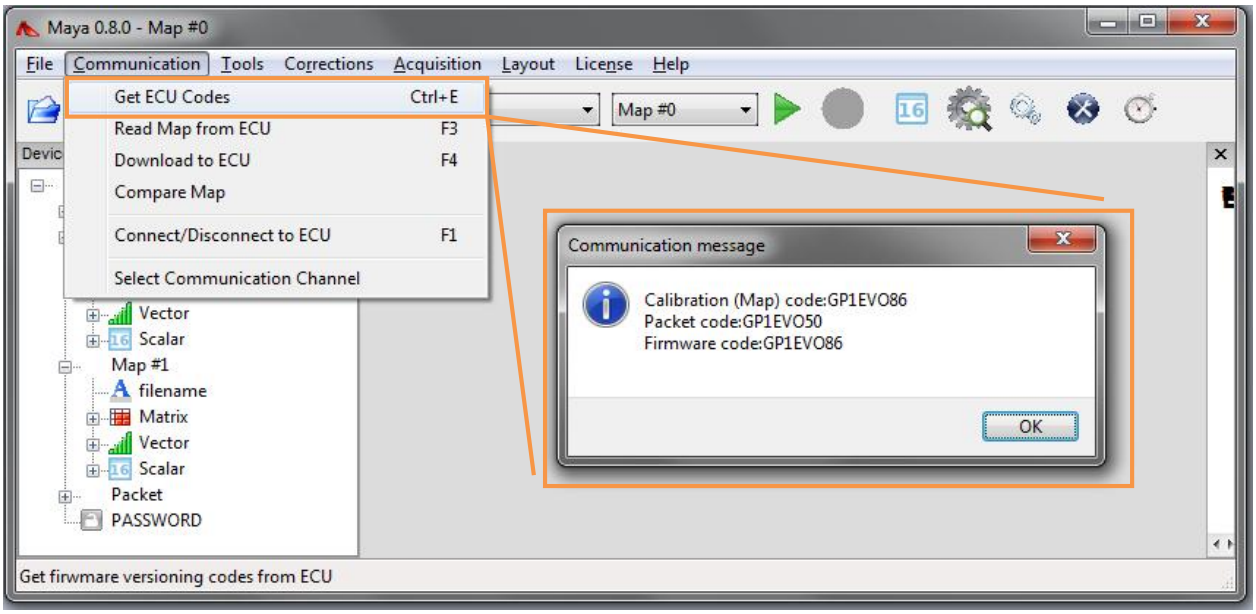
TPS variation		**WTPS relative**		**DwTPS+ (WTPS2-WTPS1)**
from	to	WTPS1	WTPS2	
4	18	20	70	50
16	30	65	80	15
80	100	95	100	5

The gas variation is concentrated in the low region, for this reason these regions will be mostly involved in this strategy.
For this reason, it is possible that high TPS values could even not in the region of strategy.

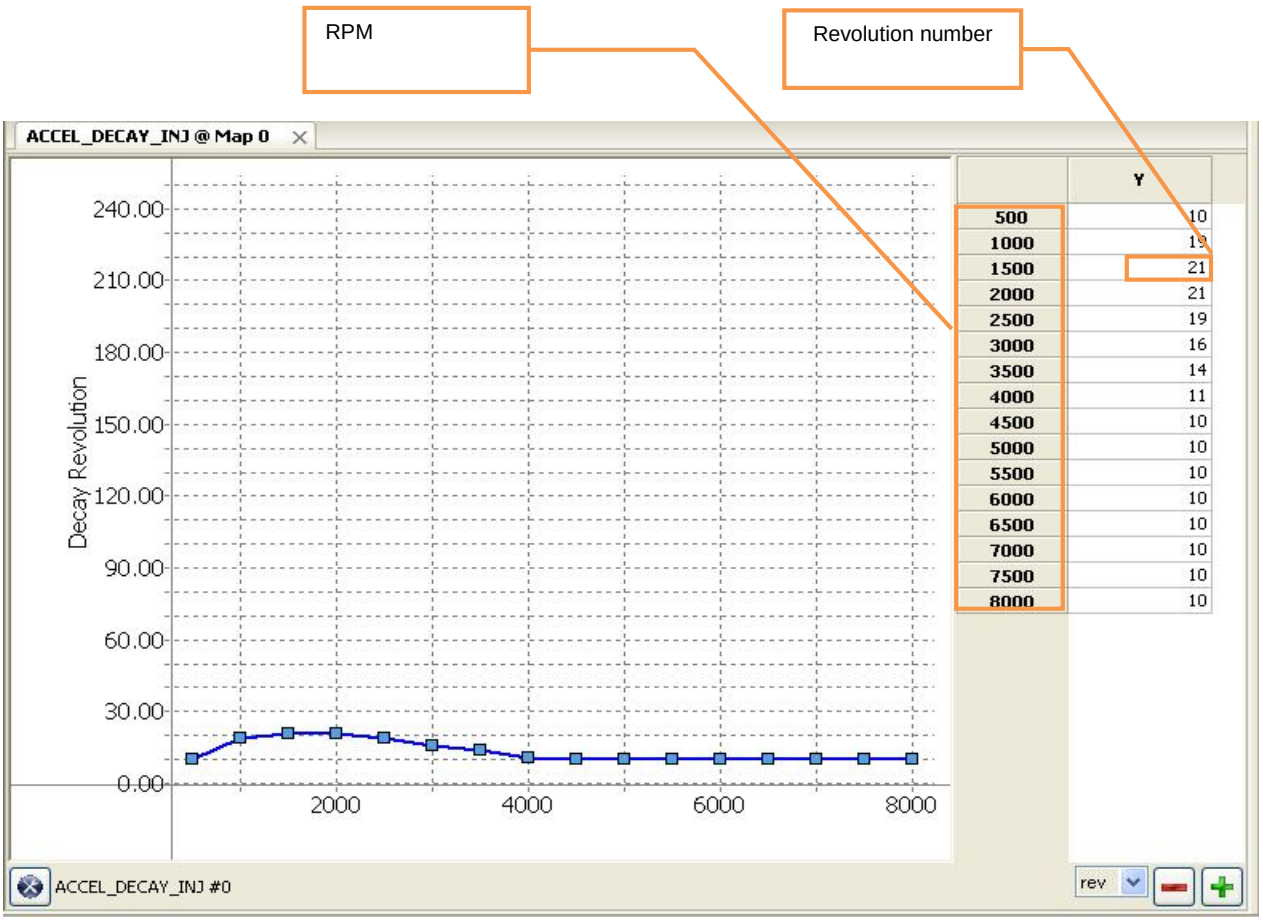
6.13.1.1 Enrichment on ECU GP1 EVO (licence ADVANCE)

Proceed as follows:

- Start Maya with double click on the icon
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if no device is loaded please load one (see chapter **6.1**)

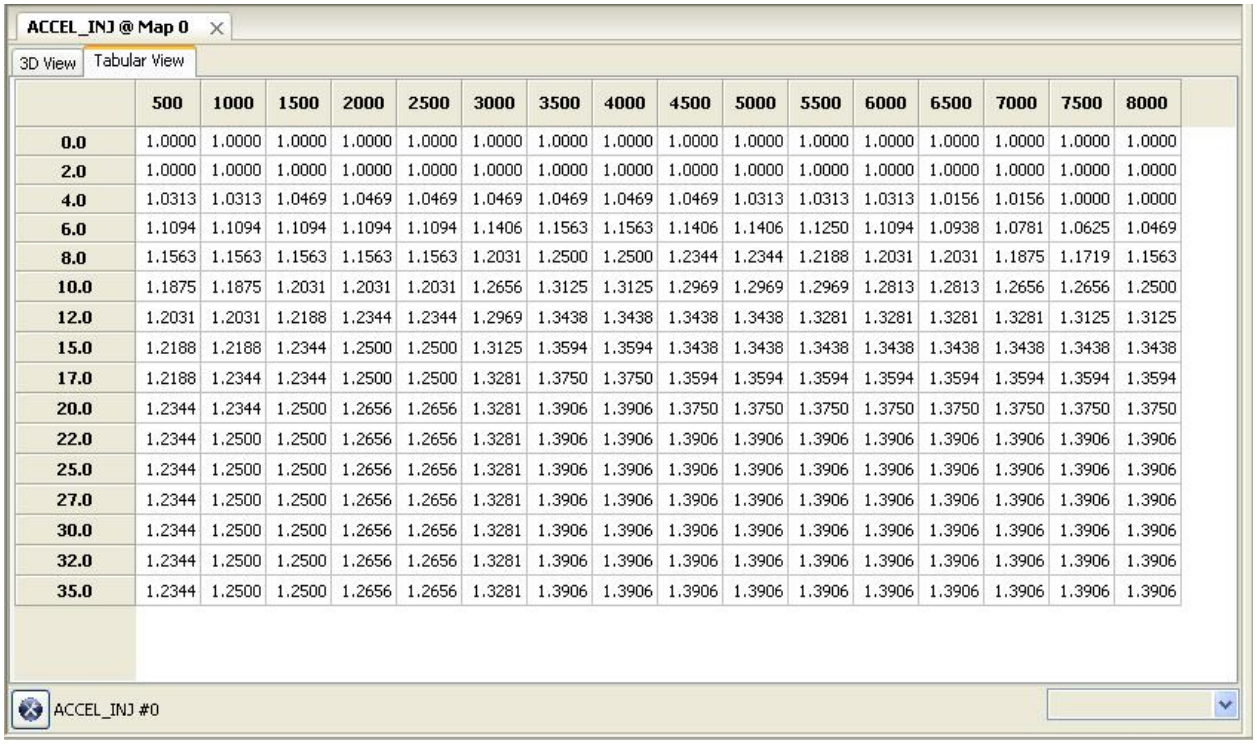


- Expand vector tree and click on **ACCEL_DECAY_INJ**, decide how many revolutions (based on rpm) the strategy will be active. To operate the modification insert the value desired in column **Y** of the vector.



The values modification could be done in graph mode (moving the mouse on points of the graph) or with context menu functions (see chapter **3.4.4** e **3.4.5**).

- Expand matrix tree and click on **ACCEL_INJ**, define the desired fuel quantity (typing the opening time of the injector in table cells). You could adjust values as described in previous chapters: **6.11.2.1** (**Tabular View** modification) and **6.11.2.3** (modification of **3D View** modification).



	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000
0.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
4.0	1.0313	1.0313	1.0469	1.0469	1.0469	1.0469	1.0469	1.0469	1.0469	1.0313	1.0313	1.0313	1.0156	1.0156	1.0000	1.0000
6.0	1.1094	1.1094	1.1094	1.1094	1.1094	1.1406	1.1563	1.1563	1.1406	1.1406	1.1250	1.1094	1.0938	1.0781	1.0625	1.0469
8.0	1.1563	1.1563	1.1563	1.1563	1.1563	1.2031	1.2500	1.2500	1.2344	1.2344	1.2188	1.2031	1.2031	1.1875	1.1719	1.1563
10.0	1.1875	1.1875	1.2031	1.2031	1.2031	1.2656	1.3125	1.3125	1.2969	1.2969	1.2969	1.2813	1.2813	1.2656	1.2656	1.2500
12.0	1.2031	1.2031	1.2188	1.2344	1.2344	1.2969	1.3438	1.3438	1.3438	1.3438	1.3281	1.3281	1.3281	1.3281	1.3125	1.3125
15.0	1.2188	1.2188	1.2344	1.2500	1.2500	1.3125	1.3594	1.3594	1.3438	1.3438	1.3438	1.3438	1.3438	1.3438	1.3438	1.3438
17.0	1.2188	1.2344	1.2344	1.2500	1.2500	1.3281	1.3750	1.3750	1.3594	1.3594	1.3594	1.3594	1.3594	1.3594	1.3594	1.3594
20.0	1.2344	1.2344	1.2500	1.2656	1.2656	1.3281	1.3906	1.3906	1.3750	1.3750	1.3750	1.3750	1.3750	1.3750	1.3750	1.3750
22.0	1.2344	1.2500	1.2500	1.2656	1.2656	1.3281	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906
25.0	1.2344	1.2500	1.2500	1.2656	1.2656	1.3281	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906
27.0	1.2344	1.2500	1.2500	1.2656	1.2656	1.3281	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906
30.0	1.2344	1.2500	1.2500	1.2656	1.2656	1.3281	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906
32.0	1.2344	1.2500	1.2500	1.2656	1.2656	1.3281	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906
35.0	1.2344	1.2500	1.2500	1.2656	1.2656	1.3281	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906	1.3906

- Send the map to ECU (see **6.6**)
- You can save map (see chapter **6.4**).

6.14 Map correction data

You could adjust data in different ways:

- Manual modification of data map (a connection between ECU and PC is needed while engine is running).
- Mix correction with Lambda (additionally to the previous mode, the system will need a lambda sensor and the abilitation of scalars and matrixes that are involved in lambda corrections).
- **closed loop** functioning for a continuous correction of the mix while engine is running (a lambda sensor needs to be connected to ECU).

First two methods need that engine map need to be saved (usually are done in dyno test bench), in the third method this approach is useless because the mix management is continuously changing due to the readings of lambda sensor (and ECU strategies).

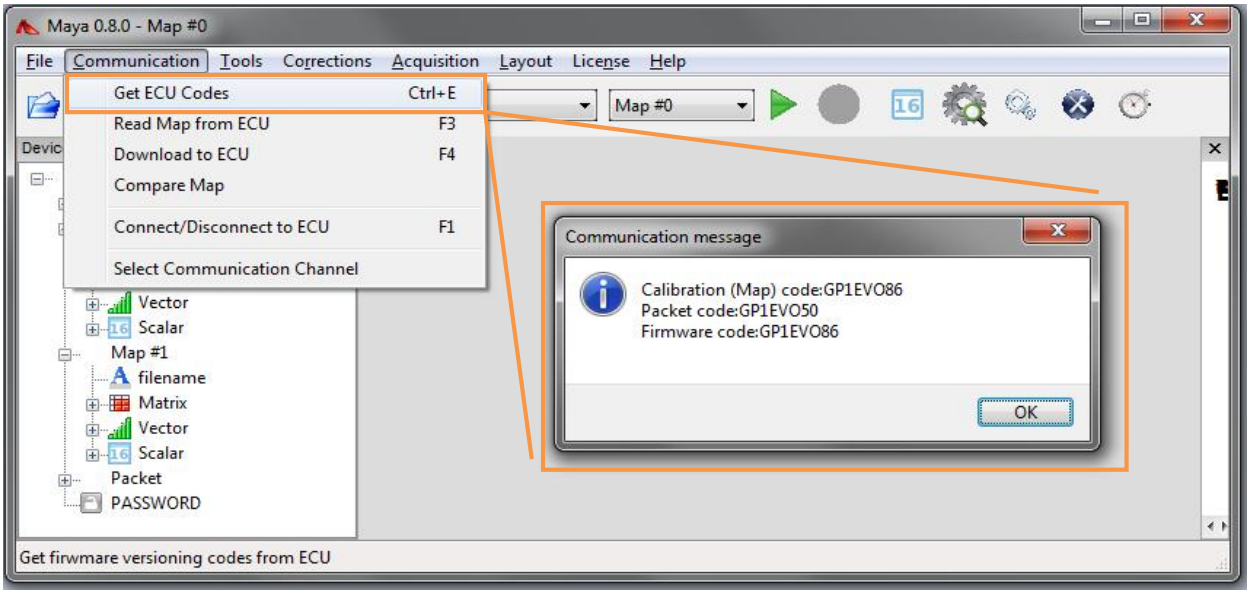
6.14.1 Manual map data correction

With a manual correction of data you could fine tune the engine performances. Modifications does not need a lambda sensor connected to ECU (in any case it is useful to tune mix adjustment). A lambda sensor could be connected to an external data logger or to a test bench: in any case it is suggested to adjust map with this sensor.

6.14.1.1 Map data correction on ECU (lic. EVO and ADVANCE)

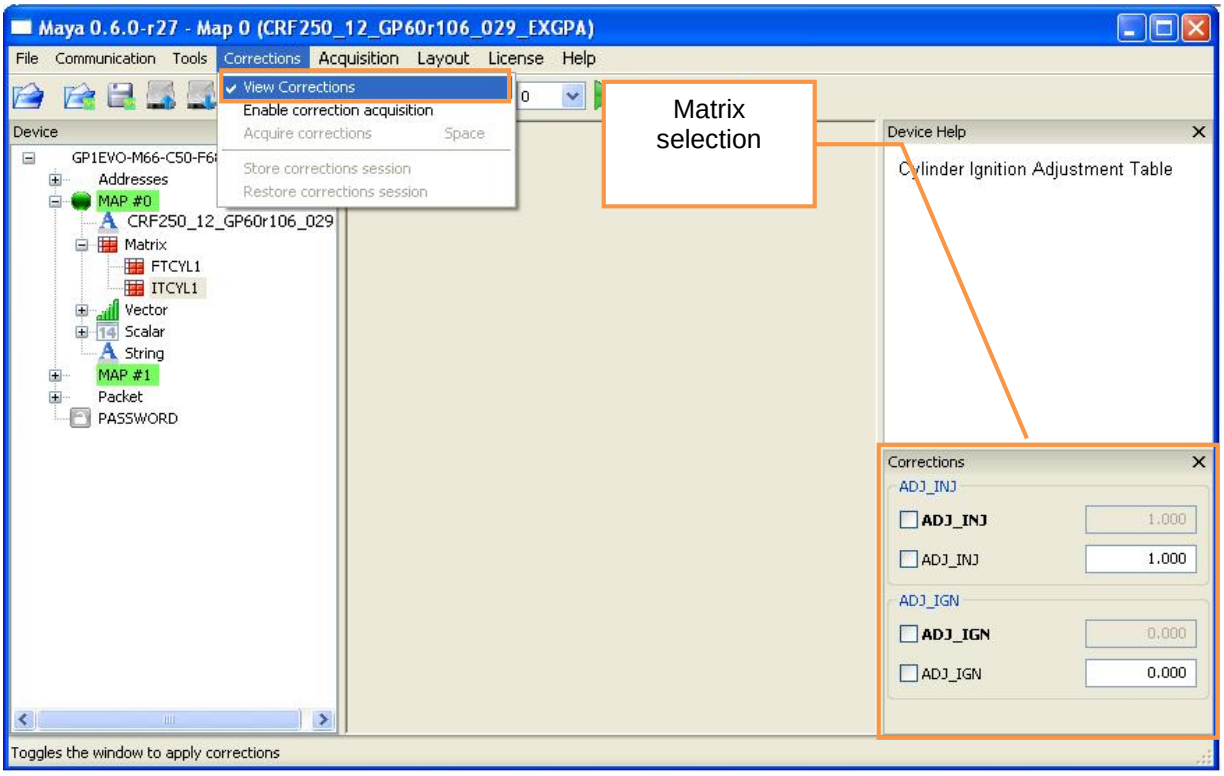
Proceed as follows:

- Start the engine.
- Start Maya with double click on the icon.
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.



NOTE: if no device is loaded please load one (see chapter **6.1**)

Select **View Correction** in **Corrections**: a selection menu will appear in **Corrections** (depending on licence).

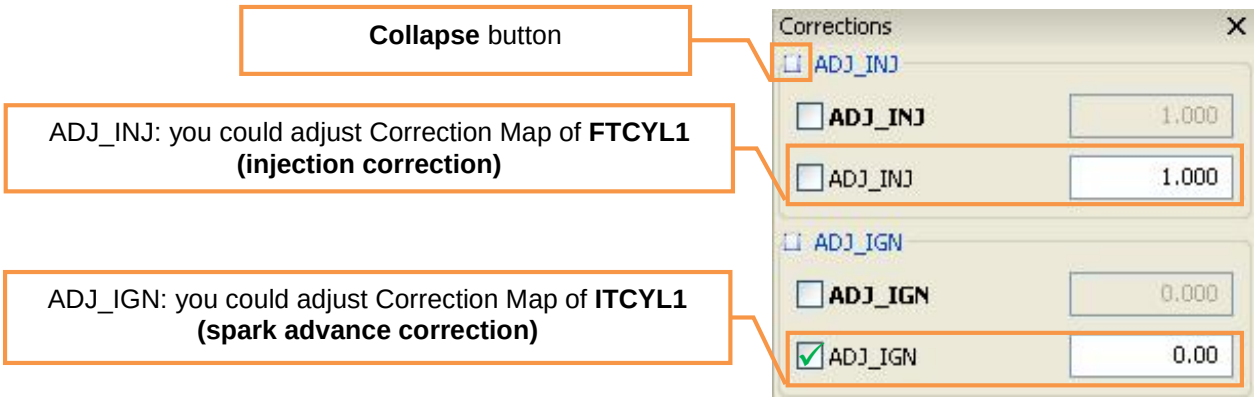


The following table shows the correspondance between cells and matrix on GP1 device (please note the difference between the cells with bold text and the ones in normal text):

Correction	Cell	Correspondent matrix	Needed Maya licence
ADJ_INJ	**ADJ_INJ**	BFUELT	Evo/Advance
	ADJ_INJ	FTCYL1	
ADJ_IGN	**ADJ_IGN**	BIGN	Evo/Advance
	ADJ_IGN	ITCYL1	
ADJ_PHASE_L	**ADJ_PHASE_L**	PHASE_L	only Advance
	ADJ_PHASE_L		
ADJ_PHASE_H	**ADJ_PHASE_H**	PHASE_H	only Advance
	ADJ_PHASE_H		
ADJ_RATIO	**ADJ_RATIO**	INJRATIOT	only Advance
	ADJ_RATIO		
ADJ_LAMBDA	**ADJ_LAMBDA**	-	only Advance
	ADJ_LAMBDA		
LAMBDAOFF	**LAMBDAOFF**	-	only Advance
	LAMBDAOFF		

NOTE: to compress the list of all correction you could use **Collapse**.

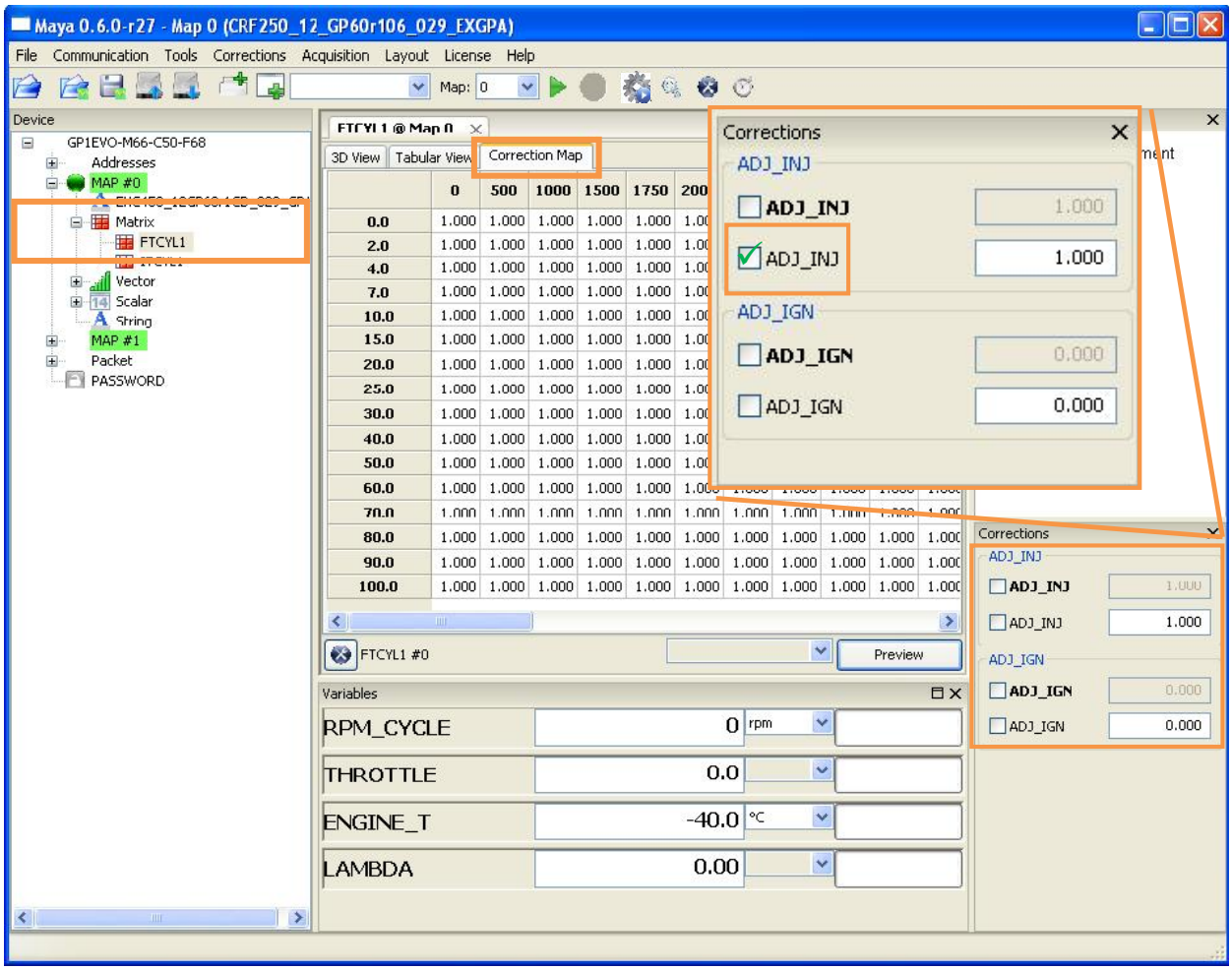
- Select desired matrix ticking the correspondent box. **With EVO licence parameters could be modified and visualized in the following picture (spark advance and injection time correction)**:



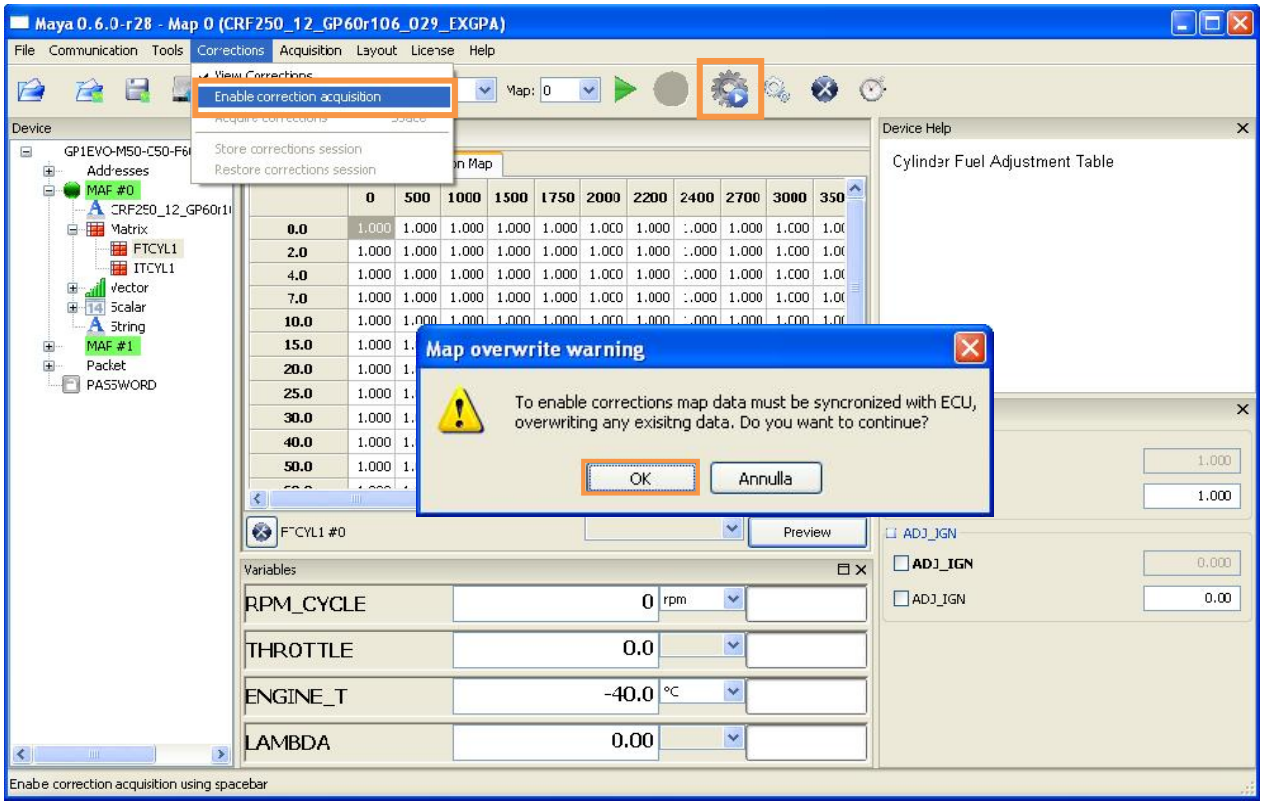
Adjusting **ADJ_IGN** you will change sparkle advance and adjusting **ADJ_INJ** you will adjust injection (ADVANCE licence).
Essentially the choice of modes is defined by the user belonging to needs/preferences.

