ECM Titanium quick user guide

Introduction

This guide contains a simplified description of the *ECM Titanium* Chip-tuning software operation, including all the necessary information to best use it.

To simplify the understanding of the *ECM Titanium* software and its functions, the sections of this guide often contain pictures. If the pictures belong to a previous version of the software, please contact your dealer to find out whether a newer version of the guide is available.

In the explanation of the sections there will be some references to electronic equipments that are used to read and write files stored within engine control units. All references in this document apply solely to electronic tools and products provided by *Alientech S.r.l.*

ECM Titanium software is designed for computers running *Windows® Vista* or *7*.

The *Table of contents* lists the information and procedures frequently used with *ECM Titanium* software.

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Section 1 – What ECM Titanium software is

ECM Titanium is the software for Chip-Tuning developed by *Alientech S.r.l.*, used to load and edit stock original files of engine control units read using electronic equipments such as:

- Serial ECU programmers (e.g. *KESSv2*, *Powergate*)
- Microcontroller interface programmers (e.g. *K-TAG*, *BDMpro*)
- Memory chip programmers (e.g. *Galep*)

or downloaded from the web through the services provided by *Alientech S.r.l*, such as:

- Original file request service from the *Internet Databank*

The program is embedded into a USB flash drive with 8GB of memory and it does not need to be installed on a computer hard disk like other software. To use *ECM Titanium* it is necessary that the USB flash drive has been previously plugged into a USB port and that it stays connected while the program is running.

To load original files with *ECM Titanium,* it is necessary that these files are first stored on the hard disk of the PC on which you want to run the software.

To edit original files with *ECM Titanium,* it is preferable to use the support files called *Drivers*, provided by *Alientech Srl* through the web. For this reason, we recommend that your PC has an active Internet connection, which can be used by the software in case you want to download a *Driver* from the web.

The Drivers

The support files are simply called *Drivers*. They contain the positions of the maps for engine control, stored in an original file that is read from the vehicle's electronic control unit. When loading a stock original file with *ECM Titanium* and its *Driver*, it is possible to see the list of the available maps used to tune the vehicle.

Drivers are provided only to *Alientech S.r.l* customers who have subscribed a contract with the company or its authorized reseller. At the end of the subscription it is no longer possible to download or request new *Drivers* from the Internet database service. The software will continue to operate normally anyway. To find out if you are entitled to download *Drivers*, please contact your dealer.

Section 2 – How to run ECM Titanium

To run *ECM Titanium* software it is necessary to use a computer running *Windows ® Vista* or *7* that has a free USB port.

Installing USB Driver

Following the procedure written in the document *ECM_Quickstart_ENU.pdf* (located in the same *ECM Titanium* USB flash drive, *Picodisk*), the operating system of the computer will install the suitable USB driver used to operate the flash drive.

From this point on, you no longer need to repeat this procedure, unless you want to use the program on another computer. In this case, you must repeat the installation of the USB driver as described in the document *ECM_Quickstart_ENU.pdf*.

Running ECM Titanium

To run *ECM Titanium* software, just follow these four steps:

1. Plug the flash drive into a USB port on your computer.
2. Wait until *Windows®* operating system displays the *AutoPlay* window.
3. Choose *Open folder* from the listed options.
4. Search the file *ECM_Titanium.bat* and run it.

After completing these steps, *ECM Titanium Upgrade Program* window (Picture 1) will pop up.
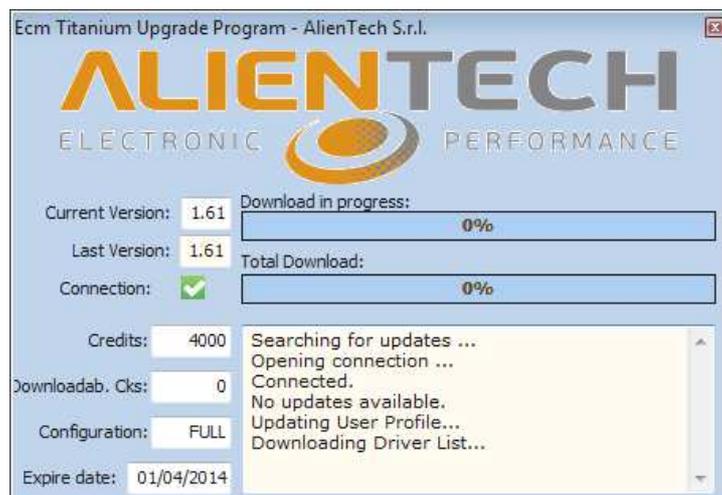
Picture 1: **ECM Titanium Upgrade Program** window.

When *ECM Titanium Upgrade Program* window is open, the software tries to connect to the Internet Databank to look for any updates and download the list of the available *Drivers*. In this phase it is recommended that the PC is connected to the Internet.

After updating, it finally appears the main window of *ECM Titanium* software (Picture 2), ready to be used.
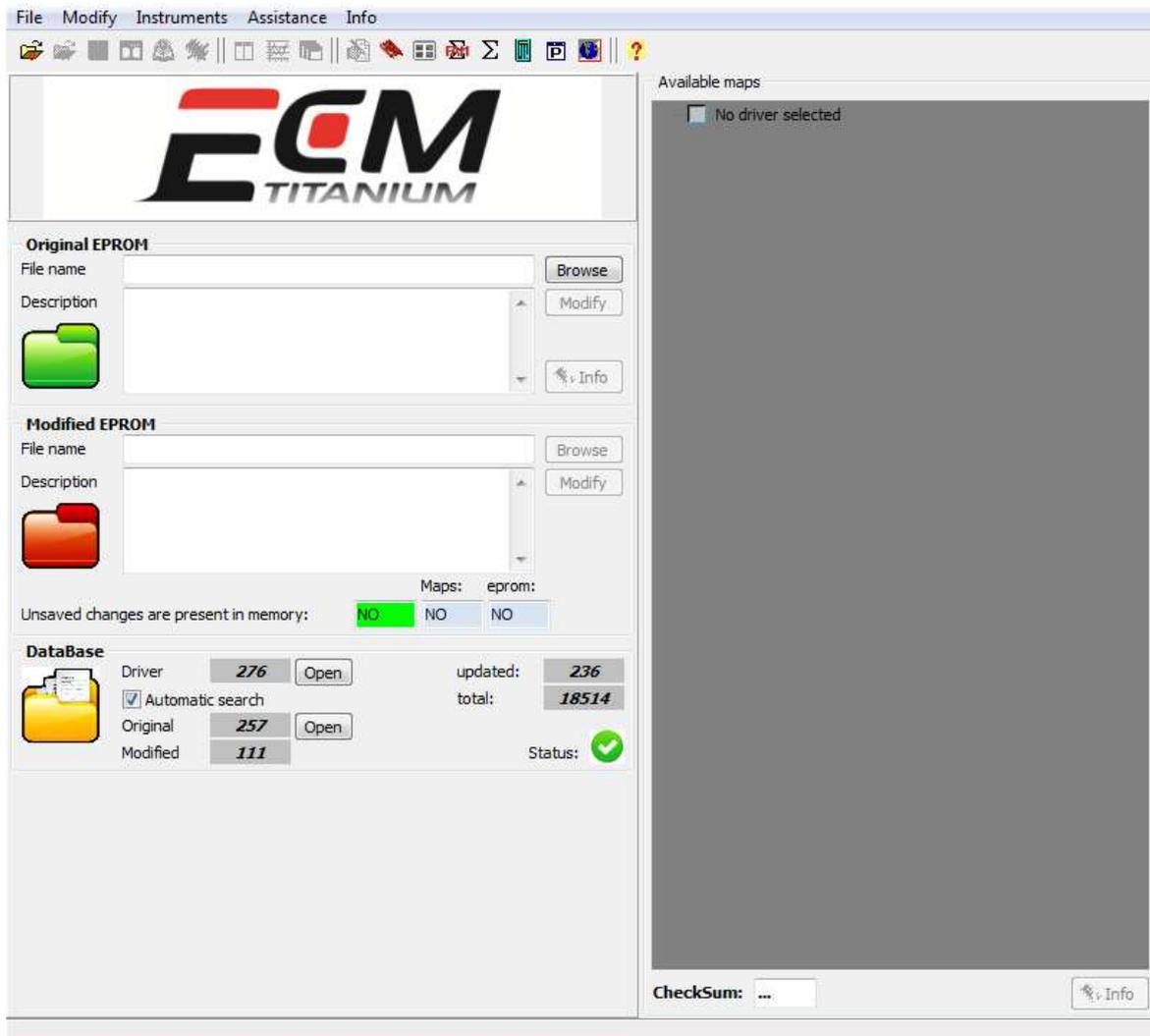
Picture 2: *ECM Titanium* main window.

If *ECM Titanium* doesn't start up, please contact your dealer in order to solve the problem.

It is recommended to install on your PC the *ECM Titanium Management Tool* software, which allows you to run *ECM Titanium* without using the *AutoPlay* window or *Windows Explorer* ® every time.

To install the *ECM Titanium Management Tools* software, just follow these five steps:

1. Plug the flash drive into a USB port on your computer.
2. Wait until *Windows®* operating system displays the *AutoPlay* window.
3. Choose *Open folder* from the listed options.
4. Search the file *SetupECMTools.exe* and run it.
5. Complete the installation wizard of the software *ECM Titanium Management Tools*.

Section 3 – How to load an original file read from an engine control unit

To load stock original files in *ECM Titanium*, it is necessary that the files are stored on the computer hard disk where the software is running and that they have been read with electronic tools such as:

- Serial ECU programmers (e.g. *KESSv2*, *Powergate*)
- Microcontroller interface programmers (e.g. *K-TAG*, *BDMpro*)
- Memory chip programmers (e.g. *Galep*)

or downloaded from the web through the services provided by *Alientech Srl*, such as:

- Original file request service from the *Internet Databank*

Decoding and encoding files for memory chip programmers

If the stock original file is read using a memory chip programmer (Picture 3), it may be necessary to decode the binary format or reverse the byte order of the file, before loading it in the software.

Picture 3: Memory chip programmer; *Galep*.

ECM Titanium is able to decode the binary format of the stock original file and remove the protection that the engine control unit manufacturers often use to prevent Chip-tuning.

The most frequent binary encodings are:

- *EDC16* format: for BOSCH engine control units model *EDC 16*.
- *M155* format: for BOSCH engine control units model *M 1.5.5*.

- *Siemens F200* format: for Siemens engine control units equipped with an integrated circuit marked *F200*.
- *Siemens 2001* format: for Siemens engine control units produced since 2001.

Byte order reversed is used on a few models of engine control units:

- *Trionic T5*: equipped on SAAB or OPEL vehicles (GM Group).
- *Trionic T7*: equipped on SAAB or OPEL vehicles (GM Group).

Only when the original file is read with a memory chip programmer it is necessary to decode or reverse the byte order before loading the file in *ECM Titanium*. Otherwise, the program does not automatically find the driver compatible with the loaded stock original file, even if it already exists.

ECM Titanium is able to convert original files that have an encoded format, but the conversion must be done before loading the file from the main window of the software (Picture 4).
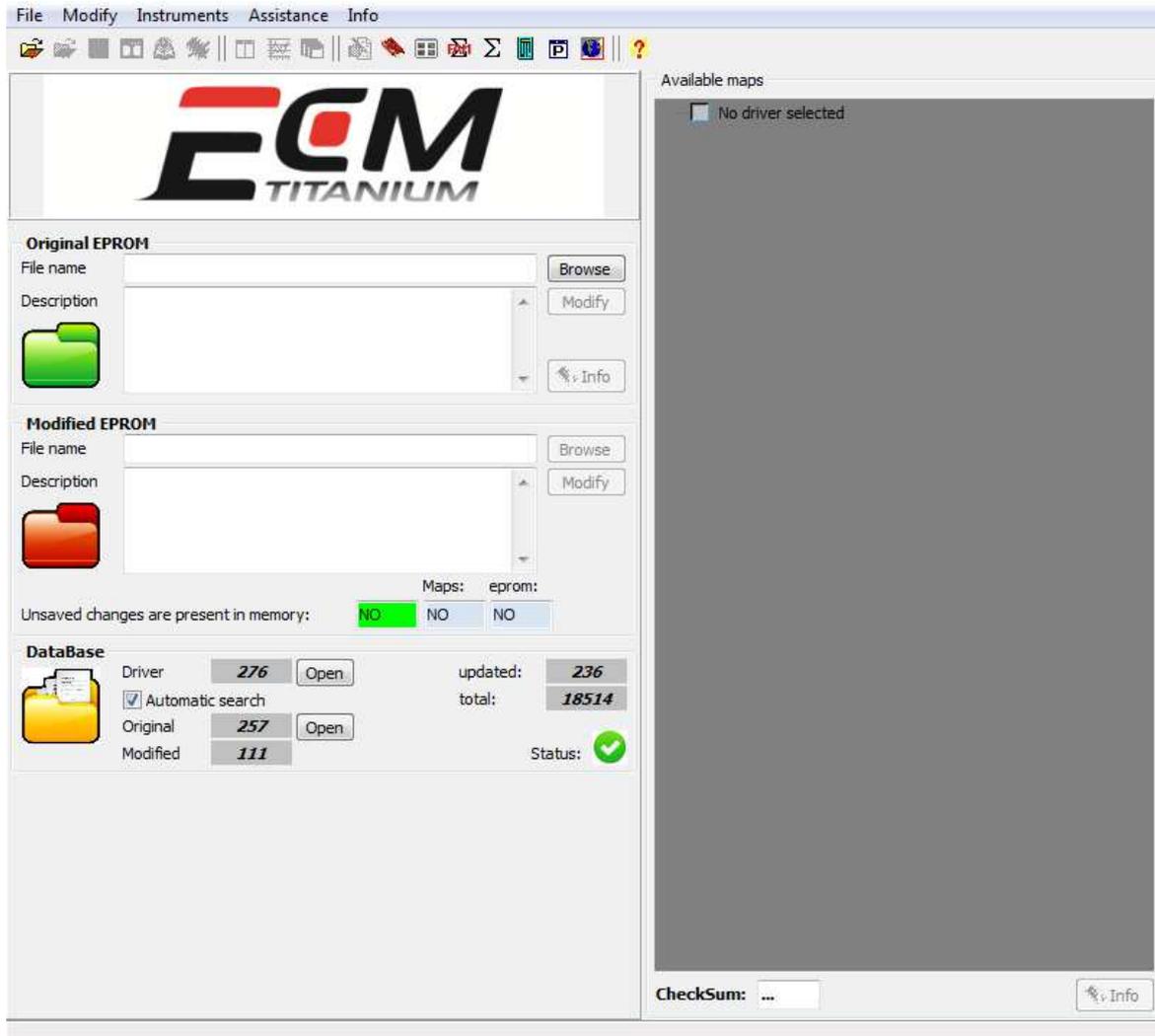
Picture 4: *ECM Titanium* main window.

