



***NANO/COM***

DESIGNERS AND MANUFACTURERS OF CUTTING EDGE AUTOMOTIVE DIAGNOSTIC EQUIPMENT.

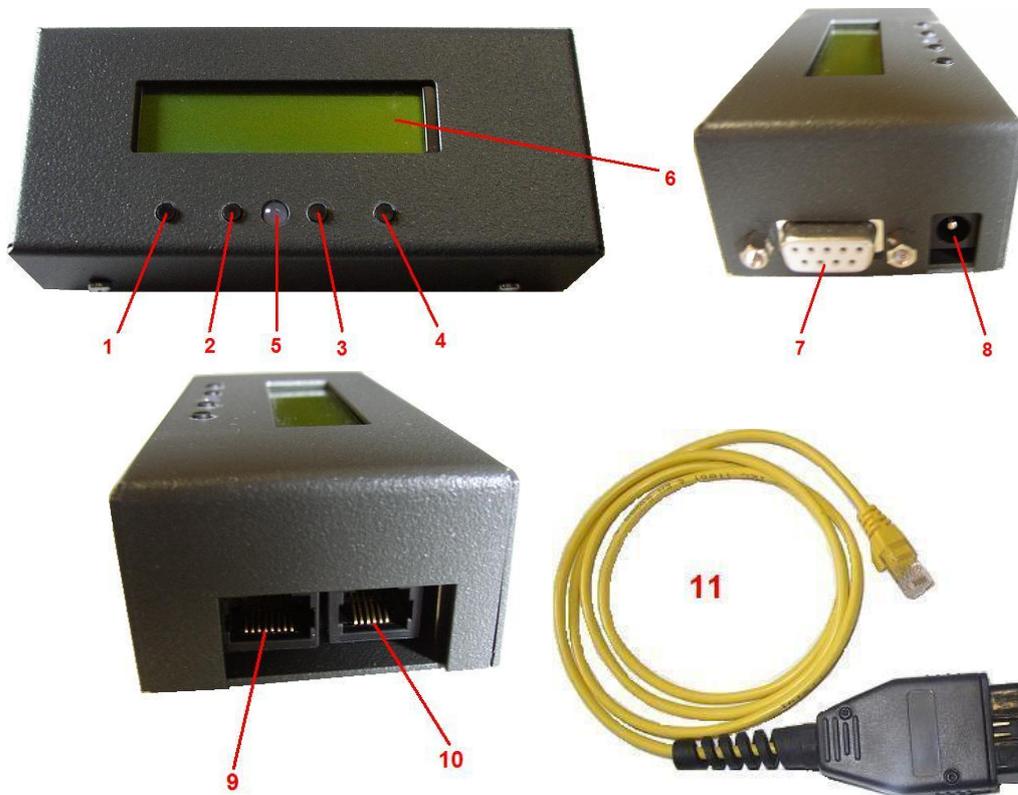
# **USER MANUAL**

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# 1 COMPONENTS DESCRIPTION



- 1) Multifunction Key 1
- 2) Multifunction Key 2
- 3) Multifunction Key 3
- 4) Multifunction Key 4
- 5) red-green light LED indicator
- 6) Display
- 7) Serial port RS232 (Connector 1)
- 8) Auxiliary power supply (Connector 2)
- 9) OBD port (Connector 3)
- 10) Expansion port (Connector 4)
- 11) OBD Cable (Cable 1)

## 2 INSTALLATION AND STARTUP

### 2.1 NANOCOM STARTUP AND CONNECTION TO OBD PORT

To start up the NANOCOM you have to connect it to the OBD port of the car with the OBD cable( cable 1). Once connected the writing “Push a key or connect me” will appear on the display, and the LED indicator will flash until the red light stays on.

In this condition the NANOCOM is ready to work in one o the two mode REMOTE or STANDALONE (This two working mode will be described in the chapter 4 e 5).

If when you connect the NANOCOM nothing happen, check that the OBD plug is well connected, and the service’s fuse of your car is working fine.

### 2.2 SOFTWARE INSTALLATION

To install the NANOCOM software on the personal computer, you have to launch the “setup.exe” file from the CD ROM, or downloaded by the WEB.

Follow the step of the application until the installation is complete, and if you need, you canchange the application folder as you prefer. If a previous version of the software is already installed, please remove it from the controll Window’s control pannel.

Is not necessary to reboot the computer after the installation.



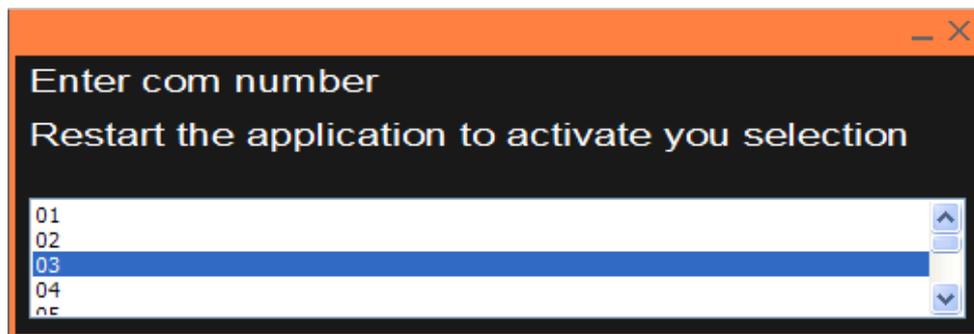
Nanocom

To start the “Nanocom.exe” application, you have to double click the NANOCOM icon.

At the first execution, the software will show the error message “Unable to open serial port!!!”, click OK to ignore the message. Now you have to setup the number of port that the application will use.To do that click on the “Com setting” button that you find in the top of the main frame of the NANOCOM application.



Now a window where you can select the chosen comm port number will appear.



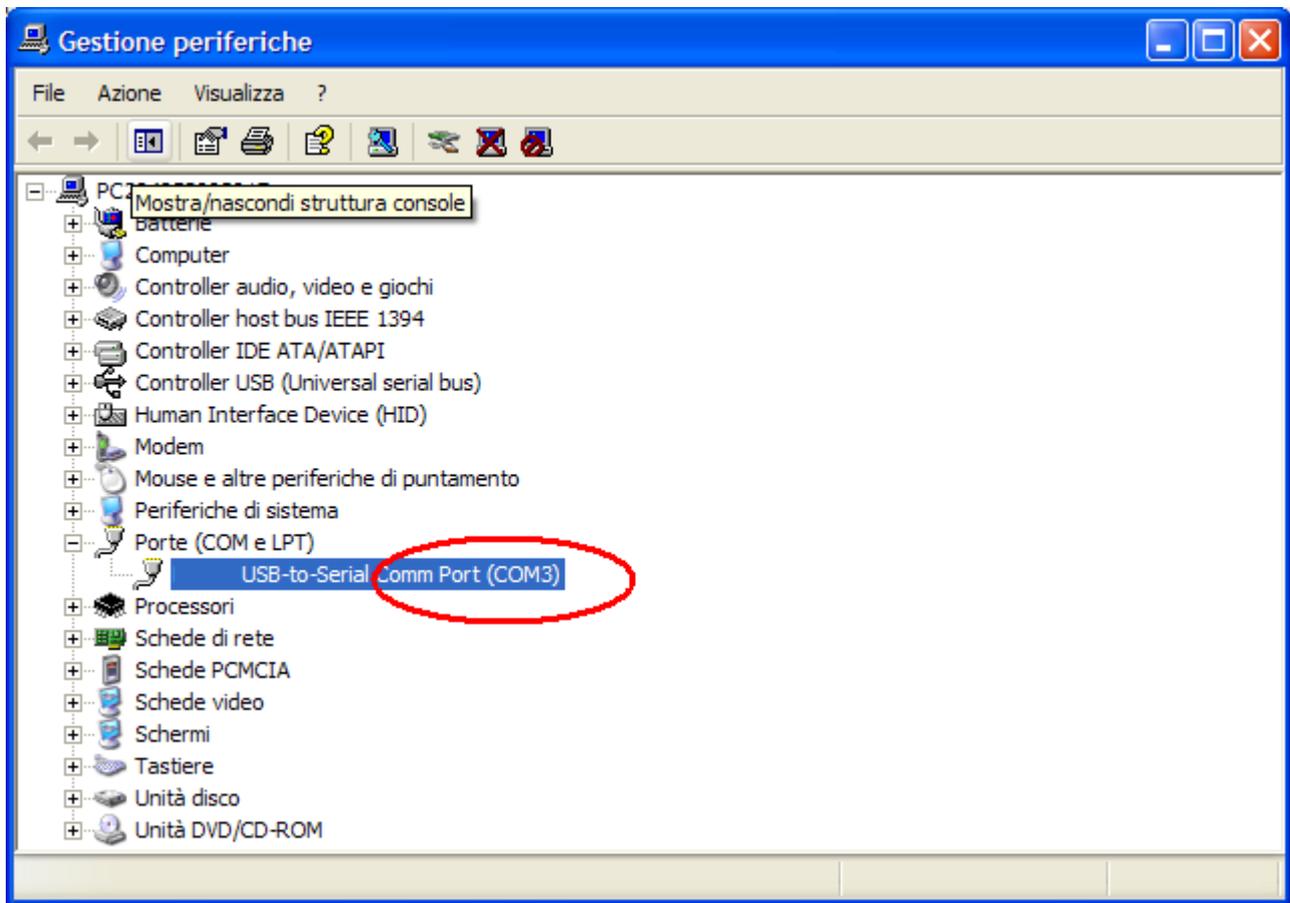
Close this window, and restart the application without rebooting the computer, if the comm port you selected is valid, the application will start normally.

To have communication between laptop and NANOCOM you have to connect the RS232 port of the NANOCOM (connector 1) to the RS232 port of the computer with a RS232 cable.

NANOCOM have to be powered, the comm port doesn’t supply power.

## 2.3 CONNECTING NANOCOM WITH USB

If your computer doesn't have the serial port, you can use a standard commercial USB-RS232 converter. You have to install the driver of the converter as the manufacturer of the accessory require, and check what number of port is associated with it, by exploring the hardware management from the Window's control panel.



now you can do the comm port setting on the NANOCOM application as described in the 2.2

## 2.4 GIVE POWER TO NANOCOM WITHOUT THE OBD PORT

The NANOCOM take his supply directly from the car's OBD port, and this supply is enough to perform all function. If will be necessary to give power to the NANOCOM without connect it to the car, (for exaple to update the firmware ,exchange the files, or all function that don't require the car connection) is possible to use the auxiliary power supply input of the NANOCOM (connector 2).

This input work with all standard line adapter with a continuos output voltage from 9Vdc to 12Vdc minimum 100mA. (TAKE CARE TO NOT SUPPLY A VOLTAGE GREATER THAN 12Vdc).

The polarity of the power supply must be as shown in the picture, but if it is inverted the NANOCOM doesn't work, but that doesn't cause any damage to NANOCOM.



## 2.5 SWITCH ON – SHUT DOWN - STANDBY

**Switch on** - The NANOCOM run automatically when it get power from the car's OBD port or from the auxiliary power supply connector (connector 2). Once the NANOCOM run, the writing "Push a key or connect me" will appear on the display, and it is ready to work.

NOTE: *if the NANOCOM stay on without to be used for more than 1 minute it goes automaticaly in standby.*

**Shut Down** - The NANOCOM doesn't have any switch that disconnect the power from the source, either when the power comes from the OBD port or the auxiliary power conector. To completely stop the circuit you have to disconnect the NANOCOM from the power source.

**Standby** – The Standby mode reduce the power consumption to about 12mA, this small cuttent allow you to keep the NANOCOM connected to the car's OBD port, also when the car is stopped, without discharge the battery. It must be disconnected from the OBD plug when the car is stopped for a long time.

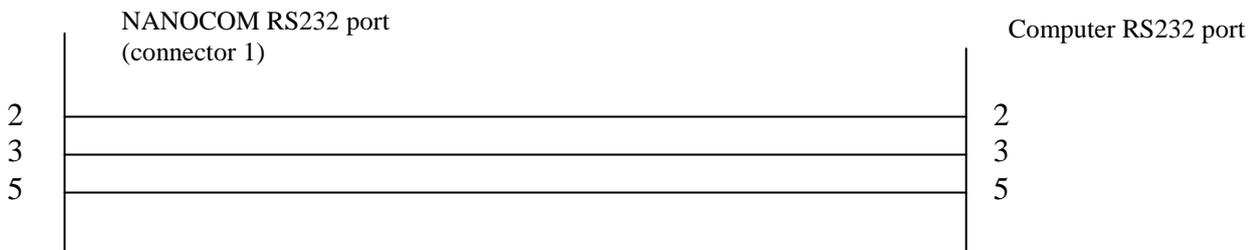
The standby can be activated manually, but the NANOCOM activate itself this state if it doesn't detect any activity on the OBD or RS232 communications or the keys.

The procedure to activate the standby is different for each of the three working modes, so please read carefully the chapter 4, 5 and 6 that esplanes all cases.

**Whake up from standby** – to wake up the NANOCOM from standby you have to press the key 1.

## 2.6 RS232 CONNECTION DIAGRAM

The RS232 cable required to connect the NANOCOM with the computer is a RS232 pin to pin cable (not twisted)



## 3 WORKING MODES

### 3.1 GENERAL DESCRIPTION OF THE WORKING MODES

The NANOCOM has three main working modes.

The **STANDALONE** mode, allow the user to work without connect the NANOCOM to a computer. This mode require only to connect the OBD cable to the car; The four keys and the display become the user interface to perform any function.

The **REMOTE** mode, give the possibility to control the NANOCOM interface by a Windows application, with a user graphic interface more friendly than the STANDALONE mode.

In this mode the NANOCOM has to be connected to the OBD port with the OBD cable (cable1), and the RS232 port (connector 2) must be connected to the RS232 port of the computer.

The **INSTRUMENT** mode, is a special mode that makes the NANOCOM work as a board instrument. In this mode the NANOCOM start automatically to read and show the main fuelling parameter of the engine, engine speed, turbo pressure in Bar, coolant temperature in C° and the battery voltage. The user can activate this modality by selecting an item from the setup function (section 4.4.4 or 5.4.3) .

In this modality the NANOCOM goes in standby automatically after the car is turned off.

Please read well the chapter 4,5 and 6 that completely explane these three working modality.