- It is suggested to open real view of parameters (**scalar display**, see chapter **6.8.2**): this operation will permit to check rpm, engine temperature, TPS, Lambda value (if installed).

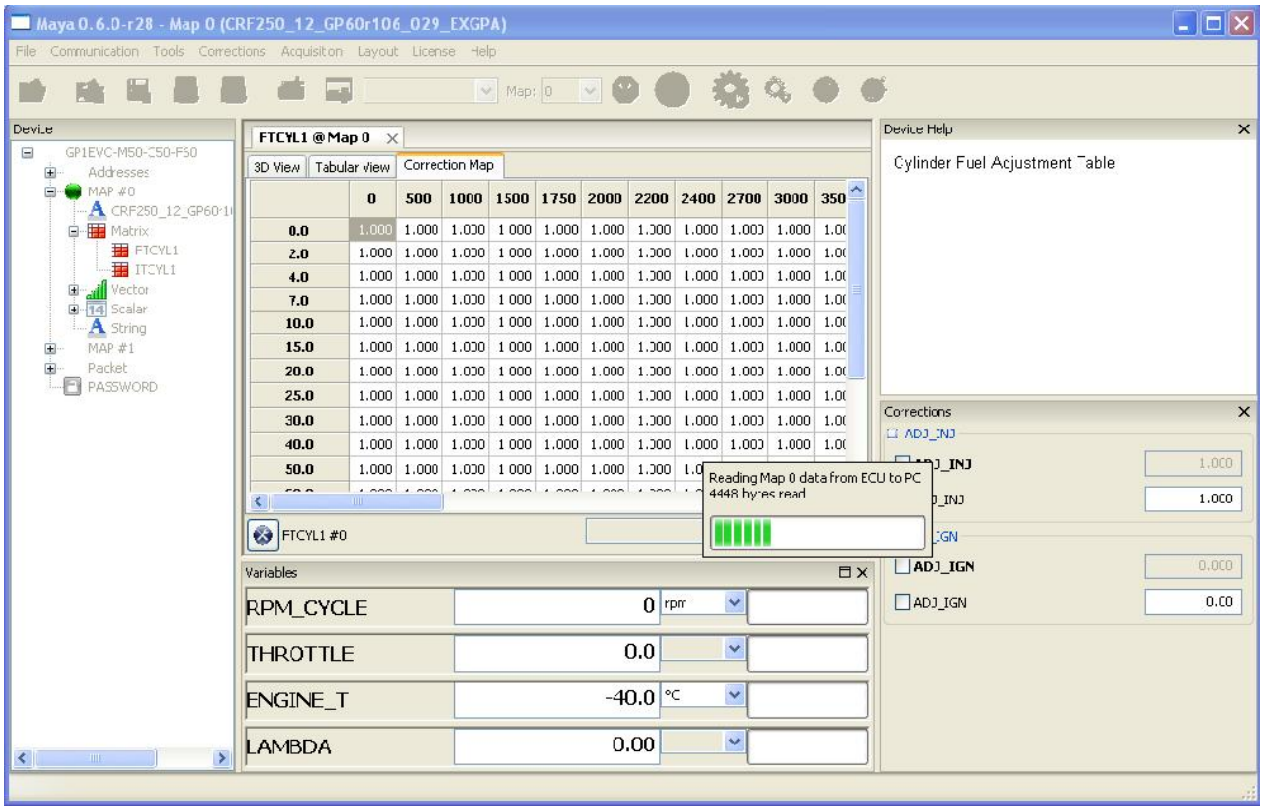
- It is suggested to open **Correction Map** of the desired map (in the example **FTCYL1**)



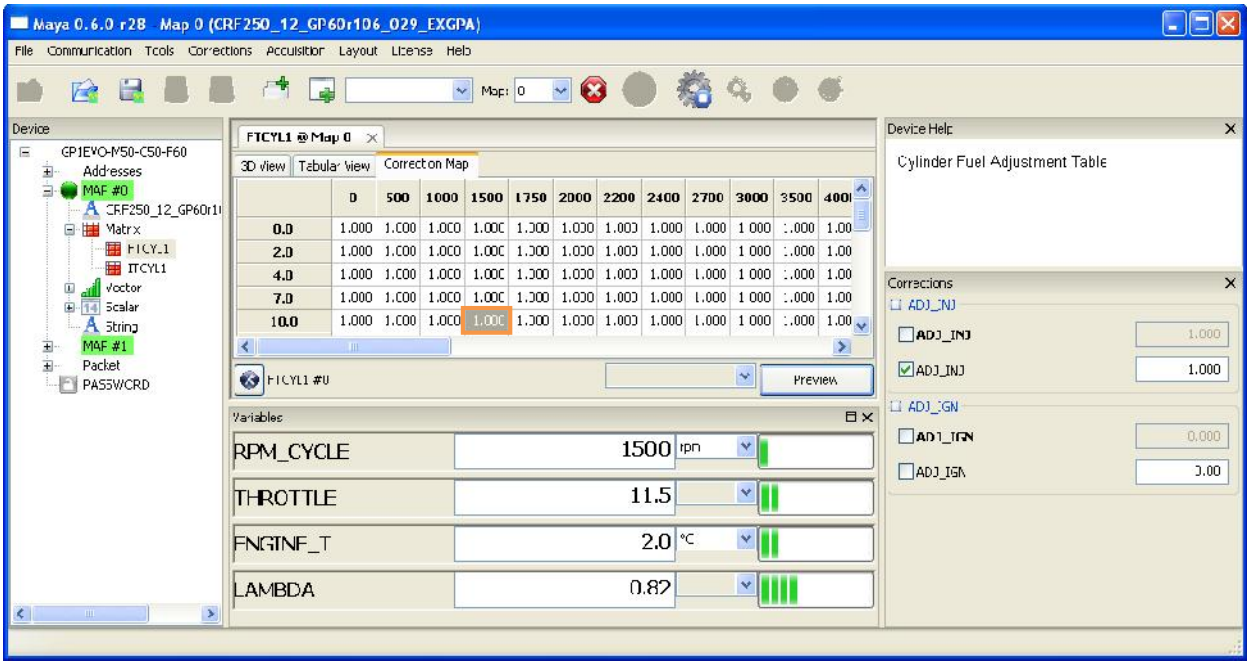
- Enable the correction of values selecting **Enable correction acquisition** in **Correction**. The same operation could be done by clicking .



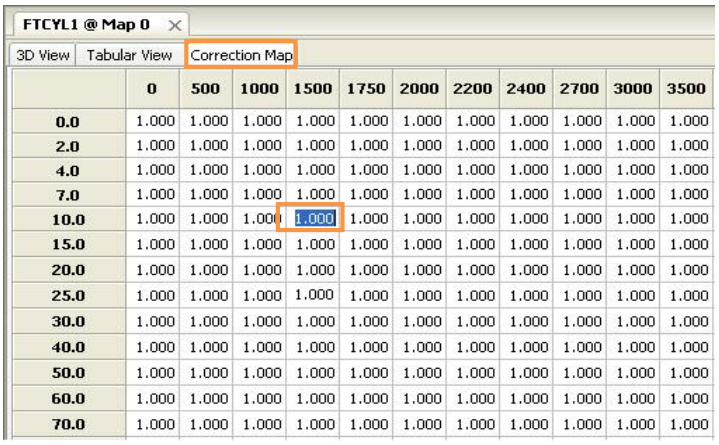
- Synchronize data in ECU with PC by clicking **OK**. Wait for the end of the process.



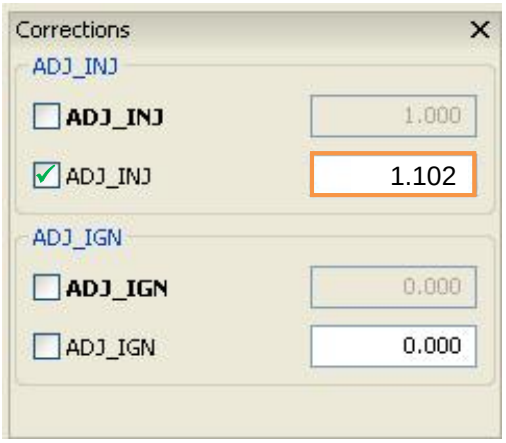
- Start real time visualization (▶).



- Select a rpm and a tps: the correspondent cell will be highlighted. Modify the value in ADJ_INJ of **matrix selection window**: you could adjust the value with arrows (→ and ←) or with the mouse (avoid numbers buttons to avoid mistakes during typing). **THE VALUES WILL BE USED IN ECU AND LAMBDA VALUE WILL BE READ BY LAMBDA SENSOR (IF PRESENT).**

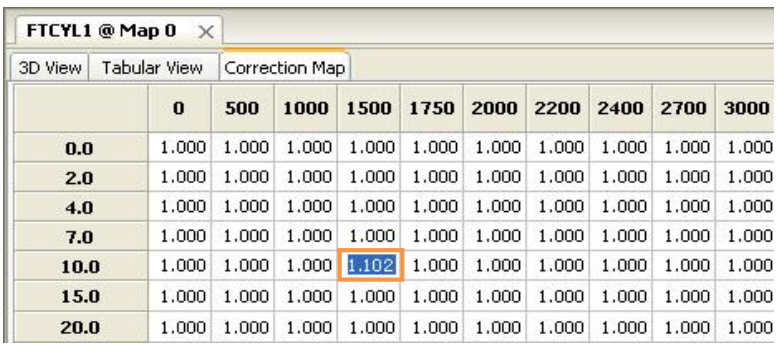


	0	500	1000	1500	1750	2000	2200	2400	2700	3000	3500
0.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
4.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
7.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
10.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
15.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
20.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
25.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
30.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
40.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
50.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
60.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
70.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

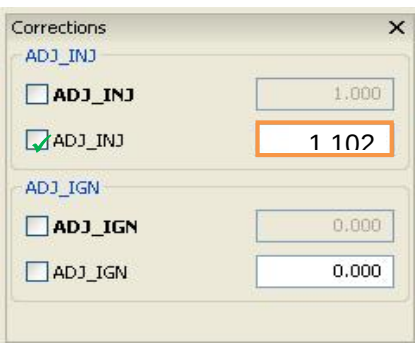


Note: read chapter 6.10.2.1 for values.

- Space bar will permit to change the value in ADJ_INJ cell of **Correction Map** (**<u>this operation is needed to save the modified map</u>**).



	0	500	1000	1500	1750	2000	2200	2400	2700	3000
0.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
4.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
7.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
10.0	1.000	1.000	1.000	1.102	1.000	1.000	1.000	1.000	1.000	1.000
15.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
20.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

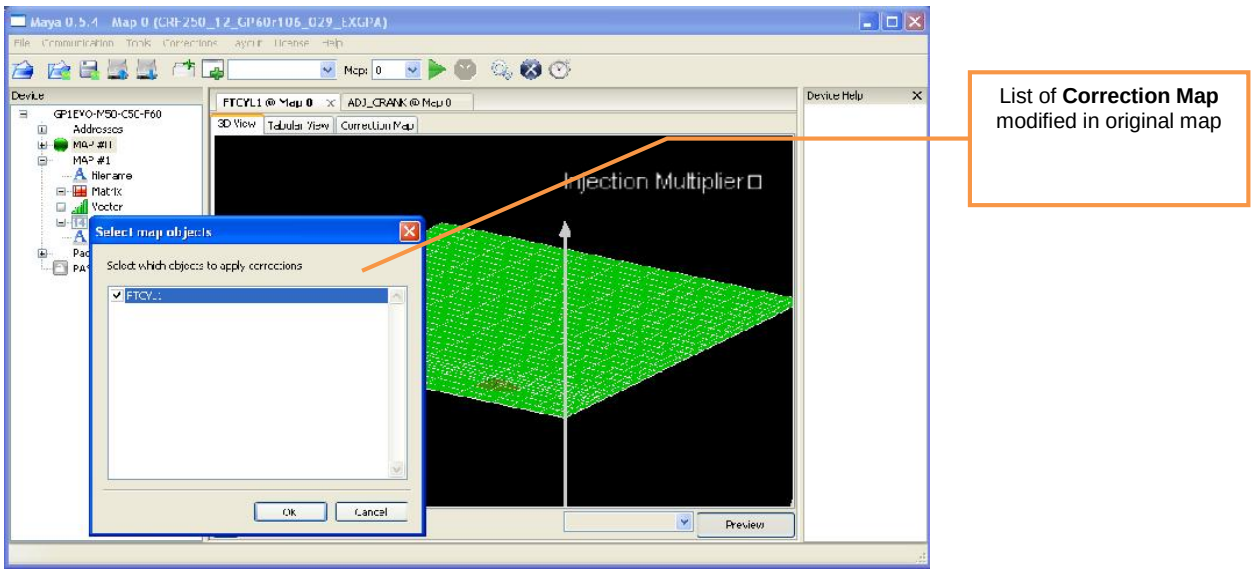


- Proceed with corrections with same modes seen before. Changed cells are highlighted with a different colour (green if increased, yellow if reduced).
NOTE: you could see in 3D graph corrections using **Preview** (see chapter **6.10.2.2** and **6.11.2.2**).

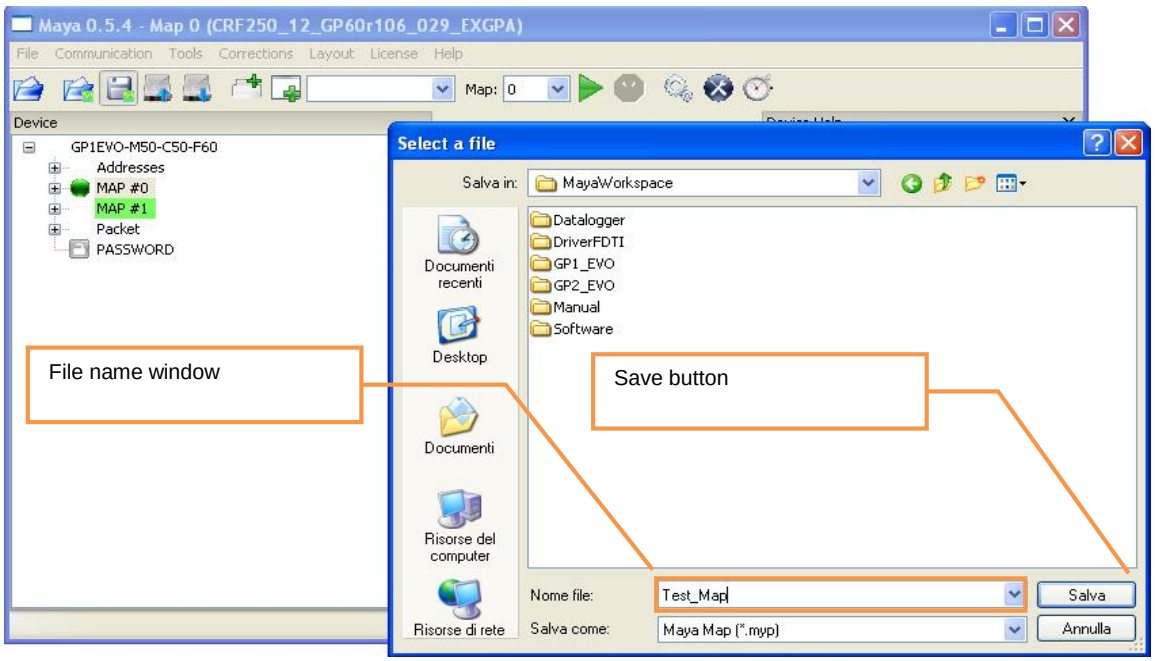
To save correction you need to create a new map:

- Check that map you need to save is active (green indicator)
- Click on **Create Map**… (in File menu).

- Select matrix you need to save in the new map (**Maya** show automatically a list of modified matrix).



- Select folder and file name you wish, confirm with **Save**.
  NOTE: it is suggested to save in **MayaWorkspace**.



- At the end of the procedure **Maya** will ask if you want to download the map in the ECU: click **Yes** to start the procedure (please check that all conditions described in chapter **6.6** are satisfied), select **No** to get back to **Maya**.

6.14.2 Map data correction with a Lambda sensor connected to ECU

The correction of mix is done with the use a Lambda sensor. With this strategy you could reach the "best" engine combustion. Operating with matrix that adjust injected fuel (as BFUELT, FTCYL1 etc...) it is possible to extract automatically values to create a new **Correction Map**.
It is suggested to activate fuel correction matrix also if you are using spark advance correction matrix. Adjusting ignition parameters, lambda will correct the mix. If correction are not enabled could not be saved in the new map (risk: no good matching between ignition and injection).

6.14.2.1 Lambda sensor correction - ECU GP1EVO (only lic. ADVANCE)

Verify these conditions:

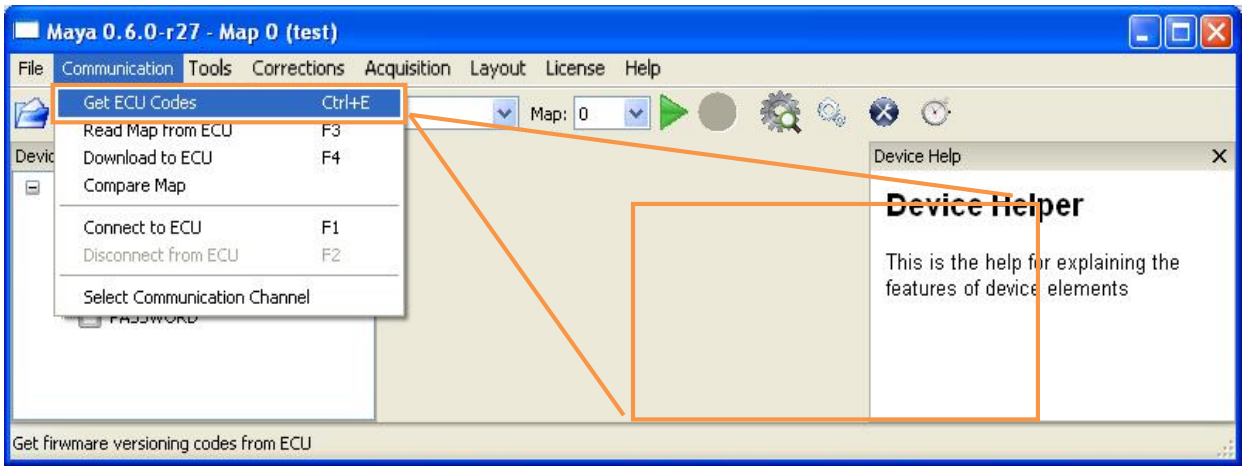
- Verify that lambda sensor is correctly calibrated (see vector **TBLINLAMBDA** in chapter **5.1.3.2**) and connected to ECU
- Verify scalars, vectors, matrixes in ECU map are as defined in following table:

Name	Type	Description	Setting
FLAMBDA	Scalar	Enable **Closed Loop** of Lambda value	See note[4]
LAMBDAERR	Scalar	Tolerance on reading of Lambda sensor	See note[5]
CLKLAMBDA	Scalar	Intervention frequency (in rpm) of correction on mix	See note[5]
INCLKLAMBDA	Scalar	Injected fuel quantity to obtain lambda target (lean mix)	See note[5]
DECLKLAMBDA	Scalar	Injected fuel quantity to obtain lambda target (rich mix)	See note[5]
LOW_KLAMBDA	Scalar	Minimum value to start correction during **Closed Loop**. If the Lambda sensor is faulty, the ECU will continue to lean the mix until defined value.	See note[5]
HIGH_KLAMBDA	Scalar	Maximum value to start correction during **Closed Loop**. If the Lambda sensor is faulty, the ECU will continue to enrich the mix until defined value.	See note[5]
LAMBDAT	Matrix	Table of "ideal" Lambda values to be used during map correction or in **Closed Loop**	See note[6]
LAMBDAENT	Matrix	This table enable the correction of air/fuel ratio using **Lambda** value readed by ECU using target value defined in **LAMBDAT**	See note[7]

- Start the engine.
- Start Maya with double click on the program icon.
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.

