TuneECU version 2.1

meeou@wanadoo.fr
Translated/Adapted to English by crenninger 11/2010 / Revised by Tom 02-15-2012

Warning: Use of this software solution under certain circumstance can invalidate your warranty.

DISCLAIMER
Use of this software is at your own risk. Neither the software developer nor the website operator will provide any form of guarantee.
Damages of any kind are the sole responsibility of the end user.
Changing ECU injection mapping or using maps not legally allowed for your country is forbidden.
Using this software to change ECU mapping is only for track and off-road use.

Contents

1 Introduction

TuneECU is software to program, diagnose, and test the Sagem & Keihin engine control units (ECU) that are used by some Aprilia, Triumph, and KTM motorcycles.

The software is available for the following models with injection systems:

Aprilia Caponord and RST Futura
Triumph 3 & 4 cylinders (all EFI models)
Triumph twins (all EFI models)
KTM 690 / 990/ 1190
Benelli 900 Tornado models

The manual, software and mapping files and other usefull information are available here:

- http://www.box.net/shared/pusg6v7nyd
- http://www.tuneecu.com

Software is FREE
It can be given only FREELY

2 Installation

2.1 Required configuration

PC (Netbook, laptop, desktop) running Windows XP, Vista, or 7; minimum screen resolution 1024x576
NET Frameworks 2.0 or greater
USB/OBD cable with FTDI chipset and the driver FTDI D2XX CDM Driver: PLEASE REFER TO TUneECU.com for the proper current driver to use.

2.2 Installing FrameWork 2.0 (XP only)

NET Frameworks 2.0 http://www.microsoft.com/downloads/details.aspx?FamilyID=0856eacb-4362-4b0d-8edd-aab15c5e04f5&DisplayLang=en
Execute dotnetfx.exe and follow the instructions.

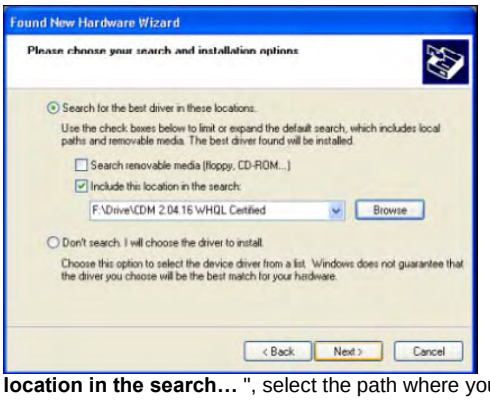
2.3 Installing the Windows drivers

Windows 7 and Vista users: MAKE SURE YOU ARE *NOT* connected to the internet.
Disconnect any WIFI or Ethernet cable. Otherwise Windows will download the latest driver automatically, which may not be compatible with TuneECU.

1. Plug the cable into a USB Port.

2. The PC will open the Found New Hardware Wizard to install the USB/Serial driver:

3. Choose "**No, not this time**" for the connection to Windows Update.
4. Click **Next**. You see this screen:



5. Under the checkbox for "**Include this location in the search…** ", select the path where you have downloaded and saved the drivers.

6. Click **Next**.

7. The USB driver is installed. Click **Finish** when complete.

8. Repeat the above steps for the serial driver.

2.4 Installing TuneECU

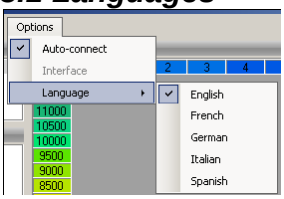
1. Download TuneECU from TuneECU.com and extract the ZIP file.

2. Copy TuneECU.exe and TuneLibrary.dll into a directory on your hard drive. For example C:\TuneECU.

3. Download the appropriate (.hex) map files for your bike from TuneECU.com.

3 Using the Software

3.1 Languages



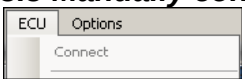
The software is available in French, English, German, Italian, Portuguese and Spanish.
The default language is set based on your windows system language.
You can change it using the **Language** submenu under **Options**.

3.2 Connecting

Connect the USB/OBD cable to the ECU connector on the motorcycle, and the USB side to the computer. Turn the key to the ON position and the ignition kill switch to the RUN position, but do not start the engine. Start TuneECU and wait for the connection to be established. You can monitor the connection with the indicator at the bottom-right corner of the screen.