## 4 STANDALONE MODE

### 4.1.1 STARTUP OF THE STANDALONE MODE

This working mode allow you to perform any function without use the cumputer, the four keys and the display become the user interface to perform any function.

To work in this mode you have to switch on the NANOCOM, by giving it the power, or waking it up from the standby by means of the Key 1. The display will show the writing “Push a key or connect me”, now by pushing one of the four keys you enter the main menu of the STANDALONE mode

### 4.1.2 USAGE MAIN CONCEPTS OF THE STANDALONE MODE

In this mode the higher line of the display shows the menu items and the output of the functions, and the lower line shows the keys function.



This picture shows an example; As you can see the four writing “ent” “off” “<<” “>>” above each key describe the function that the key do when it is pressed.

In the STANDALONE mode the LED indicate the OBD communication state; When there is no activity the LED is off, when there is a data transfer from the NANOCOM to the ECUs the LED is green, at least when the data transfer is in the oposite direction the LED is red. Normally during the diagnostic function the LED will flash with the two color.

### 4.1.3 MAIN MENU

The main menu contains the following items:

TD5 ECU (diagnostic function of the TD5 engine control unit)

OTHERS ECU MODULE....(all the other ECU modules will be described in the dedicated manuals)

MEMORY MANAGER (functions to manage, erase, rename the files stored inside the NANOCOM)

NANOCOM SETUP (NANOCOM configurations function)

In this menu the keys have the following meaning:

Key 1: ent = ENTER

Key 2: off = OFF (activate the standby).

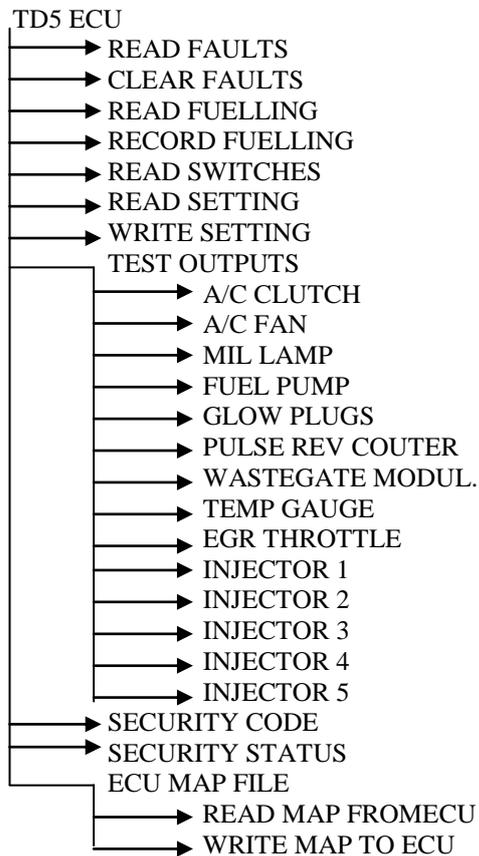
Key 3: “←←” = menu backward

Key 4: “→→” = menu forward

NOTA: To activate the standby you have to keep the key 2 pressed for more than one second

### 4.2.1 TD5 ECU MENU

This tree diagram show the TD5 ECU menu structure:



In this menu the keys have the following meaning:

Key 1: ent = ENTER (activates the functions or goes to the submenu for the TEST OUTPUT and ECU MAP FILE items)

Key 2: esc ESCAPE (returns to the previous menu level).

Key 3: “←←” = menu item backward

Key 4: “→→” = menu item forward

#### 4.2.2 READ FAULTS FUNCTION

To make this function work turn on the ignition of the car to the second step with or without run the engine.

When the main menu shows the item "Read faults" you have to press the key 1 "ent", on the display will appear the writing "Read faults?". Now if you press the key 1 "yes" you enter the function, or if you press the key 4 "not" you come back to the menu without do the function.

If the communication starts the LED flashes as described in the section 4.1.2, and if the function work properly on the display will appear the faults list.

The faults are shown as numeric code. The meaning of each numeric code is described in the TABLE 1 in the appendix of this manual.

Now the keys have the following meaning:

Key 1:	no function
Key 2: esc	ESCAPE (goes back to the previous menu level).
Key 3: "bak"	goes back to the first fault code
Key 4: "→→"	go to the next fault code

To come back to the main menu, you have to press the key 2 "esc", or see the complete list of faults, stepping with the key 4. Before to come back to the main menu the display will show the writing "Save this file?". If you press the key 1 "yes" the fault list read is stored in the NANOCOM memory. If you press the key 4 "not" the faults data are discharged from the memory and the NANOCOM goes to the main menu.

The file storing procedure is described in the section 4.5.

The file \*.fal generated by this procedure is stored in the NANOCOM memory and it can be downloaded on the computer and read by the application (section 5.2.3).

#### 4.2.3 CLEAR FAULTS CODE FUNCTION

To make this function work turn on the ignition of the car to the second step with or without run the engine.

When the main menu shows the item "Clear faults" you have to press the key 1 "ent", on the display will appear the writing "Clear faults?". Now if you press the key 1 "yes" you enter the function, or if you press the key 4 "not" you come back to the menu without do the function.

If the communication starts the LED flashes as described in the section 4.1.2, and if the function work properly on the display will appear the writing "Clear fault done".

At the end of the function the NANOCOM will goes back automatically to the menu

*NOTE: This function asks the ECU to clear the faults register, but it doesn't mean that after this function you will find no more faults logged. Immediately after this function the ECU can reload some faults that it sees again.*

#### 4.2.4 READ FUELING FUNCTION

To make this function work turn on the ignition of the car to the second step with or without run the engine.

When the main menu shows the item "Read fuelling" you have to press the key 1 "ent", on the display will appear the writing "Read fuelling?". Now if you press the key 1 "yes" you enter the function, or if you press the key 4 "not" you come back to the menu without do the function.

This function scans continuously all the fuelling parameter. If the communication starts the LED flashes as described in the section 4.1.2 and it keeps flashing during all the scan time.

Now the keys have this meaning:

Key 1:	no function
Key 2: stop	stops the parameter scanning.
Key 3: "←←"	shows the previous fuelling parameter
Key 4: "→→"	shows the next fuelling parameter

The parameters are shown one at time on the higher line of the display.

*NOTE: For technical reason in this function the keys are checked one time per second, so to make them work you have to keep them pressed for more than a second.*

The fuelling parameters that NANOCOM scan are the following:

Engine Speed =	Engine speed (Rpm)
Road speed =	Road speed (Km/h)
Rpm error =	idle speed error (Rpm)
Pot1 =	First accelerator potentiometer track (Volt)
Pot2 =	Second accelerator potentiometer track (Volt)
Pot3 =	Third accelerator potentiometer track (Volt)
PotSup =	Supply of the accelerator potentiometers tracks (Volt)
Battery =	Battery voltage (Volt)
Air-flow =	Air flow (Kg/h)
AmbPr =	Ambient pressure (Kpa)
TurboPr =	Mainfold pressure (Kpa)
CT =	Coolant temperature (C°)
FT =	Fuel temperature (C°)
AIT =	Air inlet temperature (C°)
EGRm =	Output value of the EGR modulator
EGRi =	Output value of the ILT modulator
TWG =	Output value of the Wastegate modulator
PWB =	Balancing value of the cylinders

#### 4.2.5 RECORD FUELLING FUNCTION

To make this function work turn on the ignition of the car to the second step with or without run the engine.

When the main menu shows the item “Read fuelling” you have to press the key 1 “ent”, on the display will appear the writing “Read fuelling?”. Now if you press the key 1 “yes” you enter the function, or if you press the key 4 “not” you come back to the menu without do the function.

This function scans continuously all the fuelling parameter and store them in the NANOCOM memory in a \*.fu1 file. If the communication starts the LED flashes as described in the section 4.1.2 and it keeps flashing during all the scan time. Now the keys have this meaning:

Key 1:	no function
Key 2: stop =	stops the scanning.
Key 3:	no function
Key 4:	no function

On the display will appear the writing “byte saved xxxxxx”, that shows the current file dimension.

When you press the key 3 the scanning stops and the writing “Save this file?” will appear. If you press the key 1 “yes” the fuelling data read are stored in the NANOCOM memory. If you press the key 4 “not”, the fuelling data are discharged from the memory and the NANOCOM comes to the main menu.

In case the NANOCOM loose the communication with the ECU, it stops automatically the scanning and give you the possibility to store the data read before the error. The maximum file dimension is 122880byte corresponding to 35 minutes of scanning, and when this limit is reached the NANOCOM stops the function and asks you if you want to store the data. The file storing procedure is described in the section 4.5.

This files can be opened and viewed with the application “GraphicViewer.exe” that is supplied with NANOCOM. The application “GraphicViewer.exe” is described in the chapter 8

*NOTA: For technical reason in this function the keys are checked one time per second, so to make them work you have to keep them pressed for more than a second.*

#### 4.2.6 READ SWITCH FUNCTION

To make this function work turn on the ignition of the car to the second step with or without run the engine.

When the main menu shows the item “Read switch” you have to press the key 1 “ent”, on the display will appear the writing “Read switch?”. Now if you press the key 1 “yes” you enter the function, or if you press the key 4 “not” you come back to the menu without do the function.

This function scans continuously all the digital inputs of the ECU. If the communication starts the LED flashes as described in the section 4.1.2 and it keeps flashing during all the scan time.

Now the keys have this meaning:

Key 1: no function  
Key 2: stop = stop the inputs scanning.  
Key 3: “←←” = shows the previous digital input  
Key 4: “→→” = shows the next digital input

The inputs are shown one at time in the higher line of the display.

Brake inputs:

BRAKE SWITCH1  
BRAKE SWITCH2 (only for vehicle with cruise control )

Clutch, transfer and gear box inputs:

TRANSFER RATIO  
GEAR SWITH ( only for auto gear box )  
CLUTCH SWITCH

Air conditioning inputs:

A/C CLUTCH REQ  
A/C CLUTCH DRIVE (feed back contact)  
A/C FAN REQUSET  
A/C FAN DRIVE (feed back contact)

Cruise control inputs:

CRUISE  
SET ACCELERATE  
RESUME/OFF

*NOTA: For technical reason in this function the keys are checked one time per second, so to make them work you have to keep them pressed for more than a second*

#### 4.2.7 READ SETTING FUNCTION

To make this function work turn on the ignition of the car to the second step with or without run the engine.

When the main menu shows the item “Read setting” you have to press the key 1 “ent”, on the display will appear the writing “Read setting?”. Now if you press the key 1 “yes” you enter the function, or if you press the key 4 “not” you come back to the menu without do the function.

If the communication starts the LED flashes as described in the section 4.1.2, and if the function works properly on the display will appear the ECU setting.

This setting are the five injector alphanumeric code, and the number of accelerator’s tracks, the two ID codes of the map tuning, and the part number of the ECU.

INJ1 AA AA N  
INJ2 AA AA N  
INJ3 AA AA N  
INJ4 AA AA N  
INJ5 AA AA N  
Fuel tune ID ( esempio svloe006 )  
Config tune ID ( esempio stnvp003 )  
ECU part number ( esempio NNN000120 )

AccPot X Way

AA is the alpha part of the injectors code, N is the numeric part of the injectors code, X is the accelerator’s tracks number( 2 or 3 ).

Now the keys have the followin meaning:

Key 1: no function  
Key 2: esc escapes from the function  
Key 3: “←←” shows the previous setting  
Key 4: “→→” shows the next setting

To come back to the main menu, you have to press the key 2 “esc”, or see all the settings, stepping with the key 4. Before to come back to the main menu the display will show the writing “Save this file?”. If you press the key 1 “yes” the settings read are stored in the NANOCOM memory. If you press the key 4 “not” the settings data are discharged from the memory and the NANOCOM comes to the main menu.

The file storing procedure is described in the section 4.5.

The file \*.se1 generated by this procedure is stored in the NANOCOM memory and it can be downloaded on the computer and read by the application (section 5.2.9). This file can be used directly in the WRITE SETTING ( paragraph 4.2.8 ) to write the setting of the file in the ECU.

#### 4.2.8 WRITE SETTING FUNCTION

To make this function work turn on the ignition of the car to the second step with or without run the engine.

When the main menu shows the item “Write setting” you have to press the key 1 “ent”, on the display will appear the writing “Get from file?”. Now if you press the key 4 “not” you go to the next step of this function, if you press the key 1 “yes” the display will shows the list of available file present on the NANOCOM memory.

Now the keys have the following menaing:

Key 1: ok	Opens the file
Key 2:	no function
Key 3: “←←”	shows the next file
Key 4: “→→”	shows the previous file

After you choose the file that contain the settings that you want to write on the ECU, with key 1 you can open the file. The NANOCOM check automatically the data integrity of the file.

Now the display will shows the writing “Edit Setting?”. Now if you press the key 4 “not” you go to the next step of this function, if you press the key 1 “yes” you enter the procedure that allow you to edit the settings manually.

The following part describe the editing procedure of the settings:

In the higher line of the display will appear the settings as follow

INJ1 →AA AA N

The keys have this meaning:

Key 1: ent =	enables the edit of the pointed setting
Key 2: esc =	escapes from the editing procedure
Key 3: “←←” =	moves the arrow pointer to the next setting
Key 4: “→→” =	moves the arrow pointer to the previous setting

By pushing the keys 3 and 4 you will see the pointer arrow moving between the settings, for example

Start:

INJ1 →AA AA N

pushing key 3:

INJ1 AA →AA N

pushing key 3:

INJ1 AA AA →N

pushing key 3:

INJ2 →AA AA N

And so it goes on until it reach the accelerator setting

AccPot X Way

The same thing is for the key 4, but the arrow pointer goes each time to the prewious setting.

When you press the key one you enter the editing of the value pointed by the arrow.

The keys will have the following meaning:

Key 1: ok	confirms the modification
Key 2:	no function
Key 3: “(-)”	decreases the value
Key 4: “(+)”	increases the value

If the arrow points an alpha value the keys 3 e 4 allow you to show one at time, all the 128 possible alpha code. If the arrow points an numeric value the keys 3 e 4 will increase or decrease the value in a range of values from 0 to 9.

The potentiometer setting can only have the values 2 or 3, so with the keys 3 and 4 you can toggle this value.