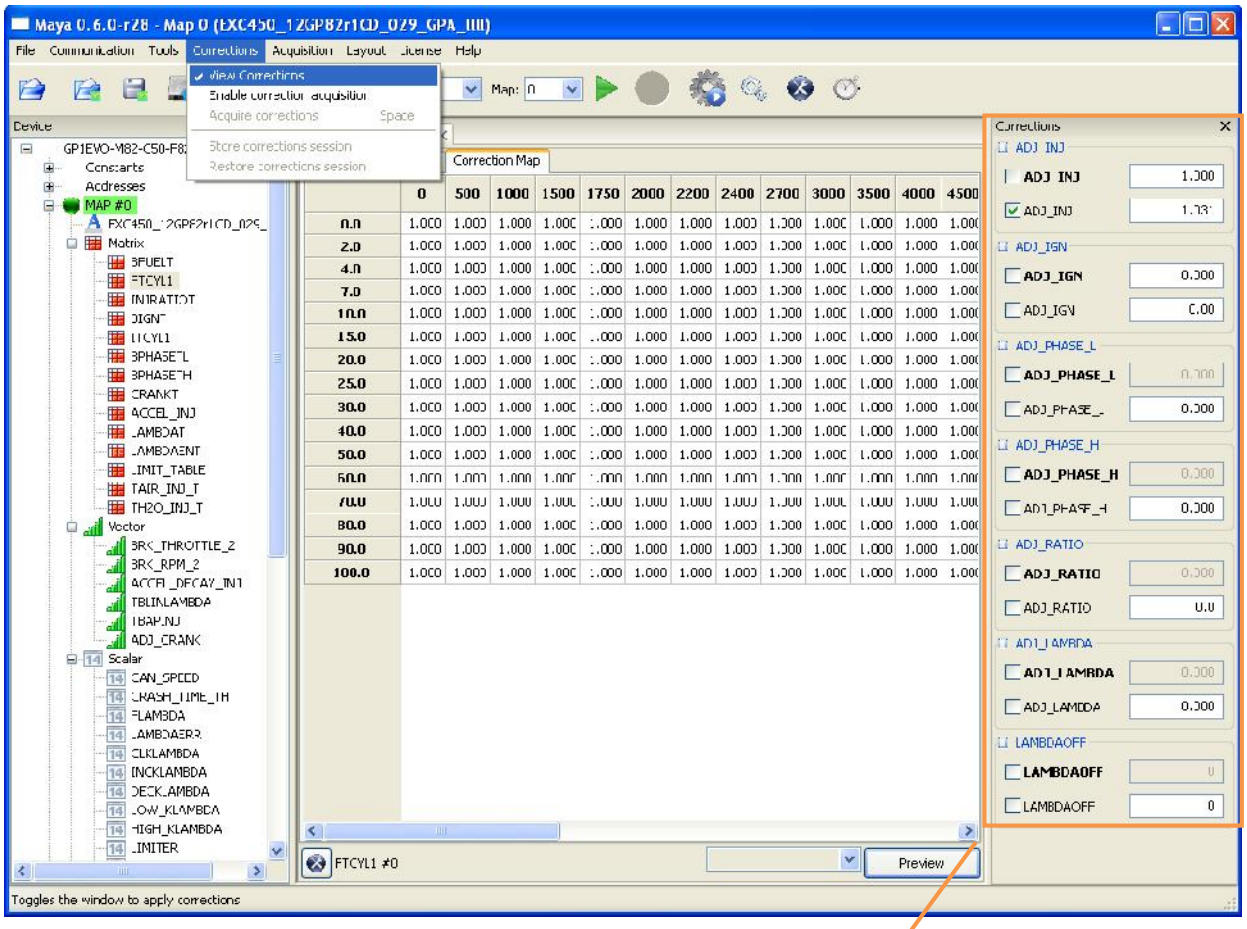
[4] The values does not influence corrections
[5] Verify that the value of the scalar is correct (chapter **5.1.4.3**): **a wrong setting could cause damages to people or parts**
[6] Verify that values of breakpoints are correct (chapter **5.3.3.1**): **a wrong setting could cause damages to people or parts**
[7] Verify that values of breakpoints are enabled (cap. **5.1.3.1**) : **a wrong setting could cause damages to people or parts**

- Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if any device is loaded it is necessary to load one (see chapter **6.1**).



NOTE: if no device is loaded please load one (see chapter **6.1**)

Select **View Correction** in **Corrections**: a selection menu will appear in **Corrections** (depending on licence).



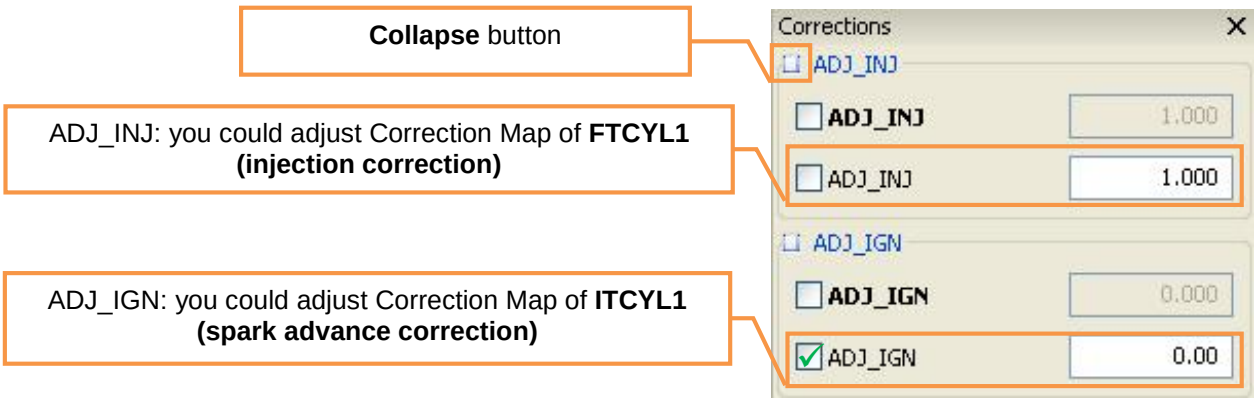
Selection window

The following table shows the correspondance between cells and matrix on GP1 device (please note the difference between the cells with bold text and the ones in normal text):

Correction	Cell	Correspondent matrix	Needed Maya licence
ADJ_INJ	**ADJ_INJ**	BFUELT	Evo/Advance
	ADJ_INJ	FTCYL1	
ADJ_IGN	**ADJ_IGN**	BIGN	Evo/Advance
	ADJ_IGN	ITCYL1	
ADJ_PHASE_L	**ADJ_PHASE_L**	PHASE_L	only Advance
	ADJ_PHASE_L		
ADJ_PHASE_H	**ADJ_PHASE_H**	PHASE_H	only Advance
	ADJ_PHASE_H		
ADJ_RATIO	**ADJ_RATIO**	INJRATIOT	only Advance
	ADJ_RATIO		
ADJ_LAMBDA	**ADJ_LAMBDA**	Offset on the target value in engine map	only Advance
	ADJ_LAMBDA		
LAMBDAOFF	**LAMBDAOFF**	Activate the orrection of data according to readings of Lambda value	only Advance
	LAMBDAOFF		

NOTA: to compress the list of all correction you could use **Collapse**.

- Select desired matrix ticking the correspondent box

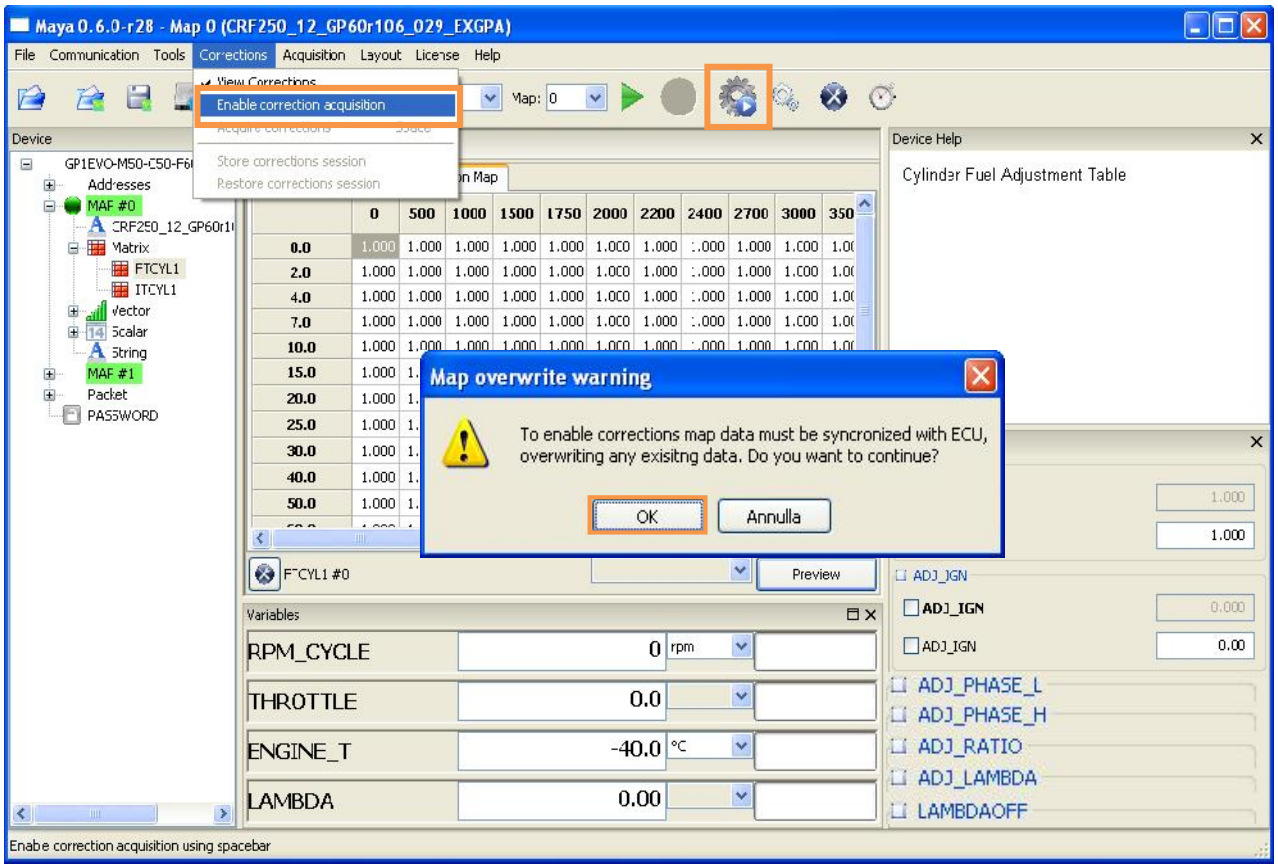


Adjusting **ADJ_IGN** you will change sparkle advance and adjusting **ADJ_INJ** you will adjust injection (ADVANCE licence).
Essentially the choice of modes is defined by the user belonging to needs/preferences.

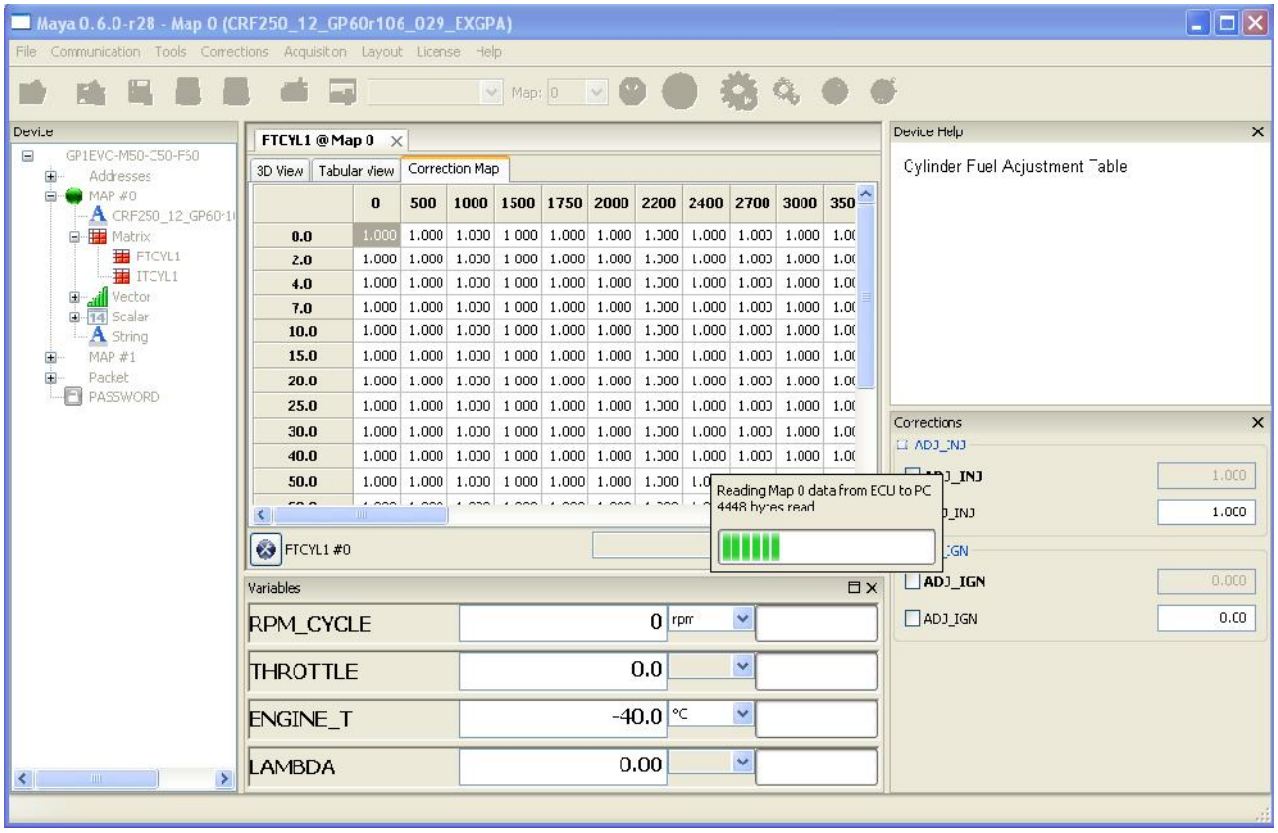
- It is suggested to open real view of parameters (**scalar display**, see chapter **6.8.2**): this operation will permit to check rpm, engine temperature, TPS, Lambda value (if installed).

- It is suggested to open **Correction Map** of the desired map (in the example **FTCYL1**)

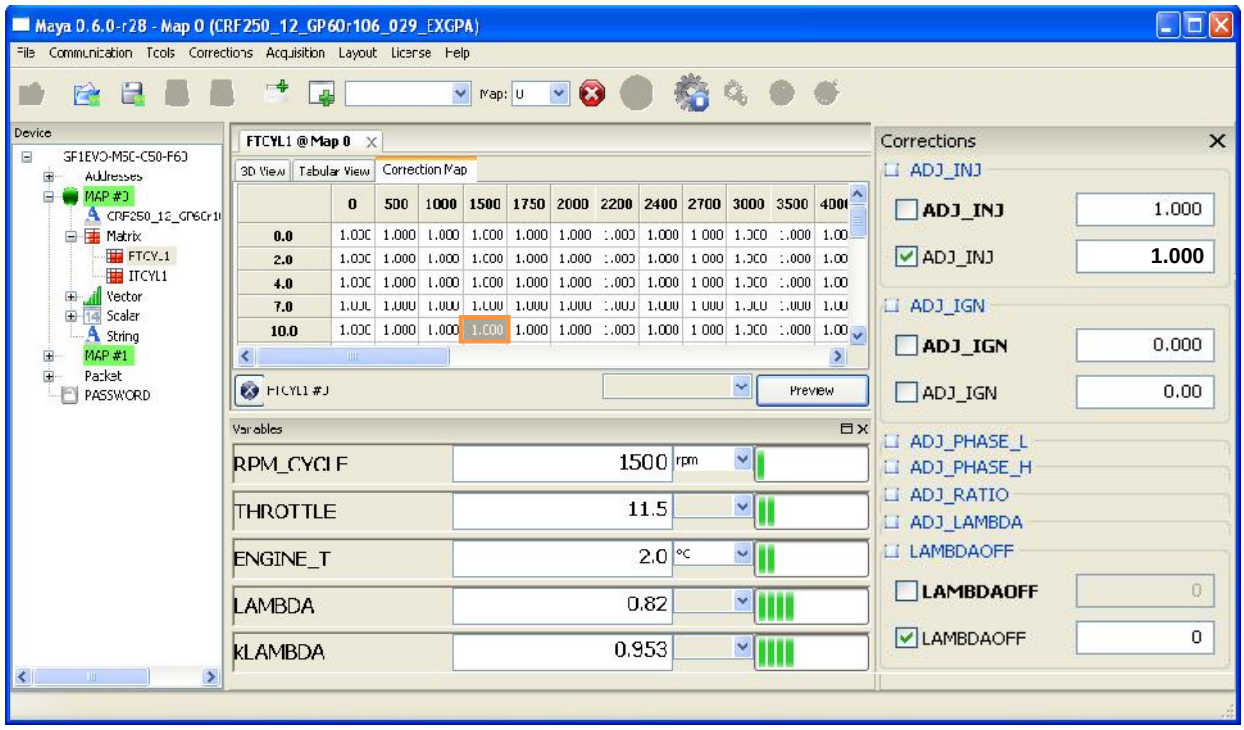
Enable the correction of values selecting **Enable correction acquisition** in **Correction**. The same operation could be done by clicking .



- Synchronize data in ECU with PC by clicking **OK**. Wait for the end of the process.

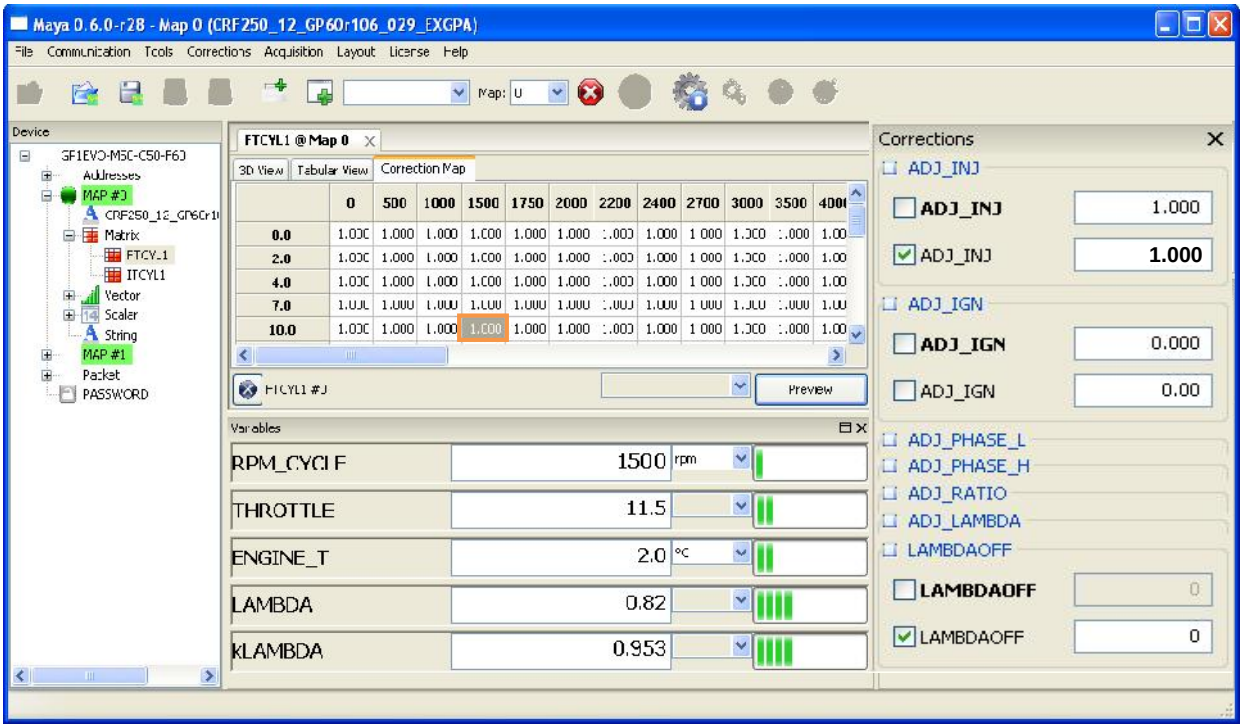


- Start real time visualization ( ).



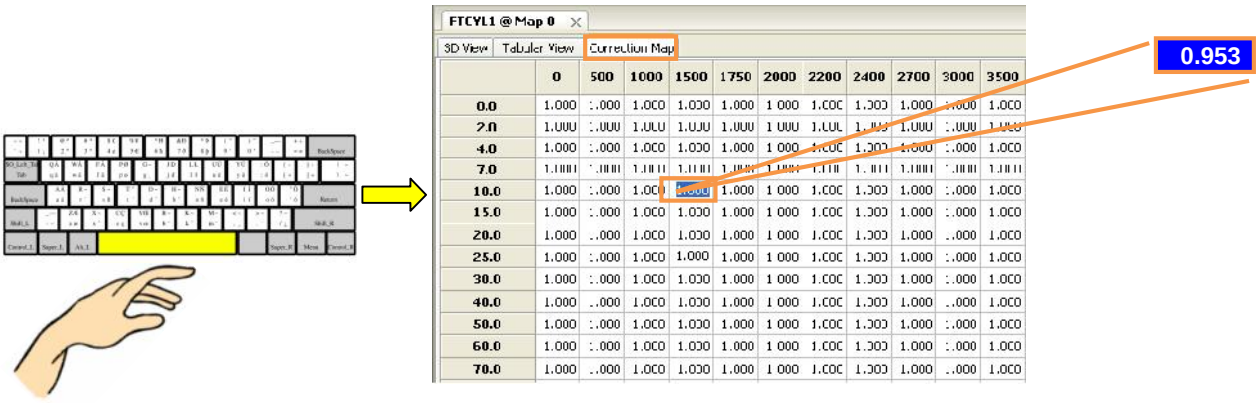
- Tick cell **LAMBDAOFF** to enable calculation of data correction using readings of Lambda sensor (and relative scalar and matrixes).

- Select a rpm and a tps: the correspondent cell will be highlighted. Automatically the ECU will correct mix value according to what read by Lambda value and what defined by Lambda target (and all other parameters).



NOTE: the previous picture, for example, shows the correction factor (KLAMBDA) o fan engine at 1500 giri/min, tps at 11.5%, lambda target (defined in LAMBDAT) is 0.86, lambda value is 0.82.
KLAMBDA is the ratio between read lambda value and LAMBDAT (in our example: 0.82/0.87 = **0.953**). the total sum of the cell will be:
KLAMBDA X cell value= 0.953 x 1.000=0.953

- Press **Space bar** of the keyboard to confirm the value in the breakpoint **(this operation is needed to save the modified map).**



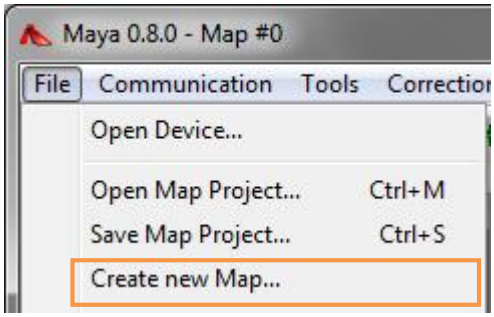
If a fast change of lambda target value is required the operator can modify the ADJ_LAMBDA value: with this it is possible to add or subtract a value from the optimal mix value. The modification could be done with arrows (→ or ←) in the keyboard or with the mouse (avoid numbers buttons to avoid mistakes during typing).

- Press **Space bar** of the keyboard to confirm the value in the breakpoint **(this operation is needed to save the modified map).**

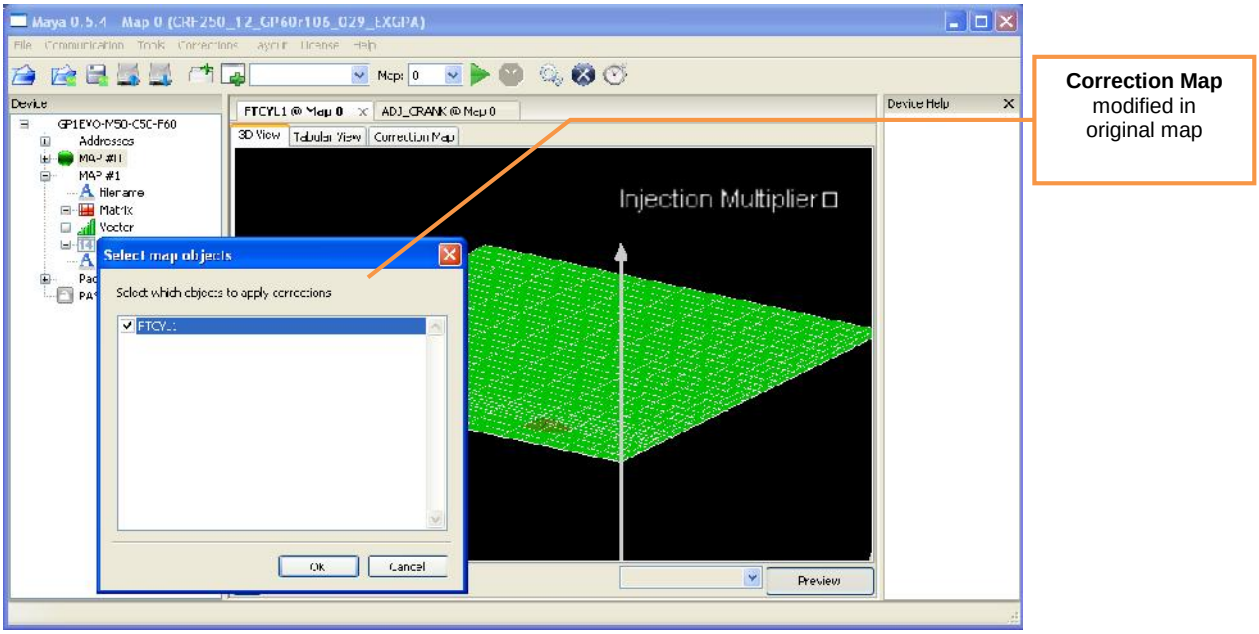
- Make corrections as seen before. Please note that cells change color according to an increase or a decrease of the original value (green for increase, yellow for decrease).
  NOTE: you could see in a 3D graph applied corrections using **Preview** (see chapter **6.10.2.2** and **6.11.2.2**).

To save correction you need to save a new map:

- verify that the map is active ( ) in **Device Manager** of **Maya**. Click on **Create Map**… (in menu File).