- Red – not connected
  Orange – connecting
  Green – connected

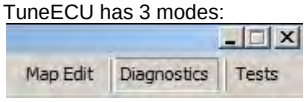
3.3 Manually connecting to the ECU



If the connection to the ECU is not automatic, select **Connect** from the **ECU** menu.

3.4 Selecting a Mode

TuneECU has 3 modes:



- ***Map Edit***: Editing and programming ECU maps
- ***Diagnostics***: Checking the sensors for engine management
- ***Tests*:** Adjustment and testing of certain component of the motorcycle

The mode selection is done by clicking the proper button

4 Diagnostics

Triumph

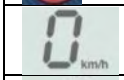
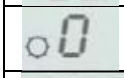
Aprilia

KTM

Benelli

4.1.1 Dashboard

This screen will have a slightly different presentation between Sagem and Keihin ECUs.
The analog gauge displays the following indicators.
(Note, not all sensors are available on all bikes.)

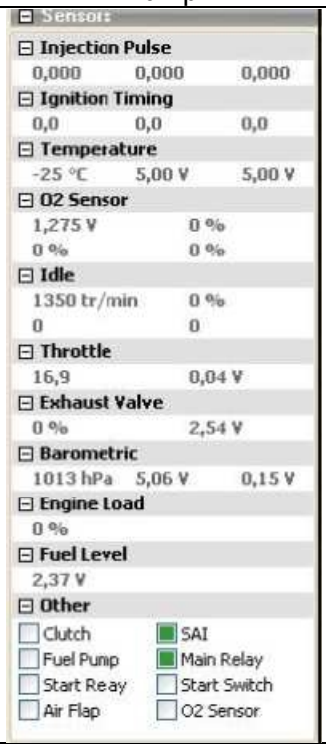
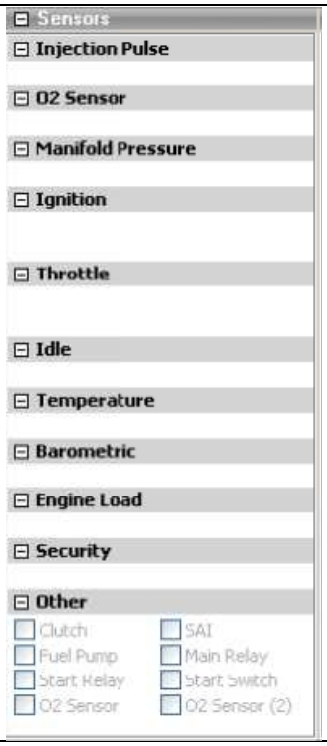
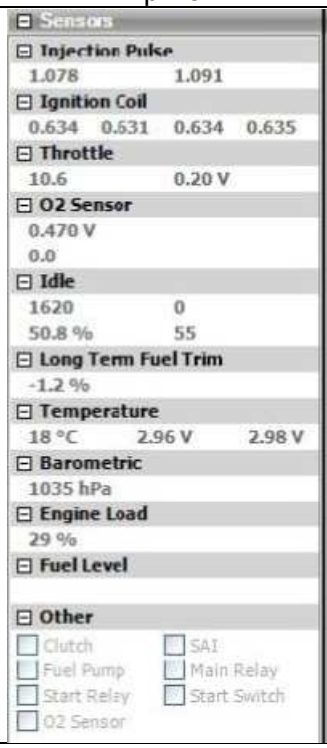
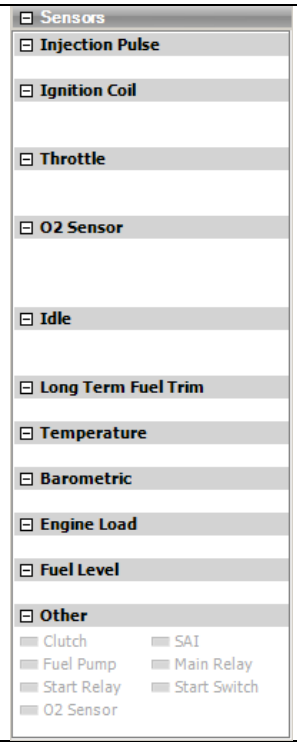
	Cooling fan On/Off
	Malfunction in the MIL system (EFI light on Caponord/Futura)
	Fall-over sensor
	Neutral (N)
	Side stand (S)
	Speed indicator
	Engaged gear number
	Engine RPM

3 dial (Analogue/Digital)

Throttle position sensor in %		
MAP (manifold air pressure) in hPa (Keihin) Ignition advance (Sagem)	 Keihin	 Sagem
Engine temperature in °C.		