The key 1 allow you to confirm the choosen value and come back to the previous step where you can move the arrow pointer to edit another setting value.

Now pressing the key 1, the NANOCOM quit the editing procedure and goes back to the WRITE SETTING function, and ask you if you want to save this data. Now on the display will appear the writing "Write now?", if you press the key 4 "not" you stop the function without write the setting on the ECU, and if you press the key 1 "yes" you activate the writing of the settings.

If you press the key 4 "not" you come back to the menu without do the function.

If the communication starts the LED flashes as described in the section 4.1.2, and if the function work properly on the display will appear the writing "Setting write done".

*NOTE: There are two kind of ECUs build from the 1999 to the 2006, completely compatible, but the first models doesn't accept all setting values. The vehicle before the 2002 with the engine EURO2 have different kind of injectors that doesn't have the numeric part of the code, and the alpha part doesn't have all the 128 possibility.*

**WARNING: The injectors code are wery importants to the good working of the engine, so take the maximum care when you set this values because a wrong writing can cause problems to the engine.**

**To be sure to not loose the original data of the car, in case of a wrong writing of the settings, save them with the READ SETTING function before do this function.**

#### 4.2.9 TEST OUTPUTS FUNCTIONS

This group of functions is a submenu of the TEST OUTPUTS item of the TD5 ECU menu, so when the display shows the writing "Test outputs" you can enter this submenu by pressing the key 1. Each of these items allows you to test the relayive output.

TEST A/C CLUTCH	activate the AC clutch
TEST A/C FAN	activate the AC fan
TEST MIL LAMP	activate the MIL lamp
TEST FUEL PUMP	activate the fuel pump
TEST GLOW PLUGS	activate the glow plugs
TEST PULSE REV	give a short speed reference to the pulse rev gauge
TEST WASTEGATE	activate the wastegate modulator
TEST TEMP GAUGE	give a short temperature reference to the temperature gauge
TEST EGR TROTTLER	activate the EGR modulator
TEST INJECTOR 1	activate the injector 1
TEST INJECTOR 2	activate the injector 2
TEST INJECTOR 3	activate the injector 3
TEST INJECTOR 4	activate the injector 4
TEST INJECTOR 5	activate the injector 5

As for the other functions, to make it work turn on the ignition of the car to the second step but keep the engine stopped. When you press the key 1 the test function will be activated. If the communication starts the LED flashes as described in the section 4.1.2, and if the function work properly on the display will appear the writing "Test done", and the relative output is activated for a few seconds.

#### 4.2.10 SECURITY CODE FUNCTION

This function asks the ECU to learn the security code from the anti theft system, this is usefull when you install a new ECU on a vehicle.

To make this function work turn on the ignition of the car to the second step but keep the engine stopped.

When the main menu shows the item "Security code" you have to press the key 1 "ent", on the display will appear the writing "Learn sec. code?". Now if you press the key 1 "yes" you enter the function, or if you press the key 4 "not" you come back to the menu without do the function. If the communication starts the LED flashes as described in the section 4.1.2, and if the function work properly on the display will appear the writing "Learn security code done successfully".

Now to complete this function you have to turn off the ignition of the car and keep it off for more than 15 seconds (see the next note) then turn it back on.

*NOTE: on the NANOCOM display will appear the writing "turn ignition off for 15 sec." and it stay on the display for 15 second, giving you the possibility to respect the timing of the function without any countdown.*

#### 4.2.11 GET SEC. STATUS FUNCTION

This function asks the ECU the current status if the immobilization, so allow you to test the communication between the ECU and the anti theft system.

To make this function work turn on the ignition of the car to the second step , whit or without the run engine.

When the main menu shows the item “Security status” you have to press the key 1 “ent”, on the display will appear the writing “get sec. status?”. Now if you press the key 1 “yes” you enter the function, or if you press the key 4 “not” you come back to the menu without do the function. If the communication starts the LED flashes as described in the section 4.1.2, and if the function work properly on the display will appear the status if the immobilization with the following writings: "the ECU is not immobilized" in case the ECU get a correct code from the anti theft, and "the ECU is immobilized" when the anti theft doesn't answer or answers with a wrong code.

#### 4.2.12 ECU MAP FILE FUNCTIONS

This group of functions is a submenu of the ECU MAP FILE item of the TD5 ECU menu, so when the display will show the writing ECU MAP FILE you can enter this submenu by pressing the key 1. This submenu has the following items:

READ MAP FROM ECU

WRITE MAP TO ECU

##### WARNING:

- 1) **MODIFYING THE MAP FILES OF THE ECUs OF IS NOT LEGAL AND IT IS YOUR OWN RESPONSIBILITY IF YOU USE THESE FUNCTIONS.**
- 2) **WRITING THE ECU's FIRMWARE IS A DANGEROUS OPERATION BECAUSE THE MEMORY MUST BE CLEARED AND REWRITTEN. IT IS AT YOUR RISK AND RESPONSIBILITY IF YOU DO THAT. NANOCOM MANUFACTURERS DO NOT ANSWER OF ANY DAMAGE CAUSED TO ECUs. REMEMBER TO SWITCH OFF ALL THE ELECTRONIC DEVICE INSIDE THE CAR DURING THE MAP FILE WRITING, TO PREVENT EVERY PROBLEM THAT CAN BE CAUSED FROM THE RF INTERFERENCES.**
- 3) **MODIFYING THE MAP FILES OF ECUs MAY CREATE MECHANICAL PROBLEMS TO THE ENGINE AND TRANSMISSION OF THE VEHICLE**

*NOTE: There are two kinds of ECUs, the first model produced until the begin of 2002 and the latest model manufactured since 2002 to now, these two models of ECUs have the same shape and work the same way, the only difference between them is in the memory technology they are built with.*

*The first type stores the firmware in a 128K EPROM, the second one stores the firmware in a 256K FLASH EEPROM: this difference allows the second model to get the firmware update through the OBD port.*

#### 4.2.13 READ MAP FROM ECU FUNCTION

To make this function work turn on the ignition of the car to the second step but keep the engine stopped.

When the main menu shows the item “Read Map From ECU” you have to press the key 1 “ent”, on the display will appear the writing “Read map?”. Now if you press the key 1 “yes” you enter the function, or if you press the key 4 “not” you come back to the menu without do the function.

If the communication starts the LED flashes as described in the section 4.1.2, and it keeps flashing during all the data transfer.

On the display you can see the number of byte read.

The keys will jave the following meanings:

Key 1: stop	stops the function (all map data read will be loose)
Key 2:	no function
Key 3:	no function
Key 4:	no function

When the file will be completely read the writing “Save this file?” will appear on the display. If you press the key 1 “yes” the map file read is stored in the NANOCOM memory. If you press the key 4 “not” the data are discharged from the memory and the NANOCOM comes to the main menu.

The file storing precEDURE is described in the section 4.5.

#### 4.2.14 WRITE MAP TO ECU FUNCTION

To perform this operation, the ignition has to be kept off for a few minutes and when it is turned on you don't have to execute any diagnostic function before to write the map file.

When the main menu shows the item "Write Map to ECU" you have to press the key 1 "ent", on the display will appear the list of the map file stored on the NANOCOM memory.

The keys will have the following meanings:

Key 1: ok	opens the file
Key 2:	no function
Key 3: "←←"	shows the next available file
Key 4: "→→"	shows the previous available file

Pressing the key 1 after you select the file you want to write on the ECU, the display will show the writing "Write map?". Now if you press the key 1 "yes" you enter the function, or if you press the key 4 "not" you come back to the menu without do the function.

**WARNING: From this time the NANOCOM must be kept powered and the battery voltage must be stable. Please switch off all the electronic devices radio gps etc... to prevent every problem caused by the RF interferences.**

When the function starts the LED flashes as described in the section 4.1.2, and it keeps flashing during all the data transfer. The map file is completely transferred when all the 118796 byte are written on the ECU. At the end of the data download the display will show the writing "Write done successfully" and the ECU should start automatically. If for some reason the ECU doesn't start itself try to switch off the ignition and turn it back on. If the engine starts you have to consider the writing operation well done.

During this function the user has no way to stop the download, to prevent any accidental stopping that can cause the ECU damage.

*NOTE: When the data transfer reach 102400 byte it stops the procedure for a few seconds and then restart automatically until it is completed. This is a normal event during this procedure, so if you see this condition of noactivity don't be scared, just wait that the NANOCOM restart the work.*

### 4.3.1 MEMORY MANAGER MENU

This tree diagram shows the TD5 ECU menu structure:



In this menu the keys have the following functions:

Key 1: ent	ENTER (enter the function)
Key 2: esc	ESCAPE (come back to the lower higher level).
Key 3: “←←”	menu items forward
Key 4: “→→”	menu items backward

### 4.3.2 FILE LIST

This function allow the user to see the list of all files stored in the NANOCOM memory.

When the main menu shows the item “File list” you have to press the key 1 “ent”.On the higher line the display alternates each second the name of the first file and his dimension.

Now the keys have the following meanings:

Key 1 “ent”	show the description of the file, and show the data that it contain if it is possible
Key 2 “esc”	escapes from the function
Key 3: “←←”	shows the previoust file
Key 4: “→→”	shows the next file

With the keys 3 and 4 you can see all files stored in the memory, and at the end of the list NANOCOM doesn’t give any message but restart from the beginning of the list.

### 4.3.3 CLEAR FILE

This function allow the user to delete a file stored in the NANOCOM memory. When the main menu shows the item “Clear file” you have to press the key 1 “ent”.The display will shows the file list in the same way of the “File list” function.

The keys have the following meanings:

Key 1 “clr”	deletes the file
Key 2 “esc”	quits the function
Key 3: “←←”	shows the previoust file
Key 4: “→→”	shows the next file

You can select the file that you want to delete and so press the key 1 to erase it or pres the key 2 to quit the function.

When you press the key 1 on the display will appear the writing “clear this file?”, so you can choose to press key 1 “yes” to clear the file or key 4 “not” to come back without clear the file.

During the clearing of the file the display will show the writing “clearing file...” until the operation is done.

*NOTE: The clear file operation, after it has erased the file, it reorder all the other file still present in the memory so it can take several time.This time dipends from how many file are stored in the memory, and the position that the erased file had in the memory. Approximately the maximum time required is about 50 seconds.*

*During this function the NANOCOM doesn’t allow the user to stop the procedure. Please be sure that during the time required by the clearing function the NANOCOM is kept powered, because if it stop this function before it is complete, the remaining file in the memory will result corrupted.*

*NOTE: Is possible to blank all memory by clearing one file at time, but is better to use the CLEAR ALL function of the STANDALONE mode, thet require less time and give less work to the memory. Please read the section 4.3.4 to see this function*

#### 4.3.4 CLEAR ALL

This function allow the user to delete all the file stored in the NANOCOM memory. When the main menu shows the item "Clear all" you have to press the key 1 "ent". Now the display asks you "clear all memory?", so by pressing the key 1 you blank all the memory, and by pressing the key 4 "not" you come back to the menu without change anything on the memory.

The blank operation takes about 10 seconds.

#### 4.3.5 RENAME FILE

This function allow the user to rename the files stored in the NANOCOM memory.

When the main menu shows the item "Rename file" you have to press the key 1 "ent".

As for the "File list" function the display will show the list of the file stored.

The keys will have this functions.

Key 1 "ren"	renames the file
Key 2 "esc"	quits the function
Key 3: "←←"	shows the previous file
Key 4: "→→"	shows the next file

You can select the file that you want to rename by means of keys 3 and 4, so by pushing the key 1 "ren" you enter the rename procedure.

On the display will appear the writing "rename this file?" and you can choose the key 1 "yes" to rename or the Key 4 "not" to come back without rename the file.

When you enter the rename procedure the keys have the following meanings:

Key 1: mod	Enter the modification of the character pointed by the blinking cursor
Key 2: ok	confirm the name showed on the display
Key 3: "←←"	move the blinking cursor to the left
Key 4: "→→"	move the blinking cursor to the right

To modify the name you have to move the blinking cursor on the character that you need to modify, then press the key 1 "mod".

Now the keys have this meanings:

Key 1: ok	confirms the new character
Key 2: clr	inserts a space
Key 3: "←←"	changes the character in alphabetic order down
Key 4: "→→"	changes the character in alphabetic order up

Is possible to insert alphanumeric characters and some symbol; All available characters are listed by means of the keys 3 and 4.

Once you have setted the correct character, you can confirm by means of key 1 "ok". You can modify all the characters of the name repeating this procedure for more times.

When you compose the correct name you have to confirm by means of the key 2 "ok"

#### 4.3.6 FREE MEMORY

This function allow the uset to know how many bytes of the memory are free.

When the main menu shows the item "Free memory" you have to press the key 1 "ent". now the display will show for two seconds the free memory available.

#### 4.4.1 NANOCOM SETTING MENU

This tree diagram shows the TD5 ECU menu structure:



In this menu the keys have the following functions:

Key 1: ent	ENTER (enters the function)
Key 2: esc	ESCAPE (goes back to the lower higher level).
Key 3: “←←”	menu items backward
Key 4: “→→”	menu items forward

#### 4.4.2 NANOCOM ID

This function allow the user to see the ID code of the NANOCOM.

When the main menu shows the item “Nanocom ID” you have to press the key 1 “ent”. On the display will appear the ID code; This code is compsed by 6 alphanumeric characters.

In this function the keys have the following meanings:

Key 1:	no function
Key 2: esc	quits the function
Key 3:	no function
Key 4:	no function

NOTE: *The user is not allowed to moify the ID code*

#### 4.4.3 UNLOCK CODES

This function allow the user to see and modify the unlock codes of the NANOCOM.

The unlock codes allow the nanocom to unlock the function of his firmware. This codes are composed by six alphanumeric characters. When the unlok code is “?????” it means that is not stored.

Actually the unlok codes active ere the following:

- unlock code 1 = Unlock the diagnostics function of the TD5 ECU
- unlock code 2 = Unlock the “write map to ECU” function of the TD5 ECU

When the main menu shows the item “Unlock codes” you have to press the key 1 “ent”. Now the display shows the unlock codes and the keys have the following meanings:

Key 1: mod	enters the modification procedure
Key 2: ok	confirms the unlock code as it is showed
Key 3: “←←”	moves the blinking cursor to the left
Key 4: “→→”	moves the blinking cursor to the right

If you want modify the unlock code, you have to move the blinking cursor on the character that you want to modiy, then press the key 1 “mod”

Now the keys have the following meanings:

Key 1: mod	confirm the new character
Key 2: clr	insert a 0 character
Key 3: “←←”	change the character in alphabetic order down
Key 4: “→→”	change the character in alphabetic order up

All available character are shown by means of the keys 3 and 4.