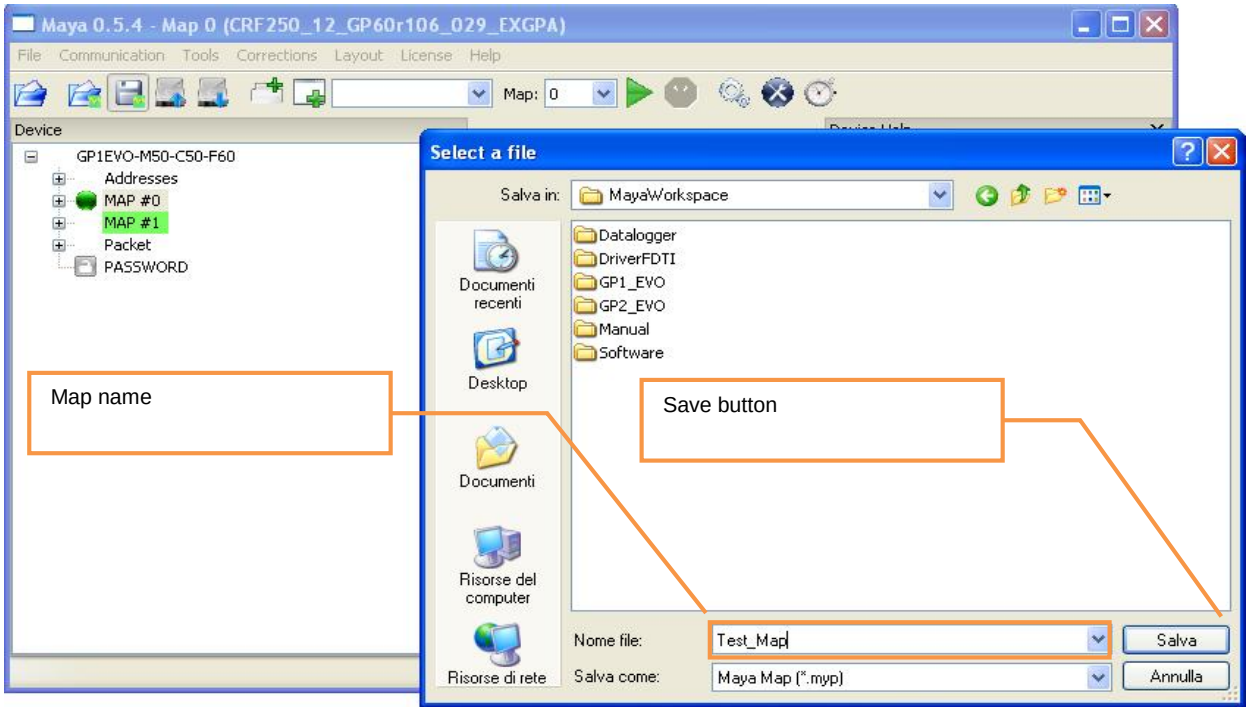


- Select matrix or matrixes you whish to save in the new map (**Maya** suggest automatically the list of modified).



NOTE: in the previous picture you could see that it is possible to select or not modified tables.

- Select the desired folder and map name, and push **Save**.
NOTE: it is suggested to save in **MayaWorkspace** .



- At the end of this procedure the software suggest to save in the ECU the map: click on **Yes** to start the operation (in this case all condition in chapter **6.6** need to be satisfied).

6.14.3 Closed loop Lambda control (only ADVANCE licence)

Closed Loop correction permit the continuous correction of the mix during engine working.
Differently from other tipes of correction seen before, it is not possibile to save the map (corrections are applied in real time by the ECU).
In this configuration it is crucial that the lambda target (and correlated scalars and matrix) is set correctly. This strategy is important when a map is already defined and it is needed that the engine respecs its values, with a live modification of parameters.

6.14.3.1 Closed Loop Lambda – ECU GP1 EVO (only lic. ADVANCE)

All these condition have to be satisfied:

- Verify that lambda sensor connected to ECU is working and correctly calibrated (see vector **TBLINLAMBDA** in chapter **5.1.3.2**)
- Verify that scalars, vector and matrixes in ECU map are defined as per the previous table:

Name	Type	Description	Setting
FLAMBDA	Scalar	Enable **Closed Loop** of Lambda value	Set to **2**
LAMBDAERR	Scalar	Tollerance on reading of Lambda sensor	See note[8]
CLKLAMBDA	Scalar	Intervention frequency (in rpm) of correction on mix	See note[8]
INCLKLAMBDA	Scalar	Injected fuel quantity to obtain lambda target (lean mix)	See note[8]
DECLKLAMBDA	Scalar	Injected fuel quantity to obtain lambda target (rich mix)	See note[8]
LOW_KLAMBDA	Scalar	Minimum value to start correction during **Closed Loop**. If the Lambda sensor is faulty, the ECU will continue to lean the mix until defined value.	See note[8]
HIGH_KLAMBDA	Scalar	Maximum value to start correction during **Closed Loop**. If the Lambda sensor is faulty, the ECU will continue to enrich the mix until defined value.	See note[8]
LAMBDAT	Matrix	Table of “ideal” Lambda values to be used during map correction or in **Closed Loop**	See note[9]
LAMBDAENT	Matrix	This table enable the correction of air/fuel ratio using **Lambda** value readed by ECU using target value defined in **LAMBDAT**	See note[10]

- Send the map to ECU (see chapter **6.6.1**) and, if needed save it in the PC (see chapter **6.4**).

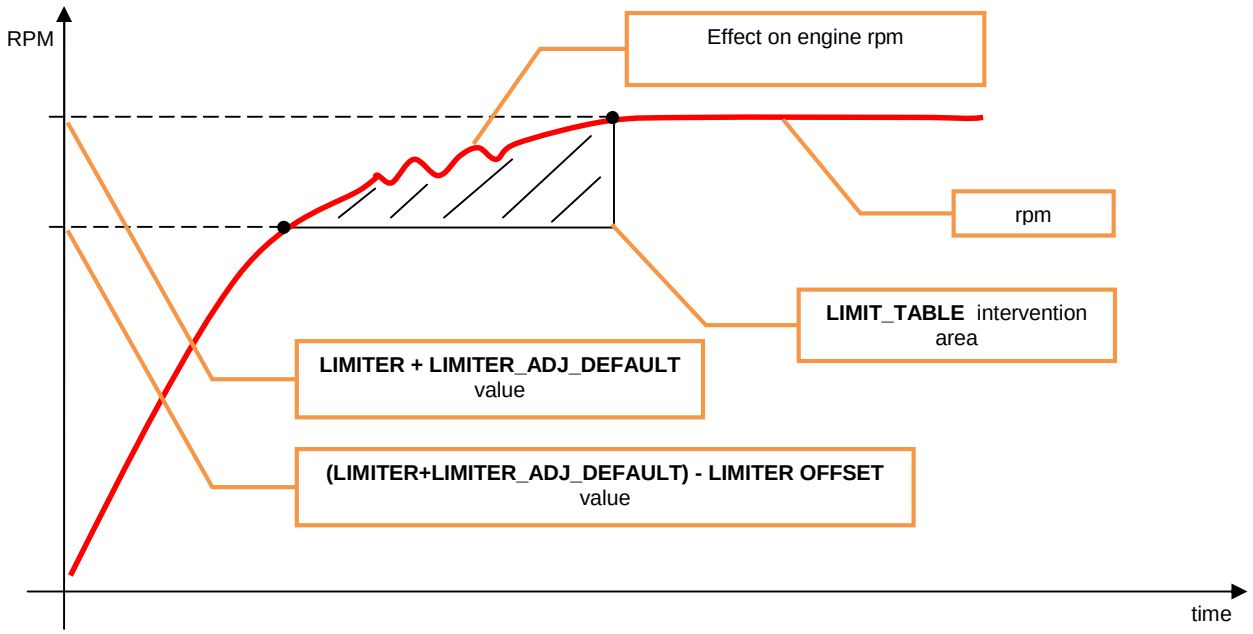
[8] Verify that the value of the scalar is correct (chapter **5.1.3.3**): **a wrong setting could cause damages to people or parts**
[9] Verify that values of breakpoints are correct (chapter **5.3.3.1**): **a wrong setting could cause damages to people or parts**
[10] Verify that values of breakpoints are enabled (cap. **5.1.3.1**) : **a wrong setting could cause damages to people or parts**

6.15 Modify rev limiter

It is important to know all parameters involved in the strategy before start to work on the strategy itself.
These strategies are valid also during electronic gearbox, traction control and launch control.

6.15.1 RPM limiter

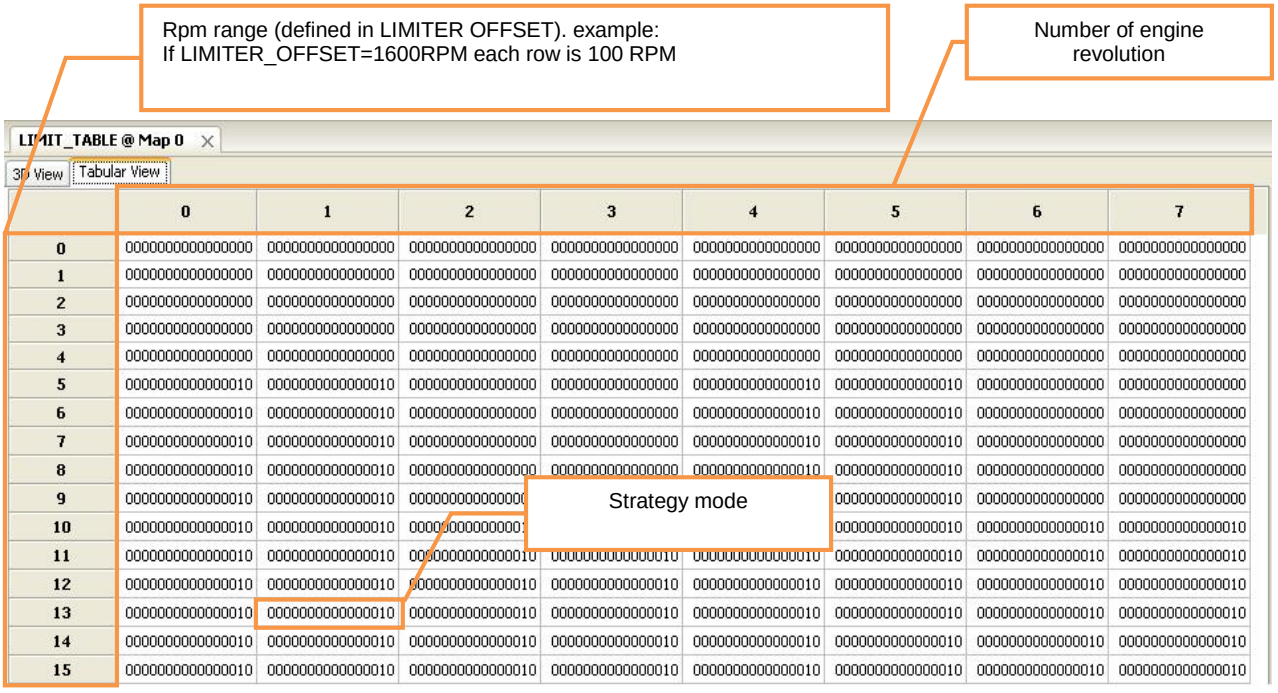
This strategy is not only a simple “cut” of ignition/injection.
The strategy is really complex to save the engine and to advise the driver that the limit is going to be reached, for this reason the limit is progressively “announced” (the engine will arrive to the “limiter” gently and not suddenly).
The following picture resume the strategy:



During acceleration the engine could try to get over the limit define in **LIMITER_OFFSET**: from this point onward the max engine rpm (as the sum of **LIMITER** and **LIMITER_ADJ_DEFAULT**) is defined by the activation of the strategy define in **LIMIT_TABLE** matrix.
Due to this strategy implementation the engine rpm will decelerate and accelerate until the reaching of max rpm allowed.

6.15.1.1 LIMIT_TABLE matrix

LIMIT_TABLE matrix will operate a sequence of “cuts” to ignition/injection.
This matrix works for **8** revolutions on **16** different levels of intervention (also “cutting depth”) defined by scalars in the graph.
Let’s fix for example the **LIMITER_OFFSET** to **1600** rpm.
Each row of the matrix is 100 rpm: with this pace and for a length of **8** revolutions, the ECU will apply what defined in the matrix cyclically (starting again from column 0 once the column 7 is reached). During the cycle it is possible to jump a level (row) belonging to calculated rpm drop.

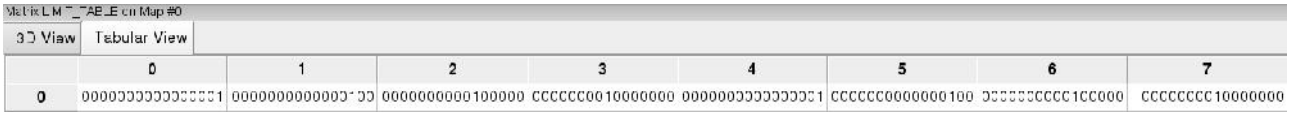


Cells contain binary information (only **0** and **1**) and permit to define the type of cutting strategy and which cylinder will be interested.

Structure of the value in the cell **LIMIT TABLE**

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coil	Inj	Coil	Inj	Coil	Inj	Coil	Inj	Coil	Inj	Coil	Inj	Coil	Inj	Coil	Inj
Cylinder 8		Cylinder 7		Cylinder 6		Cylinder 5		Cylinder 4		Cylinder 3		Cylinder 2		Cylinder 1	

Where:
Inj = injection
Coil = ignition
The value **1** will enable the strategy.
If we need to enable the ignition cut on **Cylinder 1**, the value will be: **00 00 00 00 00 00 00 10**
For **Cylinder 2** it will be: **00 00 00 00 00 00 10 00**
The value **00 00 00 00 00 00 00 11** will be a cut of ignition and injection for **Cylinder 1**.
The sequence seen in following picture (with **LIMITER+LIMITER_ADJ_DEFAULT = 10000 RPM** and **LIMITER_OFFSET= 1600 RPM**) will enable the following strategies:



Engine revolution value	Revolution number	Effect
9900	0	Injection cut on Cylinder 1
	1	Injection cut on Cylinder 2
	2	Igniction cut on Cylinder 3
	3	Igniction cut on Cylinder 4
	4	Injection cut on Cylinder 1
	5	Injection cut on Cylinder 2
	6	Igniction cut on Cylinder 3
	7	Igniction cut on Cylinder 4

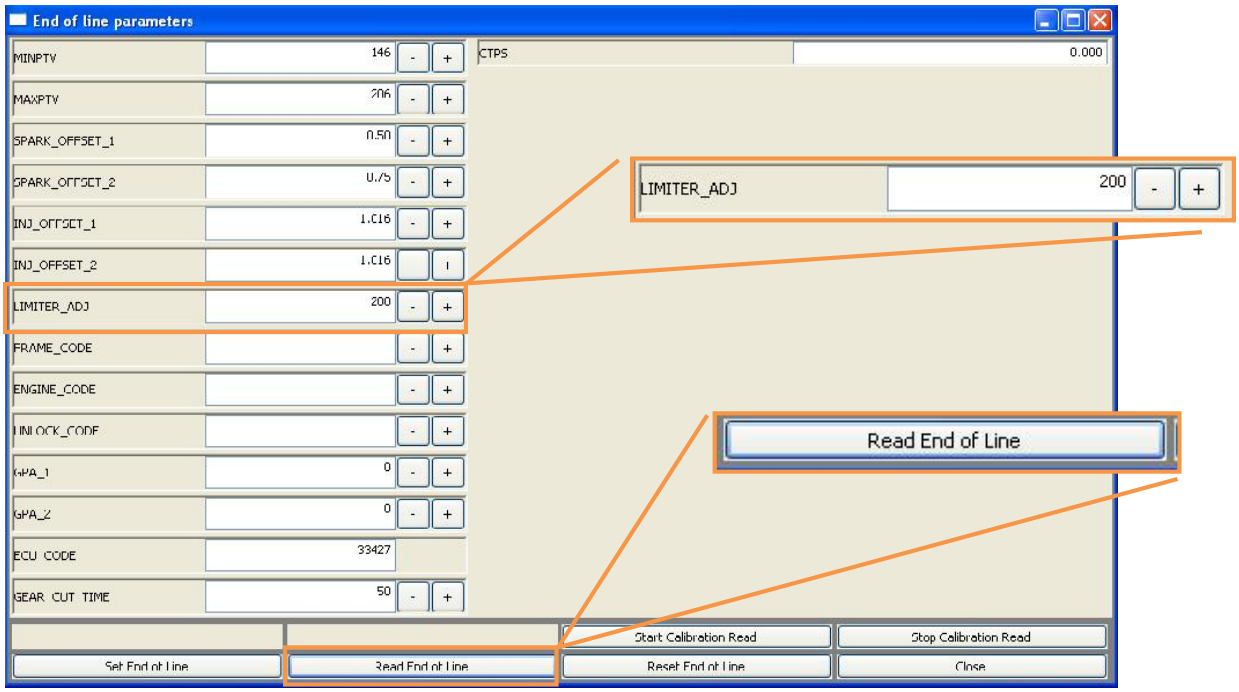
It the number of cylinder is less than 8, ECU will consider only values for the engine is managed (in a single cylinder i twill be consider only the first two numbers on the right).
In order to avoid engine failure or over revs type injection and ignition cuts in row 15.

6.15.2 Modification of intervention thresholds (lic. EVO and ADVANCE)

Intervention thresholds could be modified in End Of Line in the ECU:

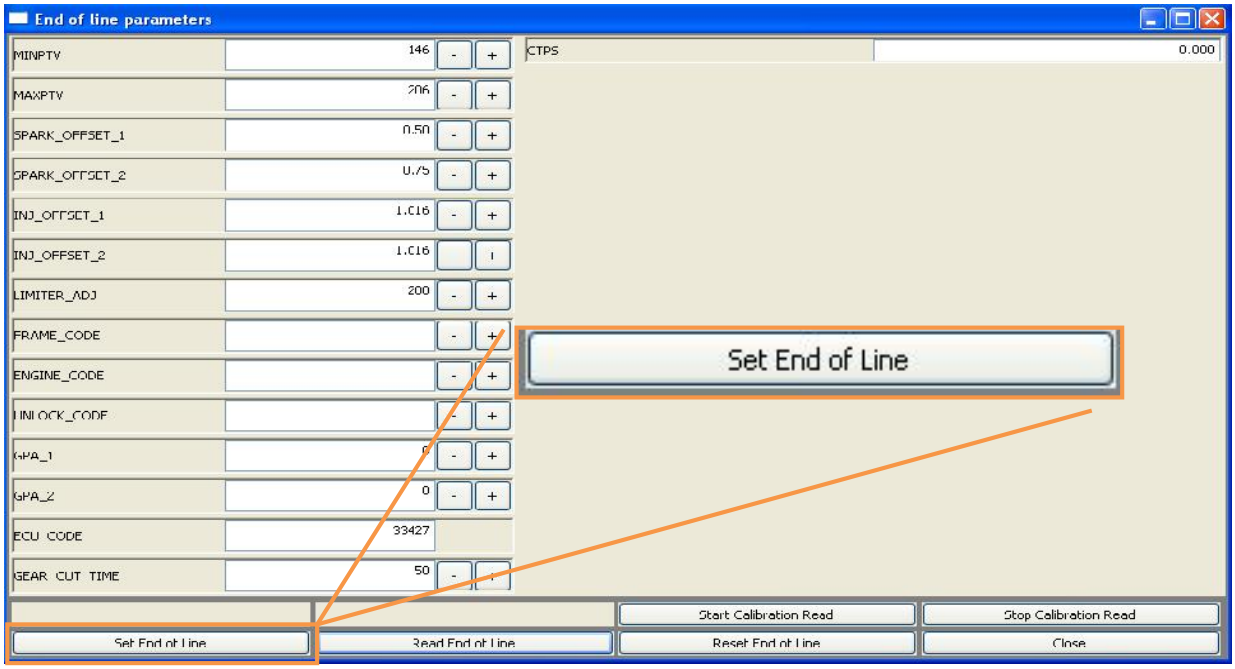
- Start Maya with double click on the icon
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if no device is loaded please load one (see chapter **6.1**)
- Click on **End Of Line** (**Tools**) or on icon in instrument bar **Maya.**
  NOTE: if the option **Enable Hot keys …** in **Preferences** of **Maya** is enabled, you could do the same procedure with **F5**

- Click on **Read End Of Line** to update parameters visualized in **End Of Line parameters**.

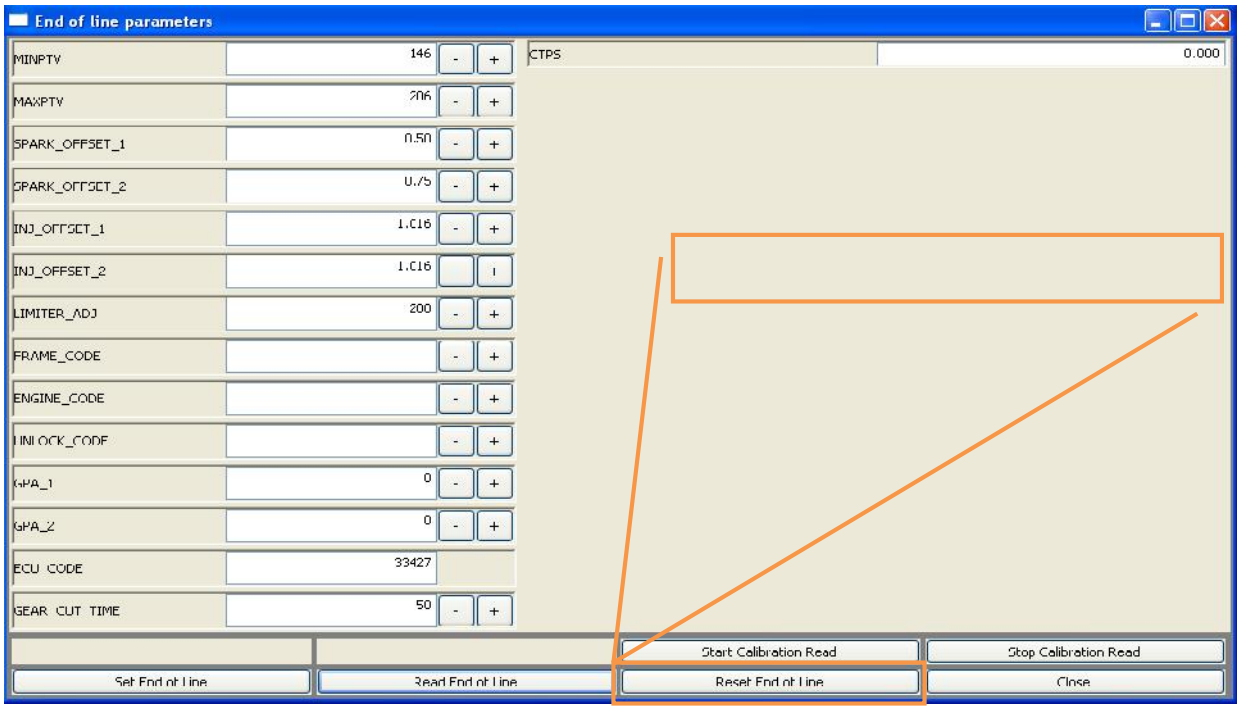


- Increase or decrease (as needed) the value of **LIMITER_ADJ**. Values could be set from 0 (rpm limiter is the value of **LIMITER**) to 510 (rpm limiter is the sum of **LIMITER** and **LIMITER_ADJ**). unit of measurement is RPM (revolutions per minute)

- At the end of modification click on **Set End Of Line** to update parameters of **End Of Line** stored in the ECU.



- If you want to get back to original parameters, push **Reset End of Line**.



WARNING: AN EXCESSIVE RPM LIMITER COULD CAUSE DAMAGES TO PARTS OR PERSON

6.15.3 Modification of intervention thresholds (lic. ADVANCE)

If you have a licence **Maya ADVANCE** you could set rpm limiter thresholds in different ways:

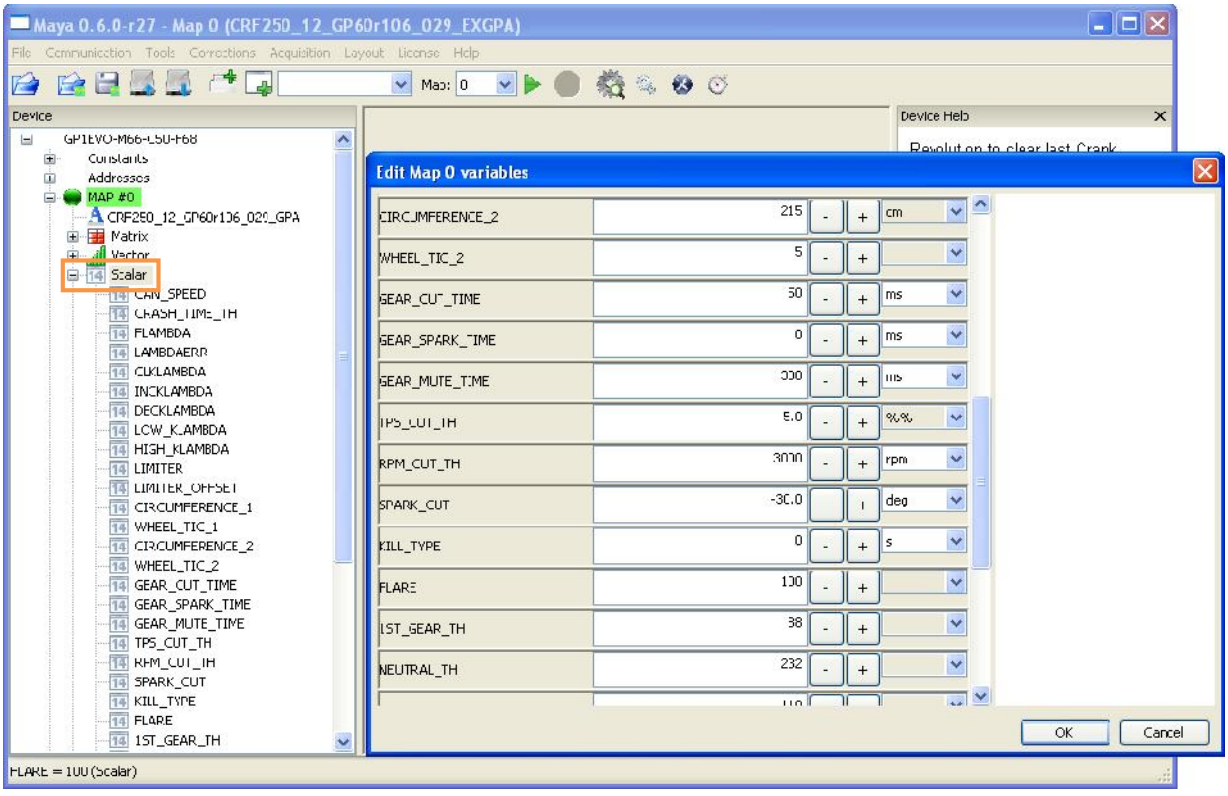
- Scalar
- End Of Line in ECU
- Matrix **LIMIT_TABLE**

	**WARNING: AN EXCESSIVE RPM LIMITER COULD CAUSE DAMAGES TO PARTS OR PERSON**

6.15.3.1 Modification of scalar in ECU GP1 EVO

Operate as follows:

- Start Maya with double click on the icon 
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if no device is loaded please load one (see chapter **6.1**)
- Expand scalar tree (clicking once the cross at the left of **Scalar**) and select scalars that involve rpm limiter, or open **Scalar** window.