To decode an encoded original file, just follow these four steps:

1. Select *Instruments* from the main window of the software, and then *Encodings*.
2. Select the right encoding format according to the memory chip or the ECU (Picture 5).
3. Click *OK* when the message of decoded file creation appears.
4. Save the decoded file on your computer with a different name than the original.
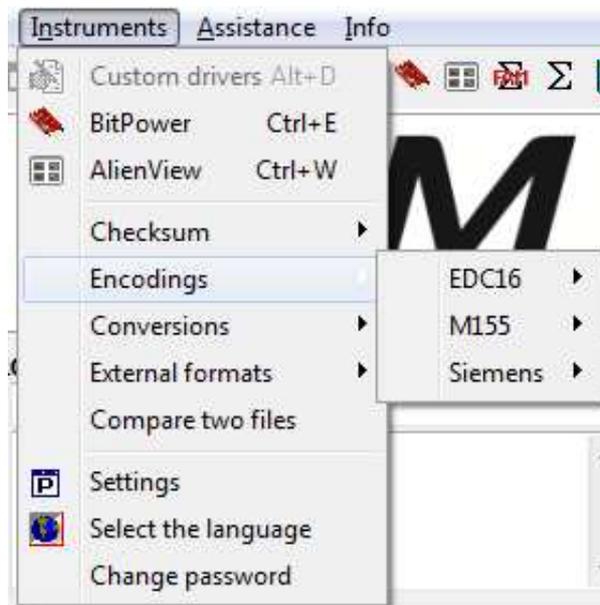
Picture 5: List of available *Encodings*.

To convert an original file that has the byte order reversed, just follow these four steps:

1. Select *Instruments* from the main window of the software and then *Conversions* (Picture 6).
2. Select *Swap bytes.*
3. Click *OK* when the message of reversed file creation appears.
4. Save the converted file on your computer with a different name than the original.
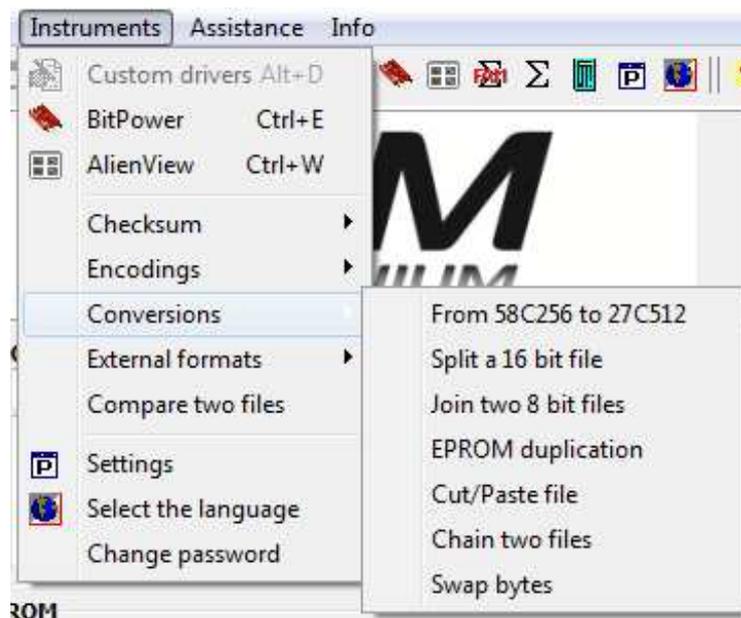
Picture 6: List of available *Conversions*.

Decoding and encoding files for Slave tools

If the original file is read with a *Slave* version of a serial ECU programmer (e.g. *KESSv2*, *Powergate*) or of a microcontroller interface programmer (e.g. *K-TAG*, *BDMpro*) (Pictures 7 and 8), it is necessary to remove the file protection in order to use it with *ECM Titanium*.

Picture 7: *Master* and *Slave* versions of a serial ECU programmer.

Picture 8: *Master* and *Slave* versions of a microcontroller interface programmer.

The owner of the *Master* tool (e.g. *KESSv2*, *K-TAG*) is the only one who can remove the protection of files read with a *Slave* tool (special encoding).

The owner of the *Slave* tool (e.g. *KESSv2*, *K-TAG*) can only read protected files and have to send them to the owner of the *Master* tool that has been associated to the *Slave* tool by *Alientech Srl*. If you don't know how to decode files for *Slave* tools associated to you, please contact your dealer.

If the original file is read with a *Master* version of a serial ECU programmer (e.g. *KESSv2*, *Powergate*) or of a microcontroller interface programmer (e.g. *K-TAG*, *BDMpro*), it is not necessary to decode the file to use it with *ECM Titanium*.
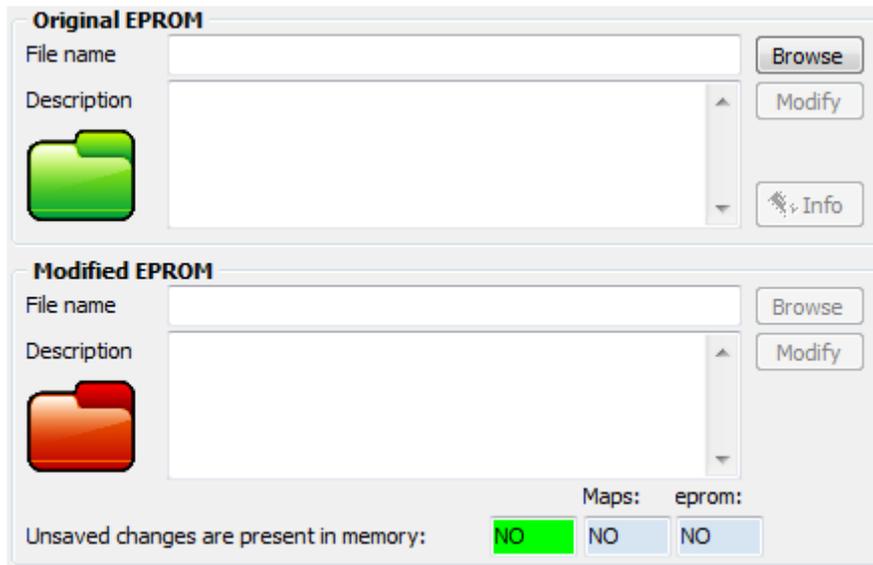
Loading an original file

To load an original file, first it is necessary to launch *ECM Titanium* and open the main window of the software (Picture 9).
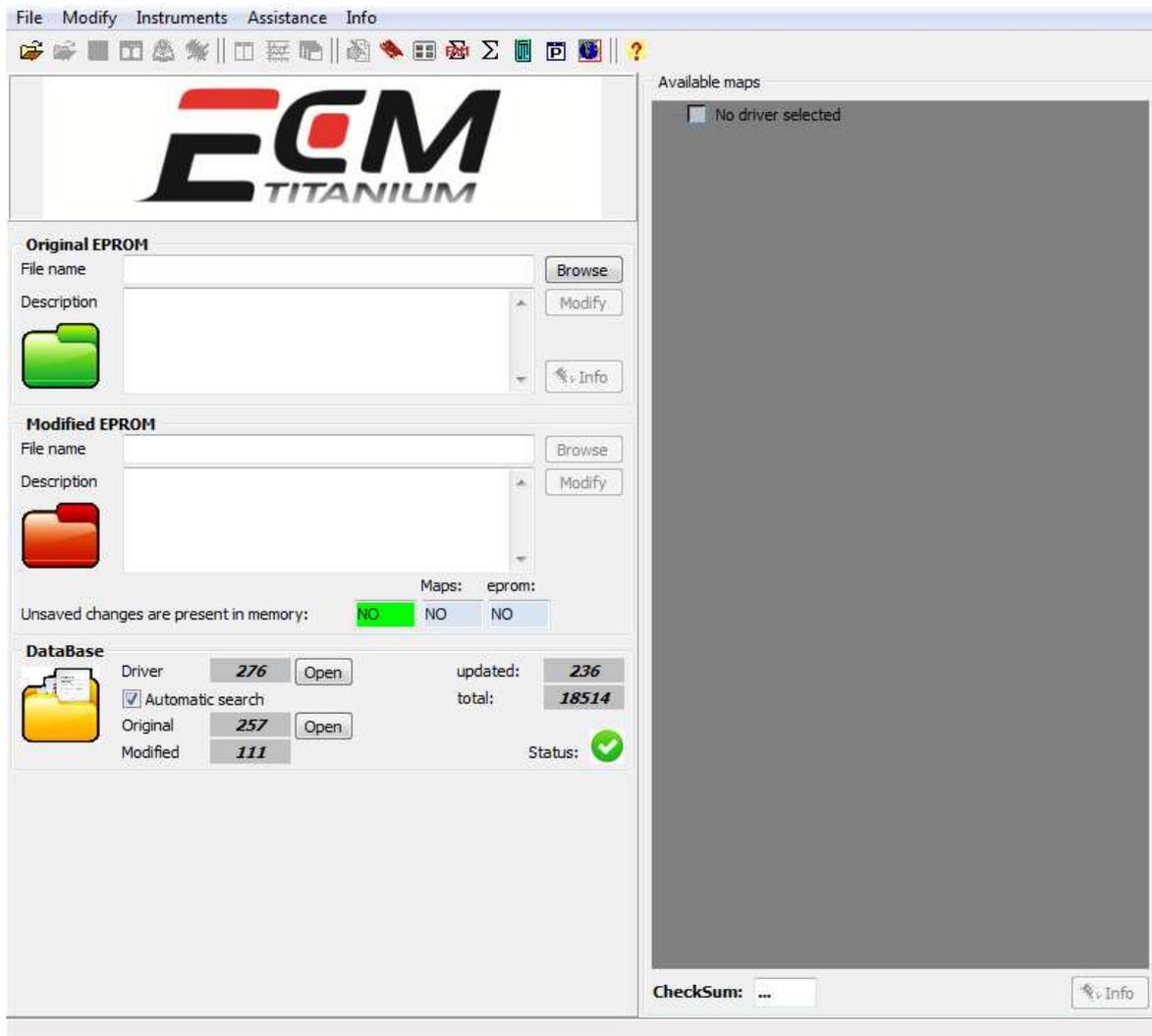
Picture 9: *ECM Titanium* main window.

The easiest and quickest way to load an original file is to click *Browse* in the *Original EPROM* panel that appears on the left side of the main window of the software (Picture 10).

Picture 10: *Original EPROM* and *Modified EPROM* panels.

After clicking *Browse*, search for the folder where the original file of the ECU is saved using *Windows® Explorer.*

Once the file has been selected, the main window of the software displays its path on the hard disk and a copy is automatically loaded in the *Modified Files* panel. Actually, the software modifies this copy of the file, to avoid that the stock original file is corrupted by mistake.

After selecting the file to be loaded, the software automatically opens the *Search for a Driver in DB* window, to associate a *Driver* to the selected file.

Section 4 – How to associate the right Driver to the original file of an engine control unit

The support files are simply called *Drivers*. They contain the positions of maps for engine control, stored in an stock original file that is read from the vehicle's electronic control unit. Loading a stock original file with *ECM Titanium* and its *Driver*, it is possible to see the list of the available maps used to tune the vehicle.

Drivers are provided only to *Alientech S.r.l* customers who have subscribed a contract with the company or its authorized reseller. To find out if you are entitled to download *Drivers*, please contact your dealer.

ECM Titanium software allows associating a *Driver* only to files that contain maps to be tuned. It is not possible to associate a *Driver* to *Backup* files that contain data of *Microcontroller, Flash,* and *EEPROM* memories.

The *Available maps* panel includes the list of maps and limiters related to the loaded *Driver* file. After launching *ECM Titanium,* the *Available maps* panel is empty because no original file has been loaded yet.
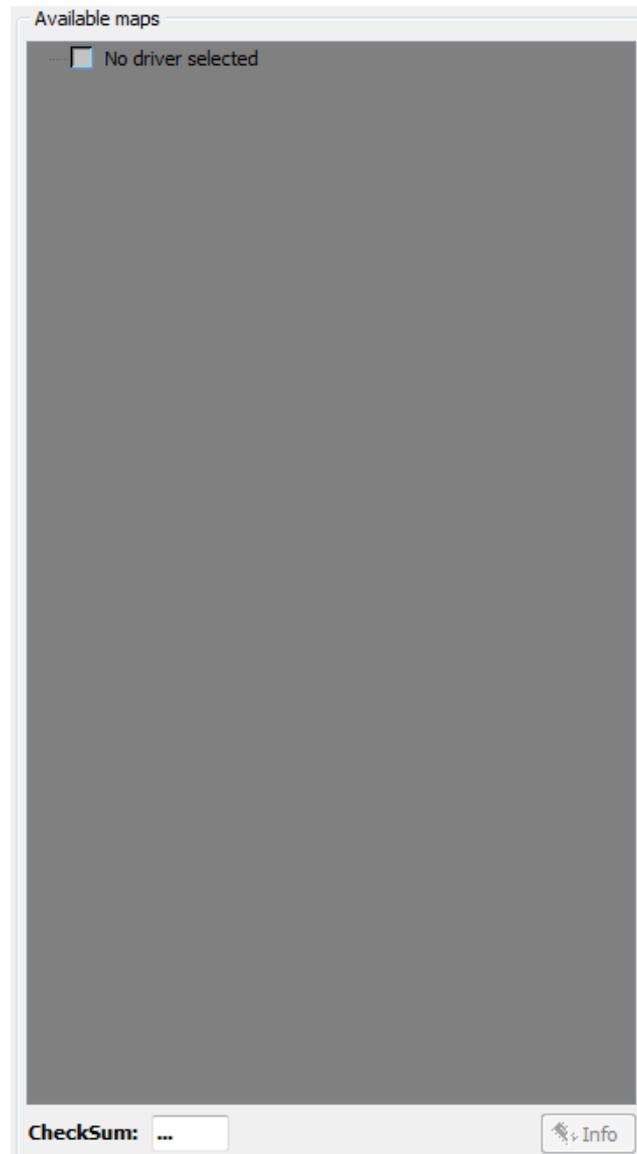
Picture 11: *Available maps* panel.