Once you have setted the correct character, confirm by means of the key 1. You can modify all character repeating the operation more times. When you compose the correct code confirm by means of key 1.

#### 4.4.4 START UP SETTING

This function allow the user to set the startup modality of the NANOCOM. It can be choosen between INSTRUMENT or NORMAL.

INSTRUMENT means that the NANOCOM run automatically the INSTRUMENT modality at startup (see chapter 6 ), and NORMAL meand that the nanocom run normal at startup.

When the main menu shows the item “Startup setting” you have to press the key 1 “ent”. Now the display will alternate the writing “startup mode:” and the item actually stored “INSTRUMENT” or “NORMAL”.

Now the keys have the following meanings:

Key 1: ok	stores the new setting
Key 2:	no function
Key 3: “←←”	toggles the setting
Key 4: “→→”	toggles the setting

#### 4.4.5 OBD PORT TEST

This function allow to test the two OBD ports. When the main menu shows the item “OBD port test” you have to press the key 1 “ent”. Now the display will show the writing “O1x O2x I1x I2x” on the higher lone; The x values can be “L” low or “H” high. For example:

O1L	means that the Output 1 is at the low logic level.
O2H	means that the Output 2 is at the high logic level.
I1L	means that the Input 1 is at the low logic level.
I2H	means that the Input 2 is at the high logic level.

The keys have the following functions:

Tasto 1: esc	quits the test
Tasto 2: no function	
Tasto 3: “O1”	inverts the logic level of the Output 1
Tasto 4: “O2”	inverts the logic level of the Output 2

*NOTA: This test doesn't allow to do a functional test of the OBD port of the car, and is better to do that with the OBD plug siconnected.*

The pourpose of this test is just to check if the NANOCOM hardware prots are working.

To test the OBD1 port you have to check that when the logic level of the out 1 is high O1H also the corresponding input is high I1H, and the same for the low logic level, with O1L the relative input has to be low I1L. The same considerations are valid for the OBD2 port.

The low logical level correspond to an output voltage near to ground (0V), and the high logical level correspond to an output voltage near to the battery voltage( normally about 0.6V less than the battey voltage).

To measure this values you can find them in the OBD connector:

- Pin 4 and 5 is ths Ground (0V)
- Pin 7 is the OBD port 1
- Pin 8 is the OBD port 2

#### 4.5 STORING THE FILES

When at the end of a function, the writing “Save this file?” appear on the display, it means that the data used by the function can be stored in a file. In this moment if you press the key 4 “not” you go on without store the file and all the data are discharged from the memory. If you press the key 1 “yes” you store the file.

On the display will appear the name that the NANOCOM by default gives to the file. This default name is “fileNN”, the two chatacter NN are a number that rappresent the position of the file in the memory. For example if in the memory there are three file “file01.fu1”, “defender.se1” and “disco\_map.map”, the new file will be named by default “file04.xxx”.

The extension of the file is automatically given by the function that calls the store file procedure, and the user can not modify it.

A blinking cursor appears on the first character of the name.

The keys have the following meanings:

Key 1: mod	enters the modification of the character pointed by the blinking cursor
Key 2: ok	confirms the name showed on the display.
Key 3: “←←”	moves the blinking cursor to the left
Key 4: “→→”	move sthe blinking cursor to the right

If you want to store the file with the default name you have just to press the key 2 “ok”.If you want to modify the name, you have to press the key 1 “mod”.

After you press the key 1 the keys will have the following meanings:

Key 1: ok	confirms the character modification
Key 2: clr	inserts a space
Key 3: “←←”	modifies the character in alphabetic order down
Key 4: “→→”	modifies the character in alphabetic order up

Is possible to insert alphanumeric character and some symbol; All available characters are listed by means of the keys 3 and 4.

Once you have setted the correct character, you can confirm by means of key 1 “ok”. You can modify all the characters of the name repeating this procedure for more times.

When you compose the correct name you have to confirm by means of the key 2 “ok”

Now the message “Working...” is shown on the display until the file is not completely stored. At the end of the operation the message “file saved” will indicate the succesfully result of the function.

*NOTE:The NANOCOM allow you to store more file with the same name, because it generate files with different extension, and this allow you to give the same name to a .ful file and a .sel file that are coming from the same car. The user have to take care to give different name to the files with the same extension.*

## **4.6 HOW TO CHANGE FROM THE STANDALONE MODE TO THE OTHERS**

The working mode are verry different specially for the user interface, but NANOCOM offer a good flexibility that allows to go across the three korking mode without disconnect the NANOCOM or reboot the windows application. In the following sections are described all the case that the user can find to go across the worging modes.

### **4.6.1 HOW TO CHANGE FROM THE STANDALONE MODE TO THE REMOTE MODE**

To change working mode from STANDALONE to REMOTE you just have to connect phisically the NANOCOM to the computer with the RS232 cable, without restart it.

Launch the application if it was not already running and ask for some function.

The NANOCOM will automatically restart in REMOTE mode.

The only thing that the user must care is that the NANOCOM has not to be performing any function when the computer asks the connection, so is enough to let it in one of the STANDALONE menus.

### **4.6.2 HOW TO CHANGE FROM THE STANDALONE MODE TO THE INSTRUMENT MODE**

To change from STANDALONE mode to INSTRUMENT mode, you need to set from the NANOCOM SETUP→STARTUP SETTING the startup mode INSTRUMENT (see 4.4.4 ).

After you have done this setting you have to restart the NANOCOM. To restart the NANOCOM you can put it in standby as described in the 4.6.1 and the wake it up as described in the 2.5. You can also disconnect the power supply and give it again.

### **4.6.3 HOW TO CHANGE FROM THE STANDALONE MODE TO STANDBY**

To activate the standby from the STANDALONE mode you have to quit all menus with the key 2 ”esc” until you reach the main menu.

Once entered the main menu you turn off the NANOCOM keeping pressed the key 2 “off” for more than one second.

*NOTE: If the NANOCOM doesn't detect any activity on the OBD port, on the RS232 port, or on the keys it automatically goes in standby after 10 minutes*

## 4.7 ERROR MESSAGES

### **"ERROR: unable to init the ECU"**

This Message appear when the NANOCOM is not able to initialize the communication with the ECU. Verify that the ignition is o the second step. If the ignition is in the right position turn it off for mode than 15 seconds, then turn it back on and retry.

### **"ERROR: no answer from the ECU. . . "**

This Message appear when the ECU stop to communicate with the NANOCOM. Turn the ignition off for mode than 15 seconds, then turn it back on and retry.

### **"ERROR: bad answer from the ECU. . . "**

This Message appear when the NANOCOM receive from the ECU a corrupdet frame or a valid frame that not correspond at the asked frame. Retry the function and if the NANOCOM give back the error again turn the ignition off for more than 15 seconds, then turn it back on and retry.

### **"ERROR: unable to perform function"**

This Message appear when the NANOCOM doesn't acknowlgedge the communication problem with the ECU. Turn the ignition off for mode than 15 seconds, then turn it back on and retry.

*NOTE: If one of the previous error message appear even after you turn of the ignition for 15 second, please disconnect the NANOCOM from the OBD port of the car for some seconds to stop the power supply, reconnect it and retry.*

### **"Checksum error data corrupted!!"**

This message appear when the NANOCOM detect that the file that you want to open is corrupted. Please remove this file to prevent any problem that it can cause to the car or to the NANOCOM.

### **"this map file is not for TD5"**

This message indicate that the .map file that you want to write on the ECU have not a format compatible with the "Write map file to ECU" function of the NANOCOM.

### **"not enough memory!"**

This message appear when you start a function that generates a file and this file is greater than the available space on the memory.

### **"Prog map error!! turn off and retry"**

This message appear when the NANOCOM detect a communication error during the "Write map to ECU" function. Turn the ignition of and keep it off for few minutes, then retry.

### **"Function locked"**

This message appear when the user asks to the NANOCOM to perform a function that have not the relative correct unlock code (see 4.4.3).

### **"Resetting comm please wait"**

This message appear when the NANOCOM need to reset the communication with the ECUs, and it is showed for about 15 seconds, the time required to reset the comms.

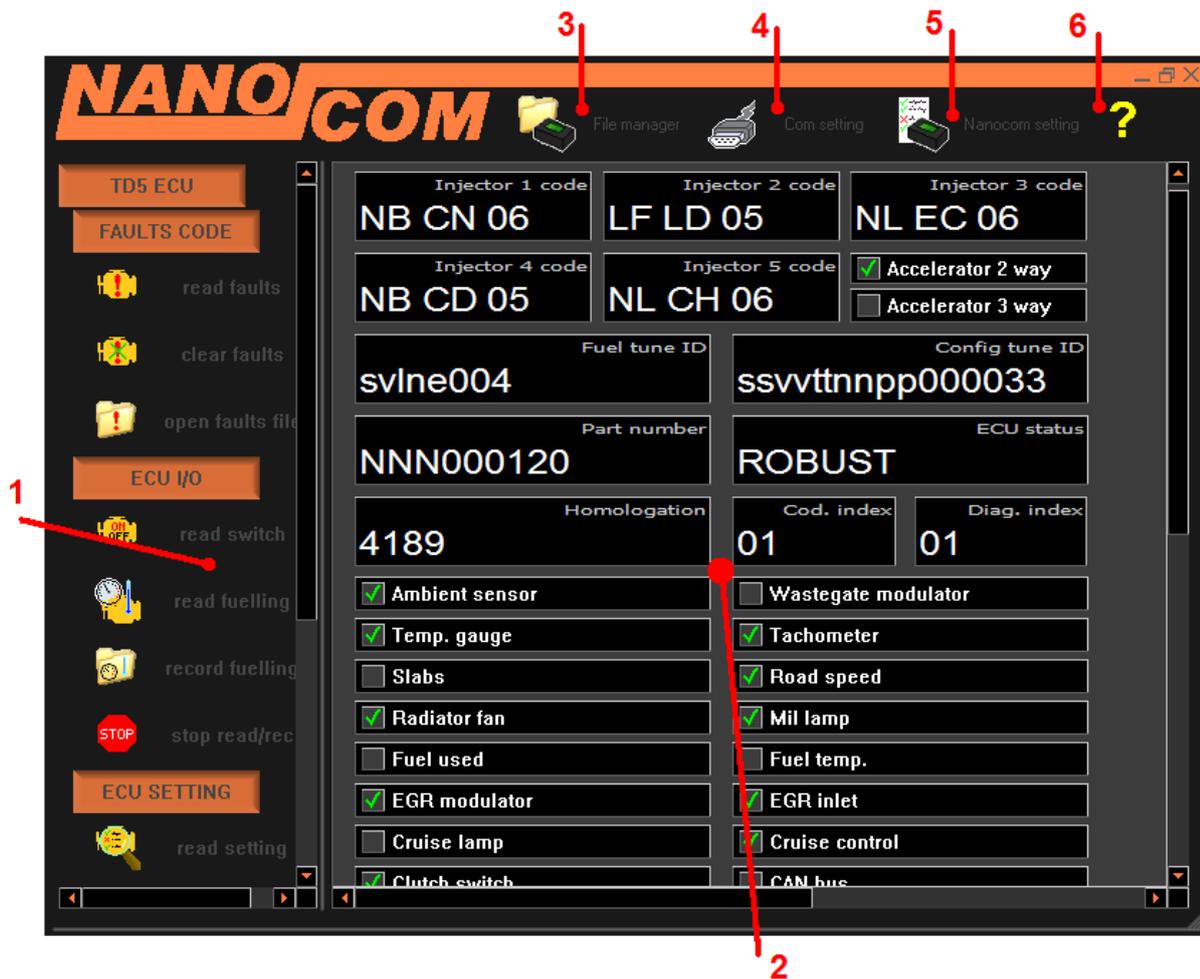
## 5 REMOTE MODE

### 5.1.1 STARTUP OF THE REMOTE MODE

This working mode allow to control the NANOCOM interface with a personal computer.

To work in this modality you have to connect the NANOCOM to the RS232 port of the computer, then switch it on giving it the power or waking it up from the standby with the key 1. When the NANOCOM is running the display shows the writing “Push a key or connect me”, now after you launch the applicaton Nanocom.exe and you ask for a function, the display will show the writing ”REMOTE” ans the NANOCOM is connected.

### 5.1.2 SOFTWARE DESCRIPTION



- 1) Diagnostic functions navigator area
- 2) interactive input-output data area
- 3) “File manager” utility launch button
- 4) Com port setting launch button
- 5) “NANOCOM setting” utility launch button
- 6) Product information button.

### 5.1.3 USAGE MAIN CONCEPTS OF THE STANDALONE MODE

The diagnostic function are activated by clicking on the buttons in the navigator area.

In this area you find two kind of buttons:

The first that look as the following picture is an expanding button that contain some other button.

When you clicking on this kind of button you can show or hide the buttons that it contain



The other kind of button is the action button that allow the user to launch the functions



The diagnostic functions and all other function of the NANOCOM, can work one at time; The application automatically forbid the execution of a function if another one is already runing.

When a function is started a “working bar” as the followin picture indicate that the application is waitin for the NANOCOM reply to the asked function.