- Look for and modify (if needed) following voices:

  - **LIMITER:** you could set max rpm for the engine.
  - **LIMITER_OFFSET:** you could set intervention threshold for rpm limiter.
  - **LIMITER_ADJ_DEFAULT:** to increase the value of rpm limiter (set with scalar **LIMITER**). WARNING: if you reset End Of Line in ECU, the value will be reset in **LIMITER_ADJ**.

- Send the map to ECU (see **6.6**)

6.15.3.2 Modification of End Of Line

To modify End Of Line please refer to chapter **6.15.2**.

6.15.3.3 Modification of Matrix LIMIT_TABLE in ECU GP1 EVO

As seen in chapter **6.15.1.1** matrix **LIMIT_TABLE** will influence the speed of intervention of injection cut and ignition.

Proceed as follows:

- Start Maya with double click on the icon 
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if no device is loaded please load one (see chapter **6.1**)
- Download the map you wish to modify from ECU (see chapter **6.3.3**).
- Verify that the map is active (symbol  near **MAP #...**).

Double click on **LIMIT_TABLE**: you will see a table in **Activity** area. Modify needed parameters: **in order to avoid engine failure or over revs type injection and ignition cuts in row 15.**

LIMIT_TABLE @ Map 0

3D View | Tabular View

	0	1	2	3	4	5	6	7
0	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000
1	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000
2	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000
3	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000
4	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000	0000000000000000
5	0000000000000010	0000000000000010	0000000000000000	0000000000000000	0000000000000010	0000000000000010	0000000000000000	0000000000000000
6	0000000000000010	0000000000000010	0000000000000000	0000000000000000	0000000000000010	0000000000000010	0000000000000000	0000000000000000
7	0000000000000010	0000000000000010	0000000000000000	0000000000000000	0000000000000010	0000000000000010	0000000000000000	0000000000000000
8	0000000000000010	0000000000000010	0000000000000000	0000000000000000	0000000000000010	0000000000000010	0000000000000000	0000000000000000
9	0000000000000010	0000000000000010	0000000000000000	0000000000000000	0000000000000010	0000000000000010	0000000000000000	0000000000000000
10	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010
11	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010
12	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010
13	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010
14	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010
15	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010	0000000000000010

- Send the map to ECU and/or save it (see **6.6**)

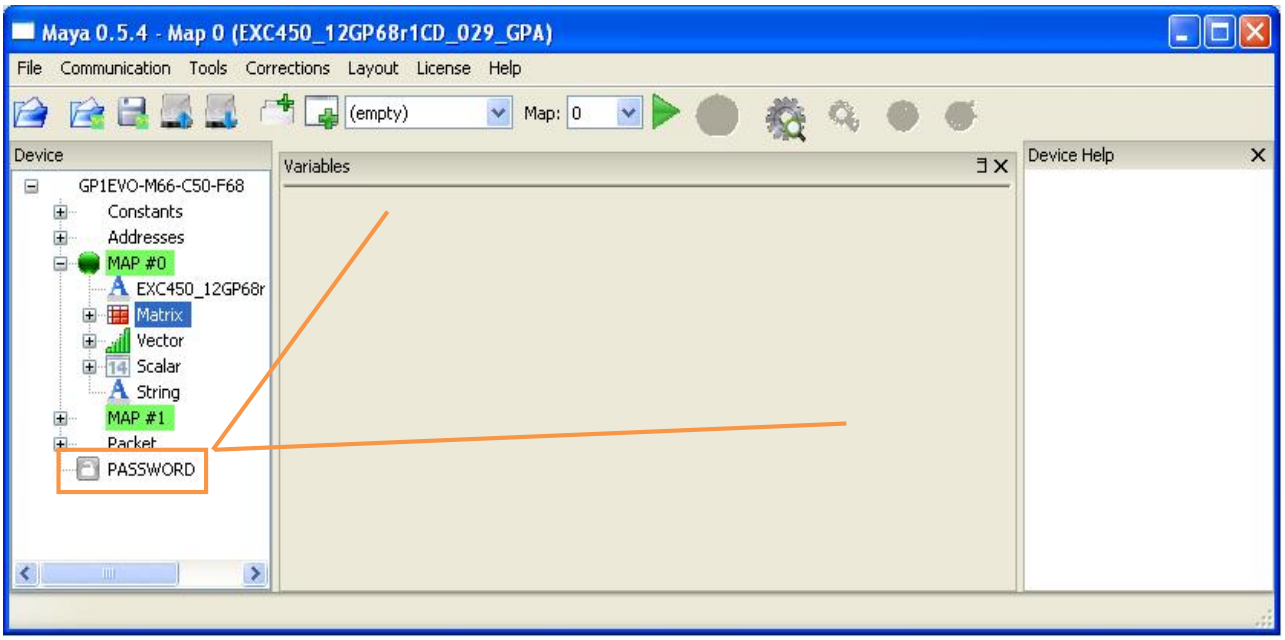
6.16 Define a protection password

Maps and calibration could be protected by a password.

ATTENTION: this option could be not available for all devices.

Proceed as follows:

- Start Maya with double click on the icon
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if no device is loaded please load one (see chapter **6.1**)
- Download the map you wish to modify from ECU (see chapter **6.3.1**).
- Double click on the padlock icon (in device tree): the password will be required each time the user try to open map data.



THE PASSWORD HAS TO BE 8 NUMBERS LONG.

- Click on OK to confirm: the padlock now will be visible on device tree.
- Send map to ECU (see chapter **6.6**) to save the operation

Once a password is set each time you try to open a communication with the ECU, Maya will ask you the password. If the password is correct, the ECU is unlocked and by pushing on **Read Map from ECU** (icon) you can download maps and work normally until the ECU will be switched off.

If you want to disable a password proceed as follows:

- Start Maya with double click on the icon 
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- Verify that a device is loaded and it is coherent with engine map you need. Check correct ECU-PC connection by clicking **Get ECU Codes** (in **Communication**). If the connection is working you will see a window with codes in ECU memory.
  NOTE: if no device is loaded please load one (see chapter **6.1**)
- Download the map you wish to modify from ECU (see chapter **6.3.3**).
- Double click on padlock: set password **00000000** (eight zeroes).
- Transmit map/maps to ECU: **data will be updated with new parameter and this will be unlocked for next readings.**

NOTE: if the status of the padlock is not updated after unlocking, close/open **Maya**.

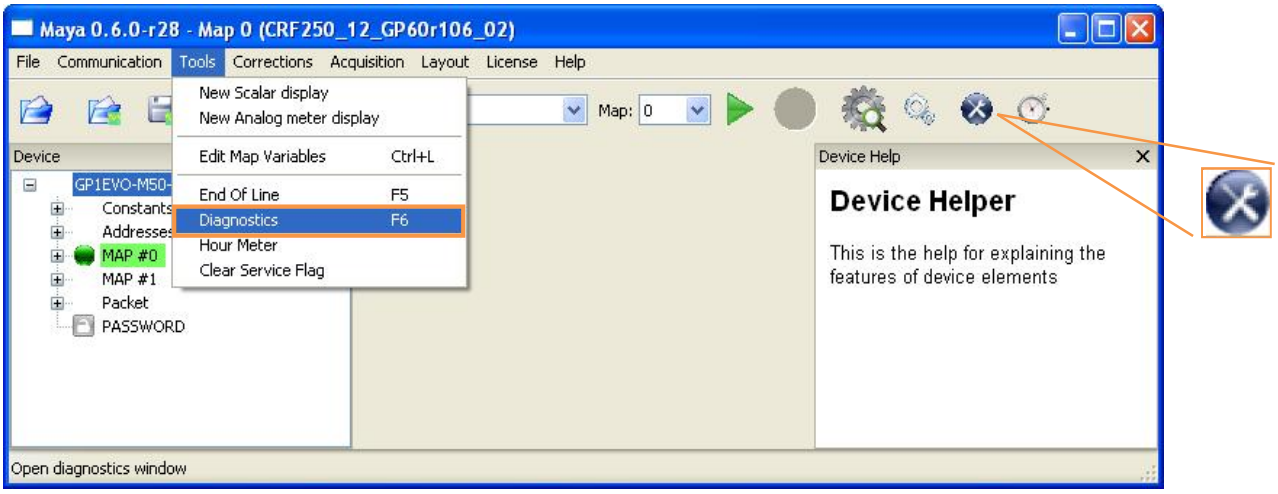
6.17 Diagnosis of ECU errors

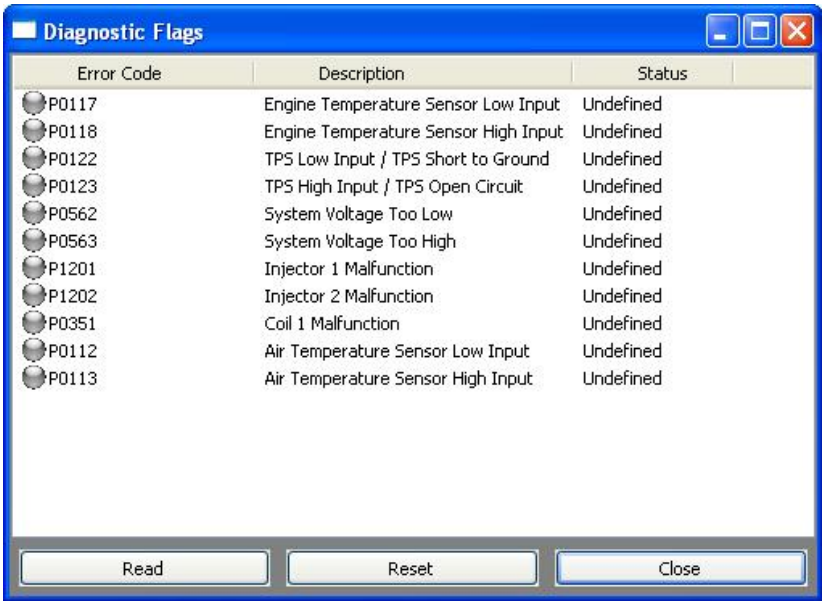
Maya integrate the function of diagnosis of connected ECU.
This tools permit to understand status of ECU and errors store in it being fundamental to solve issues during vehicle running.

ATTENTION: the number of sensors is dependent to stored device.

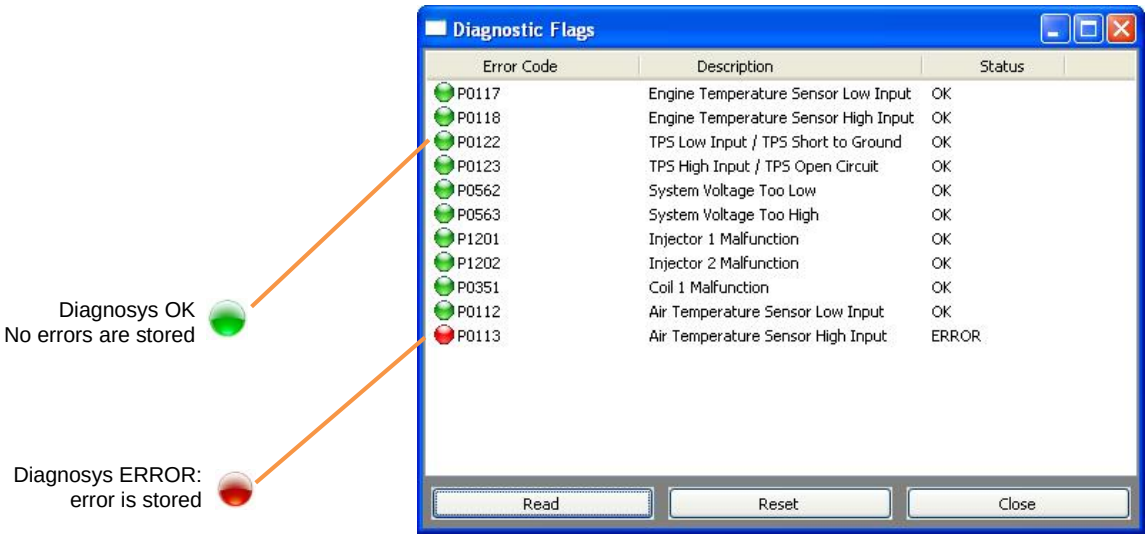
For diagnosis tool proceed as follows:

- Start Maya with double click on the icon
- Verify that ECU is connected to PC as define in chapter **6.2** of this manual.
- In menu **Tools** and click on **Diagnostics** or on icon : the diagnosis window will be visualized. The operation could be done also with **F6**.





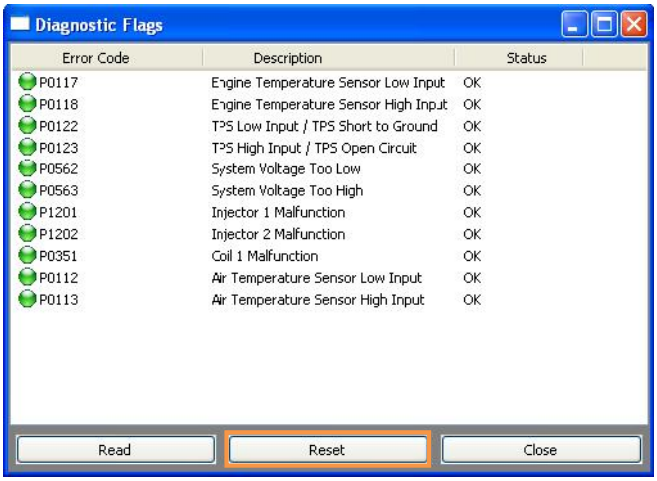
- Read the status of errors clicking on **Read**:



During these operations it is important to erase chronology of errors stored in the ECU: it is possible that an error that is visualized in the error window is not anymore seen by the ECU. The ECU in any case stores in its memory events occurred during functioning, therefore in the diagnosis window the error is stored (false error).

Proceed as follows:

- Check that previous passages have been correctly accomplished,
- Push **Reset** in diagnosis window to reset the history of alarms stored in the ECU:



- Push **Close**.
- Power the ECU (starting the engine in battery-less applications): the diagnosis table will be updated.
  NOTE: some failures of sensors/actuators could not be seen if the ECU didn't used them (as for example fuel injectors that are activated only when the engine is running).
- Repeat the reading procedure as seen before.

6.18 ECU running time

GET-Athena ECUs are provided with a time-counter to monitor the hours of ECU running time.

6.18.1 Reading of ECU running time

Proceed as follows:

- Start Maya with double click on the icon
- Verify that the ECU is connected to PC as indicated in chapter **6.2** of this manual.
- Go to menu **Tools** and click on **Hour Meter** or on : the report window will appear (**Working Time**).

- Push **OK** to close this window.

6.18.2 ECU running time reset

To reset the ECU running time proceed as follows:

- Start Maya with double click on the icon
- Verify that the ECU is connected to PC as indicated in chapter **6.2** of this manual.
- Go to menu **Tools** and click on **Clear Service Flag:** the running time will be reset (**Working Time**).

6.19 Traction control settings

Traction Control strategy (**TC**) presented below is a standard Traction Control implementation based on reading wheel speeds from wheel mounted sensor. The following informations are related only to this strategy while GPA strategy, the GET Power Assistant, is a sensorless Power Control and will be described on a different section. The primary function of TC is to reduce the power of the engine if the SLIP% value became too large. The SLIP% is the percentage difference between the Front and Rear Wheel Speed:

SLIP% = (RearSpeed – FrontSpeed) / Front Speed

Where FrontSpeed is read from SPEED_1 Input and RearSpeed is read from SPEED_2 input
During the power reduction mainly two method are used: Sequential cut or/and Ignition Retard
The steps to enable TC are as follow:

- Activation of TC strategy.
- Set of Start and Stop conditions for TC actuation.
- Settings of progression parameters for Power Reduction.

TC, Parameters of Traction Control and their names are related to the Devices and can be different.

Below a description of Scalars involved in TC settings:

TC_ENABLE: Main activation flag for **TC**. Clearing this value to 0 will disable TC regardless any other setting on the rest of parameters. Values other than 0 will enable the TC strategy and its behaviour for Power Reduction. Power reduction can be actuate mainly trough LIMIT_TABLE or/and GET_MATRIX.

TC_TPS: Throttle threshold to activate TC. Its value setting can be positive or negative in order to set the direction of activation according to the table below. In any case the threshold value is always the absolute value (unsigned)

SETTING	EFFECT
Positive Values	**TC** is active for Throttle positions greater or equal to the absolute value.
Negative Values	**TC** is active for Throttle positions lower or equal to the absolute value.

TC_TPS_OFF: Throttle threshold to release TC actuation. This settings has no meaning when the previous TC_TPS is a Positive value while it has sense when TC_TPS is negative. It is intended to release any actuation from TC when the Throttle is below this value to avoid actuation al low Throttle (Cranking ,Idling)

TC_RPM: Rpm threshold to activate TC. Its value setting can be positive or negative in order to set the direction of activation according to the table below. In any case the threshold value is always the absolute value (unsigned)

SETTING	EFFECT
Positive Values	**TC** is active for Rpm values greater or equal to the absolute value.
Negative Values	**TC** is active for Rpm values lower or equal to the absolute value.

TC_SPEED: Front Speed threshold to activate TC. Its value setting can be positive or negative in order to set the direction of activation according to the table below. In any case the threshold value is always the absolute value (unsigned)

SETTING	EFFECT
Positive Values	**TC** is active for Speed values greater or equal to the absolute value.
Negative Values	**TC** is active for Speed values lower or equal to the absolute value.

TC_SPEED_FILTER: this value set the type of filter to be applied to the samples read from the speed sensor. Clearing this value to 0 will disable any filter. Only values suggested on the Device Help section are allowed. Larger is the value higher is the filter applied.

TC_SLIP: this value set the maximum SLIP% allowed. As soon as the SLIP% became greater than this value the TC strategy start to reduce the power according to the normalized value.

Before continue with the description a preface is need.

To provide the TC Strategy with an INDEX that contain the information of the amount of power reduction need according to the SLIP% a normalization to the SLIP% value is applied.
The formula used to translate the SLIP% into an index in the range 0 to 15 is as follows:

$$\mathbf{SLIPSTAR} = \mathbf{SLIP\% * TC\_GAINP} + \mathbf{TC\_OFFSET}$$

E.g: Having a max SLIP% (from the acquisition analysis) of 50 % and using a TC_GAINP of 0.3 and a TC_OFFSET = 0 the resulting
SLIPSTAR = 50 * 0.3 + 0 = 15
SLIPSTAR = 20 * 0.3 + 0 = 6
SLIPSTAR = 10 * 0.3 + 0 = 3

If the TC_SLIP value setting is 6 (no Traction Control below 6% SLIP) the above formula for a SLIP% = 7 gives:

SLIPSTAR = 7 * 0.3 + 0 = 2

In this situation as soon as the SLIP% rise above 6 the INDEX of Power reduction pass from (-1 = no reduction) to 2 without moves through 0-1-2. In this case the help of TC_OFFSET adjust the setting.
In the above example with a TC_OFFSET of -2 the results change into:
SLIPSTAR = 50 * 0.3 - 2 = 13
SLIPSTAR = 20 * 0.3 - 2 = 4
SLIPSTAR = 10 * 0.3 - 2 = 1
SLIPSTAR = 7 * 0.3 - 2 = 0

To take in account of the progression (Derivative) of TC an additional gain is used : TC_GAIND
So the final INDEX calculation formula became:

$$\mathbf{SLIPSTARD} = \mathbf{SLIPSTAR} + \mathbf{(TC\_GAIND} * \Delta\mathbf{SLIP\%)}$$

The resulting Index value is used to access LIMIT_TABLE or/and GET_MATRIX

TC_GAINP: proportional GAIN applied to the SLIP% to calculate the INDEX of correction

TC_OFFSET: offset applied to the SLIP% to calculate the INDEX of correction

TC_GAIND: derivative GAIN applied to the SLIP% to calculate the INDEX of correction

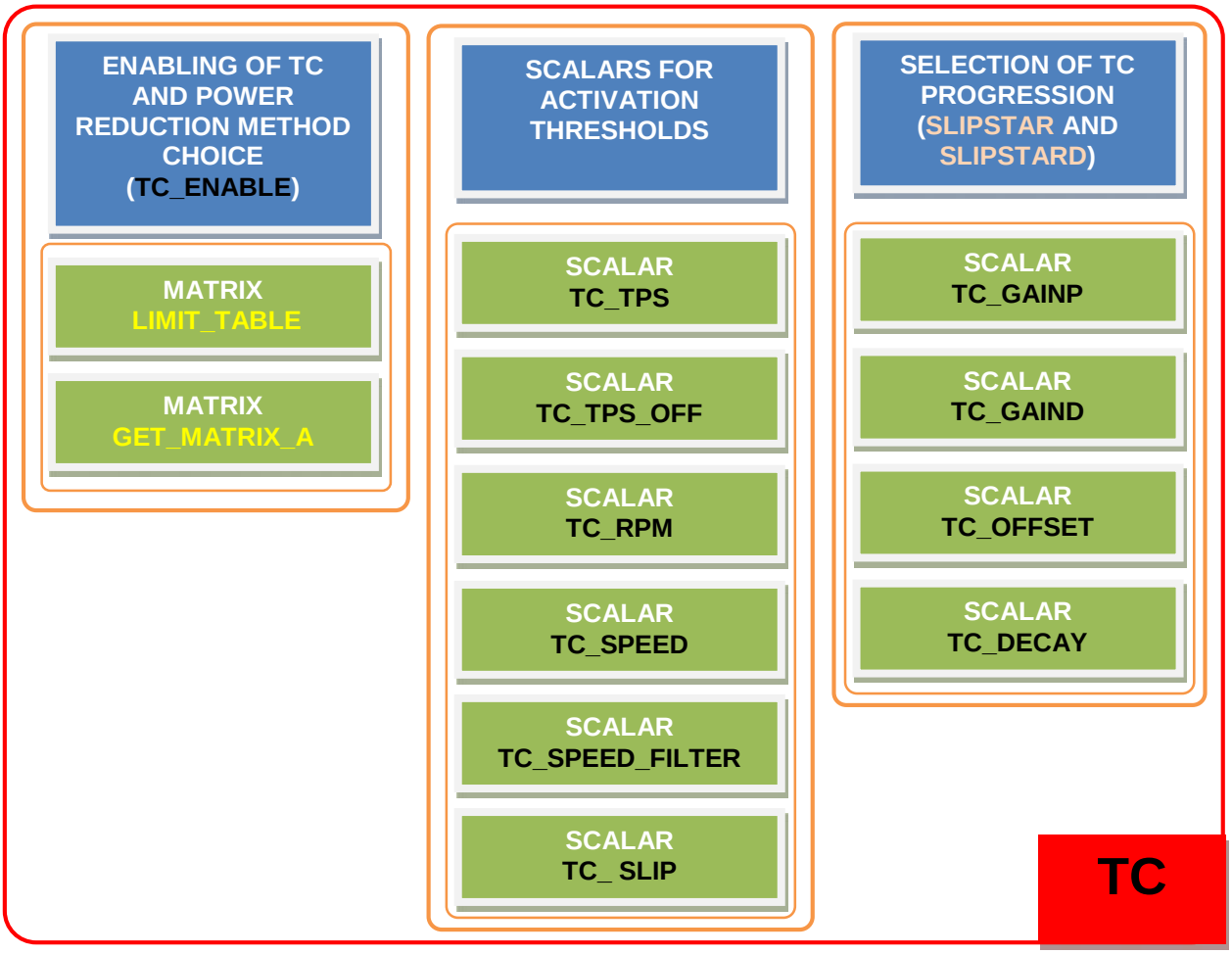
TC_DECAY: in case the TC strategy is set active only on a region by the setting of **TC_RPM** and **TC_TPS** it might happen that the driver exit the active region while the TC is applying a correction or a limitation. In this case the return to normal condition can be set as a decreasing function by this value.
Ex. The TC_TPS is set to -70. This means the TC is active below 70% Throttle. At a certain time while the driver is running at TPS = 50% the TC is activated by an increased SLIP% event applying a INDEX = 5 reduction. At the same time the driver open the throttle at 100%. TC should be disabled according to TC_TPS = -70%. The active INDEX = 5 is then decremented to 0 within a time set by **TC_DECAY** value.