After loading an original file, as explained in Section 3 of this guide, the software pops up the *Search for a Driver in DB* window (Picture 12).
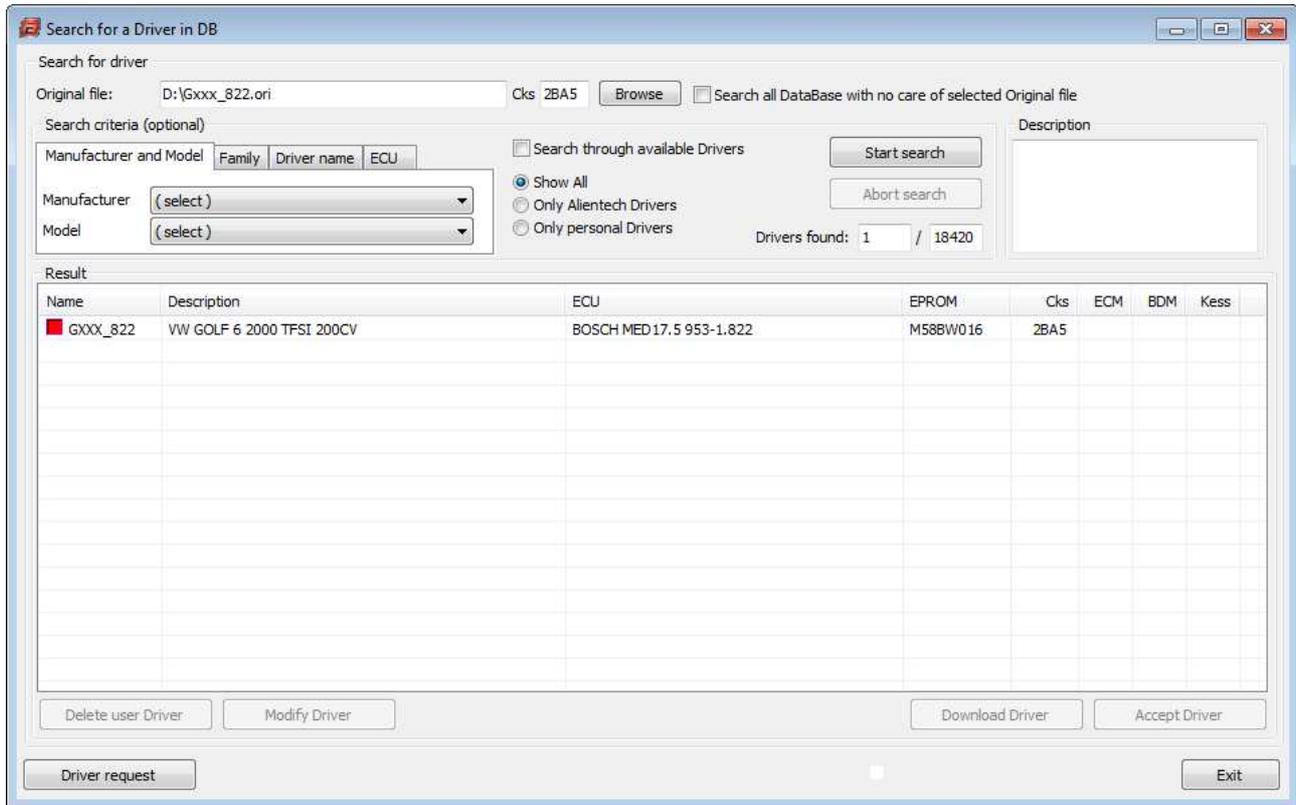
Picture 12: *Search for a Driver in DB* window.

The software automatically searches for the most appropriated support file for the loaded stock original one, among all those available in the list of *Drivers*, which is updated every time you start the software.

There can be three situations:

1. The *Driver* is automatically found.
2. More than one compatible *Driver* is found.
3. No *Driver* is found.

When the *Driver* is automatically found, there can be three cases:

1. The small box on the left of the *Driver* name is red: it is necessaty to click on the *Download Driver* button.
2. The small box on the left of the *Driver* name is green: the *Diver* has already been downloaded.

3. The small box on the left of the *Driver* name is yellow: the *Driver* has been updated by *Alientech Srl* and it is necessary to click the *Download Driver* button to get the latest version.

If *Search for a Driver in DB* window displays more than one compatible *Driver* for the loaded file, it means that all the *Drivers* in the list are suitable. For instance, it is very likely that if the loaded file belongs to a BMW 1 Series 120d 2.01 177HP, the software will also display a *Driver* belonging to a BMW 3 Series 320d 2.01 177HP.

If no *Driver* is found, we suggest clicking on the *Driver Request* button on the bottom left of the *Search for a Driver in DB* window.

ECM Titanium will open your Internet browser to connect to the *Alientech Data Bank,* so that you can request a check of the original file, and, if necessary, a new *Driver* will be developed. At this stage, it is mandatory that your computer is connected to the Internet.

To associate the selected *Driver* to the original file loaded in *ECM Titanium,* just click on *Accept Driver*.

At the end of the *Drivers* association procedure, the software asks if you want to save a copy of the stock original file in the Personal *DataBase* of the USB dongle.

It is strongly recommend registering a copy of the file in the personal *Database*, so that the file will be accessible from any PC on which *ECM Titanium* is executed. The software also allows you to add a short description (Picture 13), useful for example to remember the name of the owner of the vehicle or its license plate.

Picture 13: *Original File* and *Modified File* panels; *Description* fields.

Section 5 – How the maps of an original file are grouped when the file is associated to a Driver

The support files called *Drivers* contain the positions of the maps stored in the stock original file read from the engine control unit. Maps control several electronic and electro-mechanic systems that are managed by the ECU, but these are not the only parameters included in stock original files.

There are five different types of parameters:

- *Maps* or *Matrices*: three dimensional objects (X, Y, Z), consisting of more than one row and more than one column (e.g. 2x4, 16x16, 18x40,…), with two reference axes (X, Y).
- *Curves* or *Vectors*: two dimensional objects (X, Z), consisting of more than one row and one single column, or one single row and more than one column (e.g. 2x1, 16x1, 1x8,…), with one reference axis (X or Y).
- *Single values* or *Scalars*: one dimensional objects (Z), consisting of one row and one column (e.g. 1x1), with no reference axis.
- *Activations/deactivations*: single value objects that can have only two possible values, 0 or 1.
- *Text*: text strings stored inside the file that are visible only with the *Hexadecimal* window of *ECM Titanium*.

By editing the values that belong to maps and then flashing the modified file to the ECU, the engine performance will change. This is the principle behind the Chip-tuning, also known as engine control unit re-flashing.

Periodically, *Alientech Srl* updates the support files in order to increase the number of available maps for tuning and simplify the understanding of data related to the maps.

For this reason, now there are two types of *Driver* (Picture 14):

- Standard structure Drivers.
- Advanced structure Drivers.

Drivers with standard structure are very easy to understand, but values shown in the maps are not represented with units of measurement.

Drivers developed using standard structure have maps sorted in the categories:

- INJECTION
- SPARK ADVANCE
- TURBO
- LIMITERS

Drivers with advanced structure are less simple, but more detailed compared to standard ones and values shown in the maps are represented with units of measurement (e.g. *kg/h*, *Nm*, *% Ped*,…).

Drivers developed with advanced structure have maps sorted in the categories:

- *Air Control*
- *Engine Torque*
- *Injection System*
- *Rail*
- *Turbo System*
- *Limiters*
- *Spark Advance*
- *Volumetric System*
- *Breaks*
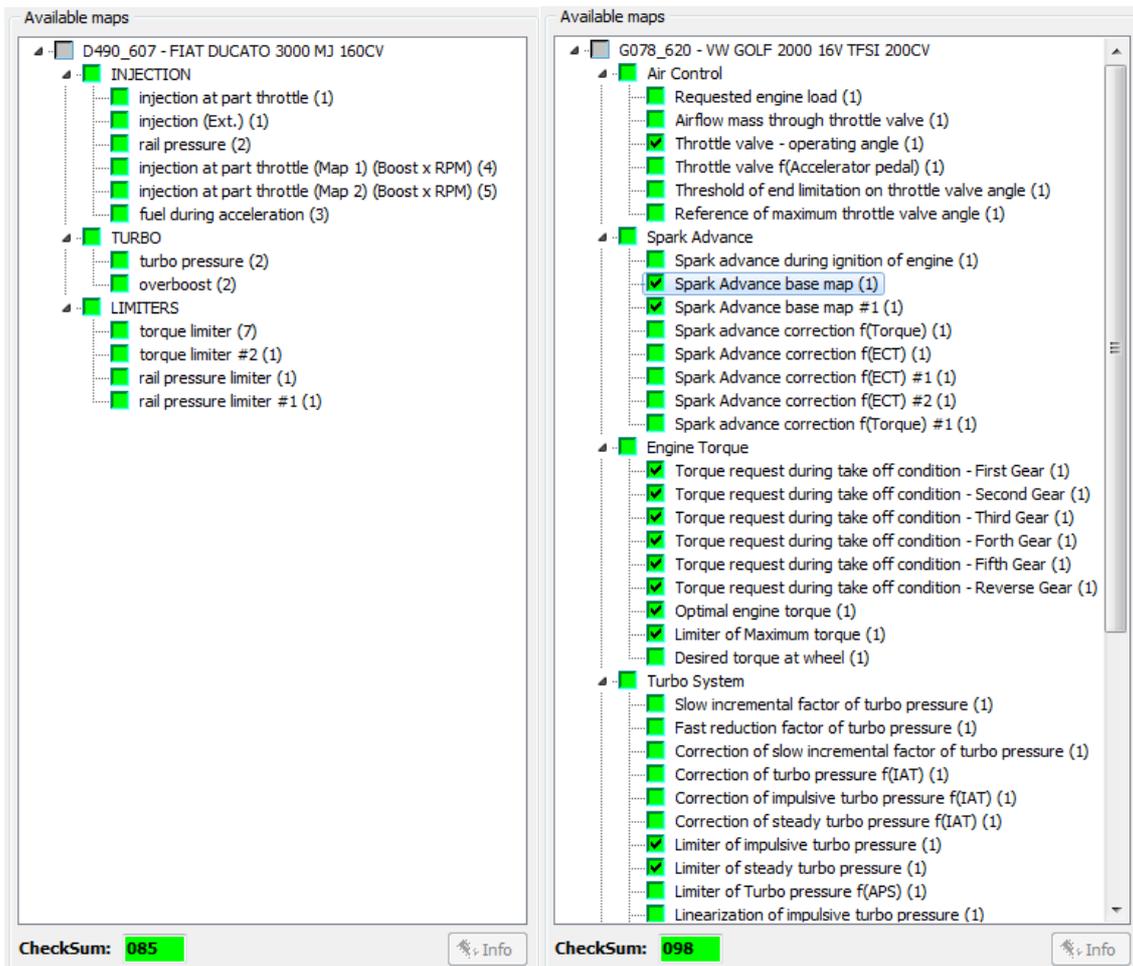
Picture 14: *Available Maps* panels; **standard** and **advanced** structure Drivers.

All *Drivers* provided by Alientech will be converted to the advanced structure as soon as possible.

The units of measurement shown by advanced *Drivers* are the same used by the ECU manufacturer.

Please do not request to *Alientech Srl* Support Department a conversion from standard to advanced structure through the *Driver Request* service. *Driver* conversion requires a lot of time for its developing.

Section 6 – How maps of an original file can be displayed if associated to a Driver

ECM Titanium can display the maps listed in a *Driver* in four different ways:

- *Map*
- *3D Graphics*
- *2D Graphics*
- *Hexadecimal*

Each one of these views is suitable for a specific purpose. *Map* and *3D Graphics* views are specific for editing the values of a single map; *2D Graphics* view is more useful if used to compare two files, and *Hexadecimal* view to search data (e.g. values or text strings).

To use one of these four views, it is necessary to have previously loaded a stock original file and associated it to a *Driver* (Picture 15).

The *2D Graphics* and the *Hexadecimal* views can be used without *Driver* association, but this means having no information concerning map names and their position into the original file. For this reason they are used by expert tuners.
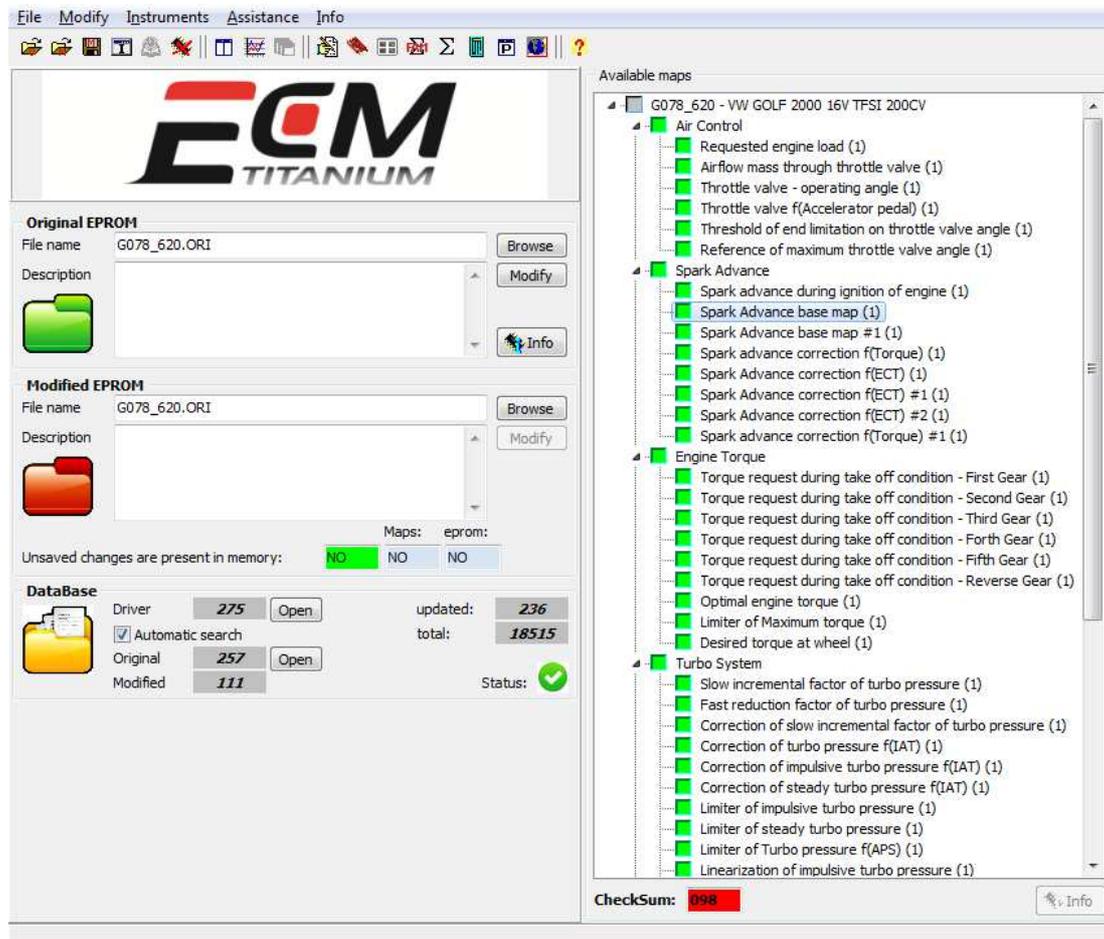
Picture 15: *ECM Titanium* main window; file with *associated Driver*.

Map View

To look a map using *Map* view (Picture 16), just double click on the desired map name, listed in the *Available Maps* panel from the main window of the software.