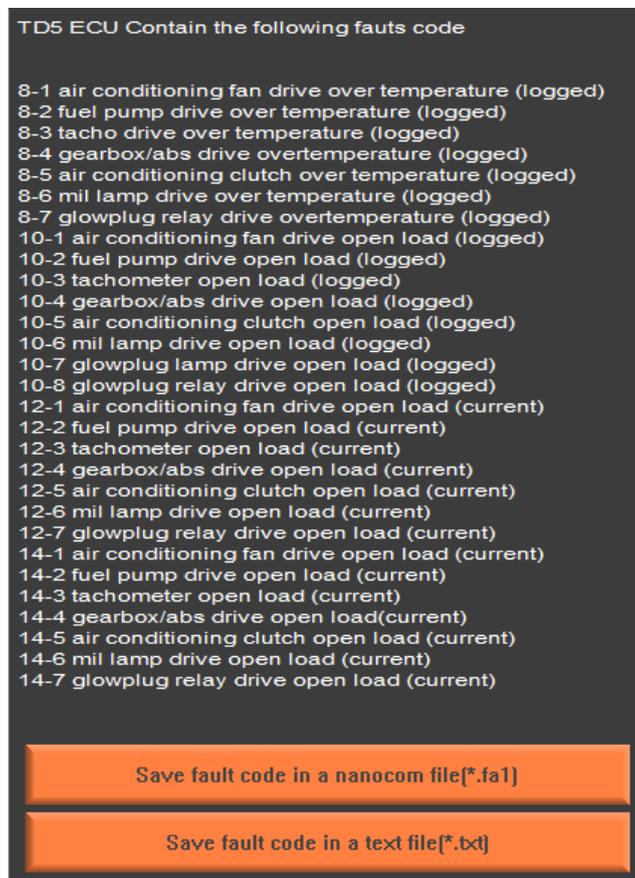
The system is to be considered locked until this “working bar” runs, and no messages of good or bad result appears.

If the waiting time is too long you can close the application from the system menu, but the application reset itself automatically after the internal timeout occurs.

#### 5.2.1 READ FAULTS FUNCTION

To make this function work turn on the ignition of the car to the second step with or without run the engine.

To activate this function you have to click the button “Read faults”. If the communication starts the LED flashes as described in the section 4.1.2, and if the function work properly the fault list will appear on the input-output area.



Under the fault list you can find two buttons that allow you to create a file with this faults code.

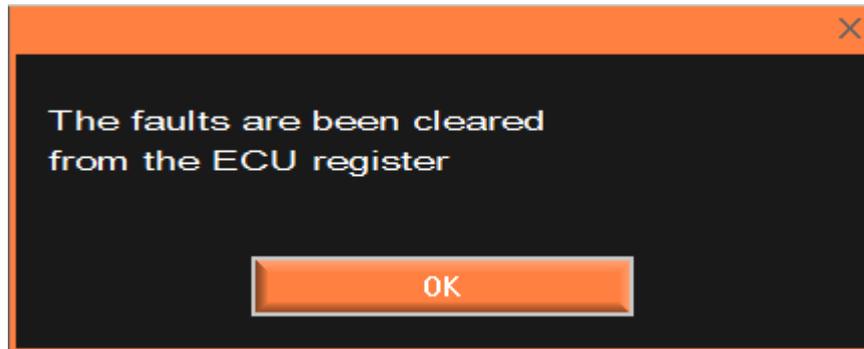
The button “Save fault code in a NANOCOM file (\*.fa1)”, save a file with \*.fa1 extension (the same format of Fault file generated by the NANOCOM in standalone mode). This kind of file is visible just by the NANOCOM.exe application.

The button “Save fault code in a text file (\*.txt1)”, save a text file with \*.txt extension. This file can be opened with a standard text editor and so you can also print it.

### 5.2.2 CLEAR FAULTS FUNCTION

To make this function work turn on the ignition of the car to the second step with or without run the engine.

To activate this function you have to click the button “Clear faults”. If the communication starts the LED flashes as described in the section 4.1.2, and if the function work properly a message box will indicate the good result of the function.



*NOTE: This function asks the ECU to clear the faults register, but it doesn't mean that after this function you will find no more faults logged. Immediately after this function the ECU can reload some faults that it sees again.*

### 5.2.3 OPEN FAULT FILE FUNCTION

This function offers the possibility to open a file \*.fa1, thus allowing to visualise the faults code contained in a file previously saved.

Using NANOCOM in standalone mode you can read the fault code register and store the contents in a file, which will be found in NANOCOM memory even after it has been switched off. In a later moment, it will thus be possible to transfer this file to the PC through the “file manager” utility to create a copy of it and open it through this function which will visualise the faults code contained in the file, or open it directly without importing it to the PC.

This allows to do diagnostics without necessarily having a laptop, or to store the ECU state in a given moment, even if you are distant from your house, workshop, etc.

Clicking the button “Open event file” a dialog window will appear offering you to choose whether to open a file contained in NANOCOM memory or on the PC.

If you choose to open a file contained in NANOCOM, a window will show the files in it. To open the file you want, select one of the files and click the button “OK”.

If you want to open a file contained in the PC, a file browser will appear offering you to choose among the files in the PC. The faults code are visualise in the same way as in the Read events function, and here too it's possible to save a text-format file.

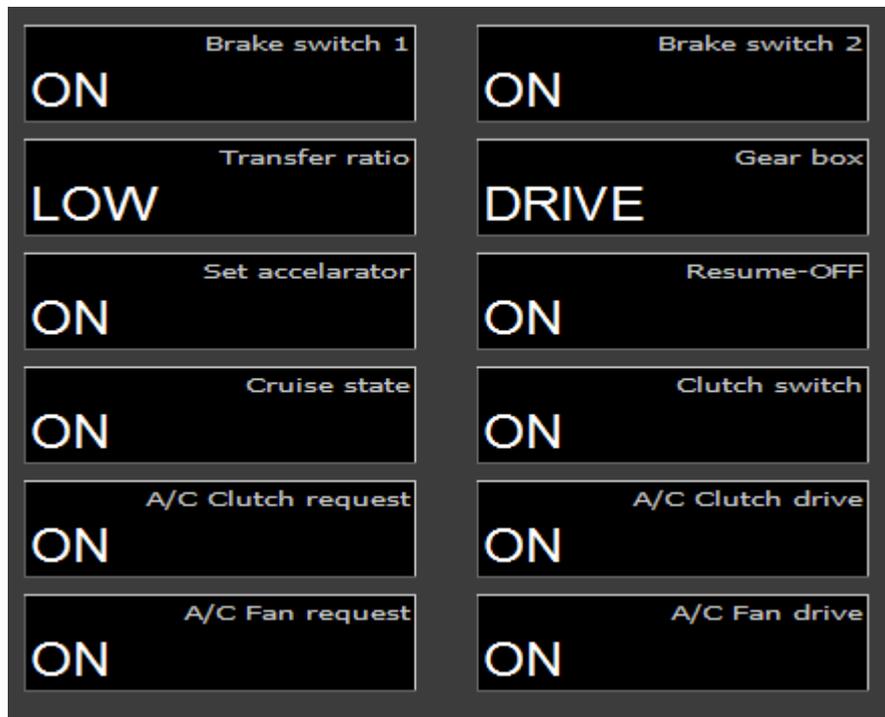
## 5.2.4 READ SWITCH FUNCTION

To make this function work turn on the ignition of the car to the second step with or without run the engine. This function scans the digital input about one time per second and shows them on the screen.

To activate this function you have to click the button “Read switch”. If the communication starts the LED flashes as described in the section 4.1.2, and it keeps flashing during all the scanning time.

To stop the scanning and quit the function you have to click the “Stop read/rec” button.

The digital inputs are showed in the input-output area as in the following picture.



Brake inputs:

BRAKE SWITCH1

BRAKE SWITCH2 (only for vehicle with cruise control )

Clutch, transfer and gear box inputs:

TRANSFER RATIO

GEAR SWITH ( only for auto gear box )

CLUTCH SWITCH

Air conditioning inputs:

A/C CLUTCH REQ

A/C CLUTCH DRIVE (feed back contact)

A/C FAN REQUSET

A/C FAN DRIVE (feed back contact)

Cruise control inputs:

CRUISE

SET ACCELERATE

RESUME/OFF

### 5.2.5 READ FUELLING FUNCTION

To make this function work turn on the ignition of the car to the second step with or without run the engine. This function scans the fuelling parameters about one time per second and shows them on the screen.

To activate this function you have to click the button “Read fuelling”. If the communication starts the LED flashes as described in the section 4.1.2, and it keeps flashing during all the scanning.

To stop the scanning and quit the function you have to click the “Stop read/rec” button.

The fuelling parameters are showed in the input-output area as in the following picture.

Engine speed 0	Engine speed error -804	Road speed 0
Pot 1 0.371	Pot 2 4.658	Pot 3 4.638
Pot supply 4.994	Battery voltage 12.20	
EGR modulator 0.00	EGR inlet 0.00	Turbo modulator 0.00
Mainfold pressure 100.24	Ambient pressure 99.47	Air Flow 4.40
Air inlet temperature 16.80	Coolant temperature 15.10	Fuel temperature 15.80
Cyl.1 balance 0	Cyl.2 balance 0	Cyl.3 balance 0
Cyl.5 balance 0	Cyl.4 balance 0	

Engine Speed =	Engine speed (Rpm)
Road speed =	Road speed (Km/h)
Rpm error =	idle speed error (Rpm)
Pot1 =	First accelerator potentiometer track (Volt)
Pot2 =	Second accelerator potentiometer track (Volt)
Pot3 =	Third accelerator potentiometer track (Volt)
PotSup =	Supply of the accelerator potentiometers tracks (Volt)
Battery =	Battery voltage (Volt)
Air-flow =	Air flow (Kg/h)
AmbPr =	Ambient pressure (Kpa)
TurboPr =	Mainfold pressure (Kpa)
CT =	Coolant temperature (C°)
FT =	Fuel temperature (C°)
AIT =	Air inlet temperature (C°)
EGRm =	Output value of the EGR modulator
EGRi =	Output value of the ILT modulator
TWG =	Output value of the Wastegate modulator
PWB =	Balancing value of the cylinders

## 5.2.6 RECORD FUELLING FUNCTION

This function work as the “Read fuelling” function but it store the fuelling parameter in a \*.fu1 file.

This files can be opened and viewed with the application “GraphicViewer.exe” that is supplied with NANOCOM. The application “GraphicViewer.exe” is described in the chapter 8

To make this function work turn on the ignition of the car to the second step with or without run the engine.

To activate this function you have to click the button “Read fuelling”. If the communication starts the LED flashes as described in the section 4.1.2, and it keeps flashing during all the scanning.

To stop the scanning and quit the function you have to click the “Stop read/rec” button.

When you activate the function a file browser allow you to choose the name and the location of the file that the function will create.

This function is similar to the “Record fuelling” of the standalone mode (see section 4.2.5), the only difference is that the file created is stored in the computer, so it don’t have any dimensions limit and you can store a scanning longer that 35 minutes.

## 5.2.7 READ SETTING FUNCTION

To make this function work turn on the ignition of the car to the second step with or without run the engine.

To activate this function you have to click the button “Read setting”. If the communication starts the LED flashes as described in the section 4.1.2, and if the function work properly the settings of the car will appear on the input-output area.

Injector 1 code <b>NB CN 06</b>		Injector 2 code <b>LF LD 05</b>		Injector 3 code <b>NL EC 06</b>	
Injector 4 code <b>NB CD 05</b>		Injector 5 code <b>NL CH 06</b>		<input checked="" type="checkbox"/> Accelerator 2 way <input type="checkbox"/> Accelerator 3 way	
Fuel tune ID <b>svlne004</b>			Config tune ID <b>ssvtttnpp000033</b>		
Part number <b>NNN000120</b>			ECU status <b>ROBUST</b>		
Homologation <b>4189</b>			Cod. index <b>01</b>	Diag. index <b>01</b>	
<input checked="" type="checkbox"/> Ambient sensor			<input type="checkbox"/> Wastegate modulator		
<input checked="" type="checkbox"/> Temp. gauge			<input checked="" type="checkbox"/> Tachometer		
<input type="checkbox"/> Slabs			<input checked="" type="checkbox"/> Road speed		
<input checked="" type="checkbox"/> Radiator fan			<input checked="" type="checkbox"/> Mil lamp		
<input type="checkbox"/> Fuel used			<input type="checkbox"/> Fuel temp.		
<input checked="" type="checkbox"/> EGR modulator			<input checked="" type="checkbox"/> EGR inlet		
<input type="checkbox"/> Cruise lamp			<input checked="" type="checkbox"/> Cruise control		
<input checked="" type="checkbox"/> Clutch switch			<input type="checkbox"/> CAN bus		
<input type="checkbox"/> Auxiliary fan			<input type="checkbox"/> Auto gear box		
<input checked="" type="checkbox"/> Air conditioning			<input type="checkbox"/> Active engine mounting		
Save setting in a nanocom file (*.se1)			Save setting in a text file (*.txt)		

The settings are composed by the five injector codes, the accelerators potentiometer track, and some information about the features of the ECU’s firmware.

The two buttons under all the settings allow you to create a file with this settings.

The button “Save setting in a NANOCOM file (\*.se1)”, save a file with \*.se1 extension (the same format of setting file generated by the NANOCOM in standalone mode). This kind of file is visible just by the NANOCOM.exe application.

The button “Save setting code in a text file (\*.txt)”, save a text file with \*.txt extension. This file can be opened with a standard text editor and so you can also print it.

### 5.2.8 WRITE SETTING FUNCTION

This function allow to write the setting in the ECUs.

The only setting that can be written in a ECU are the injectors code and the number of accelerator tracks.

To activate this function you have to click the button “Read setting”. In the input-output area are showed the available settings.



You can edit them manually, load them from a file stored in the computer or from a file stored in the NANOCOM.

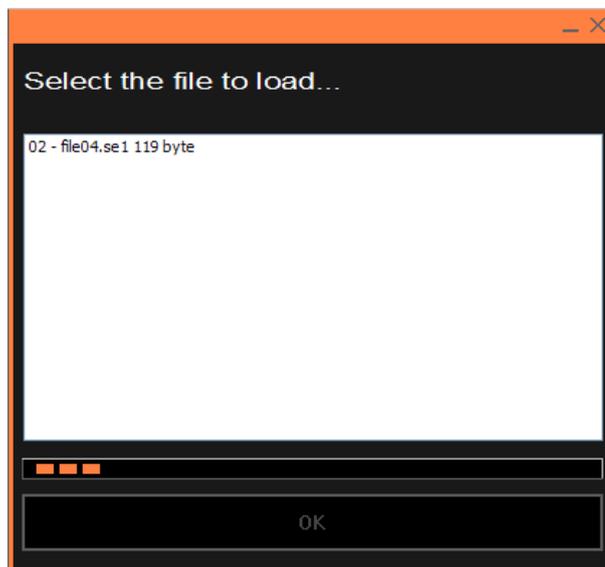
In the first case you have just to click on the injector code that you want edit, and a small window will appear on the screen.