4.1.2 Sensors

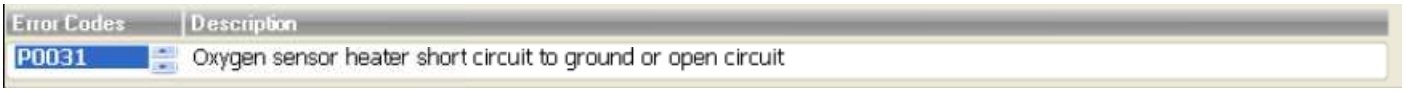
The values, state, or voltage (V) of all other sensors are listed on the left side of the display. Move your mouse over the value and a highlighted text will give you a definition of the value.

Triumph	KTM	Aprilia	Benelli
			

Note:

To hide a sensor display, click the – sign ⊟. The icon will become a **+**. Click the **+** to re-enable the sensor readings.
The display will refresh faster when fewer sensors are displayed.

4.1.3 Error Codes



Lists the error code(s) currently stored in the ECU and a short description of each.

4.1.4 Status Bar

The status bar at the bottom of the screen shows some general information.

Battery Voltage *Note: At least on Caponord/Futura, the displayed voltage is about 0.5v more than at the battery. This difference is also present on other tuning software.*	
O2 Sensor (Closed or Open Loop) If the bike has an O2 Sensor, this icon will show if the system is operating in closed-loop or open-loop mode.	
TPS (Throttle Position Sensor)	
Connection Status (Red-Orange-Green)	
Name of the open map (Tune)	

5 Tests & Adjustments

5.1.1 Keihin Mode

In this mode, only 3 small dials of the dashboard are active, providing the value of the vacuum intake (Manifold Absolute Presure) of the corresponding cylinder (Keihin only), thus providing reference values for syncronising butterfly valve (throttle) opening.

5.1.2 Tests Not all tests are available on all motorcycles. Test components of the motorcycle.

Test	Description	Triumph	KTM	Aprilia	Benelli
Tachometer	Turn on sequentially all lights, engine temperature chart, speed to 100km/h, tachometer to 7500rpm	Keihin	Yes Only Tacho To 7500 rpm	Yes Only Tacho To 5000 rpm	
Cooling Fan	Starts the cooling fan – listen for the fan noise	Yes	No	Yes	
Fuel Pump	Prime the fuel pump – listen for the fuel pump noise	Yes	Yes	Yes	
Idle Stepper	Cycle through the idle stepper – listen for a very quiet ticking noise	Yes	Yes	Yes	
Purge Control Valve	(Only bikes with charcoal canister) Activate the purge valve – listen for a very quiet noise	Yes	Yes	Yes	
SAI	Secondary air injection system	Yes	Yes	No	
Sonde O2	O2 sonde heater - see in Diagnostics	No	Yes	No	
Air Flap	Air flap (675 Daytona) located in the air intake towards the front	Yes	No	No	
Exhaust Valve	Exhaust valve (675 Daytona) located in the exhaust	Yes	No	No	
Adjust EXBV	Adjust the exhaust valve – when you change the cable	Yes	No	No	
Adjust ISCV /TPS	**Keihin**(exept KTM) It is done in several steps. Read the workshop manual. The third dial shows the voltage (V), allowing the adjustment of the position and adjustment of the controller.	Keihin	No	No	
Reset Adaption	See the procedure in the “Resetting the Throttle Position Sensor (TPS)” section for Keihin.	Keihin	No	No	
Ignition Coil	Excitation of the coils -- hear or see if sparks will appear at the spark plugs. ***	No	Yes	No	
Injectors	Several triggers ---- hear the function	No	Yes	No	
2nd Throttle	Test the 2nd throttle function only (Triumph Rocket & KTM)	Yes	Yes	No	
Reset TPS	**Sagem**: Recalibrate the throttle position sensor, Double-click the Reset TPS button	Sagem	No	Yes	
Idle Fuel Trim (CO)	Adjust the idle fuel trim (Triumph without O²-Sensor only)	Sagem	No	Yes	
Adjust IACV (Stepper Motor)	**Triumph Sagem** Double-click to IACV. It is possible to reset these two last parameters by right-clicking the arrows active during the adjustment.	Sagem	No	Yes	
Long Term Fuel Trim	Adjust the long term fuel trim (Sagem) Triumph models with O²-Sensor only	Sagem	No	Yes	
Adjusting the throttle cable	The idle speed control stepper motor will be completely retracted and the throttle valves completely closed. Switch the ignition switch off, WITHOUT exiting or disconnecting the software, and adjust the throttle cable clearance.	No	Yes	No	