The map in Picture 16 has a dimension of 16 rows by 12 columns (192 values) and it is sorted according to a vertical axis, representing the engine revs (specific to the vehicle from which the original file has been read) and a horizontal axis, representing the percentage of air (engine load). Generally, the axes of a map can be different, depending on its function or the category to which it belongs.

To select a portion of a map, place the mouse cursor on the corner where you want to start the selection and hold the left mouse button until the end of the selection.
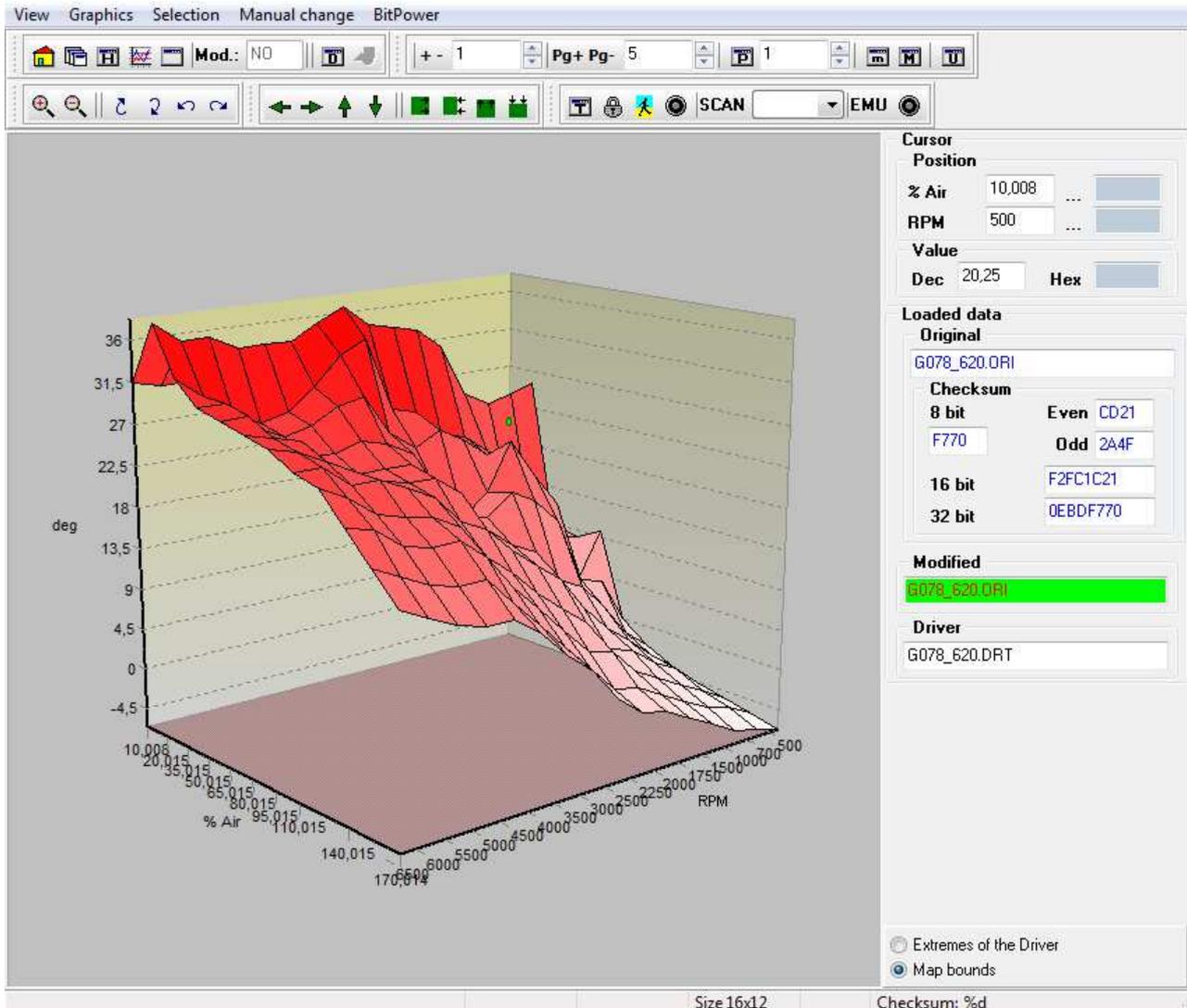
Picture 16: *Map* view.

3D Graphics View

From *Map* view, you can switch directly to the *3D Graphics* view (Picture 17), by clicking the icon on the top left.

Picture 17: *3D Graphics* view.

The map in Picture 17 maintains the same dimensions and characteristics of the reference axes, relative to its representation as the *Map* view in Picture 16. The previous views are basically different ways to represent the same values of the "*Spark Advance base map*".

With the *3D Graphics* view, you can rotate the map in any direction, holding the right mouse button and rotating. To select a portion of a map, place the mouse cursor on the corner where you want to start to select and hold the left mouse button until the end of the selection.

2D Graphics View

To access the *2D Graphics* view from the main window of the software, just click the icon on the top left. This way, *ECM Titanium* displays the whole original file, starting from the beginning (Hex address 0x000000) up to the end (it depends on the hexadecimal length of the loaded file).

The chart on which the track of the values of the file appears has two axes: the vertical one represents the height reached by the single values, and the horizontal one the hexadecimal address (position) of the single value of the loaded file.

To navigate and correctly display the objects contained in a file, you must be able to:

- Use the directional buttons.
- Select the correct binary representation.

The directional buttons are all located at the bottom of the *2D Graphics* view:

- Start
- Back
- Forward
- End
- Previous difference
- Next difference
- Previous map
- Next map

The correct binary representation depends on the microcontroller present on the printed circuit board of the engine control unit or on the numeric precision used by who created the single map.

ECM Titanium is able to display the following representations:

- Unsigned 8 bits, values from 0 to 255.
- Signed 8 bits, values from -128 to 127.
- Motorola unsigned 16 bits, values from 0 to 65535.
- Motorola signed 16 bits, values from -32768 to 32767.
- IEEE unsigned 16 bits, values from 0 to 65535.
- IEEE signed 16 bits, values from -32768 to 32767.
- Motorola unsigned 32 bits, approx. from 0 to $4x10^9$.

- Motorola signed 32 bits, approx. from -2×10^9 to 2×10^9.
- IEEE unsigned 32 bits, approx. from 0 to 4×10^9.
- IEEE signed 32 bits, approx. from -2×10^9 to 2×10^9.
- IEEE floating point (values depend on the precision).
- Motorola floating point (values depend on the precision).

The binary representations applicable to the values shown on the chart are located on the right side of the *2D Graphic* view. If an original file is associated to a *Driver,* the numeric conversion is automatic.

In the *2D Graphics* view, choosing the correct representation and navigating through the original file means that you can see a track that has an orderly form (Picture 18).
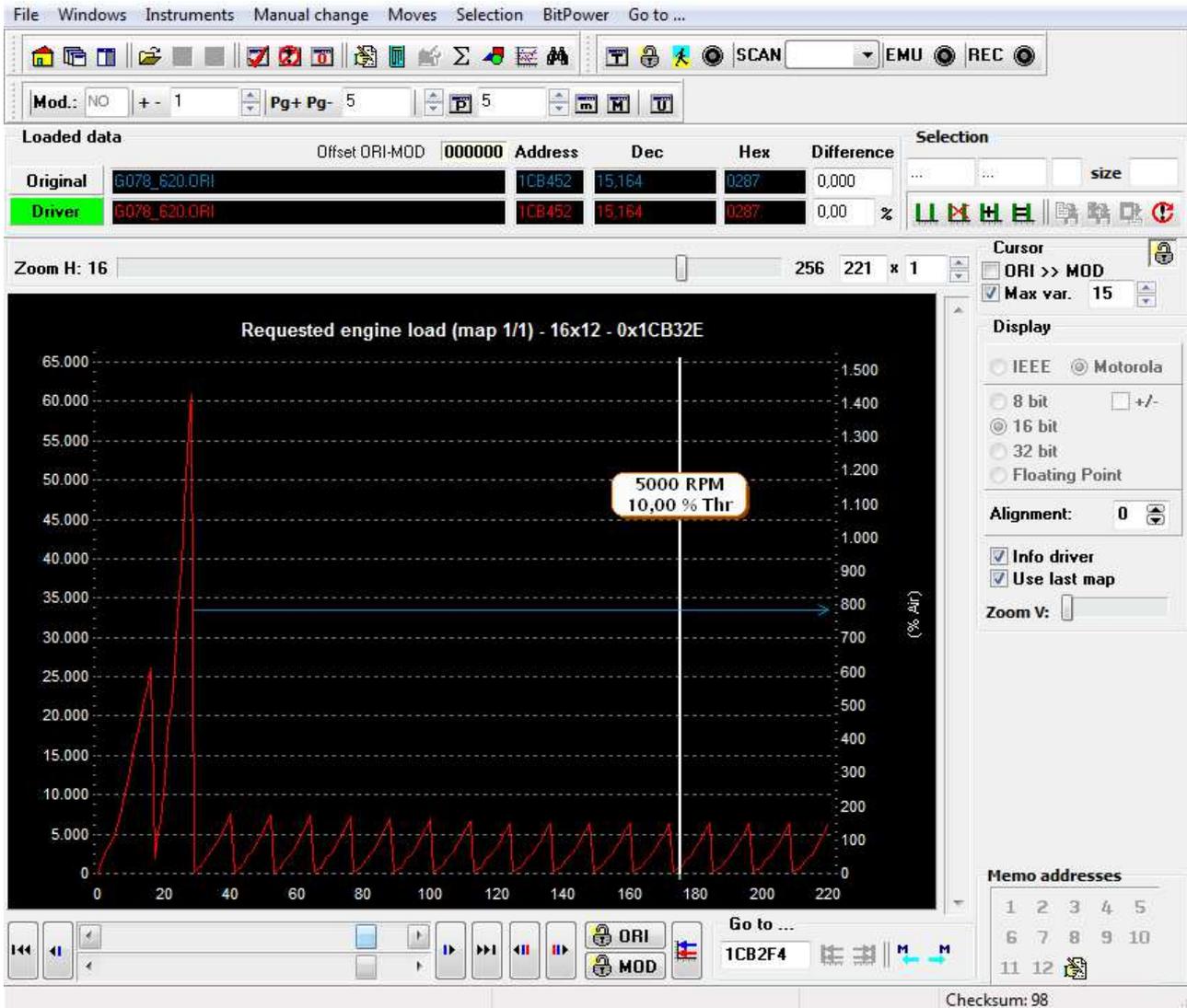
Picture 18: *2D Graphics* view.

If the original file is associated to a driver, it is possible to navigate through the listed maps, using the buttons *Next map* and *Previous map* that are located on the bottom right. The maps are indicated by a horizontal arrow and if the cursor passes on the vertical arrow the map name is shown.

By using *2D Graphics* view to display several files it is possible to increase your experience in recognizing the forms of maps in the original files.
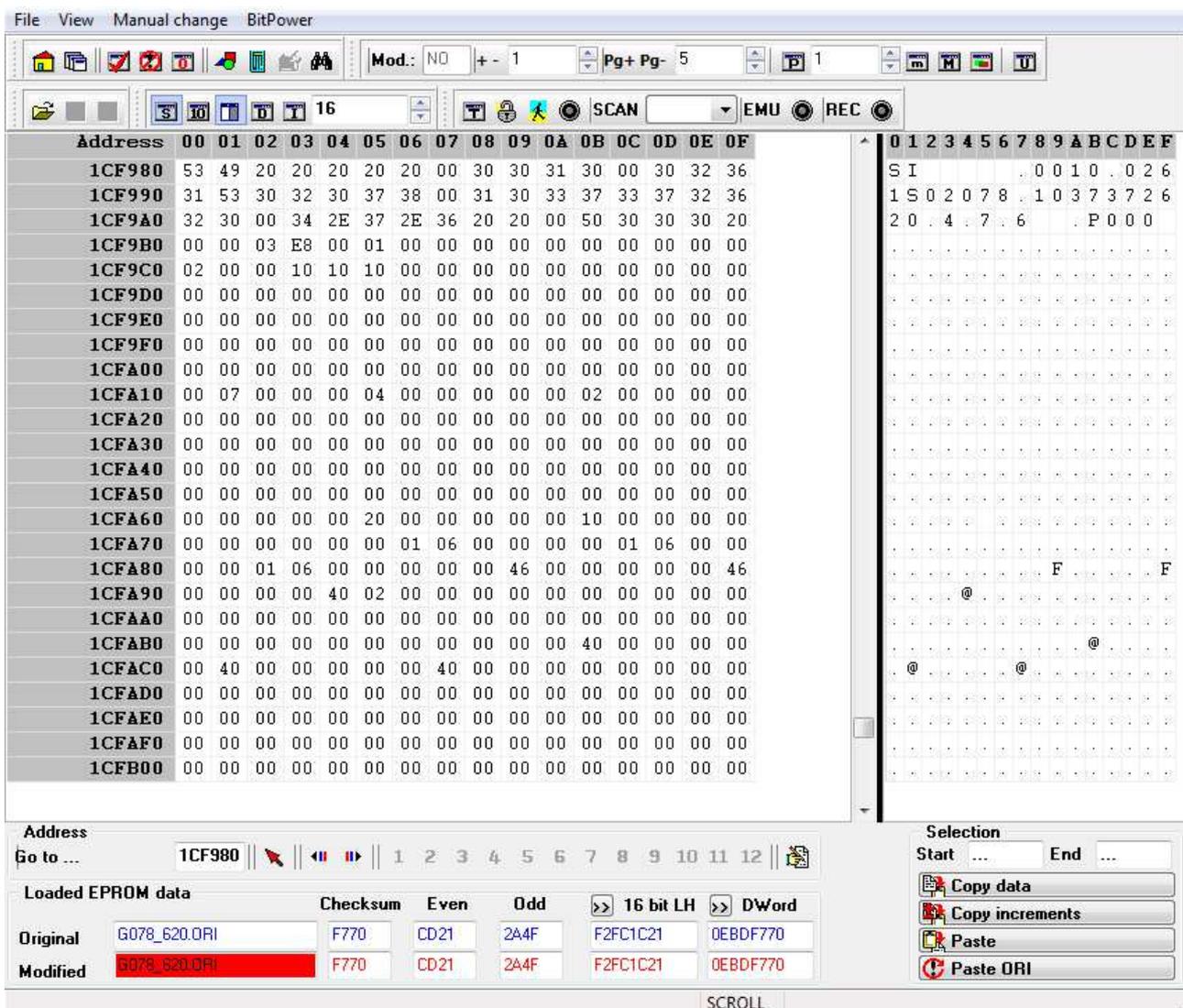
Hexadecimal View

The *Hexadecimal* view (Picture 19) is very useful for doing searches in the data of the loaded file, but we do not recommend to make any changes to the data if you are not enough experienced. To access the *Hexadecimal* view from the main window of the software, just click on the icon on the

top left. This way, *ECM Titanium* displays the whole original file, starting from the beginning (Hex address 0x000000) up to the end (it depends on the hexadecimal length of the loaded file).