To edit the code you have to enter the data on the edit boxes and then close the wondow. The new value will be loaded on the injector code that you clicked before. To set the number of accelerator potentiometer traks you have just to click on the check box.

If you want load the settings from a file stored on the computer you have to click the “Get setting file from PC” button, choose the file from the brouser and open it. The settings will be loaded and showed on the screen.

You can also load the setting from a file stored in the NANOCOM. Clicking on the button “Get setting file from NANOCOM”, will appear a window that shows the available file,



You have to select a file from the list, then close the wondow with the “OK” button. The value contained in the file will be loaded and showed on the screen.

Once you edit or load the values that you want, you can activate the writing function by clicking the “Write setting on the ECU” button. If the communication starts the LED flashes as described in the section 4.1.2, and if the function work properly a message box will indicate the good result of the function.

### 5.2.9 OPEN SETTING FILE FUNCTION

This function offers the possibility to open a file \*.se1, thus allowing to visualise the settings contained in a file previously saved.

Using NANOCOM in standalone mode you can read the settings and store them in a file, which will be found in NANOCOM memory even after it has been switched off. In a later moment, it will thus be possible to transfer this file to the PC through the “file manager” utility to create a copy of it and open it through this function which will visualise the faults code contained in the file, or open it directly without importing it to the PC.

This allows to do diagnostics without necessarily having a laptop, or to store the ECU state in a given moment, even if you are distant from your house, workshop, etc.

Clicking the button “Open setting file” a dialog window will appear offering you to choose whether to open a file contained in NANOCOM memory or on the PC.

If you choose to open a file contained in NANOCOM, a window will show the files in it. To open the file you want, select one of the files and click the button “OK”.

If you want to open a file contained in the PC, a file browser will appear offering you to choose among the files in the PC. The faults code are visualise in the same way as in the Read setting function, and here too it’s possible to save a text-format file.

### 5.2.10 READ MAP FUNCTION

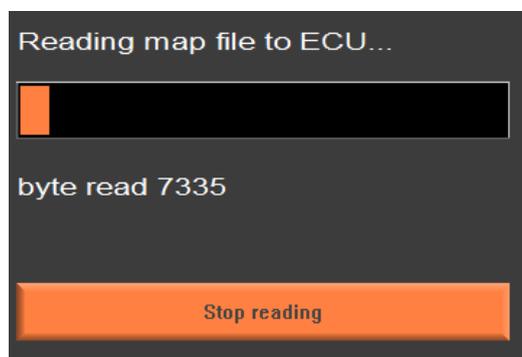
**Please read carefully the section 4.2.12 before to use this function.**

To make this function work turn on the ignition of the car to the second step with or without run the engine.

To start this function you have to click the “Read map” button. On the screen will appear a window where you can edit the name of the file that will be stored inside the NANOCOM.



To confirm the name, close the window with the “OK” button. Now the function will start. The LED will flash continuously during all the map reading as described in the section 4.1.2, and a progress bar will appear on the input-output area, to inform you about the state on the reading.



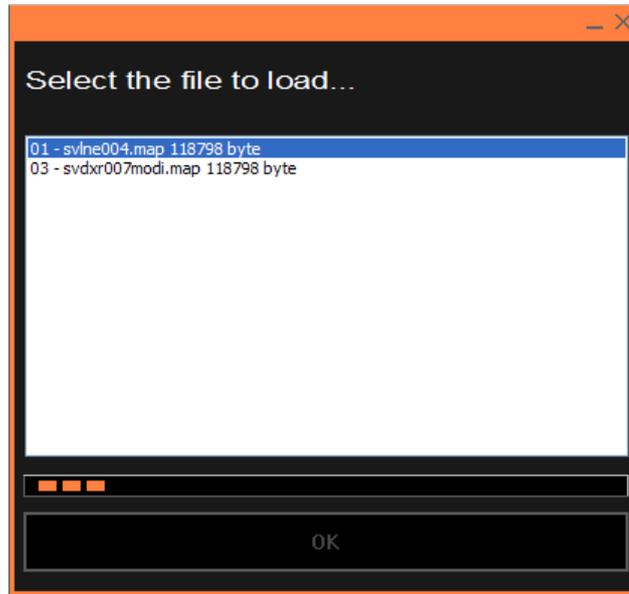
The map will be completely read and stored when the progress bar will be completely full. A message box will indicate the good result of the operation.

### 5.2.11 WRITE MAP FUNCTION

Please read carefully the section 4.2.12 before to use this function.

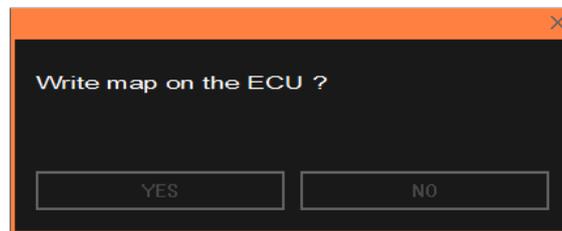
To perform this operation, the ignition has to be kept off for a few minutes and when it is turned on you don't have to execute any diagnostic function before to write the map file.

To run this function you have to click on the “Write map” button, now a window will shows you the available map file that you can write ont the ECU.



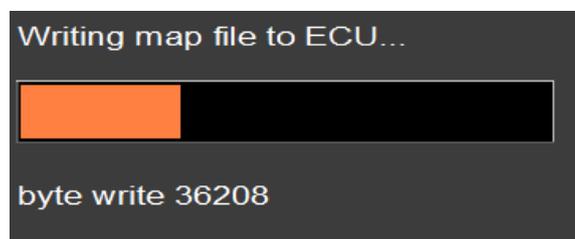
Select a map file and confirm with the “OK” button.

Now a message box will ask you the last confirm to precede with the writing.



Clicking on the “yes” button you start the function.

Now a progress bar will appear on the input-output area and it will show the writing state.



Once the function run, as for the STANDALONE mode the user is not allowed to stop the function.

In this function The NANOCOM firmware starts to work in a mixed mode; The operation is controlled in RMOTE mode by the computer but the display shows the byte written as in the STANDALONE mode. This allows the NANOCOM to complete the writing function also if the communication with the computer stops for any reason.

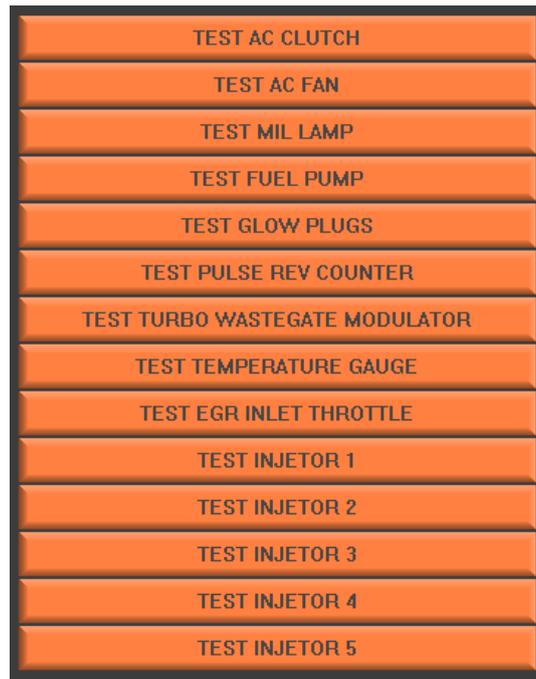
**WARNING:** From this time the NANOCOM must be kept powered and that the battery voltage must be stable. Please switch off all the electronic devices radio gps etc... to prevent every problem caused by the RF interferences.

The map file is completely transferred when all the 118796 byte are written on the ECU. At the end of the data download the display will show the writing “Write done succesfully” and the ECU should start automatically. If for some reason the ECU doesn’t start itself, try to switch off the ignition and turn it back on. If the engine starts you have to consider the writing operation well done.

NOTE: When the data transfer reach 102400 byte it stops the procedure for a few seconds and then restart automatically until it is completed. This is a normal event during this procedure, so if you see this condition of noactivity don’t be scared, just wait that the NANOCOM restart the work.

### 5.2.12 TEST FUNCTIONS

As for the other functions, to make this functions work turn on the ignition of the car to the second step but keep the engine stopped. On the input-output area you will find the test buttons.



Each of these button allow you to test the relayive output.

TEST A/C CLUTCH	activates the AC clutch
TEST A/C FAN	activates the AC fan
TEST MIL LAMP	activates the MIL lamp
TEST FUEL PUMP	activates the fuel pump
TEST GLOW PLUGS	activates the glow plugs
TEST PULSE REV	gives a short speed reference to the pulse rev gauge
TEST WASTEGATE	activates the wastegate modulator
TEST TEMP GAUGE	gives a short temperature reference to the temperature gauge
TEST EGR TROTTLLE	activates the EGR modulator
TEST INJETOR 1	activates the injetor 1
TEST INJETOR 2	activates the injetor 2
TEST INJETOR 3	activates the injetor 3
TEST INJETOR 4	activates the injetor 4
TEST INJETOR 5	activates the injetor 5

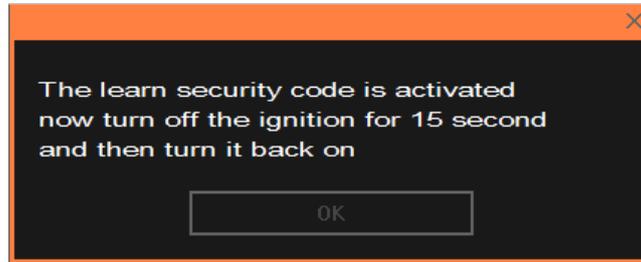
When you click a button, if the communication starts the LED flashes as described in the section 4.1.2 and the relative output is activated for a few seconds.

### 5.2.13 LEARN SECURITY CODE FUNCTIONS

This function asks the ECU to learn the security code from the anti theft system, this is usefull when you install a new ECU on a vehicle.

To make this function work turn on the ignition of the car to the second step but keep the engine stopped.

To activate this function you have to click the “Learn sec. code” button. If the communication starts the LED flashes as described in the section 4.1.2, and if the function work properly a message box indicate the good result of the function.



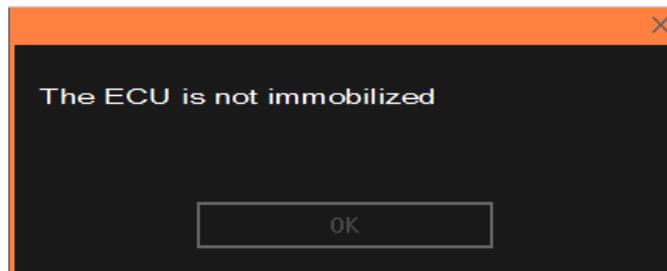
Now click the “OK” button, turn off the ignition for 15 seconds and then turn in back on. Now the ECU is ready to work with the new security code.

### 5.2.14 GET SEC. STATUS FUNCTION

This function ask the ECU the current status if the immobilization, so allow you to test the communication between the ECU and the antit heft system.

To make this function work turn on the ignition of the car to the second step , whit or without the run engine.

To activate this function, click the “Get sec. status” button, now if the communication starts the LED flashes as described in the section 4.1.2, and if the function work properly on the screen will appear the status if the immobilization in a message box.

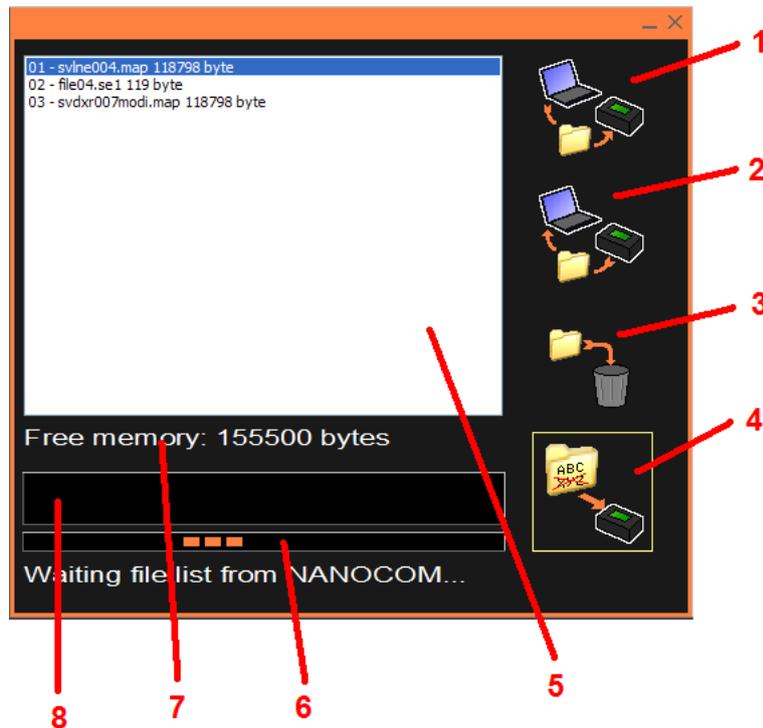


### 5.3 FILE MANAGER UTILITY

This software utility allow you to manage the files stored in the NANOCOM memory. You can import, export, clear and rename the files.

To run this utility you have to click the “File manager” button (section 5.1.2 - object 3).

The file manager window has this look.



- 1) Button IMPORT
- 2) Button EXPORT
- 3) Button CLEAR FILE
- 4) Button RENAME FILE
- 5) files list
- 6) Working bar
- 7) Free memory display
- 8) Progress bar

When the utility start, it asks to the NANOCOM the list of the file stored in his memory. The working bar (6) will indicate the status of the operation, and when the file manager is ready, it shows all the files stored in the NANOCOM in the files list (5). Now you can do one of the four function.

#### 5.3.1 IMPORT A FILE IN THE NANOCOM MEMORY

To import a file in the NANOCOM memory, click the IMPORT button (1), when the working bar (6) is stopped. A file browser appears and allow you to select the file with compatible extension (.map .fu1 .se1 .fal etc) to import in the NANOCOM memory. Once you open the file selected, the file manager starts the data transfer. The working bar (6) and the Progress bar (8) shows the state of the transfer. When the process is completely done a message box will indicate the good result of the operation. The file manager automatically asks to the NANOCOM the updated file list.

#### 5.3.2 EXPORT A FILE FROM THE NANOCOM MEMORY

To export a file from the NANOCOM memory and store it on the computer, you have to select it from the file list of the file manager and click the EXPORT button (2).