***** Warning: the metal part of the candle must be in contact with the mass of the bike under threat of destruction of the coil.**

5.1.3 Adjustments (Keihin except KTM)

Adjust the exhaust valve: Refer to the workshop manual. The third dial displays the position of the valve in % during this adjustment.

Reinitialisation of the idle stepper motor: It is done in three steps. Read the workshop manual. The third dial shows the voltage (V), allowing the adjustment of the position and adjustment of the controller.

Reset Adaption (Reset TPS): See the procedure in the “Resetting the Throttle Position Sensor (TPS)” section.

KTM only

Adjusting the throttle cable : The idle speed control stepper motor will be completely retracted and the throttle valves completely closed. Switch the ignition switch off, WITHOUT exiting or disconnecting the software and adjust the throttle cable clearance.

5.1.4 Adjustments (Sagem)

Reset TPS: Recalibrates the closed throttle position to a zero reading. After the reset, restart the engine and idle for at least 30 seconds.

Idle Fuel (CO): Double-click to access this adjustment. Allows adjustment of the fuel trim at idle.

Long Term Fuel Trim: Double-click to adjust the parameter.

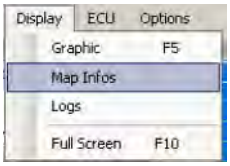
Adjust Stepper Motor: Double-click to adjust the position of the idle stepper motor.

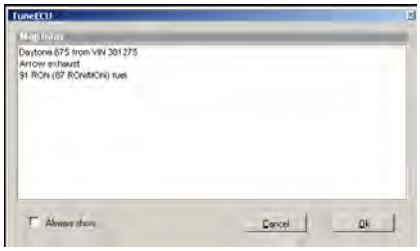
It is possible to reset these two last parameters by right-clicking the arrows active during the adjustment.

6 Maps

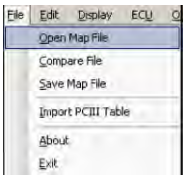
(Not available in the Lite Version.)

Fuel/Ignition maps of file type “.hex” are generated by reading the ECU, and available on the website (www.tuneecu.com).
You must select a map that corresponds to your model of motorcycle and its configuration (type of exhaust for example).
From the **Display** menu, choose **Map Infos** to see comments and the basis of the map (in parentheses).

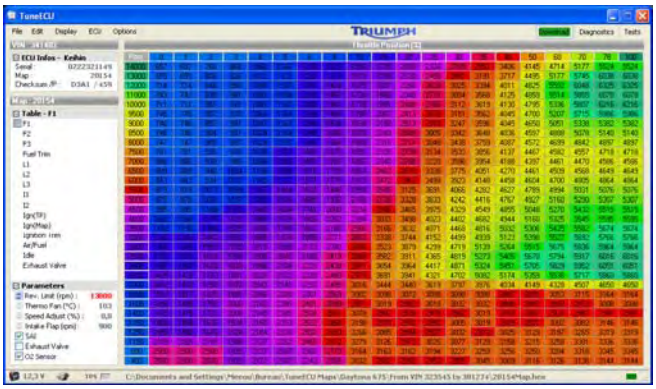




6.1 Selecting a Map



From the **File** menu, select **Open Map File**. The map’s data appears in a grid.