The next two descriptions are relative to the two elements used to reduce Power according to the TC index.

LIMIT_TABLE: this matrix defines the sequence and type of cuts in the event of an activation of TC power reduction. On single cylinder application this type of power reduction is too hard and invasive to be used as by the TC. Instead the GET_MATRIX_A is used

GET_MATRIX_A: this matrix is the Ignition spark retard table used by the TC strategy to reduce the Power. The 16 lines (0 to 15) are accessed by the TC strategy according to the TC index while the 10 row are 10 different lines used by TC strategy selected by the driver using the CAN Switch on the handlebar or by setting a single value on the EoL.

Finally **Traction Control** schematic can be as follow



6.20 Launch control settings

Launch control or **LC** strategy is based on injection cuts or advances define in **LIMIT_TABLE** (see chapter **6.15.1.1**).
The input in the matrix is defined by specific scalars contained in the device.

Launch control strategy is available only for some devices.

These are parameters involved in the strategy (names could be different belonging to the device in use):

LAUNCH_SPEED: speed threshold after that LC is disable. Value=0 means that LC is disabled.

LAUNCH_LIMITER: define the max rpm value for activation of **Launch control**. Once this limit is reached, the ECU will apply what contained in row 15 of **LIMIT_TABLE** (see chapter **6.15.1.1**).

LAUNCH_LIMITER_OFFSET: similar to **LIMITER_OFFSET** (see chapter **6.15.1**) used for input in **LIMIT_TABLE** of ECU map.

To implement the use of this strategy, a switch in the handle bar (steering wheel) is needed.
The strategy is started when the button is pressed for more than 3 seconds and the speed is below the limit define in **LAUNCH_SPEED**.
Each time that the strategy is “engaged”, it is necessary that the vehicle will be at 0 km/h, for a minimum of 5 seconds.

6.21 Pit Limiter settings

The **Pit Limiter** strategy is use to limit the bike speed into the track pit lane and is based on injection cuts or advances.
The input in the matrix is defined by specific scalars contained in the device.
These are parameters involved in the strategy (names could be different belonging to the device in use):

- **PIT_SPEED:** threshold value. You could set the maximum bike speed allows by pit limiter strategy. A positive value sets the front sensor as speed source, a negative value sets the rear one as speed source.

- **PIT_SPEED_OFFSET:** threshold value. You could set the lower value of speed to stop the ignition cutting in pit limiter strategy. The parameter represents the hysteresis of pit limiter strategy. Finally the speed for exit the pit limiter strategy will result:

lower speed for pit limit = **PIT_SPEED** – **PIT_SPEED_OFFSET**

PLEASE NOTE: the Pit Limiter strategy is available only for some devices; it requires at least one speed sensor and a button connected to ECU.

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6.22 Second Injector Strategy

Second injector strategy involves some particular matrices which allow you to determine the fuel quantity percentage between injectors and the injection point.

WARNING: second injector management depends on Maya license and ECU in use.

Fuel quantity depends from:

BFUELT	base fuel map
FTCYL…	fuel correction table
EOL	End of Line fuel correction variables (i.e. INJ_OFFSET)
OTHER	fuel correction matrices ,vectors and scalars (i.e. temperature correction, Lambda, battery voltage)

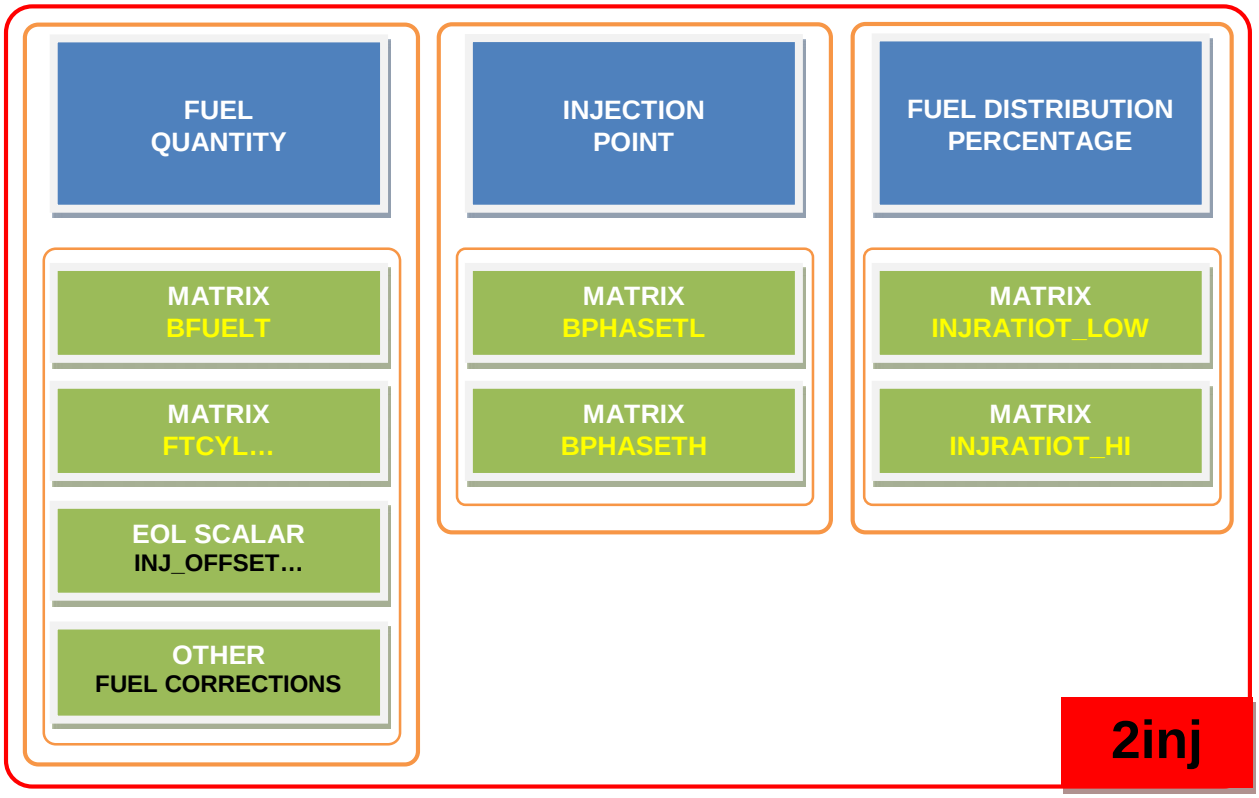
Fuel distribution percentage is manage by:

INJRATIOT_LOW	matrix for low injector fuel percentage
INJRATIOT_HI	matrix for high injector fuel percentage

Injection end point (expressed as crankshaft degrees)is set by:

BPHASETL	Injection end point matrix for low injector
BPHASETH	Injection end point matrix for high injector

PLEASE NOTE: check device table at the end of document to find correct parameters (matrices, vectors and scalar) names.

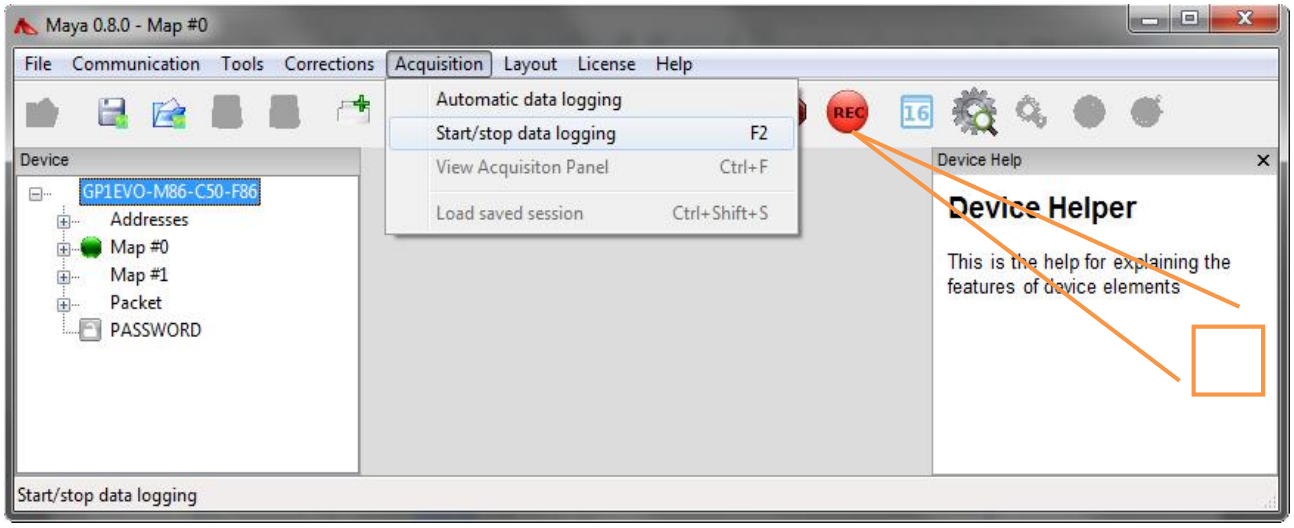


PLEASE NOTE: SOME DEVICES (E.G. GP1EVO) MANAGE FUEL DISTRIBUTION BY USING ONLY ONE MATRIX CALLED INJRATIOT.

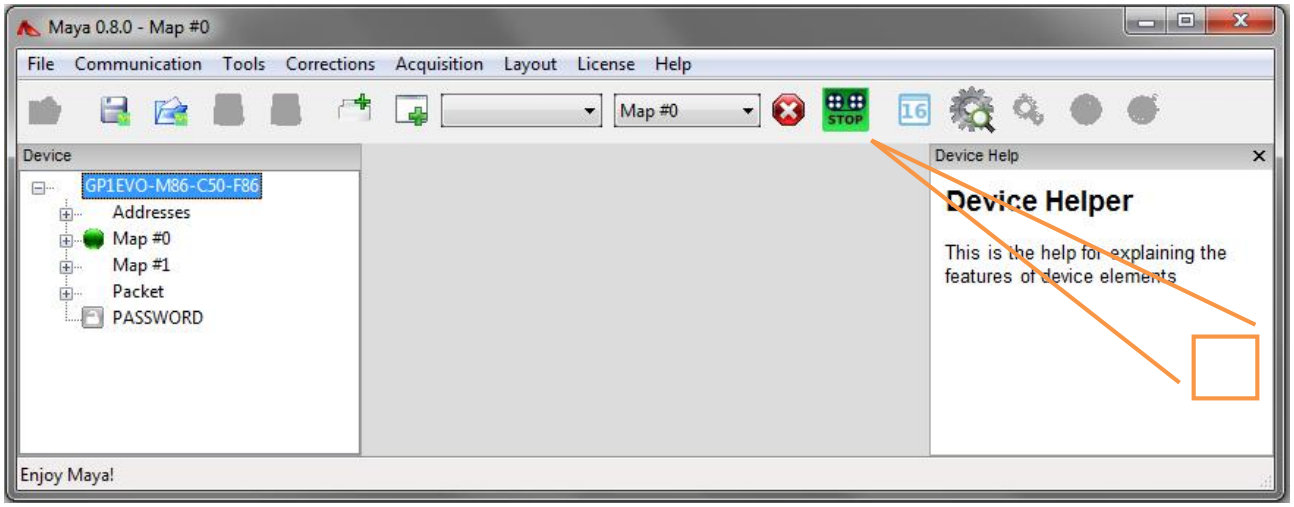
6.23 ECU data logging (only for remote ASSISTANCE)

Maya could log GET-Athena ECU parameters. This function is useful for remote assistance, given by GET – Athena, because you could send to technicians informations and failures logged by the ECU in a single file. Usually the technician will guide you to solve the problem, during the assistance intervention.
This is the (standard) procedure for data logging:

- Start Maya with double click on the icon
- Verify that the ECU is connected to PC as indicated in chapter **6.2** of this manual.
- Start live view of parameters in Instrument bar of Maya (or select the option **Connect/Disconnect to ECU** in menu **Communication**). Hot key = **F1**.
- Start logging (REC) (or select option **Start/Stop data logging** in menu **Acquisition**).



- Once the logging procedure is started, the button will change (logging active). To stop the operation do the same procedure.



Maya offers the possibility to proceed with an automatic **data logging**. Select **Automatic data logging** in menu **Acquisition**.

7 MAYA HOT KEYS

This is the list of all Maya Hot keys:

KEYBOARD	
HOT KEYS	**FUNCTION**
A	Decrease values of 1%
Q	Decrease values of - 5%
S	Increase values of + 1%
X	Increase values of + 0.5%
W	Increase values of + 5%
Z	Decrease values of - 0.5%
Ctrl+ -	Decrease values of a single step
Ctrl+ +	Increase values of a single step
Ctrl+A	**New Activity…** (new custom tab)
Ctrl+E	**Get ECU Codes…**
Ctrl+I	Map interpolation along X axis of matrix/vector graph
Ctrl+J	Map interpolation along Y axis of matrix/vector graph
Ctrl+K	Map interpolation along E and Y axis of matrix/vector graph
Ctrl+L	Open window for scalar modification in active map (same as function **Edit Map Variables**)
Ctrl+M	Open window to open a engine map file (same function as **Open Map…**)
Ctrl+N	Start a new window (same as **New Window…**)
Ctrl+S	Open save window map (same as **Save Map…**)
Ctrl+Shift+A	You could rename the visualized tab **Activity**
F1	Connect/disconnect ECU for live view of parameters
F2	Start/Stop ECU data logging (for remote assistance)
F3	Start read (download) of map/maps in the ECU (same as **Read Map from ECU**)
F4	Start download maps in ECU (same as **Download to ECU**)
F5	Open window for reading/writing of End Of Line in ECU (same as **End Of Line**)
F6	Open ECU diagnostic page (same as **Diagnostics)**
SPACE	You could write modification of **Correction Map** during calibration procedure

MOUSE	
HOT KEYS	**FUNCTION**
Right click	Open context menu You could rotate 3D graph (mouse need to be rotated while the button is pressed)
Right click and movement of arrow	Pan function. You could scroll the visualized area without changing the zoom
Scroll	You could zoom in or zoom out 3D Graph visualization, move vertically vectors
Scroll + **Ctrl**	You could zoom in or zoom out 3D Graph visualization
Scroll + **Shift**	Move horizontally vector graphs
Left click and movement of arrow	Select cells in tables, zoom of vectors in graphs

8 DEVICES TABLES

The following table resume devices of **Maya** divided by ECU.
PLEASE NOTE: some items may varied based on device firmware version.

8.1 GP1EVO ECU

Pos.	Name	Type	Description	Lic. EVO	Lic. ADV.
Map 1-2	**BFUELT**	Matrix	Injection time (base map).	☐	☑
Map 1-2	**FTCYL1**	Matrix	Injection correction table (base map).	☑	☑
Map 1-2	**INJRATIOT**	Matrix	Table of the injected fuel ration between lower injector and upper injector.	☐	☑
Map 1-2	**BIGN**	Matrix	Advance spark table (base advance map).	☐	☑
Map 1-2	**ITCYL1**	Matrix	Advance correction table.	☑	☑
Map 1-2	**BPHASETL**	Matrix	Table of degree (measured from **T.D.C.**) of end of injection from lower injector.	☐	☑
Map 1-2	**BPHASETH**	Matrix	Table of degree (measured from **T.D.C.**) of end of injection from upper injector.	☐	☑
Map 1-2	**CRANKT**	Matrix	Fuel correction during cranking.	☐	☑
Map 1-2	**ACCEL_INJ**	Matrix	Enrichment table during acceleration.	☐	☑
Map 1-2	**LAMBDAT**	Matrix	Lambda target value table (used with **Closed Loop** mode).	☐	☑
Map 1-2	**LAMBDAENT**	Matrix	Enabling table for mix correction with Lambda value.	☐	☑
Map 1-2	**LIMIT_TABLE**	Matrix	Table of rev limiter strategy.	☐	☑
Map 1-2	**TAIR_INJ_T**	Matrix	Fuel correction vs. air temperature table.	☐	☑
Map 1-2	**TH2O_INJ_T**	Matrix	Fuel correction vs. engine temperature table.	☐	☑
Map 1-2	**BRK_THROTTLE_2**	Vector	With this vector you could set TPS breakpoint values in FTCYL1 and ITCYL1.	☐	☑
Map 1-2	**BRK_RPM_2**	Vector	With this vector you could set RPM breakpoint values in FTCYL1 and ITCYL1.	☐	☑
Map 1-2	**ACCEL_DECAY_ INJ**	Vector	This vector will define number of revolutions during the matrix ACCEL_INJ is running.	☐	☑
Map 1-2	**TBLINLAMBDA**	Vector	Voltage vs. Lambda value calibration vector.	☐	☑
Map 1-2	**TBAPNJ**	Vector	Correction table for air Pressure.	☐	☑
Map 1-2	**ADJ_CRANK**	Vector	Correction vector during engine starting procedure.	☑	☑
Map 1-2	**CAN_SPEED:**	Scalar	Setting for CAN bus speed.	☐	☑
Map 1-2	**CRASH_TIME_TH**	Scalar	Automatic engine switch off time (seconds) when tilt sensor is activated.	☐	☑
Map 1-2	**FLAMBDA**	Scalar	This variable will enable **Closed Loop** strategy.	☐	☑
Map 1-2	**LAMBDAERR**	Scalar	This variable define tolerance of reading error of Lambda value.	☐	☑
Map 1-2	**CLKLAMBDA**	Scalar	This variable will manage the intervention frequency (rpm) of fuel correction during **Closed Loop** strategy.	☐	☑
Map 1-2	**DECLKLAMBDA**	Scalar	Variable used to reach lambda target if the engine is running in a rich condition.	☐	☑
Map 1-2	**HIGH_KLAMBDA**	Scalar	Maximum threshold for activation of **Closed Loop** strategy. In case of Lambda sensor failures the ECU will enrich the mix until the engine reach this value.	☐	☑
Map 1-2	**LOW_KLAMBDA**	Scalar	Minimum threshold for activation of **Closed Loop** strategy. In case of Lambda sensor failures the ECU will lean the mix until the engine reach this value.	☐	☑
Map 1-2	**LIMITER**	Scalar	Set maximum engine RPM.	☐	☑
Map 1-2	**LIMITER_OFFSET**	Scalar	Set the enabling value of rpm for limiter strategy.	☐	☑

Pos.	Name	Type	Description	Lic. EVO	Lic. ADV.
Map 1-2	**CIRCUMFERENCE_1**	Scalar	you could set the wheel circumference to calculate vehicle speed (input SPEED1).	☐	☑
Map 1-2	**WHEEL_TIC_1**	Scalar	Set number of electrical impulses for wheel sensor.	☐	☑
Map 1-2	**CIRCUMFERENCE_2**	Scalar	Set the wheel circumference to calculate vehicle speed (input SPEED2).	☐	☑
Map 1-2	**WHEEL_TIC_2**	Scalar	Set number of electrical impulses for wheel sensor.	☐	☑
Map 1-2	**GEAR_CUT_TIME**	Scalar	Set injection/ignition cut time for quick shifter strategy.	☑	☑
Map 1-2	**GEAR_SPARK_TIME**	Scalar	Set ignition cut time for quick shifter.	☐	☑
Map 1-2	**GEAR_MUTE_TIME**	Scalar	Set blank interval between two gearshift trigger signals.	☑	☑
Map 1-2	**TPS_CUT_TH**	Scalar	you could set the threshold of TPS value that quick shifter strategy.	☐	☑
Map 1-2	**RPM_CUT_TH**	Scalar	you could set the threshold of RPM value that activate quick shifter strategy.	☐	☑
Map 1-2	**SPARK_CUT**	Scalar	you could set maximum ignition delay during engine running.	☐	☑
Map 1-2	**KILL_TYPE**	Scalar	Set the time for stop the engine (KILL SWITCH). Value = 0 is **Racing** mode: the stop will be done according row 15 in **LIMIT_TABLE**.	☐	☑
Map 1-2	**FLARE**	Scalar	Define the number of revolution to stop the CRANK strategy.	☐	☑
Map 1-2	**1ST_GEAR_TH → 6TH_GEAR_TH**	Scalar	Gear sensor calibration values (expressed as count).	☐	☑
Map 1-2	**GEAR_TH_ OFFSET**	Scalar	You could set the clearance for readings of gearbox potentiometer.	☐	☑
Map 1-2	**GEAR_TYPE**	Scalar	you could set the type of gearbox potentiometer connected to ECU.	☐	☑
Map 1-2	**LIMITER_ADJ_ DEFAULT**	Scalar	you could increase the value for RPM limiter (set by **LIMITER**). The value could be from 0 to 510. ATTENTION: after a reset of End Of Line the ECU will reset the value to **LIMITER_ADJ.**	☐	☑

8.2 RX1EVO ECU

Pos.	Group	Name	Type	Description	Lic. EVO	Lic. ADV.
APPLICATION	LAMBDA	TBLINLAMBDA	Vector	Voltage vs. Lambda value calibration vector.	☐	☑
	LC	LC_SWITCH_MODE	Scalar	Set if LCGPA module requires additional MODE button (follow Maya Device Helper indications to apply the correct setting).	☐	☑
		LCGPA_ID_TYPE	Scalar	Set the CAN bus ID where LCGPA module send its data (default value 0).	☐	☑
	SETTING	BRK_RPM_1	Vector	Set RPM breakpoints value in following matrix: tabelle BFUELT, BIGNT, BPHASETL, BPHASETH, LAMBDAT, LAMBDAENT, TAIR_INJ_T, TH2O_INJ_T.	☐	☑
		BRK_RPM_2	Vector	Set RPM breakpoints value in following matrix: ITCYL1, FTCYL1.	☐	☑
		CRASH_TIME_TH	Scalar	Automatic engine switch off time (seconds) when tilt sensor is activated.	☐	☑
		FAN_ON	Scalar	Temperature threshold value which activate the auxiliary fan (connected to FAN ECU output).	☐	☑
		FAN_OFF	Scalar	Temperature threshold value which deactivate the auxiliary fan (connected to FAN ECU output).	☐	☑
	ENGINE	KILL_TYPE	Scalar	Set the time for stop the engine when KILL SWITCH has been pressed. Value = 0 means **Racing** mode: the stop will be done according row 15 settings in **LIMIT_TABLE**.	☐	☑
	SENSORS	CIRCUMFERENCE_1	Scalar	Set the wheel circumference to calculate vehicle speed (sensor connected to ECU input SPEED1 – normally front speed).	☐	☑
		WHEEL_TIC_1	Scalar	Set number of electrical impulses (at every wheel revolution) from wheel speed sensor (input SPEED1).	☐	☑
		CIRCUMFERENCE_2	Scalar	Set the wheel circumference to calculate vehicle speed (sensor connected to ECU input SPEED2 – normally rear speed).	☐	☑
		WHEEL_TIC_2	Scalar	Set number of electrical impulses (at every wheel revolution) from wheel speed sensor (input SPEED2).	☐	☑
	GEAR	1ST_GEAR_TH → 6TH_GEAR_TH	Scalar	Gear sensor calibration values (expressed as count).	☐	☑
		GEAR_TH_OFFSET	Scalar	You could set the clearance for readings of gearbox potentiometer.	☐	☑
		GEAR_MASK	Scalar	Set the reading time of gear sensor signal. If the value is stable, after this delay, it'll be accepted by the ECU.	☐	☑
		GEAR_TYPE	Scalar	Set the type of gearbox potentiometer connected to ECU (follow Maya Device Helper indications to apply the correct setting).	☐	☑

Pos.	Group	Name	Type	Description	Lic. EVO	Lic. ADV.
MAP 1 MAP 2	FUEL	BFUELT	Matrix	Injection time (base map)	☐	☑
		FTCYL1	Matrix	Injection correction table (base fuel map).	☑	☑
		INJRATIOT_L	Matrix	Table of the injected fuel percentage by lower injector .	☐	☑
		INJRATIOT_H	Matrix	Table of the injected fuel percentage by upper injector.	☐	☑
		BPHASETL	Matrix	Table of degree (measured from **T.D.C.**) of end of injection from lower injector.	☐	☑
		BPHASETH	Matrix	Table of degree (measured from **T.D.C.**) of end of injection from upper injector.	☐	☑
	IGNITION	BIGN	Matrix	Advance spark table (base advance map).	☐	☑
		ITCYL1	Matrix	Advance correction table.	☑	☑
	DTPS	ACCEL_INJ	Matrix	Fuel enrichment (Accel Pump) table during acceleration.	☐	☑
		ACCEL_DECAY_INJ	Vector	This vector will define number of revolutions during the matrix ACCEL_INJ is running.	☐	☑
	CORRECTIONS	TAIR_INJ_T	Matrix	Fuel correction vs. air temperature table.	☐	☑
		TH2O_INJ_T	Matrix	Fuel correction vs. engine temperature table.	☐	☑
		TB_BARO_INJ	Vector	Fuel correction vs Barometric Pressure.	☐	☑
	CRANK	CRANKT	Matrix	Fuel correction vs engine temperature table during cranking (from 1th to 16th revolution).	☐	☑
		FLARE_OFFSET	Vector	Fuel correction vector vs engine temperature during cranking (from 17th revolution to revolution set in FLARE scalar).	☐	☑
		ADJ_CRANK	Vector	Fuel correction vector vs engine temperature during cranking (from 1th to 16th revolution). Vector values will be added to CRANK_T matrix.	☑	☑
		FLARE	Scalar	Define the number of revolution (after the first 16) to stop the CRANK strategy.	☐	☑
	LIMITER	LIMIT_TABLE	Matrix	Table of rev limiter strategy.	☐	☑
		GEAR_LIMITER_ OFFSET	Vector	RPM limiter correction based on gear ratio. The values will be added or subtracted to LIMITER scalar value.	☐	☑
		OFFSET_LIMITER_ TENG	Vector	RPM limiter correction based on engine temperature. The values will be added or subtracted to LIMITER scalar value.	☐	☑
		LIMITER	Scalar	Set maximum engine RPM.	☐	☑
		LIMITER_OFFSET	Scalar	Set the RPM threshold for limiter strategy (see chapter **6.15**).	☐	☑
		NEUTRAL_LIMITER_ OFFSET	Scalar	Set the RPM threshold for limiter strategy (see chapter **6.15**) when NEUTRAL ratio has been engaged (requires gear position sensor).	☐	☑
	LAMBDA	LAMBDAT	Matrix	Lambda target value table (used with **Closed Loop** mode).	☐	☑
		LAMBDAENT	Matrix	Enabling table for mix correction with Lambda value.	☐	☑
		CLKLAMBDA_LEAN	Scalar	Set how many engine revolutions are necessary to activate the fuel correction in case of lean engine (Lambda value > Lambda Target) during **Closed Loop** strategy.	☑	☑
		CLKLAMBDA_RICH	Scalar	Set how many engine revolutions are necessary to activate the fuel correction in case of rich engine (Lambda value < Lambda Target) during **Closed Loop** strategy.	☑	☑
		KI_INC_KLAMBDA	Scalar	Set the Lambda value increment in case of lean engine (during **Closed Loop** strategy).	☐	☑
		KI_DEC_KLAMBDA	Scalar	Set the Lambda value decrement in case of rich engine (during **Closed Loop** strategy).	☐	☑