Once you open the file selected, the file manager starts the data transfer. The working bar (6) and the Progress bar (8) shows the state of the transfer. When the process is completely done a file browser allows you to locate and rename the file transferred on the computer.

### 5.3.3 CLEAR A FILE FROM THE NANOCOM MEMORY

To clear a file from the NANOCOM memory, you have to select it from the file list of the file manager and click the CLEAR button (3). Now the working bar (6) will show the activity state. When the process is completely done a message box will indicate the good result of the operation. The file manager automatically asks to the NANOCOM the updated file list.

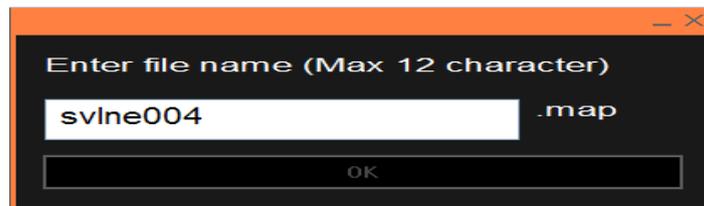
*NOTE: The clear file operation, after it has erased the file, it reorder all the other file still present in the memory so it can take several time. This time depends from how many file are stored in the memory, and the position that the erased file had in the memory. Approximately the maximum time required is about 50 seconds.*

*During this function the NANOCOM doesn't allow the user to stop the procedure. Please be sure that during the time required by the clearing function the NANOCOM is kept powered, because if it stop this function before it is complete, the remaining file in the memory will result corrupted.*

*NOTE: Is possible to blank all memory by clearing one file at time, but is better to use the CLEAR ALL function of the STANDALONE mode, that require less time and give less work to the memory. Please read the section 4.3.4 to see this function*

### 5.3.4 RENAME A FILE IN THE NANOCOM MEMORY

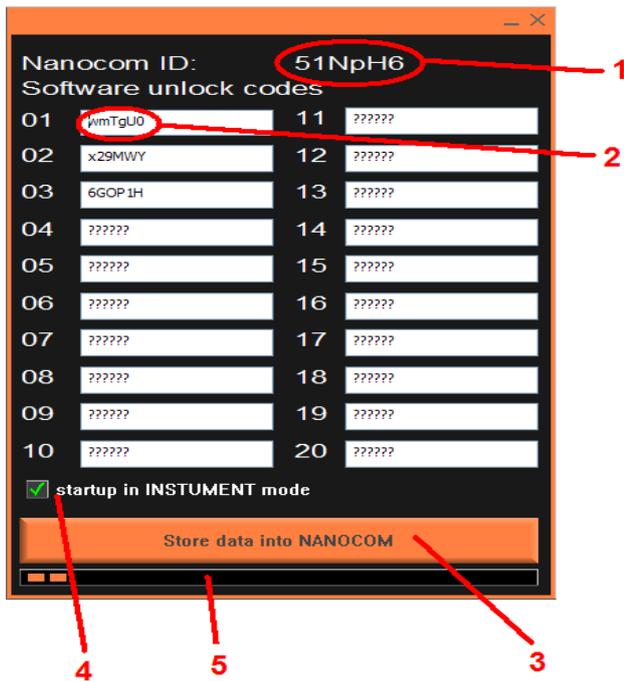
To rename a file from the NANOCOM memory, you have to select it from the file list of the file manager and click the RENAME button (4). Now will appear a window that allows you to edit the file name. Click the "Ok" button to confirm the name.



Now the working bar (6) will show the activity state. At the end of the operation the file manager automatically asks to the NANOCOM the updated file list.

## 5.4 NANOCOM SETTING UTILITY

This software utility allows the user to manage the settings of the NANOCOM. To run this utility you have to click the “Nanocom setting” button (section 5.1.2 - object 6). The nanocom setting window has this look.



- 1) NANOCOM ID (ID code of the NANOCOM)
- 2) Unlock Codes boxes (unlock codes of the NANOCOM functions)
- 3) Button “Store data into NANOCOM”
- 4) Check box “Start-up in INSTRUMENT mode”
- 5) Working bar

When the nanocom setting starts, it automatically asks to the NANOCOM the settings data currently stored, the Working bar (5) indicates the data transfer activity.

Once the nanocom setting window has all the information it updates all the files.

### 5.4.1 NANOCOM ID

The NANOCOM ID is the ID code of the NANOCOM, it is composed by 6 alpha numeric characters.

NOTE: *The user can not modify the NANOCOM ID*

### 5.4.2 UNLOCK CODES

The unlock codes allows the nanocom to unlock the function of his firmware. This codes are composed by six alphanumeric characters. When the unlock code is “??????” it means that is not stored.

Actually the unlock codes active are the following:

unlock code 1 = Unlock the diagnostics function of the TD5 ECU

unlock code 2 = Unlock the “write map to ECU” function of the TD5 ECU

The utility nanocom setting allows the user to set these unlock codes. To modify the existing codes or edit new codes you have to launch the nanocom setting utility and wait until all files are updated. Now write the unlock codes that you want to set in the unlock codes boxes (2) and then click the “Store data in to NANOCOM” button (3). A message box will give you the confirm of the correct result of the operation.

### 5.4.3 START UP SETTING

As in the STANDALONE mode the user can set the startup mode NORMAL or INSTRUMENT. INSTRUMENT means that the NANOCOM run automatically the INSTRUMENT modality at startup (see chapter 6 ), and NORMAL means that the nanocom run normal at startup.

If you want to set the INSTRUMENT startup mode you have to select the “Startup in INSTRUMENT mode” check box and click the “Store data in to NANOCOM” button (3). If you want to set the NORMAL startup mode deselct the “Startup in INSTRUMENT mode” check box and click the “Store data in to NANOCOM” button (3). A message box will give you the confirm of the correct resut of the operation.

### 5.5 HOW TO CHANGE FROM THE REMOTE MODE TO THE OTHERS

The working mode are wery different specially for the user interface, but NANOCOM offer a good flexibility that allows to go across the three korking mode without disconnect the NANOCOM or reboot the windows application. In the following sections are described all the case that the user can find to go across the worging modes.

#### 5.5.1 HOW TO CHANGE FROM THE REMOTE MODE TO THE STANDALONE MODE

To change the working mode from REMOTE to STANDALONE you have to press the key 1 for a few seconds until the display shows the following writing

standalone → key 1  
shut down → key 4

This writing will appear only if the NANOCOM is not doing any function  
Now to run the SANDALONE working mode press the key 1. The NANOCOM will automatically restart in the STANDALONE modality.

#### 5.5.2 HOW TO CHANGE FROM THE REMOTE MODE TO THE INSTRUMENT MODE

To change working mode from REMOTE to INSTRUMENT, you have to select the **startup in INSTUMENT mode** from the “nanocom setting” utility (see section 5.4.3). After you have done this setting you have to restart the NANOCOM. To restart the NANOCOM you can put it in standby as described in the 4.6.1 and the wake it up as described in the 2.5. You can also disconnect the power supply and give it back again.

#### 5.5.3 HOW TO CHANGE FROM THE REMOTE MODE TO THE STANDBY

To activate the standby from the STANDALONE mode you have to press the key 1 for a few seconds until the display shows the following writing

standalone → key 1  
shut down → key 4

then press the key 4.

*NOTE: If the NANOCOM doesn't detect any activity on the OBD port, on the RS232 port, or on the keys it automatically goes in standby after 10 minutes*

## 5.6 ERROR MESSAGES

If the NANOCOM system detect some errors it shows a message box to give you information about the errors. These are all the error that the NANOCOM can detect.

### **“UNABLE TO OPEN SERIAL PORT!”**

This message will appear if the NANOCOM is not able to open the com port. Check that the com port number is correctly setted by the “com setting” utility, and check also if the com port is not opened by another application.

### **"FUNCTION LOCKED! "**

This message appear when the user asks to the NANOCOM to perform a function that have not the relative correct unlock code (see 4.4.3).

### **"ERROR: UNABLE TO INIT THE ECU... "**

This Message appear when the NANOCOM is not able to initialize the communication with the ECU.

Verify that the ignition is o the second step. If the ignition is in the right position turn it off for mode than 15 seconds, then turn it back on and retry.

### **"ERROR: NO ANSWER FROM ECU... "**

This Message appear when the ECU stop to communicate with the NANOCOM.

Turn the ignition off for mode than 15 seconds, then turn it back on and retry.

### **"ERROR: BAD ANSWER FROM ECU... "**

This Message appear when the NANOCOM receive from the ECU a corrupdet frame or a valid frame that not correspond at the asked frame.

Retry the function and if the NANOCOM give back the error turn the ignition off for mode than 15 seconds, then turn it back on and retry.

### **"ERROR: UNABLE TO PERFORM THE FUNCTION... "**

This Message appear when the NANOCOM doesn't acknowldg the communication problem with the ECU.

Turn the ignition off for mode than 15 seconds, then turn it back on and retry.

*NOTE: If one of the previous error message appear even after you turn of the ignition for 15 second, please disconnect the NANOCOM from the OBD port of the car for some seconds to stop the power supply, reconnect it and retry.*

### **"NANOCOM COMMUNICATION ERROR... "**

This error will appear if there is a communication problem between the computer and the NANOCOM. Normally is enough to retry to do the function, but if the problem still remain, you have to restart the application and restart the NANOCOM.

### **"NOT ENOUGH MEMORY! "**

This message appear when you start a function that generate a file and this file is greater than the availabel space on the memory.

### **"UNABLE TO OPEN OR CREATE THE FILE!!! "**

This message indicates that when the application tries to create or open a file on the computer a system error occurs.

In case of file creation, try to save the file in another location, and in case of file opening check if the file is realy exsisting.

### **“RESETTING COMM...”**

This message appear when the NANOCOM need to reset the communication with the ECUs, and it is showed for about 15 seconds, the time required to reset the comms.

## 6 INSTRUMENT MODE

In this working mode the NANOCOM starts automatically to read and show the four main fuelling parameter with the frequency of four time per second as an instrument boards.



Rpm = engine speed in rpm ( this is the internal refrence of the ecu calculate with the cranck sensor)

Tp = Turbo pressure in BAR (calculated by the NANOCOM from the Kpa reference read by the ecu from the MAP/IAT sensor)

Ct = Coolant temperature( real value of the sensor without any ecu adgment )

Bt = Battery voltage(this value is the ecu internal supply voltage measurement )

### 6.1 HOW TO USE NANOCOM AS BOARD INSTRUMENT

The first important thing to do for make NANOCOM work as a board instrument is to set this modality at startup.

To do this setting you have to follow the procedure described in the section 4.4.4, if you want to do it in STANDALONE mode, or the procedure described in the 5.4.3 for the REMOTE mode. Once this working mode is setted at startup, each time that NANOCOM wakes up it starts to read the main parameter. The scanning of the main parameter goes on until the ecu answers correctly, when the ecu stop communicating the NANOCOM automatically goes in standby.

The currect procedure to use the NANOCOM as board instrument is to run the engine and when you want with the engine rinnung wakeup the NANOCOM by means of key 1 or giving it the power with the OBD cable.

When the engine stop running after 15 second since the ignition is turned to 0 position, the ecu stops communicationg and so the NANOCOM goes in standby, and you don't have to do nothing else to shut down the NANOCOM.

*NOTE: As the section 2.5 explane, if you want to instal the NANOCOM permanently on the car, you have to know that the standby power consumption is about 12mA. This small current don't give any problem of battery discharging (if the battery is in good conditions) for several days, so the NANOCOM presence is completely safe if you use the car frequently. If you have to leave the car unused for a long time is better to disconnect the NANOCOM from the OBD plug.*

*When you will use the car and you reconnect the NANOCOM you don't have to do any setting because it keeps all settings also when it is not powered for long time.*

### 6.2 HOW TO GO FROM THE INSTRUMENT MODE TO THE OTHER MODES

There is some importants consideration regarding how to go from this modality to the othes.

First of all you can use the NANOCOM in INSTRUMENT mode and run it temporarily in the other modes to use the diagnostic functions, without set the NORMAL startup mode. If you have to stop the INSTRUMENT mode definitively you have to select the NORMAL startup mode with the procedure described in the sections 4.4.4 e 5.4.3.

Another important consideration is that can happen that you need to change working mode when the INSTUMENT mode is running, and so the communication is active, or when there is not communication, for exaple when you need to use the NANOCOM far from the car (to upload or download files etc).

#### 6.2.1 HOW TO CHANGE FROM INSTRUMENT MODE ACTIVE TO STANDALONE MODE

To change working mode from the INSTUMENT mode with the communication active, to the STANDALONE mode is enough to press the key 1 for a few seconds. On the display will appear the following writing:

standalone → key 1

shut down → key 4

Now by pressing the key 1, the NANOCOM stops communicationg with the ecu and restarts automatically in the STANDALONE mode.

If you want to stay in the STANDALONE mode temporarily you have just to use the NANOCOM. If you want to disable the INSTRUMENT mode definitively you have to set the NORMAL startup as described in the secition 4.4.4.

## **6.2.2 HOW TO CHANGE FROM THE INSTRUMENT MODE ACTIVE TO THE REMOTE MODE**

To change working mode from the INSTRUMENT mode with the communication active, to the REMOTE mode is enough to connect the RS232 cable, launch the nanocom.exe application and ask for a function. When the NANOCOM receives a remote command from the computer, it stops communicating with the ecu and restart automatically in the REMOTE mode.

If you want to stay in the REMOTE mode temporarily you have just to use the NANOCOM. If you want to disable the INSTRUMENT mode definitively you have to set the NORMAL startup as described in the section 5.4.3.

## **6.2.3 HOW TO GO FROM THE INSTRUMENT MODE NON ACTIVE TO THE OTHERS**

You will see that when the nanocom is in INSTRUMENT mode and it is not connected to the ecu, it starts working but immediately it goes in standby because it doesn't find anyone to communicate.

It seems to be hard now to stop this condition, because during that small time the keys doesn't work properly and the RS232 communication is not active.

In reality is easier than it seems, because is enough to run the NANOCOM with the key 1 pressed to force the STANDALONE mode. So if the nanocom is in standby, press the key 1 to wake it up and keep the key pressed for a few seconds until the nanocom starts in STANDALONE mode. If the NANOCOM is not in standby, press the key 1 and give it the power ( from the OBD or the auxiliary power input ) keeping pressed the key one until the nanocom run the STANDALONE mode.