The window has two panels: the left one displays hexadecimal values, and the right one their conversion in accordance with the international ASCII table.

Each row common to both panels has a hexadecimal index that ends with zero: this is called row index. Each column in the left or right panel that has the same value is called column index.

Summing the row index to the column index, you get the absolute hexadecimal address of a single cell represented in the *Hexadecimal* view.

Picture 19: *Hexadecimal* view.

To navigate the whole content of the file, it possible to use the vertical scroll bar in the center of the screen, rotate the mouse wheel, or press keyboard *Page Up*/*Page Down*.

Using the *Hexadecimal* view to find text strings and data from several files, it is possible to increase your experience in understanding the information stored by the vehicle or the engine control unit manufacturers.

Section 7 – How to tune the original file of an engine control unit

Re-flashing an ECU - what is usually called Chip-Tuning - means to change the values included in the maps of the original file and then flash the modified file back in the engine control unit.

The purpose of this section is only to show all the tools that *ECM Titanium* provides for editing original files, and not to explain the theory behind tuning a generic vehicle. For that purpose, *Alientech Srl* regularly organizes specific training courses to learn how to tune stock original files of engine control units. To find out dates and places where the trainings are held, pay a visit to the *Training Courses* section of our website www.alientech.to, or contact your dealer.

There are many tools available to modify maps; the most important are:

- *Percentage* modification: increases the selected values by a percentage.
  Available in Map, 2D Graphics, 3D Graphics, and Hex view.
- *Absolute value* modification: increases the selected values by a desired absolute amount.
  Available in Map, 2D Graphics, 3D Graphics, and Hex view.
- *Interpolation* modification: when selecting several cells, the interpolation allows modifying the contents of the selection in a gradual manner, using the four values in the *Increase* panel of *Interpolation* view. This tool allows working with both percentage and absolute increases.
  Available in Map view only.
- *Edit value* modification: allows applying directly a desired value to a selection.
  Available in Map and Hex view.

To change the original file maps, *Map* view is the most simple and quick. It is only available when the original file is loaded and associated to a *Driver*, which shows the available map list.

In any view it is always possible to compare original and modified files by pressing keyboard *ESC* .

Map View

In this view, data are displayed as numbers ordered in a lookup table. The first row on top and the first column on left are the *reference axes* of the map, i.e. the values that the ECU uses to read a specific cell of the map.

To open a map as a lookup table, just select it from the list of the available maps and double click with the left mouse button.

To change the map values, first it is necessary to select them: click on a cell with the left mouse button and hold it, move the cursor to the last cell you want to select, and then release the button. Now it is possible to modify the selection using the tools available in the *"Manual change"* menu, the icons on the toolbars, or the keyboard shortcuts.
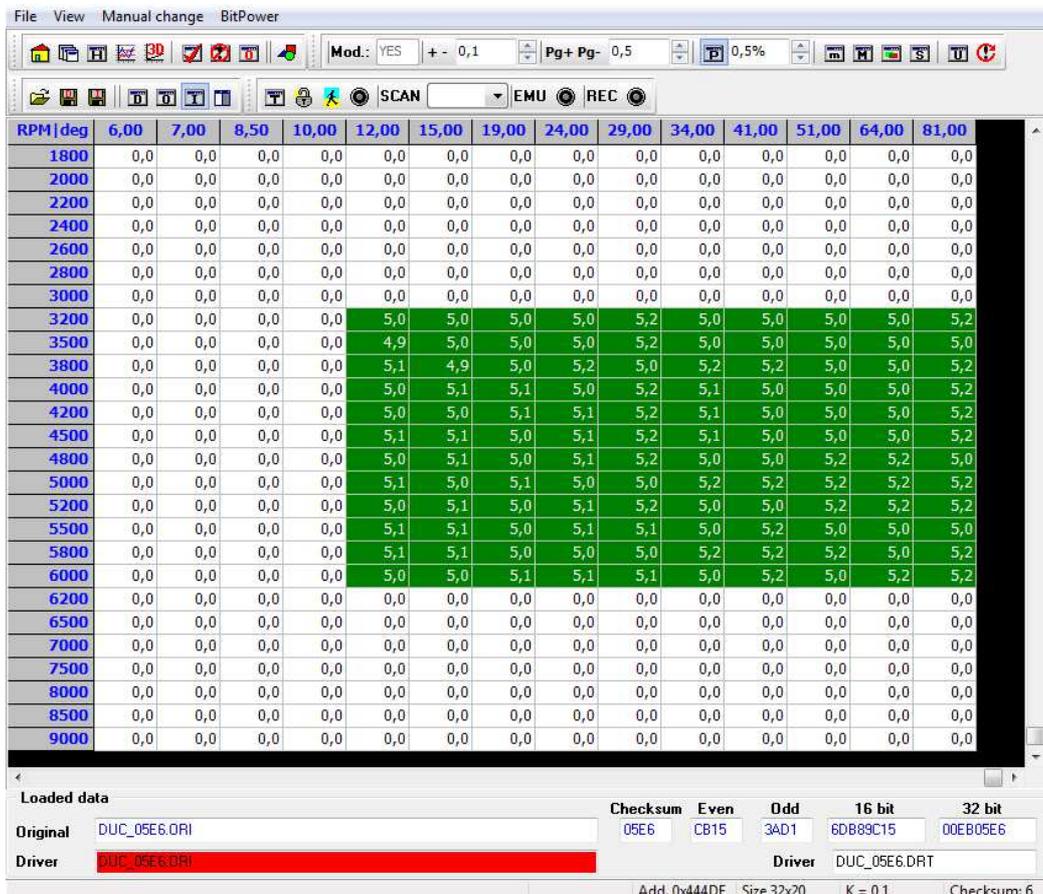
In Pictures 20 and 21 it is shown as an example the modification of an ignition advance as a percentage, carried out by following these steps:

1. Open the desired map from the main window of *ECM Titanium* by double clicking on the map name with the left mouse button.
2. Select the area to modify using the mouse.
3. Select *Interpolation* from the *Manual change* menu.
4. In *Interpolation* view, select *Percentage* from the *Compute increment* panel, then enter the number *5* in all 4 boxes and click *Ok*

Now it is possible to see the percentage increase by clicking both the icons ▣ and ▣.

Picture 20: *Map* view (before modification).

Picture 21: *Map* view (after modification, percentage increase).

3D Graphics View

In this view, data are displayed as a three-dimensional object, where the height of the points on the chart depends on the values included in the map.

To modify map values, first it is necessary to select them. That can be done with the mouse, as for the *Map* view, or alternatively using the tools available in the *"Selection"* menu, the icons on the toolbar, or the keyboard shortcuts.

It is possible to rotate the 3D object using the mouse (holding the right mouse button and moving the cursor) or the tools available in the *"Selection"* menu, the icons on the toolbars, or the keyboard shortcuts.

In Pictures 22 and 23 it is shown as an example the modification of the *"Throttle Valve - Operating angle"* map carried out by following these steps:

1. Open the desired map from the main window of *ECM Titanium* by double clicking on the map name with the left mouse button.
2. Select the last row of the lookup table and then *Edit value* from the *Manual change* menu.
3. Enter number *90* and press the keyboard *Enter*.
4. Click the icon 🔳
5. Rotate the map until it is in a comfortable position for modification, which will consist in "smoothing" the curve.
6. Select a row of the map and enter number *100* in the box **Pg+ Pg-** `100` on the toolbar at the top of the window.
7. Repeatedly press the keyboard *Page Up* or *Page Down*, until the selection reaches the desired height.
8. Move to a different row and repeat the process until you get the desired shape.
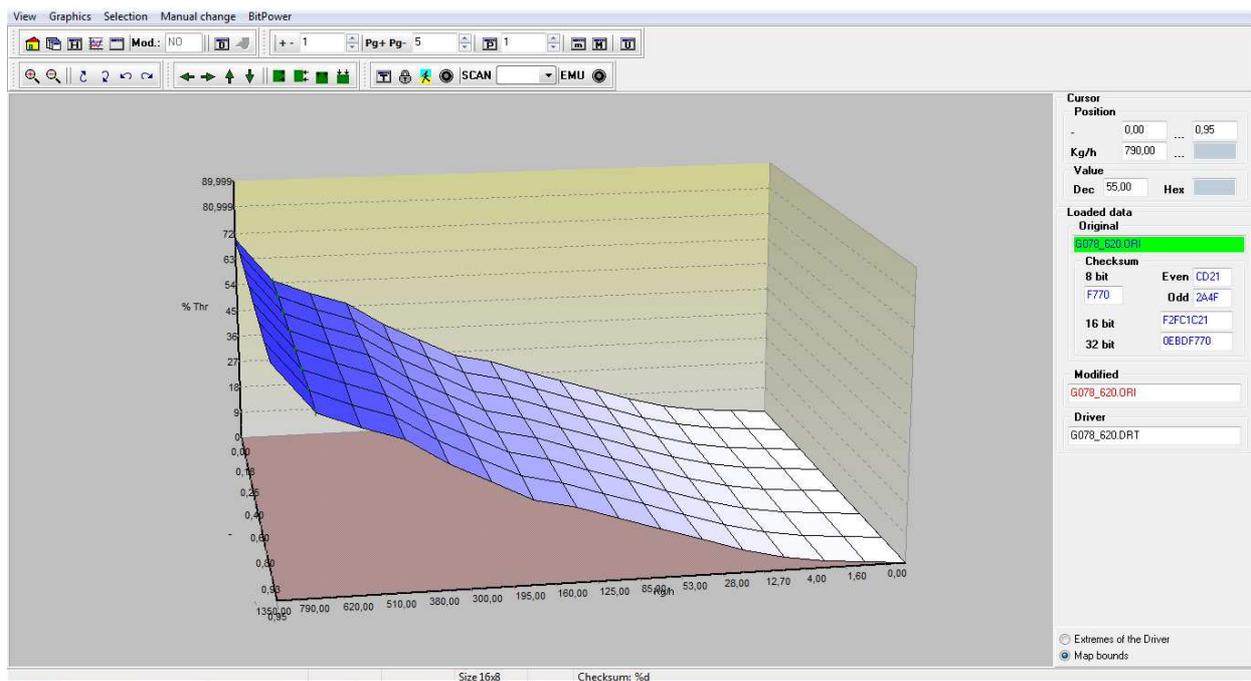
Picture 22:*3D Graphics* view (before modification).
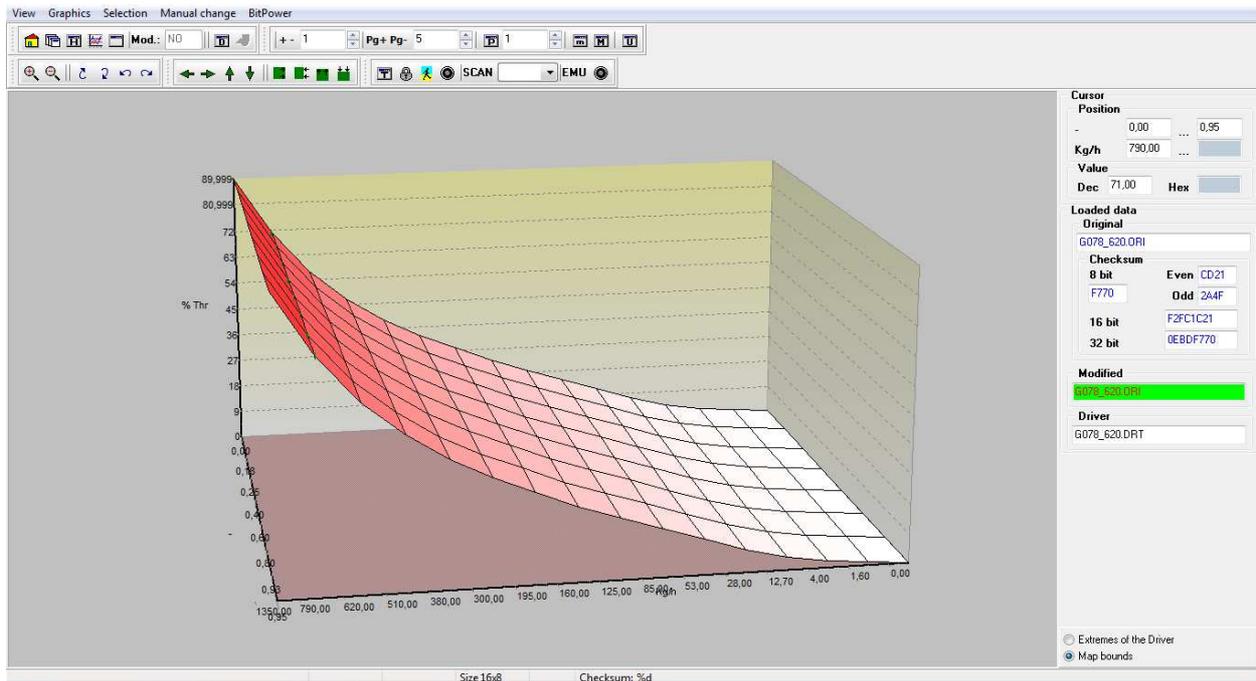
Picture 23:*3D Graphics* view (after modification).

2D Graphics View

In this view, data are displayed as a continuous track. The values in the file correspond to the height of the points composing the track. The shape displayed depends on the map and the options chosen for the representation.

To change map values, first it is necessary to make a selection: place the mouse at the beginning of the area to select and click the right mouse button; then go at the end of the area to select and click again the right mouse button. In the panel are displayed two vertical lines, which indicate the beginning and end of the selection. Now it is possible to modify the selection using the tools available in the *"Manual change"* menu, the icons on the toolbar, or the keyboard shortcuts.

Pictures 24 and 25 show as an example the modification made at the same time on the three "*Rail pressure limiter*" maps, carried out by following these steps:

- From the main window of *ECM Titanium*, open the *"Rail pressure limiter f(RPM,Q_FUEL)"* map
- Click the icon
- Place the cursor at the beginning of the area to select and click the right mouse button; then go at the end of the desired area and click again the right mouse button

- Click the icon to enable multiple selections
- Repeat the process and select other areas to modify
- Click the icon to enable percentage modification
- Using the combo box arrows, select *6* in the box on the toolbar
- Press *Page Up* on the keyboard once.