6.2 ECU Information

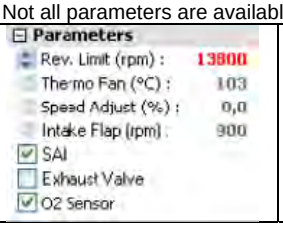
Serial number
Map ID
Checksum and a counter how many times the ECU was reprogrammed.

6.3 Map Tables

F1 F2 F3 F4	F1 – F4: main fuel table for cylinder 1 to 4 / RPM & butterfly opening or F3-1 corresponding to the position of the mapping switch on the KTM 690.
Fuel Trim	Fuel Trim: Adjustment for the Fuel table F (in %) , or Right click on a F table if not visible.
L1 L2 L3 L4	L1-4: Fuel table for the small butterfly opening / RPMs & air pressure or L3-1 for KTM690
I1 I2 I3 I4	I: Ignition advance table I3-1 and I LOF (Low Octane Fuel) for KTM690
Ignition Trim	Correction tables "Ignition advance I (°) or right-click on a table if I is not visible, e.g. KTM 690
A/F Table	Air/fuel Air/fuel ratio (AFR)
Idle	Idle Engine Idle by temperature
Exhaust Valve	Exhaust Valve (Daytona 675) Position of the exhaust valve / RPM.
Second Throttle	Butterflies (Rocket III & KTM) Position of the secondary butterflies
F-L Table	Transition F – L F to L transition and inversely / RPM and throttle opening

6.4 Map Parameters

Not all parameters are available on all bikes.



Rev limit (RPM)
Cooling fan temperature trigger
Speedo Adjustment in % (0% = no correction)
Speed Limit (Rocket III)

NOTE: Unlike some other tuning software, TuneECU lets you only change one value for Rev Limit and Thermo Fan. That is, you cannot specify both ends of an on/off range for these settings. The range is fixed, but you can adjust the trigger point, changing the RPM or temperature at which the fixed range of values applies.

For example:

Thermo Fan = 106. The fan will come on at 106. It will shut off again at 100. (The range of six degrees cannot be changed, but the start point of 106 can be.)
Similarly, the RevLimit setting has accompanying on/off parameters that cannot be changed, although the main limit setting can.

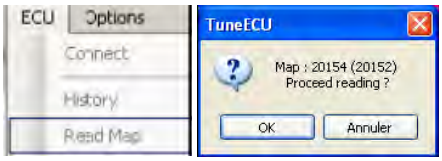
- Rev Limit = 10,000 RPM
- Restart Normal Fuel -50 RPM = 9950 RPM
- Increase Fuel Cut +100 RPM = 10,100 RPM
- Kill All Fuel +200 RPM = 10,200 RPM

6.5 Reading Maps

For a Keihin ECU, this operation may take 20 minutes. You must remove the headlight fuse to prevent the discharge of the battery. Your battery must be fully charged before doing any mapping work -- ideally connected to a battery tender.

You must have a map loaded from a .hex file for TuneECU to allow you to read a map from your ECU.
Follow the direction in "Selecting a Map".
KTM 690 on select maps to play (FI or EP).

Choose **Read Map** from the **ECU** menu.



This reads and displays the map in the ECU. Before doing anything else, save this map.

Be sure to save the map to your hard drive.

Reading time may be significantly reduced if a map with the same base is already open in the program. The base is indicated in parentheses.

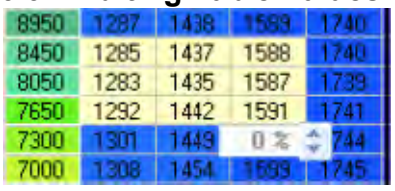
Reading progress is visible in the status bar in the bottom

The operation can be canceled by clicking on the **Close** button. The map must be saved in order to reprogram the ECU.

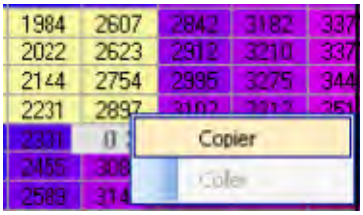
6.6 Changing Values and Settings in a Table (advanced use)

It is not recommended to change tables of Fuel or Fix F & I. The map is already optimized depending on your basic configuration. However, if you have a dynamometer, it is always possible to adjust the values for a better performance of your particular engine. Other tables can be modified according to your preferences: idle, valve exhaust, and air/fuel, knowing that better power is obtained with an AFR value of 12.8, and lower fuel consumption achieved at 14.7.