When the NANOCOM is in STANDALONE mode you can use it, go in REMOTE mode or disable the INSTRUMENT mode as described in the previous sections 6.2.1 and 6.2.2

## **6.2.4 HOW TO ATIVATE THE STANDBY FROM THE INSTRUMENT MODE**

If you need to shut down the NANOCOM from the INSTRUMENT mode with the communication active, is enough to press the key 1 for a few seconds. On the display will appear the following writing:

standalone → key 1

shut down → key 4

Now pressing the key 4 the NANOCOM stops communicating with the ecu and it goes in STANDBY.

The case that you need to shut down the NANOCOM from the INSTRUMENT mode, when it is not connected to the ecu, is not explained because the NANOCOM shut down itself automatically because there is not communication active.

## 7 GRAPHIC VIEWER APPLICATION

The application “Graphic viewer” shows with graphical lines the values of fuelling parameters, stored in the .ful files generated by the “Record fuelling” function.

You can find the launch icon of this program in the NANOCOM folder of start menu of window

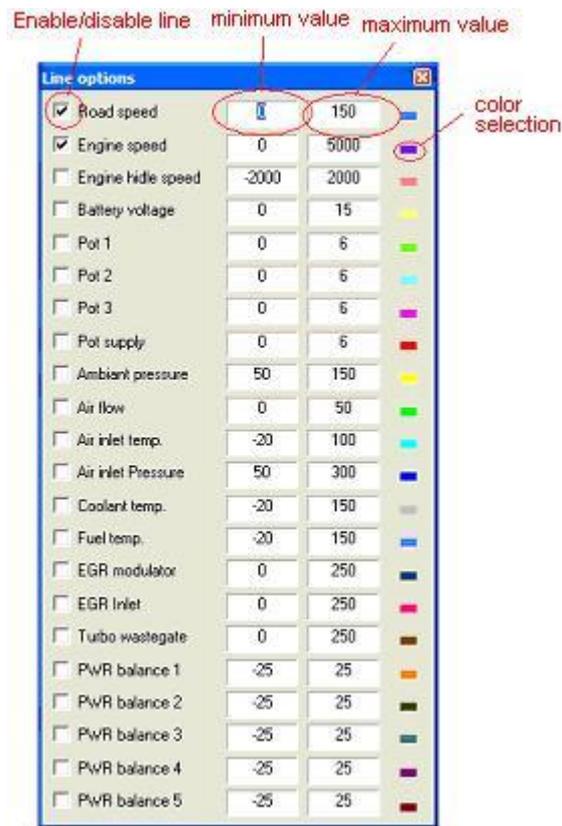
When the program is running, open the file .ful you want to see by clicking from the main menu the item “File→Open”.

When a file is open on the screen you will see the curves of the values in function of time like an oscilloscope.

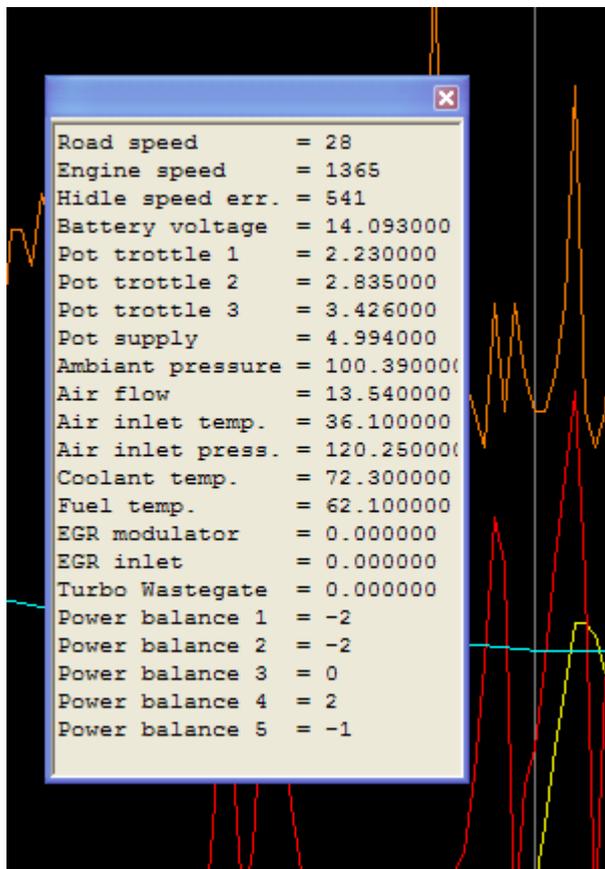
Normally only the lines of road speed and engine speed are shown.

Choosing the item ”Windows→Line options” from the main menu of the “Graphic viewer”, a dialog box will allow you to do the following adjusting:

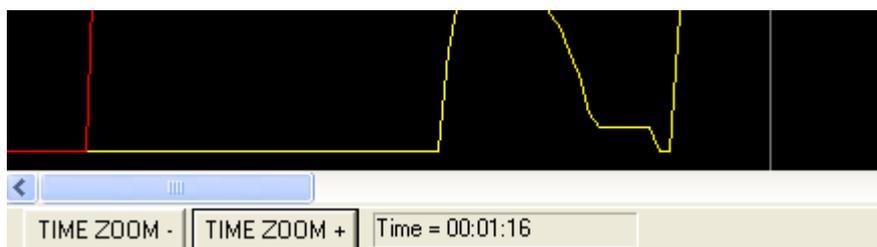
- Enabling and disabling the lines viewing by clicking on the check boxes.
- Modifying the maximum and minimum values visible on the screen, to increase or decrease the lines dimension.
- Changing the colour of the lines by clicking on the small rectangle with the current colour.



By choosing the item "Windows→Absolute values" from the main menu you can enable a window showing the absolute value of the lines corresponding to the cursor position. The cursor is the grey vertical line, and you can move it by means of the arrow keys ← and →



in the bottom of the main frame are located the two buttons ZOOM+ and ZOOM- that can expand or reduce the time base of the lines. Near to these buttons there is the time corresponding to the cursor position. The time count starts from 0 at the beginning of the graphic.



## APPENDIX

**TABLE 1: COMPLETE FAULTS CODE LIST**

1-1	cruise control lamp drive over temperature (current)
1-2	fuel used output drive over temperature (current)
1-3	radiator fan drive over temperature (current)
1-4	active engine mounting over temperature (current)
1-5	turbocharger wastegate short circuit (current)
1-6	EGR inlet throttle short circuit (current)
1-7	EGR vacuum modulator short circuit (current)
2-1	inlet air temperature circuit (logged)
2-2	fuel temperature circuit (logged)
2-3	coolant temperature circuit (logged)
2-4	battery volts (logged)
2-5	reference voltage (logged)
2-6	ambient air temperature circuit (logged)
2-7	driver demand supply problem (logged)
2-8	ambient pressure circuit (logged)
3-5	driver demand problem 1 (current)
3-6	driver demand problem 2 (current)
3-7	air flow circuit (current)
4-1	inlet air temperature circuit (current)
4-3	coolant temperature circuit (current)
4-4	battery volts (current)
4-5	reference voltage (current)
4-7	driver demand supply problem (current)
5-5	driver demand problem 1 (current)
5-6	driver demand problem 2 (current)
5-7	air flow circuit (current)
6-1	inlet air temperature circuit (current)
6-3	coolant temperature circuit (current)
6-4	battery voltage problem (current)
6-5	reference voltage (current)
6-7	driver demand supply problem (current)
7-1	cruise lamp drive over temperature (logged)
7-2	fuel used output drive over temperature (logged)
7-3	radiator fan drive over temperature (logged)
7-4	active engine mounting over temperature (logged)
7-5	turbocharger wastegate short circuit (logged)
7-6	EGR inlet throttle short circuit (logged)
7-7	EGR vacuum modulator short circuit (logged)
8-1	air conditioning fan drive over temperature (logged)
8-2	fuel pump drive over temperature (logged)
8-3	tacho drive over temperature (logged)
8-4	gearbox/abs drive over temperature (logged)
8-5	air conditioning clutch over temperature (logged)
8-6	mil lamp drive over temperature (logged)
8-7	glow plug relay drive over temperature (logged)
9-1	fuel used output drive open load (logged)
9-2	cruise lamp drive open load (logged)
9-3	radiator fan drive open load (logged)
9-4	active engine mounting open load (logged)
9-5	turbocharger wastegate open load (logged)
9-6	EGR inlett throttle open load (logged)
9-7	EGR vacuum modulator open load (logged)
10-1	air conditioning fan drive open load (logged)
10-2	fuel pump drive open load (logged)
10-3	tachometer open load (logged)
10-4	gearbox/abs drive open load (logged)
10-5	air conditioning clutch open load (logged)
10-6	mil lamp drive open load (logged)
10-7	glow plug lamp drive open load (logged)

10-8 glow plug relay drive open load (logged)  
 12-1 air conditioning fan drive open load (current)  
 12-2 fuel pump drive open load (current)  
 12-3 tachometer open load (current)  
 12-4 gearbox/abs drive open load (current)  
 12-5 air conditioning clutch open load (current)  
 12-6 mil lamp drive open load (current)  
 12-7 glow plug relay drive open load (current)  
 13-1 cruise control lamp drive over temperature (current)  
 13-2 fuel used output drive over temperature (current)  
 13-3 radiator fan drive over temperature (current)  
 13-4 active engine mounting over temperature (current)  
 13-5 turbocharger wastegate short circuit (current)  
 13-6 EGR inlet throttle short circuit (current)  
 13-7 EGR vacuum modulator short circuit (current)  
 14-1 air conditioning fan drive open load (current)  
 14-2 fuel pump drive open load (current)  
 14-3 tachometer open load (current)  
 14-4 gearbox/abs drive open load (current)  
 14-5 air conditioning clutch open load (current)  
 14-6 mil lamp drive open load (current)  
 14-7 glow plug relay drive open load (current)  
 15-2 high speed crank (logged)  
 17-3 high speed crack (current)  
 19-2 CAN rx/tx error (logged)  
 19-3 CAN tx/rx error (logged)  
 19-7 noisy crack signal has been detected (logged)  
 20-1 turbocharger under boosting (logged)  
 20-2 turbocharger over boosting (logged)  
 20-4 EGR valve stuck open (logged)  
 20-5 EGR valve stuck closed (logged)  
 21-6 problem detected with driver demand (logged)  
 21-7 inconsistencies found with driver demand (logged)  
 22-1 road speed missing (logged)  
 22-3 vehicle acceleration outside bounds of cruise control (logged)  
 22-7 cruise control resume stuck closed (logged)  
 23-1 excessive can bus off (current)  
 23-2 CAN rx/tx error (current)  
 23-3 CAN tx/rx error (current)  
 23-4 unable to detect remote can mode (current)  
 23-5 under boost has occurred on this trip (current)  
 23-6 noisy crack signal has been detected (current)  
 24-1 turbocharger under boosting (current)  
 24-2 turbocharger over boosting (current)  
 24-3 over boost has occurred this trip (current)  
 24-4 EGR valve stuck open (current)  
 24-5 EGR valve stuck closed (current)  
 24-7 problem detected with auto gear box (current)  
 25-6 problem detected with drive demand (current)  
 25-7 inconsistencies found with driver demand (current)  
 26-1 road speed missing (current)  
 26-2 cruise control system problem (current)  
 26-3 vehicle acceleration outside bounds for cruise control (current)  
 26-7 cruise control resume stuck closed (current)  
 27-1 injector 1 peak charge long (logged)  
 27-2 injector 2 peak charge long (logged)  
 27-3 injector 3 peak charge long (logged)  
 27-4 injector 4 peak charge long (logged)  
 27-5 injector 5 peak charge long (logged)  
 27-6 injector 6 peak charge long (logged)  
 27-7 topside switch failed post injection (logged)  
 28-1 injector 1 peak charge short (logged)  
 28-2 injector 2 peak charge short (logged)

28-3 injector 3 peak charge short (logged)  
28-4 injector 4 peak charge short (logged)  
28-5 injector 5 peak charge short (logged)  
28-6 injector 6 peak charge short (logged)  
28-7 topside switch failed pre injection (logged)  
29-1 injector 1 peak charge long (current)  
29-2 injector 2 peak charge long (current)  
29-3 injector 3 peak charge long (current)  
29-4 injector 4 peak charge long (current)  
29-5 injector 5 peak charge long (current)  
29-6 injector 6 peak charge long (current)  
29-7 topside switch failed post injection (current)  
30-1 injector 1 peak charge short (current)  
30-2 injector 2 peak charge short (current)  
30-3 injector 3 peak charge short (current)  
30-4 injector 4 peak charge short (current)  
30-5 injector 5 peak charge short (current)  
30-6 injector 6 peak charge short (current)  
30-7 topside switch failed pre injection (current)  
31-1 injector 1 open circuit (logged)  
31-2 injector 2 open circuit (logged)  
31-3 injector 3 open circuit (logged)  
31-4 injector 4 open circuit (logged)  
31-5 injector 5 open circuit (logged)  
31-6 injector 6 open circuit (logged)  
32-1 injector 1 short circuit (logged)  
32-2 injector 2 short circuit (logged)  
32-3 injector 3 short circuit (logged)  
32-4 injector 4 short circuit (logged)  
32-5 injector 5 short circuit (logged)  
32-6 injector 6 short circuit (logged)  
33-1 injector 1 open circuit (current)  
33-2 injector 2 open circuit (current)  
33-3 injector 3 open circuit (current)  
33-4 injector 4 open circuit (current)  
33-5 injector 5 open circuit (current)  
33-6 injector 6 open circuit (current)  
34-1 injector 1 short circuit (current)  
34-2 injector 2 short circuit (current)  
34-3 injector 3 short circuit (current)  
34-4 injector 4 short circuit (current)  
34-5 injector 5 short circuit (current)  
34-6 injector 6 short circuit (current)  
35-1 injector 1 partial short circuit (logged)  
35-2 injector 2 partial short circuit (logged)  
35-3 injector 3 partial short circuit (logged)  
35-4 injector 4 partial short circuit (logged)  
35-5 injector 5 partial short circuit (logged)  
35-6 injector 6 partial short circuit (logged)