Picture 24: **2D Graphics** view (multiple selections).
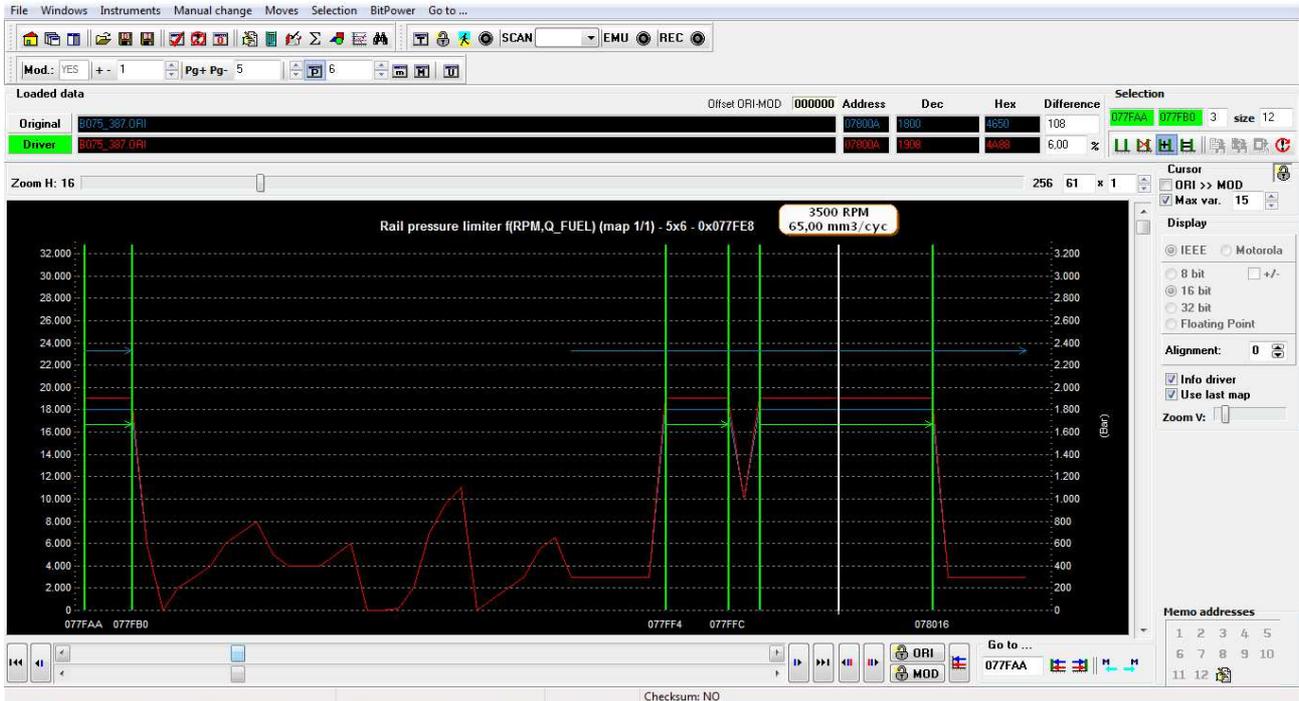
Picture 25: *2D Graphics* view (after modification).

Hexadecimal View

The *Hexadecimal* view displays the content of original and modified files through alphanumeric characters, together with the corresponding ASCII code.

This can be useful, for instance, to search or modify text strings in the file.

In Pictures 26 and 27, you can see as an example the customization of a string in the file of a motorbike, carried out by following these steps:

- In the main window of *ECM Titanium*, click the icon [icon] to open the *Hexadecimal* view
- Move through the file, using the scroll bar until you find the string to change
- Click the icon [icon] to enable the selection of the file content
- Select with the mouse the first character you want to modify, on the left of the window, where the hex characters are displayed
- Press the keys + or – on the keyboard until you get the character you need
- Repeat the process for all the following characters.
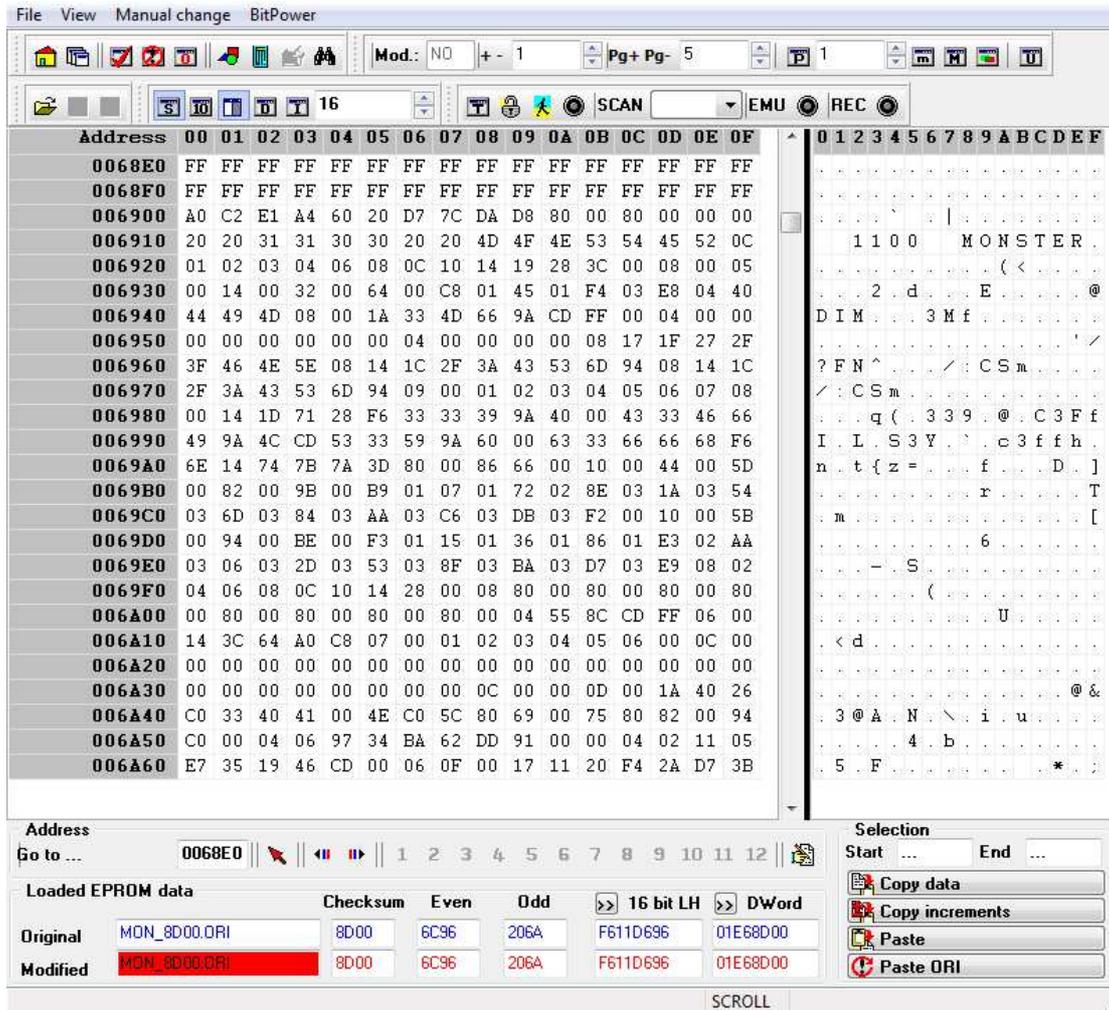
Picture 26: *Hexadecimal* view (before modification).
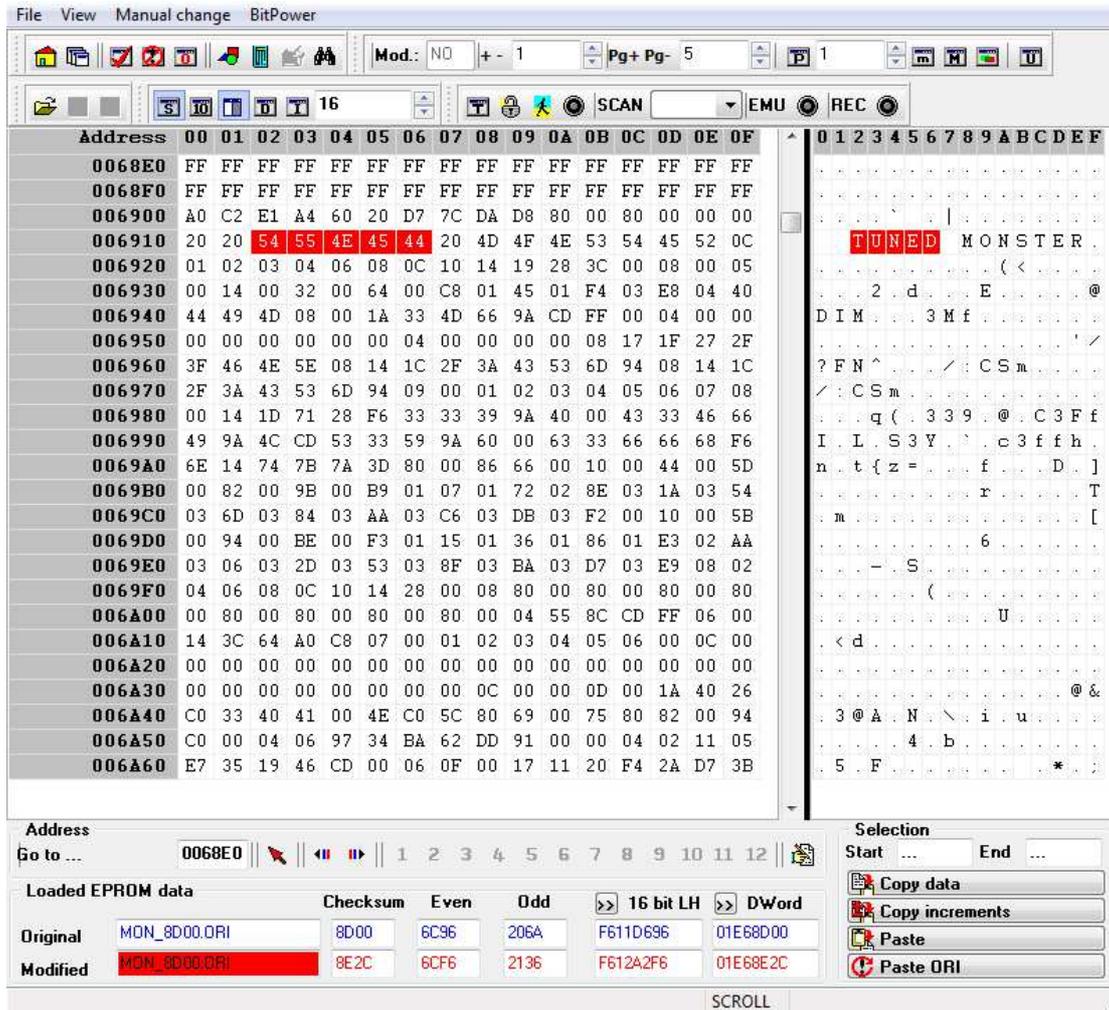
Picture 27: *Hexadecimal* view (after modification).

Section 8 – How to validate a modified file using the Checksum

Each modified file must be validated before it is re-flashed in the engine control unit, because otherwise the vehicle doesn't ignite on and even if it does, you'll get a diagnostic trouble code (e.g. *P0601 - Internal Control Module Memory Check Sum error*).

The process that validates a modified file is called *Checksum* correction. The *Checksum* is usually corrected by the same Chip-Tuning tool (e.g. *KESSv2, Powergate, K-TAG, BDMpro*) used to write files in the ECU.

If a memory chip programmer (e.g. *Galep*) is used to write the modified file, the *Checksum* correction is not made by the programmer, because that's not a professional Chip-tuning device. It is necessary to use the *ECM Titanium* software with the right *Checksum* family.

Checksum families for *ECM Titanium* are provided by *Alientech Srl,* and cost in credits. If you don't know the amount of your credits, connect to the *Alientech Data Bank,* or contact your dealer.

If a *Checksum* correction is needed, it is very important to pay attention to the message that *ECM Titanium* may display right after that a *Driver* has been associated to an original file (Picture 28), because it warns that there is no *Checksum* available to validate the modified file.
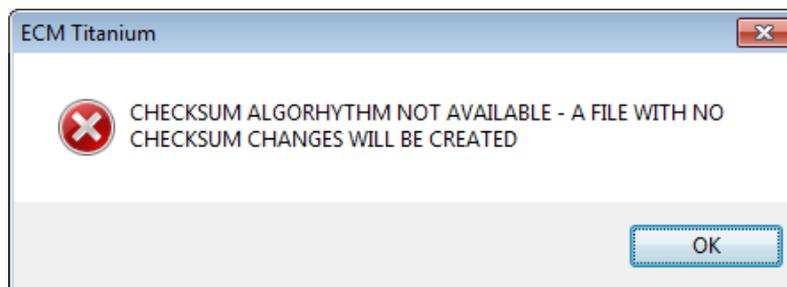
Picture 28: *Checksum Algorithm not available* warning message.

If the tool used to re-flash the modified file (e.g. *KESSv2*, *Powergate*, *K-TAG*, *BDMpro*) automatically makes a *Checksum* correction, you don't need to correct the *Checksum* with *ECM Titanium*.

After pressing *OK* at the previous message, the software redirects you to the main window:
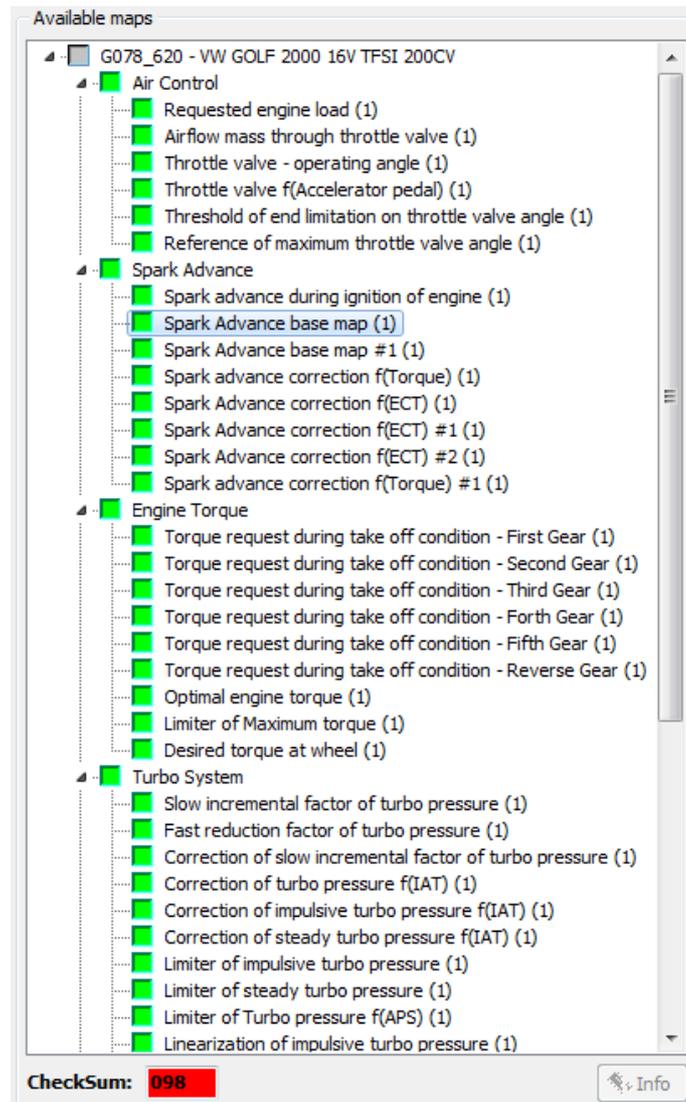
Picture 29: *Checksum* panel.