6.6.1 Editing Table Values



Select the value by a single click. Multi select is possible.
Change the value with the up/down button.Use the arrow keys from the keyboard, you can jumping from version 1.8.5 from a single selected cell in the adjacent cell.
The change can be absolute or in % on the F & L table. F4 key allows to switch between modes. Le value before modification can be display using the F6 key.

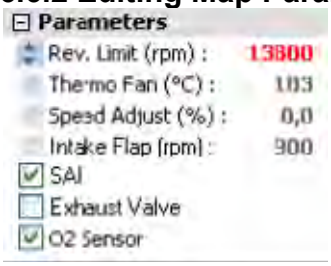


One or Multiple cell can be copy/pasted, after selection – right click to access the copy/paste menu

Select the first cell or multi select the value to be pasted and Right click.

Note: The values that have changed in the table, are shown in white color.
(Version 1.8.5)

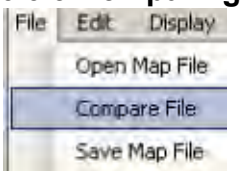
6.6.2 Editing Map Parameters



Double-click on the parameter.

Use the **<Esc>** key to undo the changes. Otherwise the new values are automatically saved.

6.6.3 Comparing Maps



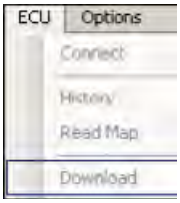
From the **File** menu, select **Compare File**.

Select a different map for comparison. Pressing the **<F6>** key to view the values.

To exit the comparison mode, select this menu again and to cancel the selection of the file.

6.6.4 Reprogramming the ECU

Your battery must be fully charged before doing any mapping work -- ideally connected to a battery tender, better yet a second 12 volt battery from a car Your laptop must be connected to the power supply.



or

From the **ECU** menu, select **Download**. Or click the green **Download** button. This action prompts for confirmation. A verification of compatibility between the ECU and the map is done.

Attention! For KTM 690: The FI and EP mapping must match on a KTM 690.
For the KTM 690 both cards are always required (FI and EP-Map)
FI is a acronym for EFI = Electronic Fuel Injection / EP is a acronym for EPT = Electronic Power Throttle

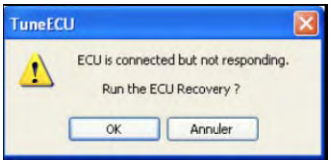
Download progress is visible in the status bar.

At the end of the download message confirms that the operation was successful

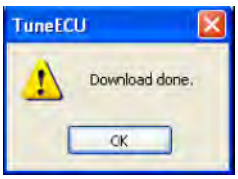
6.6.4.1 Failure to Download

1. Click OK.
2. Do not disconnect the cable.
3. Turn off the ignition.
4. Turn on the ignition.
5. Wait for TuneECU to connect to the ECU.
6. If the Download button is green, start the download again. If not, wait for the recovery option to appear.

6.6.4.2 Recovering from a Download Failure

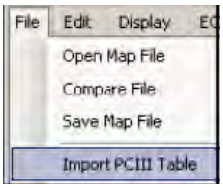


The recovery option should start automatically. If it does not, go to the **ECU** menu, and select **Recovery**.



At the end of the download, a message confirms that the operation was successful.

6.6.5 Importing a PCIII or PC-V Table (PowerCommander 3 or 5)



<Menu> File-Import PC Table (.djm table or .pvm table):
Applies *F-corrections* from a PCIII or a PC-V table in the "F-Trim" table.
If available the** Ignition table** will be imported into the I Trim table.

* includes support of "cylinder Advanced" feature, but not the "Gear Advanced", in this case you must choose the "Gear" table to import.
** Only the first Ignition table will be imported.

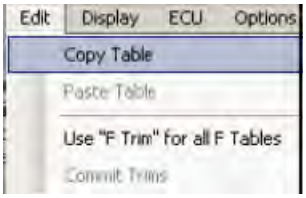
For KTM User:
TuneECU follows the KTM convention, and commits the Trim 1 to F1 (F1 in TuneECU = rear cylinder).
PowerCommander not follows the KTM convention, in the cyl. selective PCIII- or PC-V map the table1 is the front cylinder.
You must change the values in the PCIII- or PC-V Map before you import the cyl. selective PCIII or PC-V map with TuneECU.

