DIGITAL ECU TUNER³

ECU MASTER

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FEATURES

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FUEL DELIVERY

Digital ECU Tuner 3 is capable of influencing the fuel delivery in several ways. Its basic strategy is to modify the MAP or MAF sensor analogue signal, with resolution of **0.005V**. This fact together with the internal signal interpolation enable the accurate control of the fuel delivery. The second possibility is to adjust the frequency of MAP/MAF sensors with resolution of **1Hz**. Another alternative is to use **additional injectors** controlled by 3D table based on RPM and user defined load. The last option is the **direct control injectors opening time** using both high current outputs. This feature allows to control injectors with extremely high flow and will be available soon.

IGNITION ANGLE CONTROL

The device enables the alternation of the ignition timing in wide range of ignition systems. Due to the technologically advanced adaptive ignition input of the 'True Zero Cross Detection' type, Digital ECU Tuner 3 enables the precise modification of inductive signals (differential and single ended), as well as optical and Hall sensors. Moreover, the device enables the control with the ignition amplifier (dwell time is considered). At the moment, the device supports the modification of most common ignition patterns, like **60-2, 36-1, 36-2, 12+1, Subaru GT, Multitooth, Ign modules signals, EDIS SAW signal** and more.

BOOST CONTROL

Using 3 way solenoid valve and one of the PWM 3D tables, the user is capable of controlling boost (selenoid DC) vs RPM vs user defined load and 2 correction tables (eg. TPS scaling). Using **VSS** signal, there is a possibility of controlling the boost pressure in the vehicle's speed function. **PID controller based Boost Control** will be available soon.

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DIGITAL SIGNALS

By using the digital input, user receives a wide range of tools used to modify the frequency of the signal. This signal can be modified by using 3D tables (load or RPM) in the linear or non linear additive way. The range of supported frequency ranges from **1Hz** to **4Khz**, which is enough for most signals found in the automotive industry (MAP, MAF, VSS). Signals can be limited in the minimum or the maximum output frequency. Digital input **can also be used as load and/or correction**, what provides new possibilities to modify the engine's parameters (like speed dependent boost, frequency MAF based load, etc.)

TABLES

Device has **four 16x16** tables (load vs RPM) for fuel modification, PWM and ignition. Each table has additional **two corrective tables 16x1**. All table's values are interpolating according to the load and RPM values, what provides a very smooth control over the engine. Tables can be modified in the **real-time** when the engine is running, so the tuner is **istantly** able **to see** what is the engine's response. The load of each table can be assigned to any analogue or frequency input. Due to the integrated **DataFlash** memory, there are **two set of all maps**. The user can switch them by using the Map Switch input. The switch time is **less than 5ms** and doesn't influence the engine running. This feature is very useful for different fuel types, different boost settings, etc. Additionally, tables can also be covered with AFR (each cell has the corresponding AFR value from log).
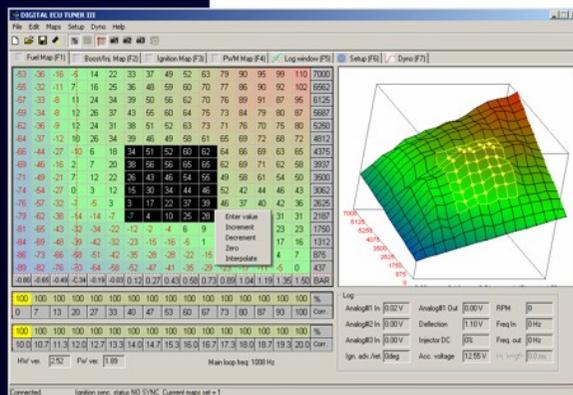
MAF TO MAP CONVERSION

The device has a unique feature that enables **automatic conversion** between the MAF sensor and MAP. Based on the log data collected during the learning process, the device generates the output 3D table that converts the MAP sensor voltage to the appropriate level for a given engine load. This feature works for analogue MAF as well as for the frequency one (using analogue MAP sensor). This feature is very useful in cars where MAF sensor is an orifice. It also enables the usage of atmospheric BOV valves in turbo cars equipped with MAF sensors.

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4 analogue inputs

1 multifunctional ignition input (adaptive VR sensor, HALL, nonadaptive VR)

1 frequency input (Hall or nonadaptive VR)

Tables switch

DATA LOGGING

Digital ECU Tuner 3 has a very powerful data logger. Logger is the main tool used for perfect mapping of the engine. **Each parameter** like RMP, analogue inputs, accumulator voltage, PWM, ignition angle, all outputs are recorded and then can be used for further analysis. Log can be saved to a file and sent to the technical support, when there are any problems. Data can be retrieved by Windows Client or stored into internal DataFlash (**up to 16 hours** depending on the required logging frequency). It is extremely important in sporting events, where data can be analysed after each race. To make reading logs easier, user can assign **appropriate scales** to each signal. Due to this fact, the user can see AFR, kPa, percentage, etc. instead of Volts.