The *Checksum* box that appears in the previous image (Picture 29) shows in red the number *98*, which corresponds to the number of the *Checksum* family suitable to correct the *Checksum* with *ECM Titanium* if the file was read with a memory chip programmer (e.g. *Galep*).

If the *Checksum* family is red, it means that it is not available in the memory of the *ECM Titanium* dongle.

To check or download a *Checksum* family among those stored in the memory of *ECM Titanium*, simply follow these 3 steps:

1. Select *Instruments* from the menu bar in the main window of *ECM Titanium*.
2. Select *Checksum* from the drop-down menu.

3. Choose *Available families*.
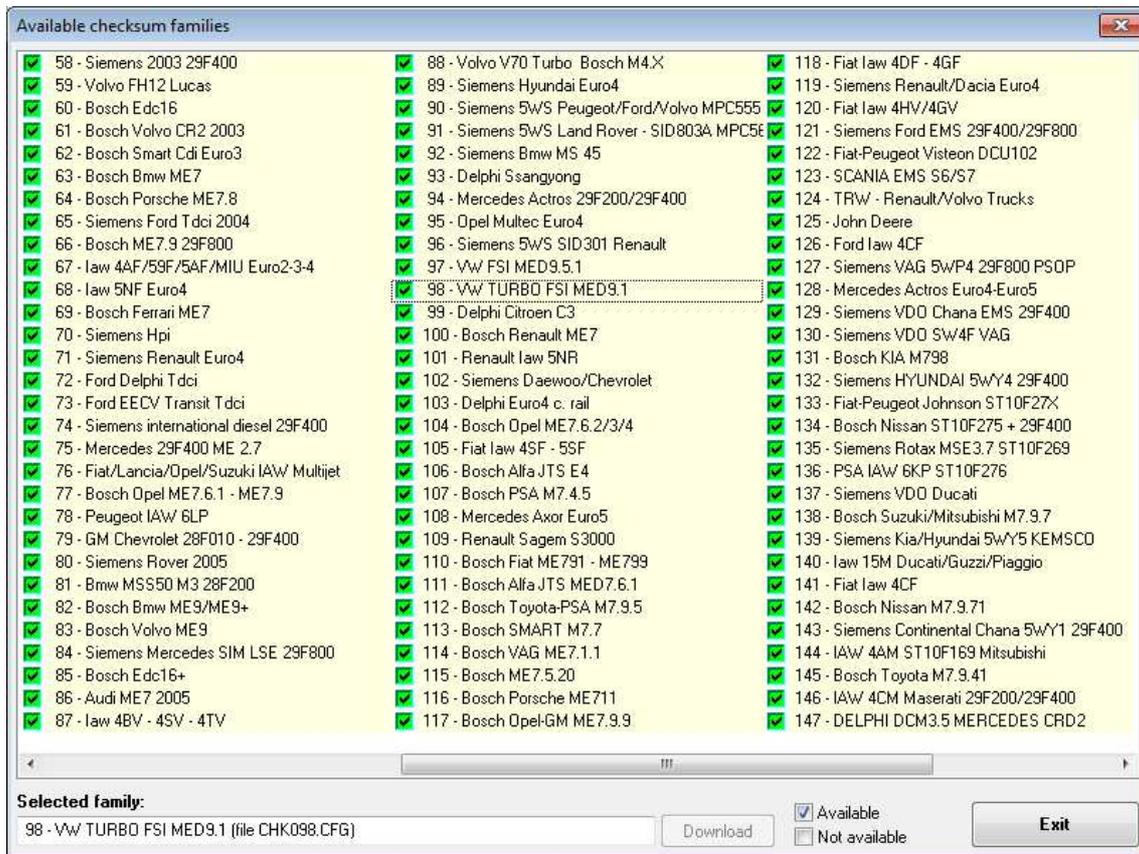
The available families stored in the USB flash drive are green, while those in red (Picture 30) can be downloaded from the web (using credits).
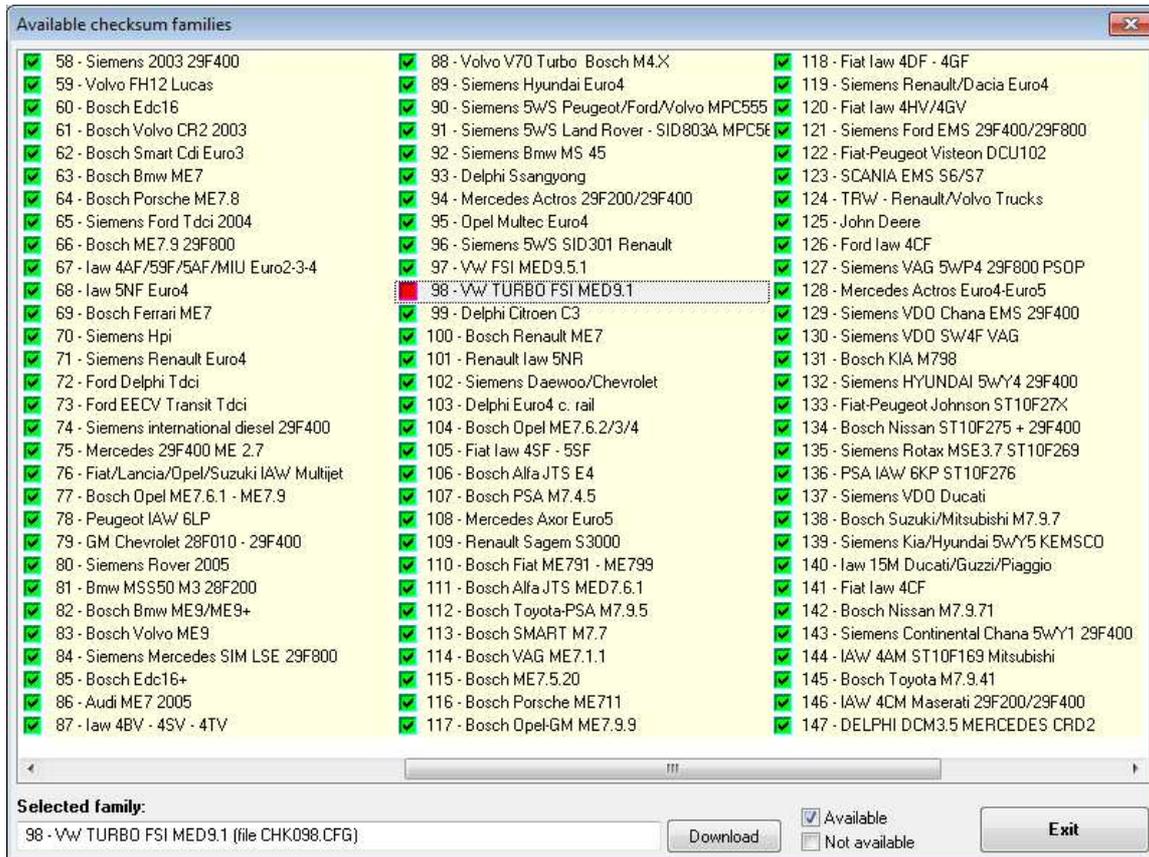
Picture 30: *Available Checksum family* window.

To download a *Checksum* family from *Alientech Internet Data Bank,* it is just necessary to follow two steps:

1. Select the number of the desired *Checksum* family (in red).
2. Click *Download*.

Picture 31: *Available Checksum family* window.

After the downloading, the *Checksum* family will appear in green (Picture 31).

After downloading the desired *Checksum* family from the web, it is necessary to reload the stock original file in the main window of the software and modify it again from the beginning. If, instead, you saved the modified file, you just need to reload the stock original file with its *Driver* and then load the modified file.

The *Checksum* correction is performed automatically when the modified file is saved, without any additional step.

Section 9 – How to save a modified file

Before re-flashing a file edited with *ECM Titanium* with a Chip-tuning tool, it is necessary to save a copy of the modified file on the hard disk of your computer.

The easiest and quickest way to save a modified file is to click the icon on the top left of the main window of the software (Picture 32).
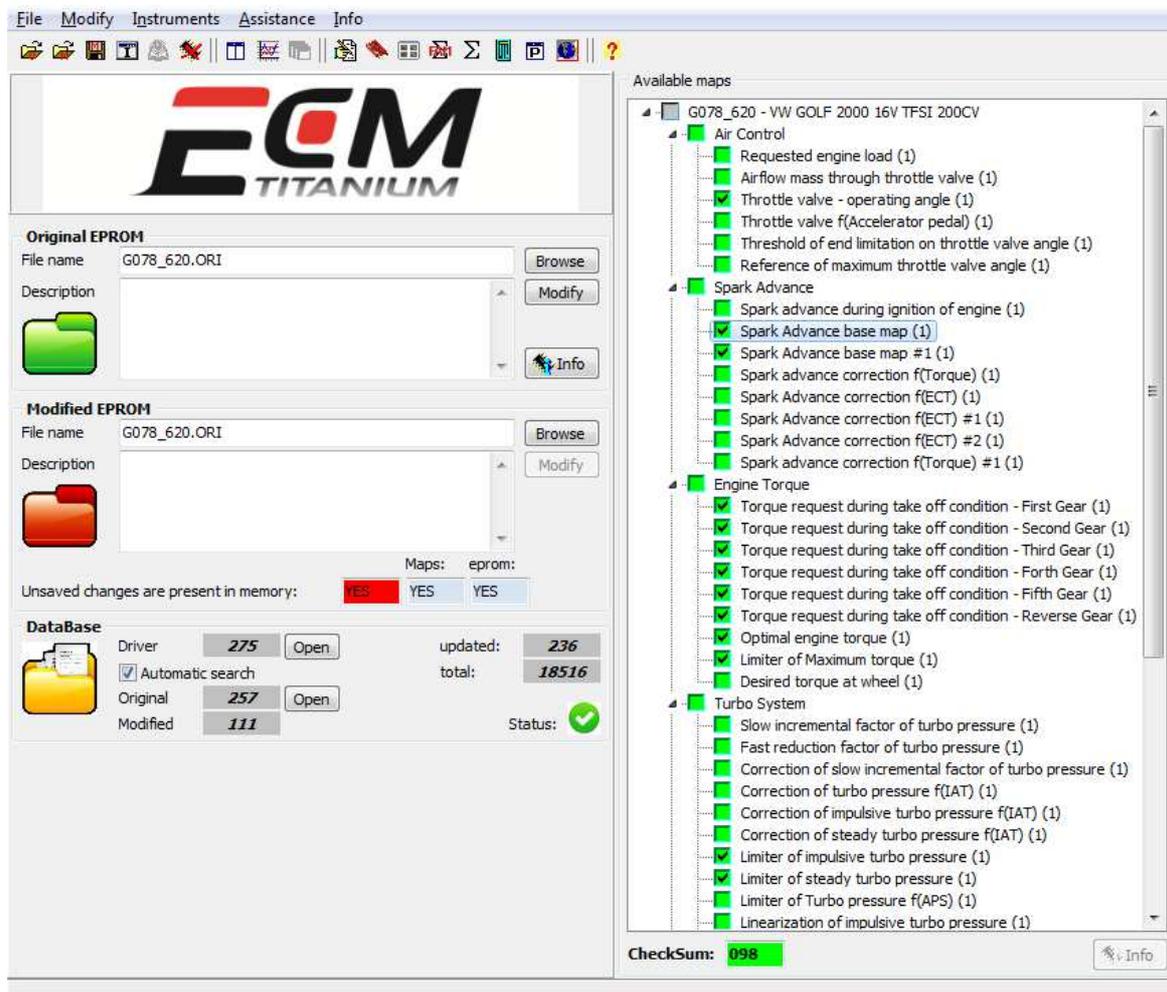
Picture 32: *ECM Titanium* main window.

At this point, the software asks if you want to save a copy of the modified file also on the personal *Database* integrated in the USB flash drive, and then it saves the modified file on the hard disk of your computer. It is always recommended to save a copy of the files on your personal *Database*, so that you don't need to work always on the same computer on which there are the files read from the engine control unit.

Sometimes, saving the modified file on the hard disk of your computer is not the last operation to perform with *ECM Titanium*.

If the original file from which you started to create the modified file was read with a memory chip programmer (Picture 33), it may be necessary to re-encode the binary format, or reverse the byte order of the modified file, before flashing this file on a new memory chip.

Picture 33: Memory chip programmer; **Galep**.

ECM Titanium is able to re-encode the binary format of the stock original file and restore the protection that engine control unit manufacturers often use to prevent Chip-tuning

The most frequent binary encodings are:

- *EDC16* format: for BOSCH engine control units model *EDC 16*.
- *M155* format: for BOSCH engine control units model *M 1.5.5*.
- *Siemens F200* format: for Siemens engine control units equipped with an integrated circuit marked *F200*.
- *Siemens 2001* format: for Siemens engine control units produced since 2001.

Byte order needs to be reversed only on a few models of engine control units:

- *Trionic T5*: equipped on SAAB or OPEL vehicles (GM Group).
- *Trionic T7*: equipped on SAAB or OPEL vehicles (GM Group).