Pos.	Group	Name	Type	Description	Lic. EVO	Lic. ADV.
MAP1 MAP2	**LAMBDA**	**LOW_KLAMBDA**	Scalar	Minimum threshold for activation of **Closed Loop** strategy. In case of Lambda sensor failures the ECU will lean the mix until the engine reach this value.	☐	☑
		HIGH_KLAMBDA	Scalar	Maximum threshold for activation of **Closed Loop** strategy. In case of Lambda sensor failures the ECU will enrich the mix until the engine reach this value.	☐	☑
	LC	**LC_RPM_DROP**	Scalar	Set the RPM threshold which activate LEDs blinking on LCGPA module (when Launch Control strategy has been activated).	☐	☑
	GEAR	**GEAR_CUT_TIME**	Scalar	Set injection/ignition cut time for quick shifter strategy.	☑	☑
		GEAR_MUTE_ TIME	Scalar	Set blank interval between two Gearshift trigger signals.	☑	☑
		TPS_CUT_TH	Scalar	Set the threshold of minimum TPS value that activate quick shifter strategy.	☐	☑
		RPM_CUT_TH	Scalar	Set the threshold of minimum RPM value that activate quick shifter strategy.	☐	☑
		GEAR_SHIFT_RPM	Scalar	Set the gear shift light threshold for LCGPA module	☐	☑
	EOL	**LIMITER_ADJ_ DEFAULT**	Scalar	It increases the value for RPM limiter (set by **LIMITER** scalar). The value could be from 0 to 510. WARNING: after a reset of End Of Line the ECU the **LIMITER_ADJ_DEFAULT** will be restored inside the ECU.	☐	☑

8.3 ECULMB48 ECU (YAMAHA YZF R25/R3)

Pos.	Group	Name	Type	Description	Lic. EVO	Lic. ADV
APPLICATION	CORRECTIONS	TAIR_INJ_T	Matrix	Fuel correction vs. air temperature table.	☐	☑
		TH2O_INJ_T	Matrix	Fuel correction vs. engine temperature table.	☐	☑
		TB_BARO_INJ	Vector	Fuel correction vs Barometric Pressure.	☐	☑
	CRANK	CRANKT	Matrix	Fuel correction vs engine temperature table during cranking (from 1th to 16th revolution).	☐	☑
		FLARE_OFFSET	Vector	Fuel correction vector vs engine temperature during cranking (from 17th revolution to revolution set in FLARE scalar).	☐	☑
	LIMITER	LIMIT_TABLE	Matrix	Table of rev limiter strategy.	☐	☑
		LIMITER	Scalar	Set maximum engine RPM.	☐	☑
		LIMITER_OFFSET	Scalar	Set the RPM threshold for limiter strategy (see chapter **6.15**).	☐	☑
	QUICK_ SHIFTER	SHIFTER_DEFAULT_ CUT_TIME	Scalar	Set injection/ignition cut time for quick shifter strategy.	☑	☑
		SHIFTER_MUTE_ TIME	Scalar	Set blank interval between two Gearshift trigger signals.	☑	☑
		SHIFTER_TPS_MIN	Scalar	Set the threshold of minimum TPS value that activate quick shifter strategy.	☑	☑
		SHIFTER_RPM_MIN	Scalar	Set the threshold of minimum RPM value that activate quick shifter strategy.	☑	☑
	LAMBDA	TBLINLAMBDA	Vector	Voltage vs. Lambda value calibration vector.	☐	☑
	IDLE	IDLE_TARGET_RPM	Vector	Idle RPM target vs Engine temperature vector	☐	☑
	SETTING	FAN_ON	Scalar	Temperature threshold value which activate the auxiliary fan (connected to FAN ECU output).	☐	☑
		FAN_OFF	Scalar	Temperature threshold value which deactivate the auxiliary fan (connected to FAN ECU output).	☐	☑
		TIPOVER_VOLTAGE _TH	Scalar	Set the threshold voltage of tip over sensor	☐	☑
	SENSORS	CIRCUMFERENCE_1	Scalar	Set the wheel circumference to calculate vehicle speed (sensor connected to ECU input SPEED1 – normally front speed).	☐	☑
		WHEEL_TIC_1	Scalar	Set number of electrical impulses (at every wheel revolution) from wheel speed sensor (input SPEED1).	☐	☑
		CIRCUMFERENCE_2	Scalar	Set the wheel circumference to calculate vehicle speed (sensor connected to ECU input SPEED2 – normally rear speed).	☐	☑
		WHEEL_TIC_2	Scalar	Set number of electrical impulses (at every wheel revolution) from wheel speed sensor (input SPEED2).	☐	☑

Pos.	Group	Name	Type	Description	Lic. EVO	Lic. ADV.
MAP 1 MAP 2	FUEL	BFUELT	Matrix	Injection time (base map).	☐	☑
		FTCYL1	Matrix	Injection correction table (base fuel map) cylinder 1.	☑	☑
		FTCYL2	Matrix	Injection correction table (base fuel map) cylinder 2.	☑	☑
		BPHASET	Matrix	Table of degree (measured from **T.D.C.**) of injection stop.	☐	☑
	IGNITION	BIGN	Matrix	Advance spark table (base advance map).	☐	☑
		ITCYL1	Matrix	Advance correction table cylinder 1.	☑	☑
		ITCYL2	Matrix	Advance correction table cylinder 2.	☑	☑
	DTPS	ACCEL_INJ	Matrix	Fuel enrichment (Accel Pump) table during acceleration.	☐	☑
		ACCEL_DECAY_INJ	Vector	This vector will define number of revolutions during the matrix ACCEL_INJ is running.	☐	☑
	LAMBDA	LAMBDAT	Matrix	Lambda target value table (used with **Closed Loop** mode).	☐	☑
		LAMBDAENT	Matrix	Enabling table for mix correction with Lambda value.	☐	☑
		CLKLAMBDA_LEAN	Scalar	Set how many engine revolutions are necessary to activate the fuel correction in case of lean engine (Lambda value > Lambda Target) during **Closed Loop** strategy.	☐	☑
		CLKLAMBDA_RICH	Scalar	Set how many engine revolutions are necessary to activate the fuel correction in case of rich engine (Lambda value < Lambda Target) during **Closed Loop** strategy.	☐	☑
		FLAMBDA	Scalar	This variable will enable **Closed Loop** strategy.	☐	☑
		LAMBDAERR	Scalar	This variable define tolerance of reading error of Lambda value.	☐	☑
		KI_INC_KLAMBDA	Scalar	Set the Lambda value increment in case of lean engine (during **Closed Loop** strategy).	☐	☑
		KI_DEC_KLAMBDA	Scalar	Set the Lambda value decrement in case of rich engine (during **Closed Loop** strategy).	☐	☑
		LOW_KLAMBDA	Scalar	Minimum threshold for activation of **Closed Loop** strategy. In case of Lambda sensor failures the ECU will lean the mix until the engine reach this value.	☐	☑
		HIGH_KLAMBDA	Scalar	Maximum threshold for activation of **Closed Loop** strategy. In case of Lambda sensor failures the ECU will enrich the mix until the engine reach this value.	☐	☑
	CUT_OFF	TPS_TH_CUTOFF	Vector	Threshold of TPS to enable the Cut-Off strategy: the strategy is enabled when the TPS value falls below this threshold.	☐	☑

8.4 KM3EVO ECU

Pos.	Name	Type	Description	Lic. EVO	Lic. ADV.
Map 1-2	**FTCYL1**	Matrix	Injection correction table (base map)	☑	☑
Map 1-2	**BFUELT**	Matrix	Injection time (base map).	☐	☑
Map 1-2	**INJRATIOT**	Matrix	Table of the injected fuel ration between lower injector and upper injector.	☐	☑
Map 1-2	**BIGN**	Matrix	Advance spark table (base advance map).	☐	☑
Map 1-2	**ITCYL1**	Matrix	Advance correction table.	☑	☑
Map 1-2	**BPHASETL**	Matrix	Table of degree (measured from **T.D.C.**) of end of injection from lower injector.	☐	☑
Map 1-2	**BPHASETH**	Matrix	Table of degree (measured from **T.D.C.**) of end of injection from upper injector.	☐	☑
Map 1-2	**CRANKT**	Matrix	Fuel correction during cranking.	☐	☑
Map 1-2	**IDLET**	Matrix	Stepper motor position table vs. engine temperature	☑	☑
Map 1-2	**ACCEL_INJ**	Matrix	Enrichment table during acceleration.	☑	☑
Map 1-2	**DECEL_INJ**	Matrix	Enrichment table during deceleration.	☐	☑
Map 1-2	**ACCEL_IDLE**	Matrix	Idle stepper motor position during acceleration. If the ETB (Electronic Throttle Body) strategy has been enabled it defines the throttle position	☐	☑
Map 1-2	**DECEL_ IDLE**	Matrix	Idle stepper motor position during deceleration. If the ETB (Electronic Throttle Body) strategy has been enabled it defines the throttle position	☐	☑
Map 1-2	**LAMBDAT**	Matrix	Lambda target value table (used with **Closed Loop** mode).	☐	☑
Map 1-2	**LAMBDAENT**	Matrix	Enabling table for mix correction with Lambda value.	☐	☑
Map 1-2	**LIMIT_TABLE**	Matrix	Table of rev limiter strategy.	☐	☑
Map 1-2	**TAIR_INJ_T**	Matrix	Fuel correction vs. air temperature table.	☐	☑
Map 1-2	**TH2O_INJ_T**	Matrix	Fuel correction vs. engine temperature table.	☐	☑
Map 1-2	**ACCEL_DECAY_ INJ**	Vector	Number of revolutions to decay the matrix ACCEL_INJ extra fuel	☐	☑
Map 1-2	**DECEL_DECAY_ INJ**	Vector	Number of revolutions to decay the matrix DECEL_INJ extra fuel	☐	☑
Map 1-2	**ACCEL_DECAY_ IDLE**	Vector	Number of revolutions to decay the matrix ACCEL_IDLE	☐	☑
Map 1-2	**DECEL_DECAY_ IDLE**	Vector	Number of revolutions to decay the matrix DECEL_IDLE	☐	☑
Map 1-2	**TBLINLAMBDA**	Vector	Voltage vs. Lambda value calibration vector.	☑	☑
Map 1-2	**TBLINFORK**	Vector	Voltage vs. fork position sensor value calibration vector.	☑	☑
Map 1-2	**TBLINSHOCK**	Vector	Voltage vs. shock position sensor value calibration vector.	☑	☑
Map 1-2	**TBAPINJ**	Vector	Fuel correction vs Barometric Pressure.	☐	☑
Map 1-2	**IDLE TARGET__RPM**	Vector	Idle RPM target vs Engine temperature vector	☑	☑
Map 1-2	**GEAR_CUT_TIME**	Vector	It sets the value of ignition cut time when the quick shifter is activated	☑	☑
Map 1-2	**GEAR_STEPPER_GAIN**	Vector	It reduces the engine braking torque by changing the by-pass valve position (that it is controlled by the stepper motor).	☑	☑
Map 1-2	**FLARE**	Scalar	Define the number of revolution to stop the CRANK strategy.	☐	☑
Map 1-2	**TACHO_TYPE**	Scalar	Set pulses supplied to revolution meter (tacho output) per revolution	☑	☑
Map 1-2	**CRASH_TIME_TH**	Scalar	Automatic engine switch off time (seconds)	☐	☑
Map 1-2	**FLAMBDA**	Scalar	This variable will enable **Closed Loop** strategy.	☐	☑
Map 1-2	**LAMBDAERR**	Scalar	This variable define tolerance of reading error of Lambda value.	☐	☑
Map 1-2	**CLKLAMBDA**	Scalar	This variable will manage the intervention frequency (rpm) of fuel correction during **Closed Loop** strategy.	☐	☑
Map 1-2	**INCLKLAMBDA**	Scalar	Variable used to set the correction step to reach lambda target (if the engine is running in a lean condition).	☐	☑

Pos.	Name	Type	Description	Lic. EVO	Lic. ADV.
Map 1-2	**DECLKLAMBDA**	Scalar	Variable used to reach lambda target if the engine is running in a rich condition.	☐	☑
Map 1-2	**LOW_KLAMBDA**	Scalar	Minimum threshold for activation of **Closed Loop** strategy. In case of Lambda sensor failures the ECU will lean the mix until the engine reach this value.	☐	☑
Map 1-2	**HIGH_KLAMBDA**	Scalar	Maximum threshold for activation of **Closed Loop** strategy. In case of Lambda sensor failures the ECU will enrich the mix until the engine reach this value.	☐	☑
Map 1-2	**CIRCUMFERENCE_FRONT**	Scalar	Set the front wheel circumference to calculate vehicle speed	☑	☑
Map 1-2	**WHEEL_TIC_ FRONT**	Scalar	Set number of electrical impulses for front wheel sensor.	☐	☑
Map 1-2	**CIRCUMFERENCE_REAR**	Scalar	Set the rear wheel circumference to calculate vehicle speed	☑	☑
Map 1-2	**WHEEL_TIC_ REAR**	Scalar	Set number of electrical impulses for rear wheel sensor.	☐	☑
Map 1-2	**GEAR_SPARK_TIME**	Scalar	Set ignition cut time for quick shifter.	☐	☑
Map 1-2	**GEAR_MUTE_TIME**	Scalar	Set inhibition time between two quick shifter trigger inputs: ECU will not activate any injection/ignition cut during this period of time.	☐	☑
Map 1-2	**TPS_CUT_TH**	Scalar	Threshold value. Below this TPS value the quick shifter will not be enabled. Value in %	☐	☑
Map 1-2	**RPM_CUT_TH**	Scalar	Threshold value. Below this RPM value the quick shifter will not be enabled. Value in rpm	☐	☑
Map 1-2	**SPARK_CUT**	Scalar	Set maximum ignition retard for quick shifter strategy.	☐	☑
Map 1-2	**GEAR_CUT_MODE**	Scalar	Set how the quick shifter strategy works: only fuel cut, only advance cut or both.	☐	☑
Map 1-2	**H2O_ALARM_ON**	Scalar	Over this value the engine temperature lamp is switched on. NOTE: set the value greater than **H2O_ALARM_OFF** value.	☐	☑
Map 1-2	**H2O_ALARM_OFF**	Scalar	Threshold value. Below this value the engine temperature alarm lamp is turned off.	☐	☑
Map 1-2	**RPM_IDLE_ACTIVATE**	Scalar	Idle RPM strategy control threshold. If the RPM goes below this value plus the value set in RPM_IDLE_TARGET vector the Idle strategy will be activated.	☐	☑
Map 1-2	**IDLE_RPM_ERROR**	Scalar	RPM clearance at idle condition.	☐	☑
Map 1-2	**IDLE_THROTTLE_TH**	Scalar	Idle RPM strategy control threshold. If the throttle value goes below this value the Idle strategy will be activated	☐	☑
Map 1-2	**IDLE_STEPS**	Scalar	Set the minimum idle motor steps to control the engine idle.	☐	☑
Map 1-2	**IDLE_UPPER_LIMIT**	Scalar	Set the maximum idle motor steps to control the engine idle (while the air by-pass is opening).	☐	☑
Map 1-2	**IDLE_LOWER_LIMIT**	Scalar	Set the maximum idle motor steps to control the engine idle (while the air by-pass is closing).	☐	☑
Map 1-2	**LAUNCH_SPEED**	Scalar	Speed threshold after that LC (launch control strategy) is disable.	☐	☑
Map 1-2	**LAUNCH_LIMITER**	Scalar	It defines the max rpm value for activation of launch control.	☑	☑
Map 1-2	**LAUNCH_LIMITER_OFFSET**	Scalar	Over this value the ECU will start a progressive ignition and/or injection cutting until the LAUNCH_LIMITER value is reached.	☐	☑
Map 1-2	**PIT_SPEED**	Scalar	It set the maximum speed for pit limiter strategy.	☑	☑
Map 1-2	**PIT_SPEED_ OFFSET**	Scalar	Hysteresis of pit limiter strategy. It set the lower value of speed to stop the ignition cutting in pit limiter strategy.	☐	☑

8.5 KM3KTM ECU

Pos.	Name	Type	Description	Lic. EVO	Lic. ADV.
Map 1-2	**FTCYL1**	Matrix	Injection correction table (base map)	☑	☑
Map 1-2	**BFUELT**	Matrix	Injection time (base map).	☐	☑
Map 1-2	**WTPS**	Matrix	Weigh of throttle position (used in acceleration pump strategy)	☐	☑
Map 1-2	**ACCEL_INJ**	Matrix	Enrichment table during acceleration	☐	☑
Map 1-2	**GET_MATRIX_A**	Matrix	Ignition spark retard table used by the TC strategy to reduce the Power	☐	☑
Map 1-2	**ACCEL_DECAY_ INJ**	Vector	This vector will define number of revolutions during the matrix ACCEL_INJ is running	☐	☑
Map 1-2	**GEAR_CUT_TIME**	Vector	It sets the value of ignition cut time when the quick shifter is activated	☐	☑
Map 1-2	**GEAR_STEPPER_GAIN**	Vector	It reduces the engine braking torque by changing the by-pass valve position (that it is controlled by the stepper motor).	☑	☑
Map 1-2	**CAN_BAUDRATE**	Scalar	Setting for CAN bus speed	☑	☑
Map 1-2	**CRASH_TIME_TH**	Scalar	Automatic engine switch off time (seconds)	☐	☑
Map 1-2	**CIRCUMFERENCE_FRONT**	Scalar	Set the front wheel circumference to calculate vehicle speed	☑	☑
Map 1-2	**WHEEL_TIC_ FRONT**	Scalar	Set number of electrical impulses for front wheel sensor.	☐	☑
Map 1-2	**CIRCUMFERENCE_REAR**	Scalar	Set the rear wheel circumference to calculate vehicle speed	☑	☑
Map 1-2	**WHEEL_TIC_ REAR**	Scalar	Set number of electrical impulses for rear wheel sensor.	☐	☑
Map 1-2	**GEAR_SPARK_TIME**	Scalar	Set ignition cut time for quick shifter.	☐	☑
Map 1-2	**GEAR_MUTE_TIME**	Scalar	Set inhibition time between two quick shifter trigger inputs: ECU will not activate any injection/ignition cut during this period of time.	☐	☑
Map 1-2	**TPS_CUT_TH**	Scalar	Threshold value. Below this TPS value the quick shifter will not be enabled. Value in %	☐	☑
Map 1-2	**RPM_CUT_TH**	Scalar	Threshold value. Below this RPM value the quick shifter will not be enabled. Value in rpm	☐	☑
Map 1-2	**H2O_ALARM_ON**	Scalar	Over this value the engine temperature lamp is switched on. NOTE: set the value greater than **H2O_ALARM_OFF** value.	☐	☑
Map 1-2	**H2O_ALARM_OFF**	Scalar	Threshold value. Below this value the engine temperature alarm lamp is turned off.	☐	☑
Map 1-2	**TC_ENABLE**	Scalar	Main activation flag for **TC**. Clearing this value to 0 will disable TC, set 1 to enable the TC strategy.	☑	☑
Map 1-2	**TC_TPS**	Scalar	Throttle threshold to activate TC.	☐	☑
Map 1-2	**TC_RPM**	Scalar	Rpm threshold to activate TC.	☐	☑
Map 1-2	**TC_SPEED**	Scalar	Front Speed threshold to activate TC.	☐	☑
Map 1-2	**TC_SLIP**	Scalar	It set the maximum SLIP% allowed in TC strategy.	☐	☑
Map 1-2	**TC_GAINP**	Scalar	Proportional GAIN applied to the SLIP% to calculate the INDEX of correction.	☐	☑
Map 1-2	**TC_GAIND**	Scalar	Derivative GAIN applied to the SLIP% to calculate the INDEX of correction.	☐	☑
Map 1-2	**TC_OFFSET**	Scalar	Offset applied to the SLIP% to calculate the INDEX of correction.	☐	☑
Map 1-2	**TC_DECAY**	Scalar	It set the return to normal condition after the TC actuation.	☐	☑
Map 1-2	**TC_TPS_OFF**	Scalar	Throttle threshold to release TC actuation.	☐	☑
Map 1-2	**LAUNCH_SPEED**	Scalar	Speed threshold after that LC (launch control strategy) is disable.	☐	☑
Map 1-2	**LAUNCH_LIMITER**	Scalar	It defines the max rpm value for activation of launch control.	☑	☑
Map 1-2	**LAUNCH_LIMITER_OFFSET**	Scalar	Over this value the ECU will start a progressive ignition and/or injection cutting until the LAUNCH_LIMITER value is reached.	☐	☑
Map 1-2	**PIT_SPEED**	Scalar	It set the maximum speed for pit limiter strategy.	☑	☑
Map 1-2	**PIT_SPEED_ OFFSET**	Scalar	Hysteresis of pit limiter strategy. It set the lower value of speed to stop the ignition cutting in pit limiter strategy.	☐	☑

8.6 HPUH4FSAE ECU

Pos.	Name	Type	Description	Lic. EVO	Lic. ADV.
Map 1-2	**BFUELT**	Matrix	Injection time (base map).	☑	☑
Map 1-2	**FTADJ1 ... FTADJ2**	Matrix	Cylinder 1 to 6 Injection correction tables.	☑	☑
Map 1-2	**INJRATIOT**	Matrix	Table of the injected fuel ration between lower injectors and upper injectors.	☑	☑
Map 1-2	**BIGN**	Matrix	Advance spark table (base advance map).	☑	☑
Map 1-2	**ITADJ1 ... ITADJ6**	Matrix	Cylinder 1 to 6 advance correction tables.	☑	☑
Map 1-2	**BPHASETL**	Matrix	Table of degree (measured from **T.D.C.**) of end of injection from lower injector.	☑	☑
Map 1-2	**BPHASETH**	Matrix	Table of degree (measured from **T.D.C.**) of end of injection from upper injector.	☑	☑
Map 1-2	**CRANKT**	Matrix	Fuel correction during cranking.	☑	☑
Map 1-2	**IDLET**	Matrix	Stepper motor position table vs. engine temperature	☑	☑
Map 1-2	**PEDALT**	Matrix	Requested throttle position based on pedal and RPM values (when electronic throttle body strategy has been enabled – DBW).	☑	☑
Map 1-2	**WTPST**	Matrix	Weigh of throttle position (used in acceleration pump strategy) matrix	☑	☑
Map 1-2	**ACCEL_INJ**	Matrix	Enrichment table during acceleration.	☑	☑
Map 1-2	**DECEL_INJ**	Matrix	Enrichment table during deceleration.	☑	☑
Map 1-2	**ACCEL_IGN**	Matrix	Advance angle table during acceleration.	☑	☑
Map 1-2	**DECEL_IGN**	Matrix	Advance angle table during deceleration.	☑	☑
Map 1-2	**ACCEL_IDLE**	Matrix	Idle stepper motor position during acceleration. If the ETB (Electronic Throttle Body) strategy has been enabled it defines the throttle position	☑	☑
Map 1-2	**DECEL_ IDLE**	Matrix	Idle stepper motor position during deceleration. If the ETB (Electronic Throttle Body) strategy has been enabled it defines the throttle position	☑	☑
Map 1-2	**LAMBDAT**	Matrix	Lambda target value table (used with **Closed Loop** mode).	☑	☑
Map 1-2	**LAMBDAENT**	Matrix	Enabling table for mix correction with Lambda value.	☑	☑
Map 1-2	**IGNLIMIT**	Matrix	Set the speed of ignition spark variation based on revolution number. See Maya Device Helper for more details.	☑	☑
Map 1-2	**LIMIT_TABLE**	Matrix	Table of rev limiter strategy.	☑	☑
Map 1-2	**TAIR_INJ_T**	Matrix	Fuel correction vs. air temperature table.	☑	☑
Map 1-2	**TH2O_INJ_T**	Matrix	Fuel correction vs. engine temperature table.	☑	☑
Map 1-2	**TAIR_IGN_T**	Matrix	Ignition spark advance correction vs. air temperature table.	☑	☑
Map 1-2	**TH2O_IGN_T**	Matrix	Ignition spark advance correction vs. engine temperature table.	☑	☑
Map 1-2	**BRK_THROTTLE_1**	Vector	Set TPS breakpoint values in BFUELT, BIGNT, BPHASETL BPHASETH tables.	☑	☑
Map 1-2	**BRK_THROTTLE_2**	Vector	Set TPS breakpoint values in FTADJ... and ITADJ... tables.	☑	☑
Map 1-2	**BRK_PRESSURE_1**	Vector	Set manifold air pressure (MAP) breakpoint values in BFUELT, BIGNT, BPHASETL BPHASETH tables. To switch from TPS to pressure set FLP_F at 0.	☑	☑
Map 1-2	**BRK_PRESSURE_2**	Vector	Set manifold air pressure (MAP) breakpoint values in FTADJ... and ITADJ... tables.. To switch from TPS to barometric set FLP_F2 at 0.	☑	☑
Map 1-2	**BRK_RPM_1**	Vector	Set RPM breakpoint values in BFUELT, BIGNT, BPHASETL BPHASETH tables.	☑	☑
Map 1-2	**BRK_RPM_2**	Vector	Set RPM breakpoint values in FTADJ... and ITADJ... tables.	☑	☑
Map 1-2	**BRK_DELTA_TPS_ACCEL**	Vector	Set TPS breakpoint values in ACCEL_INJ and ACCEL_IGN tables.	☑	☑
Map 1-2	**BRK_DELTA_TPS_DECEL**	Vector	Set TPS breakpoint values in DECEL_INJ and DECEL_IGN tables.	☑	☑
Map 1-2	**BRK_RPM_TRANS**	Vector	Set RPM breakpoint values in ACCEL_INJ, ACCEL_IGN, DECEL_INJ and DECEL_IGN tables.	☑	☑
Map 1-2	**ACCEL_DECAY_ INJ**	Vector	Number of revolutions to decay the matrix ACCEL_INJ extra fuel.	☑	☑