LAUNCH CONTROL

The device has a feature of the launch control supporting the launch, which is especially very important in racing and drag racing cars. It enables the user to define the RPM limit, ignition retard, and fuel enrichment for launch control procedures.

PARAMETRIC OUTPUT

Digital ECU Tuner III has a parametric output (5A), which can be activated when the user defined conditions are meet. All device inputs can be used as condition variables.
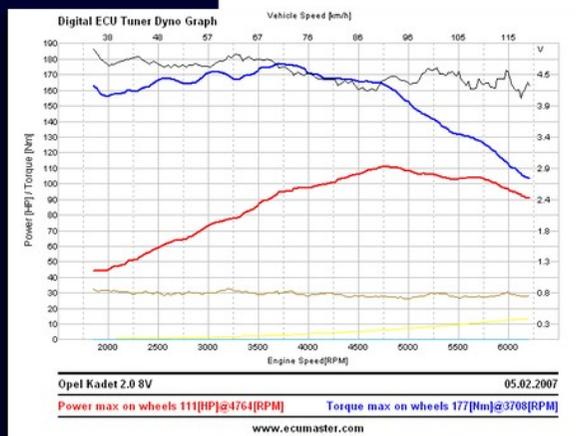
ROAD DYNO

During the engine mapping, there is a possibility of checking its effects by using the inbuilt road dyno. With this tool we can compare the following stages of the modification of the engine's parameters as well as perform the analysis of the **power and the** rotational **moment** paying special attention to the pressure angle, AFR and other logged parameters.

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Speed Density or Alpha-N

16x16 volumetric efficiency table

Batch or Bank fire

Full sensors calibration

EGO correction

Ignition angle modification

Easy installation and tuning

PID driven Boost control

FUEL IMPLANT TECHNOLOGY

Fuel Implant technology is a unique feature of the Digital ECU Tuner 3 device. It turns the device into fuel **Stand Alone** system! DET3 directly controls injectors (batch or bank fire) calculating the fuel dose based on the *Speed Density* or *Alpha-N* algorithm. Due to this unique feature, it is possible to take full control over fuelling, disabling ECU auto-adaptation. *Fuel Implant* technology simplifies modification by allowing for main ECU controlling tasks, like idling, ignition timing (ignition angle can be modified by DET3 device), fuel pump relays, etc. In the stand-alone mode, DET3 shares sensors like IAT, CLT with the main ECU, which decreases the installation costs.

There is a very advanced implementation of Speed Density algorithm with all required parameters, like *acceleration* enrichments, *warm-up* enrichment, *after-start* enrichment, *barometric* correction, etc. Due to this fact, the modified engines are as drivable as the factory ones.
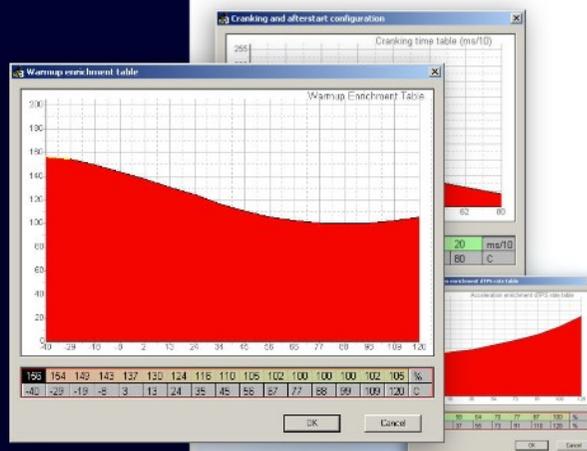
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OUTPUTS

1 analogue output

2 bipolar ignition outputs (differential)

1 unipolar ignition output

1 unipolar frequency output

2 power outputs used for injectors control, boost selenoids and parametric output

+5V output for sensors powering

2 pullups

TECHNOLOGY

Digital ECU Tuner 3 is made in the modern **SMD technology** with using the elements fulfilling the highest requirements of the automotive business. The device complies the EMC requirements and the ROHS directive. **Each device** is tested before shipment in low **(-25C)** as well as in high ambient temperatures **(60C)**. Due to this fact and the high quality design with advanced input / output protection circuit, there is **2-year** warranty for the device.

WINDOWS CLIENT

Windows client is a very powerful application working with the Windows 2000, XP, Vista and Windows 7 environment. It is very **user friendly**, and was created based on the **real world tuners experience**. Software allows to modify tables, datalogging, road dyno and setting up parameters. All operations are performed in the **realtime** with **no virtual latency**. USB connection allows to work with modern laptops that have no COM port. The minimal resolution required for effective work is 1024x768, however, the application works with lower resolution screens. Due to the fact that many users use old laptops for car mapping, we have put a lot of effort to make the application **performance and memory effective**, and thus to assure its compatibility even with Windows 2000.

PACKAGE

1 x Ecumaster DET 3 unit,
1 x USB cable,
1 x CD ROM with drivers, software and manual,
1 x connector with 20 pins
1 x pack with resistors and diode that can be useful during installation.