To re-encode a modified file, it is necessary to be in the main window of *ECM Titanium* (Picture 34).
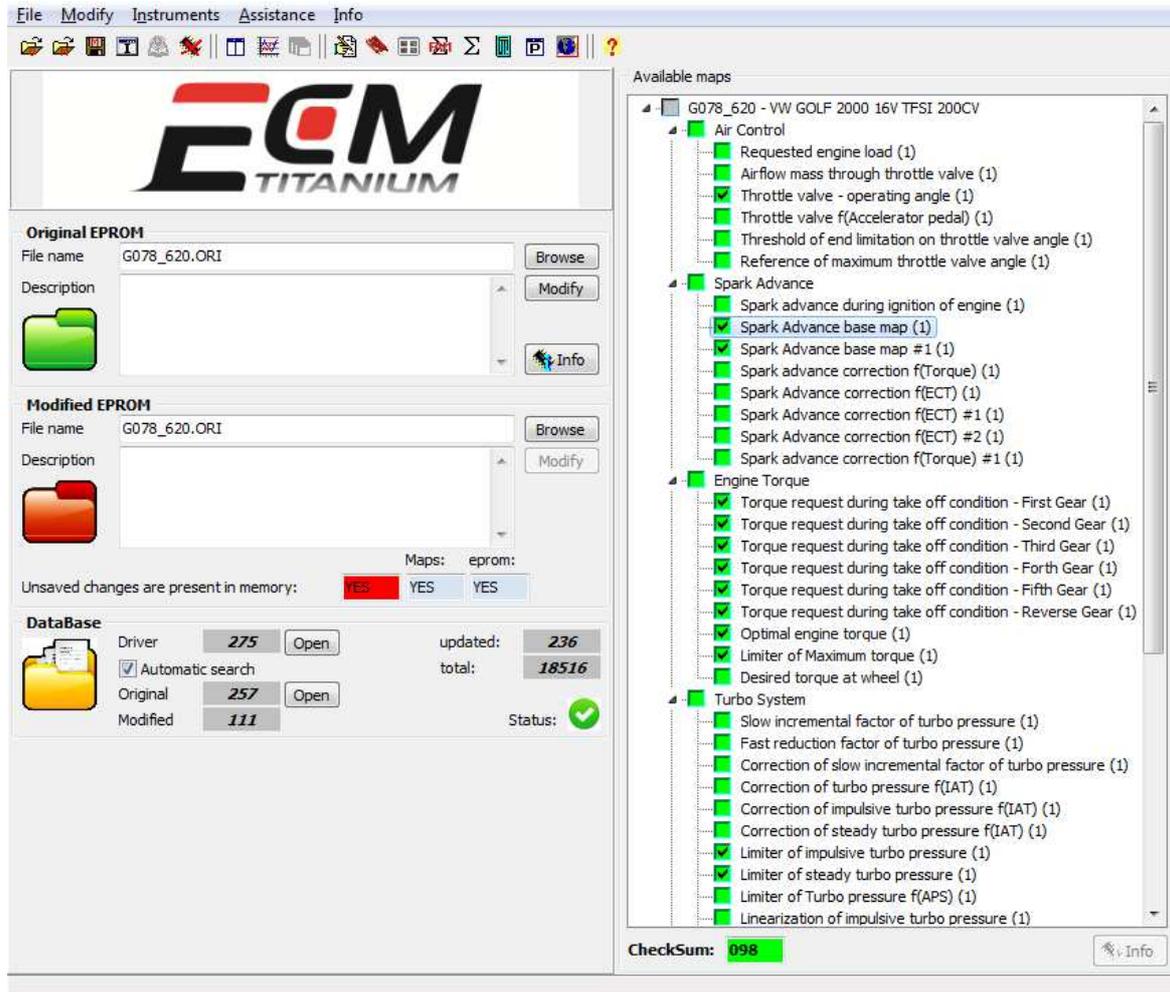
Picture 34: *ECM Titanium* main window.

To convert an encoded modified file, just follow these four steps:

1. Select *Instruments* from the main window of the software, and then *Encodings*.
2. Select the right encoding format according to the memory chip or the ECU (Picture 35).
3. Click *OK* when the message of encoded file creation appears.
4. Save the encoded file on your computer with a different name than the original.
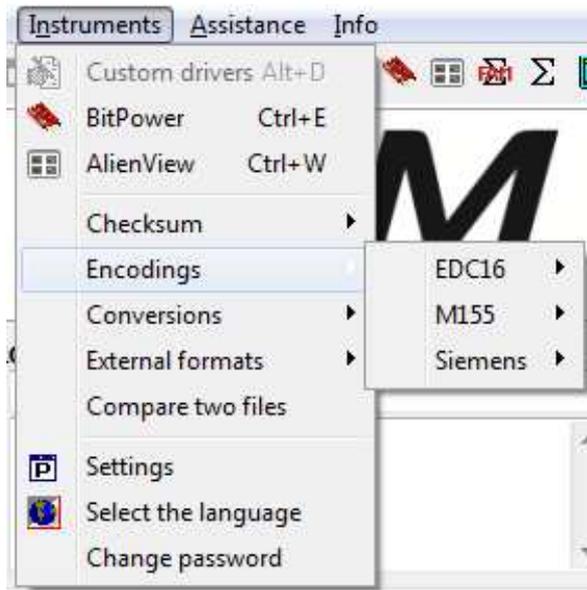
Picture 35: List of available *Encodings*.

To convert a modified file that has the byte order reversed, just follow these four steps:

1. Select *Instruments* from the main window of the software, and then *Conversions* (Picture 36).
2. Select *Swap bytes.*
3. Click *OK* when the message of reversed file creation appears.
4. Save the converted file on your computer with a different name than the original.
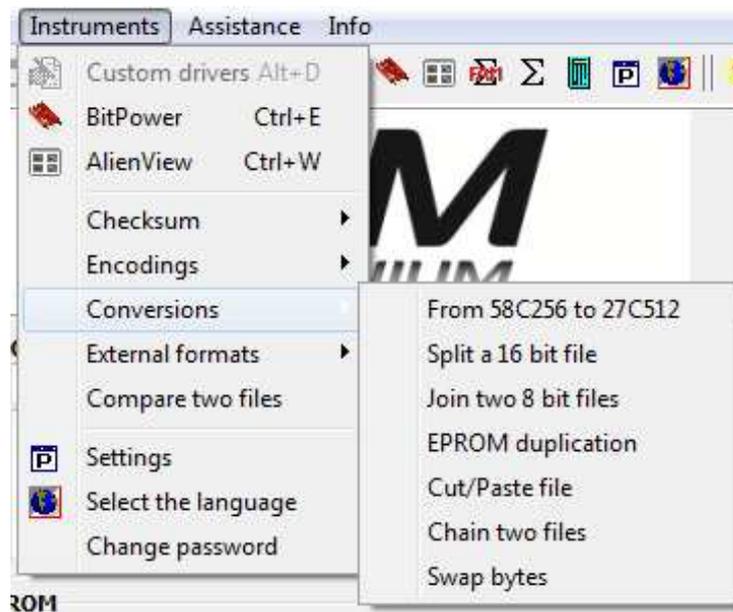
Picture 36: List of available *Conversions*.

If the original file was read with a *Slave* version of a serial ECU programmer (e.g. *KESSv2*, *Powergate*) or of a microcontroller interface programmer (e.g. *K-TAG*) (Pictures 37 and 38), it is necessary to encode the modified file in order that the *Slave* tool can write it.

Picture 37: *Master* and *Slave* versions of a serial ECU programmer.

Picture 38: *Master* and *Slave* versions of a microcontroller interface programmer.

The owner of the *Master* tool (e.g. *KESSv2*, *K-TAG*) is the only one who can protect with a special encoding the files that the *Slave* tool can flash.

The owner of the *Slave* tool (e.g. *KESSv2*, *K-TAG*) can only write the protected files received from the owner of the *Master* tool that has been associated to his *Slave* tool by *Alientech Srl*. If you don't know how to encode the files for the *Slave* tool associated to you, contact your dealer.

If the original file was read with a *Master* version of a serial ECU programmer (e.g. *KESSv2*, *Powergate*) or of a microcontroller interface programmer (e.g. *K-TAG*, *BDMpro*), it is not necessary to encode the modified file.

Section 10 – How to load a file from ECM Titanium Database

As described at the end of Section 4, at the end of the *Drivers* association procedure *ECM Titanium* asks if you want to save a copy of the stock original file in the personal *Database* (Picture 39). The personal *Database* is stored in the USB dongle and contains all the stock original files, the related *Drivers*, and the modified files previously saved with the software.
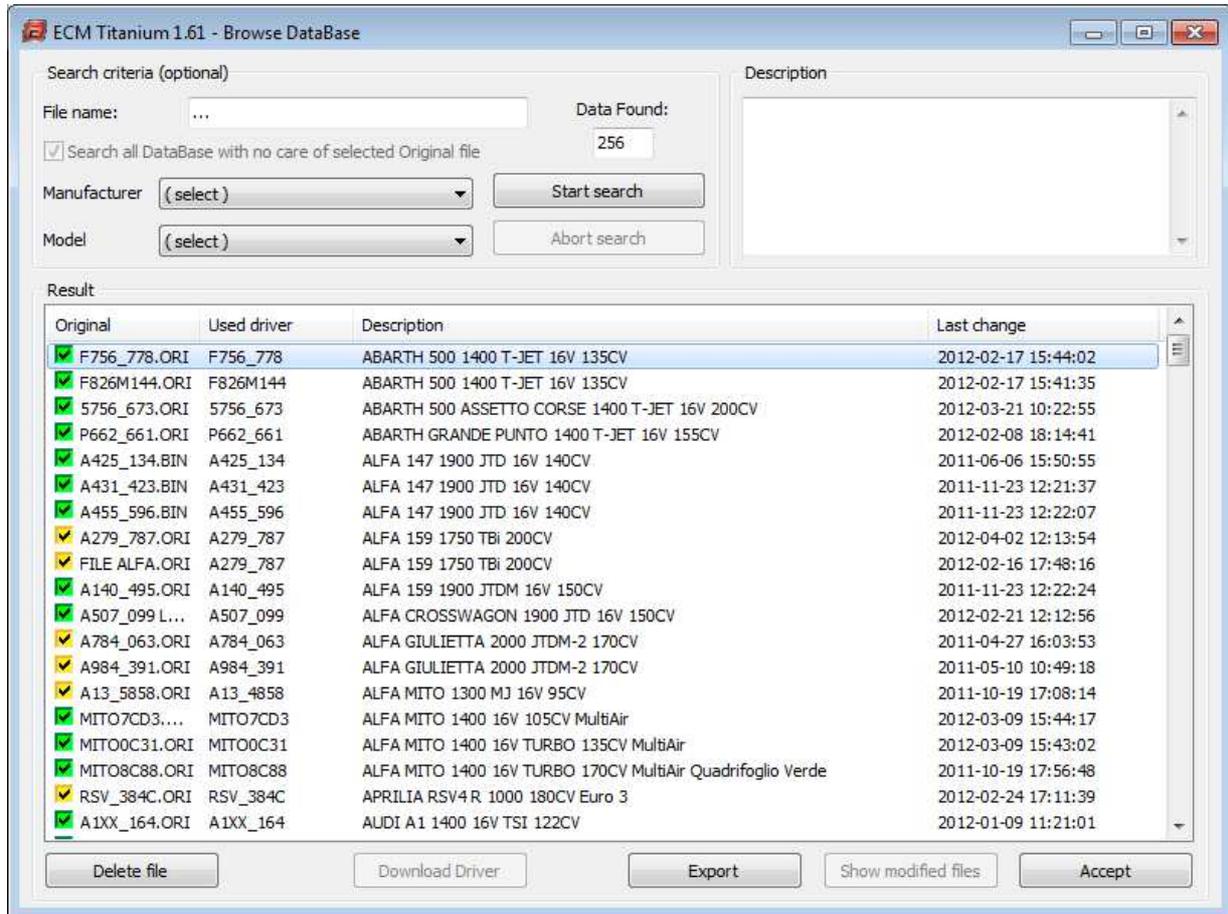

Picture 39: ***Database*** panel.

To reload an original file stored in the *Database*, follow these five steps:

1. Click the *Open* button on the right of the number indicating the amount of original files stored in the Database.
2. From *Browse Database* window, choose the desired *Manufacturer* and *Model*.
3. Click the *Start Search* button.
4. Select the desired original file.
5. Click the *Accept* button.

If you have previously added a description to the original file saved, it appears on the top right of *Browse DataBase* window (Picture 40).

Picture 40: **Browse DataBase** window.

To reload a modified file already saved in the main window of the software, follow these seven steps:

1. Click the *Open* button on the right of the number indicating the amount of original files stored in the dongle.

2. From *Browse Database* window, choose the desired *Manufacturer* and *Model*.

3. Click the *Start search* button.

4. Select the original file from which you created the modified file.

5. Click the *Show modified files* button.

6. Select the desired modified file from the *Search for Modified files* window.

7. Click the *Accept Data* button.

If you have previously added a description to the modified file saved, it appears on the right top of the *Search for Modified files* window (Picture 41).
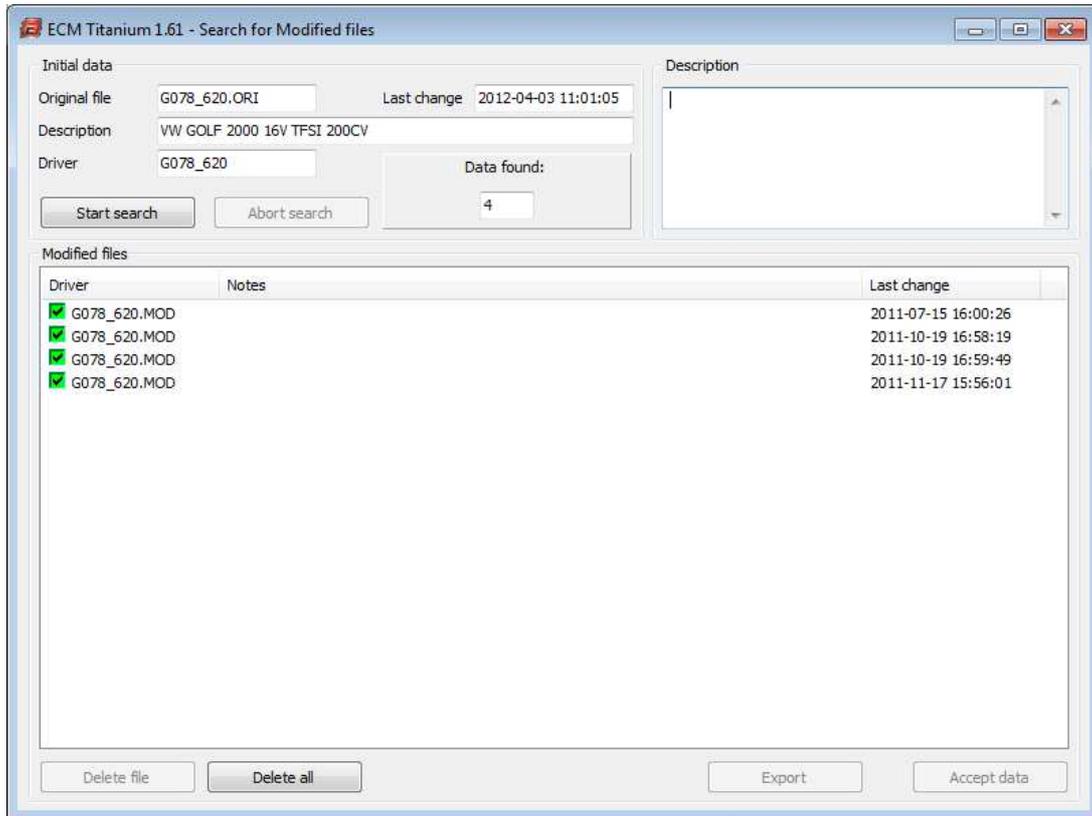
Picture 41: *Search for modified files* window.

Section 11 – WEEE Directive

This symbol on the product or its packaging indicates that this product shall not be treated as household waste. In line with EU Directive 2002/96/EC for waste electrical and electronic equipment (WEEE), this product must not be disposed of as unsorted municipal waste. Please dispose of this product by returning it to the point of sale or to your local municipal collection point for recycling.