Pos.	Name	Type	Description	Lic. EVO	Lic. ADV.
Map 1-2	**DECEL_DECAY_ INJ**	Vector	Number of revolutions to decay the matrix DECEL_INJ extra fuel.	☑	☑
Map 1-2	**ACCEL_DECAY_ IGN**	Vector	Number of revolutions to decay the matrix ACCEL_IGN.	☑	☑
Map 1-2	**DECEL_DECAY_ IGN**	Vector	Number of revolutions to decay the matrix DECEL_IGN.	☑	☑
Map 1-2	**ACCEL_DECAY_ IDLE**	Vector	Number of revolutions to decay the matrix ACCEL_IDLE .	☑	☑
Map 1-2	**DECEL_DECAY_ IDLE**	Vector	Number of revolutions to decay the matrix DECEL_IDLE.	☑	☑
Map 1-2	**BRK_PEDAL**	Vector	Set PEDAL breakpoint values in PEDALT table.	☑	☑
Map 1-2	**TBLINLAIR**	Vector	Voltage vs. air temperature value calibration vector. PLEASE NOTE: 0 V correspond to 0 , 5V correspond to 255.	☑	☑
Map 1-2	**TBLINENGINE**	Vector	Voltage vs. engine temperature value calibration vector. PLEASE NOTE: 0 V correspond to 0 , 5V correspond to 255.	☑	☑
Map 1-2	**TBLINLAMBDA**	Vector	Voltage vs. Lambda value calibration vector.	☑	☑
Map 1-2	**TBLINOIL**	Vector	Voltage vs. oil temperature value calibration vector. PLEASE NOTE: 0 V correspond to 0 , 5V correspond to 255.	☑	☑
Map 1-2	**TBAPINJ**	Vector	Fuel correction vs Barometric Pressure.	☑	☑
Map 1-2	**TBAPANT**	Vector	Ignition spark advance correction vs Barometric Pressure.	☑	☑
Map 1-2	**TBVBATTLOW**	Vector	Low injector timing correction based on battery voltage	☑	☑
Map 1-2	**TBVBATTHIGH**	Vector	High injector timing correction based on battery voltage	☑	☑
Map 1-2	**DWELL**	Vector	Coil charge time based on battery voltage	☑	☑
Map 1-2	**TB_TPS_IDLE**	Vector	Associate the stepper motor position to TPS value. Set this vector only if a stepper motor has been installed on the throttle body.	☑	☑
Map 1-2	**IDLE TARGET__RPM**	Vector	Idle RPM target vs Engine temperature vector.	☑	☑
Map 1-2	**BRK_TENGINE**	Vector	Set temperature breakpoint values on temperature correction tables (TH2O_INJ,TH20_IGN).	☑	☑
Map 1-2	**BRK_TAIR**	Vector	Set temperature breakpoint values on temperature correction tables (TAIR_INJ,TAIR_IGN).	☑	☑
Map 1-2	**SOLENOID_1**	Vector	Set solenoid output status based on RPM value.	☑	☑
Map 1-2	**TC_LIMIT_INJ**	Vector	Injection correction based on traction control level. Levels are from 0 (no traction control) to 15 (max. traction control level).	☑	☑
Map 1-2	**TC_LIMIT_ANT**	Vector	Ignition correction based on traction control level. Levels are from 0 (no traction control) to 15 (max. traction control level).	☑	☑
Map 1-2	**INH_ACT_COUNT**	Scalar	Disable ECU outputs (like solenoid) during cranking for a specified number of revolutions.	☑	☑
Map 1-2	**MINPTV**	Scalar	TPS value (plus 2) while throttle is completely closed.	☑	☑
Map 1-2	**MAXPTV**	Scalar	TPS value (minus 2) while throttle is completely open.	☑	☑
Map 1-2	**FLP_P**	Scalar	Set if ignition, injection and phase base tables work in function of TPS or manifold air pressure.	☑	☑
Map 1-2	**FLP_P2**	Scalar	Set if ignition and injection correction tables work in function of TPS or manifold air pressure.	☑	☑
Map 1-2	**TEETH**	Scalar	Set the number of crank flywheel: see Maya Device helper for more details.	☑	☑
Map 1-2	**TDC_1**	Scalar	Set the reference tooth when cylinder 1 is at TDC. The reference tooth must be the last one which has been crossed the pick-up sensor.	☑	☑
Map 1-2	**DELAYCYL2 ... DELAYCYL6**	Scalar	Offset Degrees of TDC Cylinder 2...6 referred to TDC Cylinder 1	☑	☑
Map 1-2	**OFFSET_TDC**	Scalar	Offset between the axis of pick-up sensor and the axis of TDC_1 tooth. It represent the offset between mechanical and electrical TDC	☑	☑
Map 1-2	**FLYWHEEL_TYPE**	Scalar	Set the type of crank flywheel: see Maya Device helper for more details.	☑	☑
Map 1-2	**PHASE_TOOTH**	Scalar	The tooth where you can see the maximum speed difference between teeth (normally the tooth before or after the TDC_1). ECU uses this tooth for active phase recognition.	☑	☑

Pos.	Name	Type	Description	Lic. EVO	Lic. ADV.
Map 1-2	**PHASE_COUNTER**	Scalar	It is used to check if your PHASE_TOOTH has been set correctly. The ECU check for some times (defined by PHASE_COUNTER value) if the defined phase tooth speed is different during active phase (compression-expansion) and passive phase. Normally you can set this parameter at 8 / 10.	☑	☑
Map 1-2	**CSPARKOFFSET**	Scalar	Set a general offset applied over all the Spark Advance Plane. This correction is internally Limited to +/- 4 deg and it is the default EOLvalue	☑	☑
Map 1-2	**CINJOFFSET**	Scalar	Set general offset applied over all the Injection Time Plane. This correction is internally Limited to +/- 5%. This is the Defaulf End Line value	☑	☑
Map 1-2	**INJECTOR_TYPE**	Scalar	Set the type of injector connected to the ECU	☑	☑
Map 1-2	**RPM_PHASE**	Scalar	RPM threshold for active phase recognition.	☑	☑
Map 1-2	**REVCNT**	Scalar	Set TACHO output pulse per round	☑	☑
Map 1-2	**FAN_ON**	Scalar	Temperature threshold value which activate the auxiliary fan (connected to FAN ECU output).	☑	☑
Map 1-2	**FAN_OFF**	Scalar	Temperature threshold value which deactivate the auxiliary fan (connected to FAN ECU output).	☑	☑
Map 1-2	**PEDAL1_MIN**	Scalar	Pedal minimum position value (value between 0 to 4096 - 10 bit count). Used for drive by wire control strategy.	☑	☑
Map 1-2	**PEDAL1_MAX**	Scalar	Pedal maximum position value (value between 0 to 4096 - 10 bit count). Used for drive by wire control strategy.	☑	☑
Map 1-2	**DBW_MIN_TPS1**	Scalar	Electronic throttle body position sensor 1 CLOSED position value (value between 0 to 4096 - 10 bit count). Used for drive by wire control strategy.	☑	☑
Map 1-2	**DBW_MAX_TPS1**	Scalar	Electronic throttle body position sensor 1 WOT position value (value between 0 to 4096 - 10 bit count). Used for drive by wire control strategy.	☑	☑
Map 1-2	**DBW_MIN_TPS2**	Scalar	Electronic throttle body position sensor 2 CLOSED position value (value between 0 to 4096). Used for drive by wire control strategy.	☑	☑
Map 1-2	**DBW_MAX_TPS2**	Scalar	Electronic throttle body position sensor 2 WOT position value (value between 0 to 4096). Used for drive by wire control strategy.	☑	☑
Map 1-2	**I_SATURATION**	Scalar	Set the electronic throttle body saturation current. Used for drive by wire control strategy.	☑	☑
Map 1-2	**DBW_PERIOD**	Scalar	Drive by wire motor control frequency (PWM voltage period value).	☑	☑
Map 1-2	**DBW_KP**	Scalar	Drive by wire proportional control level.	☑	☑
Map 1-2	**DBW_KD**	Scalar	Drive by wire derivative control level.	☑	☑
Map 1-2	**DBW_KI**	Scalar	Drive by wire integral control level.	☑	☑
Map 1-2	**DBW_ENABLE**	Scalar	Enable or disable drive by wire control.	☑	☑
Map 1-2	**VSAT_MOTOR**	Scalar	Drive by wire motor saturation voltage (depends on ETB motor).	☑	☑
Map 1-2	**DBW_DEADZONE**	Scalar	Drive by wire maximum throttle position percentage error.	☑	☑
Map 1-2	**RPM_IDLE_ACTIVATE**	Scalar	Idle RPM strategy control threshold. If the RPM goes below this value plus the value set in RPM_IDLE_TARGET vector the Idle strategy will be activated.	☑	☑
Map 1-2	**IDLE_CLOCK**	Scalar	Idle RPM strategy correction frequency (if stepper motor is used).	☑	☑
Map 1-2	**IDLE_RPM_ERROR**	Scalar	RPM clearance at idle condition (if stepper motor is used).	☑	☑
Map 1-2	**IDLE_THROTTLE_TH**	Scalar	Idle RPM strategy control threshold. If the throttle value goes below this value the Idle strategy will be activated	☑	☑
Map 1-2	**IDLE_STEPS**	Scalar	Set the minimum idle motor steps to control the engine idle.	☑	☑
Map 1-2	**IDLE_UPPER_LIMIT**	Scalar	Set the maximum idle motor steps to control the engine idle (while the air by-pass is opening).	☑	☑
Map 1-2	**IDLE_LOWER_LIMIT**	Scalar	Set the maximum idle motor steps to control the engine idle (while the air by-pass is closing).	☑	☑
Map 1-2	**TC_ENABLE**	Scalar	Main activation flag for **TC**. Clearing this value to 0 will disable TC, set 1 to enable the TC strategy.	☑	☑
Map 1-2	**TC_TPS**	Scalar	Throttle threshold to activate TC.	☑	☑

Pos.	Name	Type	Description	Lic. EVO	Lic. ADV.
Map 1-2	**TC_RPM**	Scalar	Rpm threshold to activate TC.	☑	☑
Map 1-2	**TC_SPEED**	Scalar	Front Speed threshold to activate TC.	☑	☑
Map 1-2	**TC_SLIP**	Scalar	It set the maximum SLIP% allowed in TC strategy.	☑	☑
Map 1-2	**TC_GAINP**	Scalar	Set TC SLIPSTAR Gain (see chapter **6.19**).	☑	☑
Map 1-2	**TC_GAIND**	Scalar	Set TC SLIPSTAR Offset (see chapter **6.19**).	☑	☑
Map 1-2	**TC_FILTER**	Scalar	Set a filter over speeds values during TC strategy.	☑	☑
Map 1-2	**PIT_SPEED**	Scalar	It set the maximum speed for pit limiter strategy.	☑	☑
Map 1-2	**PIT_SPEED_ OFFSET**	Scalar	Hysteresis of pit limiter strategy. It set the lower value of speed to stop the ignition cutting in pit limiter strategy.	☑	☑
Map 1-2	**PIT_RPM_ LIMIT**	Scalar	Set RPM Limiter active during Pit Limiter strategy. The RPM limitation start at PIT_RPM_LIMITER - LIMITER_OFFSET using the LIMIT_TABLE values according to the engine RPM.	☑	☑
Map 1-2	**PIT_PERIOD**	Scalar	Sample period for Speed Control on Pit Limiter	☑	☑
Map 1-2	**PIT_BLANK_TIMER**	Scalar	As soon as the PIT Limiter strategy is activated the RPM limitation is activated after this time. After this blank time Limiter adjustments are activated to keep the speed controlled (see chapter **6.21**)	☑	☑

8.7 RX1PRO ECU

Pos.	Group	Nome	Tipo	Descrizione	Lic. EVO	Lic. ADV.
APPLICATION	CORRECTIONS	TAIR_INJ_T	Matrix	Fuel correction vs. air temperature table.	☐	☑
		TH2O_INJ_T	Matrix	Fuel correction vs. engine temperature table.	☐	☑
		TB_BARO_INJ	Vector	Fuel correction vs Barometric Pressure.	☐	☑
	CRANK	CRANKT	Matrix	Fuel correction vs engine temperature table during cranking (from 1th to 16th revolution).	☐	☑
		ADJ_CRANK	Vector	Fuel correction vector vs engine temperature during cranking (from 1th to 16th revolution). Vector values will be added to CRANK_T matrix.	☑	☑
		FLARE_OFFSET	Vector	Fuel correction vector vs engine temperature during cranking (from 17th revolution to revolution set in FLARE scalar).	☐	☑
		FLARE	Scalar	Define the number of revolution (after the first 16) to stop the CRANK strategy.	☐	☑
	LAMBDA	LAMBDAT	Matrix	Lambda target value table (used with **Closed Loop** mode).	☐	☑
		LAMBDAENT	Matrix	Enabling table for mix correction with Lambda value.	☐	☑
		TBLINLAMBDA	Vector	Voltage vs. Lambda value calibration vector.	☐	☑
		LAMBDAERR	Scalar	This variable define tolerance of reading error of Lambda value.	☐	☑
		CLKLAMBDA_LEAN	Scalar	Set how many engine revolutions are necessary to activate the fuel correction in case of lean engine (Lambda value > Lambda Target) during **Closed Loop** strategy.	☐	☑
		CLKLAMBDA_RICH	Scalar	Set how many engine revolutions are necessary to activate the fuel correction in case of rich engine (Lambda value < Lambda Target) during **Closed Loop** strategy.	☐	☑
		KI_INC_KLAMBDA	Scalar	Set the Lambda value increment in case of lean engine (during **Closed Loop** strategy).	☐	☑
		KI_DEC_KLAMBDA	Scalar	Set the Lambda value decrement in case of rich engine (during **Closed Loop** strategy).	☐	☑
		LOW_KLAMBDA	Scalar	Minimum threshold for activation of **Closed Loop** strategy. In case of Lambda sensor failures the ECU will lean the mix until the engine reach this value.	☐	☑
		HIGH_KLAMBDA	Scalar	Maximum threshold for activation of **Closed Loop** strategy. In case of Lambda sensor failures the ECU will enrich the mix until the engine reach this value.	☐	☑
	LC	LC_SWITCH_MODE	Scalar	Set if LCGPA module requires additional MODE button (follow Maya Device Helper indications to apply the correct setting).	☑	☑
		LCGPA_ID_TYPE	Scalar	Set the CAN bus ID where LCGPA module send its data (default value 0).	☐	☑
	INPUT CONFIG SETTING	CRASH_TIME TH	Scalar	Automatic engine switch off time (seconds) when tilt sensor is activated.	☐	☑
		SET_AN_CONSOLE	Scalar	Set an analog input that is visible in raw value on pc by the Maya consolle instrument	☐	☑
		BRK_RPM_1	Vector	Set RPM breakpoints value in following matrix: tabelle BFUELT, BIGNT, BPHASETL, BPHASETH, LAMBDAT, LAMBDAENT, TAIR_INJ_T, TH2O_INJ_T.	☐	☑
		BRK_RPM_2	Vector	Set RPM breakpoints value in following matrix: ITCYL1, FTCYL1.	☐	☑
		BRK_RPM_3	Vector	Set RPM breakpoints value in following parameters: WTPST_POS,WTPST_NEG,TAIR_INJ_T,TH2O_INJ_T, TAIR_IGN_T, TH2O_IGN_T,LAMBDAT,LAMBDAENT	☐	☑
		FAN_ON	Scalar	Temperature threshold value which activate the auxiliary fan (connected to FAN ECU output).	☐	☑

Pos.	Group	Nome	Tipo	Descrizione	Lic. EVO	Lic. ADV.
	SETTING	**FAN_OFF**	Scalar	Temperature threshold value which deactivate the auxiliary fan (connected to FAN ECU output).	☐	☑
	ENGINE	**KILL_TYPE**	Scalar	Set the time for stop the engine when KILL SWITCH has been pressed. Value = 0 means **Racing** mode: the stop will be done according row 15 settings in **LIMIT_TABLE**	☐	☑
	SENSORS	**CIRCUMFERENCE_1**	Scalar	Set the wheel circumference to calculate vehicle speed (sensor connected to ECU input SPEED1 – normally front speed).	☐	☑
		WHEEL_TIC_1	Scalar	Set number of electrical impulses (at every wheel revolution) from wheel speed sensor (input SPEED1).	☐	☑
		CIRCUMFERENCE_2	Scalar	Set the wheel circumference to calculate vehicle speed (sensor connected to ECU input SPEED2 – normally rear speed).	☐	☑
		WHEEL_TIC_2	Scalar	Set number of electrical impulses (at every wheel revolution) from wheel speed sensor (input SPEED2).	☐	☑
	GEAR	**1ST_GEAR_TH → 6TH_GEAR_TH**	Scalar	Gear sensor calibration values (expressed as count).	☐	☑
		GEAR_TH_OFFSET	Scalar	You could set the clearance for readings of gearbox potentiometer.	☐	☑
		GEAR_READ_MASK	Scalar	Set the reading time of gear sensor signal. If the value is stable, after this delay, it'll be accepted by the ECU.	☐	☑
		GEAR_TYPE	Scalar	Set the type of gearbox potentiometer connected to ECU (follow Maya Device Helper indications to apply the correct setting).	☐	☑
		GEAR_MUTE_TIME	Scalar	Blank interval between two Gearshift Trigger signals	☑	☑
	EOL	**LIMITER_ADJ_DEFAULT**	Scalar	It increases the value for RPM limiter (set by **LIMITER** scalar). The value could be from 0 to 510. WARNING: after a reset of End Of Line the ECU the **LIMITER_ADJ_DEFAULT** will be restored inside the ECU.	☐	☑

Pos.	Group	Nome	Tipo	Descrizione	Lic. EVO	Lic. ADV.
MAP1 MAP2	FUEL	BFUELT	Matrix	Injection time (base map)	☐	☑
		FTCYL1	Matrix	Injection correction table (base fuel map).	☑	☑
		INJRATIOT_LOW	Matrix	Table of the injected fuel percentage by lower injector .	☐	☑
		INJRATIOT_HIGH	Matrix	Table of the injected fuel percentage by upper injector.	☐	☑
		BPHASETL	Matrix	Table of degree (measured from **T.D.C.**) of end of injection from lower injector.	☐	☑
		BPHASETH	Matrix	Table of degree (measured from **T.D.C.**) of end of injection from upper injector.	☐	☑
	IGNITION	BIGN	Matrix	Advance spark table (base advance map).	☐	☑
		ITCYL1	Matrix	Advance correction table.	☑	☑
	DTPS	ACCEL_INJ	Matrix	Fuel enrichment (Accel Pump) table during acceleration.	☐	☑
		ACCEL_DECAY_INJ	Vector	This vector will define number of revolutions during the matrix ACCEL_INJ is running.	☐	☑
		ACCEL_DUMPER_INJ	Vector	This vector sets the number of revolutions that the acceleration fuelling adjustment remains constant before it begins to decay.	☐	☑
	LIMITER	LIMIT_TABLE	Matrix	Table of rev limiter strategy.	☐	☑
		OFFSET_LIMITER_TENG	Vector	RPM limiter correction based on engine temperature. The values will be added or subtracted to LIMITER scalar value.	☐	☑
		GEAR_LIMITER_OFFSET	Vector	RPM limiter correction based on gear ratio. The values will be added or subtracted to LIMITER scalar value.	☐	☑
		LIMITER_CUT_TYPE	Scalar	This scalar sets the cut type when the Limiter does NOT use the limit table LIMIT_TABLE.	☐	☑
		LIMITER	Scalar	Set maximum engine RPM.	☐	☑
		LIMITER_OFFSET	Scalar	Set the RPM threshold for limiter strategy (see chapter **6.15**).	☐	☑
		NEUTRAL_LIMITER_OFFSET	Scalar	Set the RPM threshold for limiter strategy (see chapter **6.15**) when NEUTRAL ratio has been engaged (requires gear position sensor).	☐	☑
	LAMBDA	FLAMBDA	Scalar	This variable will enable **Closed Loop** strategy.	☐	☑
	LC	LC_RPM_DROP	Scalar	Set the RPM threshold which activate LEDs blinking on LCGPA module (when Launch Control strategy has been activated).	☐	☑
	GEAR	GEAR_CUT_TIME	Scalar	Set injection/ignition cut time for quick shifter strategy.	☑	☑

9 HOW TO GET THE MAYA ADVANCE LICENCE

In this manual the different features of **Maya** licenses (**EVO** and **ADVANCE**) are indicated.
EVO means the basic license you get with the CD Rom.
To purchase the **ADVANCE** license upgrade please send an e-mail to:

sales@getdata.it

Please indicate also:

- Name/Surname
- Team name (if available)
- Number of required licences

The license consist in a HASP usb key: every time it is inserted in the PC socket the Maya is switched automatically in ADVANCE mode.
If the key is not present the software will run in EVO mode.

Please note: the key have to be inserted before running Maya!

10 GLOSSARY

A

ADJ_CRANK: map vector. This command could add or reduce fuel quantity injected during CRANK (first 16 revolutions of the engine).

AFR: injected air/fuel ratio

AFRSTO: stoichiometric air/fuel ratio

LAMBDAT: this function requests confirmation of correction by the user.

B

Breakpoint: represent column and rows in tables.

C

CRANK: identify first 16 revolutions of the engine and it is defined in specific maps.

Closed Loop: see **Lambda (Closed Loop)**
Correction: adjustment in **Maya** for engine maps due to lambda values.

D

dTPS – throttle derivate: show the speed of throttle body (**TPS**). ECU enables different vehicle strategies. This parameter will explain if the throttle is open suddenly of gradually. Positive values represent throttle opening, negative values represent a closing phase.

E

ECR: (**E**lectronic **C**ontrol **R**elay) ECU can manage vehicle electric power
ECU: **E**ngine **C**ontrol **U**nit

F

G

H

I

L

Lambda (Closed Loop): this function permit the ECU to change the mix using Lambda value input in order to reach Lambda Target.

Lambda (sensor): this sensor can read oxygen percentage in exhaust gasses. The output values is called lambda.

Lambda (target): this value is used during **Closed Loop** correction.

Lambda (value): this value express the concentration of oxygen in exhaust gasses. Stoichiometric value between air and fuel is 1. Values below 1 mean rich mix, values above 1 mean lean mix.

Layout: visualization in **Activity** area of **Maya**

M

N

O

OTS (off throttle steering): control strategy that enable the steering of the boat also if the throttle is released and the steering is centered (normally used in PWC - personal watercraft application)

P

T.D.C. (top dead centre): the piston is in the most upper part of its stroke, near the engine head. This point is used as a reference of engine phasing and spark advance.

Accel Pump: this is an enrichment system present in some carburettor, and it was used to reduce the power losses during sudden opening of gas at low revs.
Once gas is open suddenly, the air column slow down. The deceleration is higher for higher carburettor diameters. This condition produce an increase of relative pressure in the venturi (and therefore a deceleration). This means a stop of fuel dispatching. The engine will “hesitate” until the air column is again accelerated and therefore a small fuel quantity is moved. This system avoid this problem because, once the driver open the gas, one or more levers activate a membrane that push a fixed fuel quantity through a calibrated hole after the venture. This enrichment avoid engine hesitation and increase rpm. After this moment the carburettor works normally.

PWC: personal watercraft

Q

R

REV: revolution, indicate the number of complete devolution of the engine crankshaft. It is used by the ECU to define strategies (CRANK). This values is from 0 to 65535, after this number the counter stars from 0.

S

T

U

V

X

Y

W

Z

NOTE / NOTES:

POWER MANAGEMENT SYSTEMS

GET

ATHENA