6.6.6 Saving a Map

From the **File** menu, select **Save Map File**

The modified map is saved as a .hex Map file.

6.7 Editing Tables



When working with map tables, the **Edit** menu contains these choices for moving blocks of table data among maps:

Copy Table: Copies the table selected in the Clipboard.

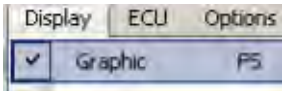
Export Table: Exports the selected table to a text file.

Paste Table: Replaces the table selected by the one in the clipboard if the same type.

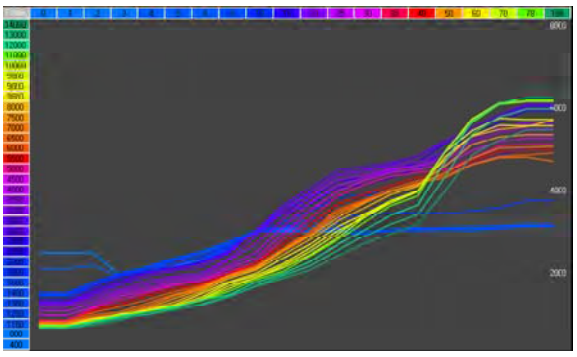
Use "F Trim" for all F Tables: For all F tables, change in whole tables F or separately.

Commit Trims: Corrects F fuel tables in %, and I ignition tables in °, according to the correction tables F & I, then puts zero values.

6.8 Displaying Maps Graphically

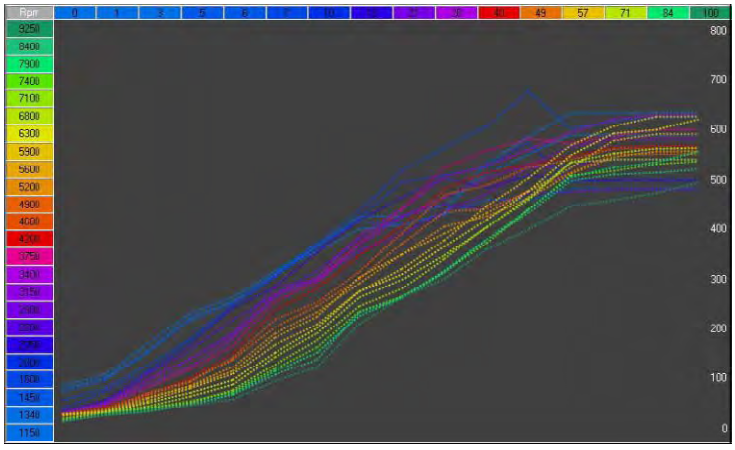


To see a graphic representation of the table, select **Graphic** from the **Display** menu, or press **<F5>**.



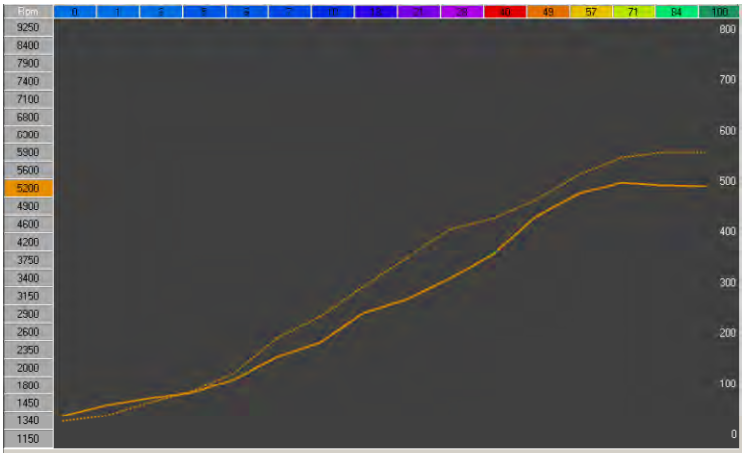
6.8.1 Comparing Maps Graphically

While comparing maps, press **<F6>** to see the comparison graph, represented with dotted lines
Press the **<F4>** to switch to mono or multi curves.



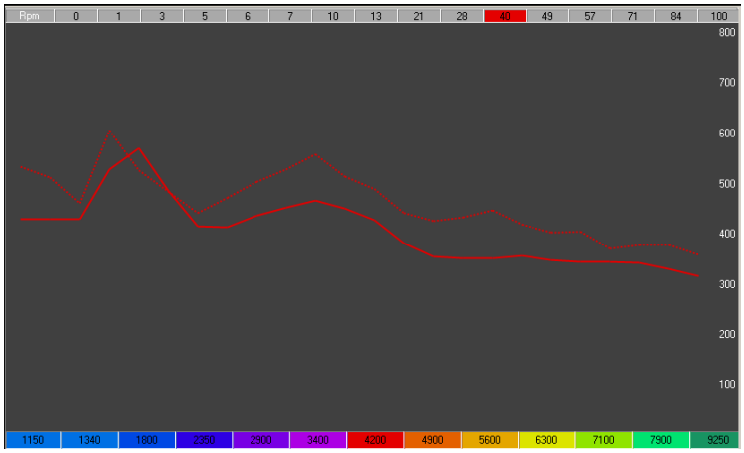
6.8.2 Comparing Maps Graphically for a Given RPM

Click on any RPM to see a comparison between the two maps. Drag the mouse up and down the RPM range to see the display change in response.

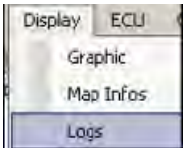


6.8.3 Comparing Maps Graphically for a Given Throttle Position

Click on any throttle position to see a comparison between the two maps. Drag the mouse up and down the throttle range to see the graph change in response.

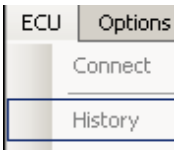


7 Viewing Information Logs



Select **Logs** from the **Display** menu to see an overview of the dialogue between the software and the ECU.

8 Viewing History (Sagem)



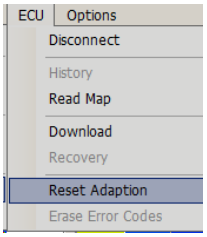
From the **ECU** menu, select **History**.
You see a windows with the logs of the latest maps loaded into the ECU

9 Resetting Adaption (Keihin) or Throttle Position Sensor (TPS)Sagem

9.1 Keihin Triumph

After each download, a "reset Adaption" is needed.

1. Turn the ignition off and back on again.
2. Wait 10 seconds and turn the ignition off again.
3. Turn the ignition on and select **Reset Adaption** from the **ECU** menu.



Start the engine and let it idle until the TPS light in the status bar becomes green – around 10 to 15 minutes.

9.2 KTM

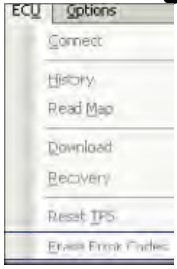
After downloading a FI-map, start the engine and let runnig it idle (without touching accelerator) for 15 minutes, then turn it off.
After downloading a EP-map, Following a mapping download into the ECU, turn off the ignition (key) , turn on the ignition, slowly rotate the Throttle until full throttle then slowly close the throttle, turn off the ignition.

9.3 Reset TPS Aprilia & Triumph Sagem

1. In the Test mode, double-click **Reset TPS**.

2. Turn off the ignition.
3. Turn on the ignition.
4. Start the engine and let it idle for one minute without touching the throttle.

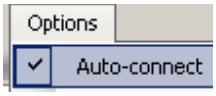
10 Erasing Error Codes



You can clear stored error codes from the ECU by choosing **Erase Error Codes** from the **ECU** menu while in Diagnostics or Tests modes. The issues that caused these codes must have been corrected, or the error code will reappear.

11 Options

11.1 Auto-Connect

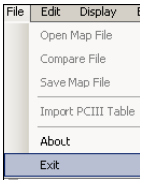


The **Auto-connect** option is found on the **Options** menu.
If this option is checked and the cable connected, the program automatically connects to ECU.
By default, the auto-connect setting is enabled

11.2 Interface

From the **Options** menu, select **Interface** to see the interface used to connect to the ECU. Connect only a single interface cable.

12 Exiting the Program



To close TuneECU, select **Exit** from the **File** menu.
This action is not possible if a download is in progress.