

EFI TECHNOLOGY - EURO-6: Selected ECU for British Touring Car Championship

Presentation

EFI Technology srl is a specialist company in advanced electronics for motor racing and high performance road cars. It is founded in 1985, initially to design and develop the early electronic engine management systems for Cosworth.

Today, EFI Technology is a highly specialised company involved in developing high tech engine control systems for use in the highest classes in motorsport and in high profile sports cars and motorbikes. EFI Technology manages and supports the complete project, from customer specification through hardware and software development, to production and testing of final products.

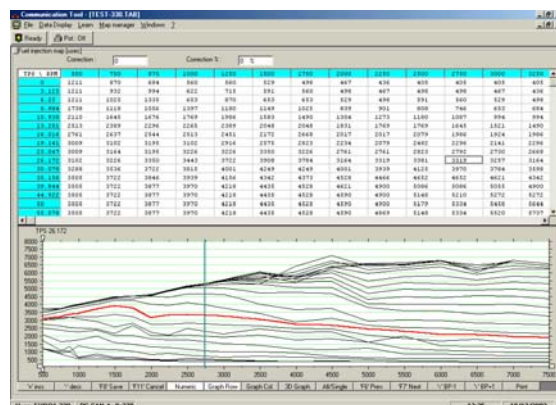
In addition, EFI Technology offers a standard range of racing products - branded "EFI Technology" - including ECU's (capable of handling engines with 1..12 cylinder), ignition coils, sensors and wiring looms.

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Main Features

- Up to 8 cylinders, aspirated or turbo charged.
- Engine speed in excess of 20,000 RPM.
- Up to 16 high impedance fuel injectors.
- On-board data logging with 8 Mb memory capacity.
- Automatic self-mapping of injection and boost pressure.
- Closed loop control of fuel injection and boost pressure.
- Knock control.
- Engine load selectable as TPS, MAP, MAF or combined.
- Trigger disc configuration:
 - 4, 5 or 6 teeth – EFI standard
 - 12+1 – Honda Civic R
 - 36-1 - typically Ford
 - 60-2 - typically Bosch
- Connection for standard and linear lambda sensors.
- Closed loop idle speed control.
- Variable camshaft timing control on various engines.
- Multi functional input / output switches and PWM's.
- 3 selectable engine maps.
- Electronic throttle body control.
- Communication via CAN line and 1 current loop link.
- Full Windows95 / 98 / NT / XP software on-line editing



Map Overview with 2-dimensional Graphics

ECU Inputs for Engine Management

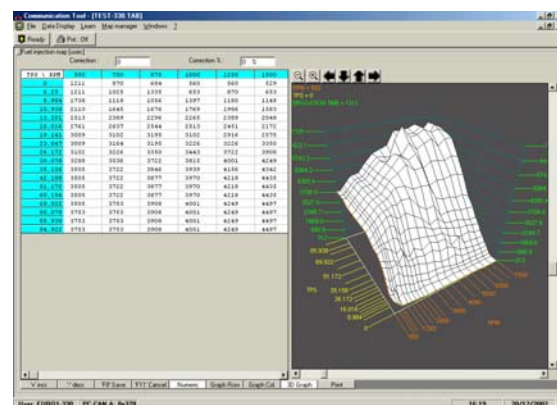
- 2 electromagnetic or 1 Hall effect speed sensor, 1 electromagnetic or Hall effect synchronisation sensor.
- 4 Hall effect vehicle speed sensors.
- 2 electromagnetic sensor inputs, i.e. turbo charger speed.
- 8 linear 0.5 Volt and 4 NTC temperature sensor inputs.
- 1 NTK UEGO lambda sensor.
- 1 knock sensor.
- 8 multi function switches / drivers.
- All sensor inputs are user configurable.

Breakpoints

- All breakpoints are user configurable

Fuel Injection

- 24 x 16 breakpoints in basic fuel map; 2 or 3-dimensional.
- 8 injector drivers with individual trims; staged injection.
- Comprehensive injection trims including programmable fuel injection phase and fuel cut-off.
- Separate fuel injection strategy during cranking.
- Launch control, pit lane speed limiter plus soft and hard cut engine RPM limiters.
- Fuel consumption measurement.
- Transient fuel trims.



Map Overview with 3-dimensional Graphics

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Ignition

- 24 x 16 breakpoint basic spark advance map, 0.25 degree resolution.
- 6 built-in ignition power drivers, max load > 15 Amps.
- Knock control.
- Comprehensive spark advance trims.
- Separate spark advance strategy during cranking.
- Separate spark advance strategy in idle speed.
- Programmable ignition coil dwell time.
- Launch control plus soft and hard cut engine RPM limiters.

Lambda Control - closed loop self mapping

- Adaptive fuel learn strategy with lambda target map.

Lambda Control – closed loop injection control

- UEGO closed loop control using lambda target map.
- HEGO closed loop lambda 1 control with bank definition.
- User defined matrix sets open loop fuel control.
- Programmable proportional and integral fuel trims.

Turbo Charged Engines

- Closed loop boost control with self-learn.

Idle Speed Control

- Closed loop control with proportional and integral control.
- Separate idle speed spark advance control.

Multi Function Input / Output - MFIO

The user can select between numerous ECU functions and relate them to a number of drivers and switches. In this way a certain MFIO can be configured to be either an input or output.

Variable Camshaft Timing Control

- Programmable variable camshaft timing available for several engines.

Traction Control

- Traction control uses 4 independent wheel speed sensors.

Data Acquisition

Euro-6 is equipped with an on-board data logger with 8 Mb memory capacity. Stack's Datapro analysis software is included.

Communication Link

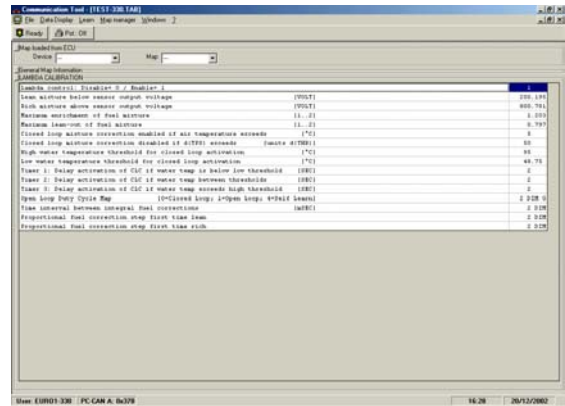
- CAN link to external data acquisition systems, dashboards and PC communication.
- Programmable serial data link to external data acquisition systems and dashboards.
- ASAP3 communication link optional.

Enclosure and Components

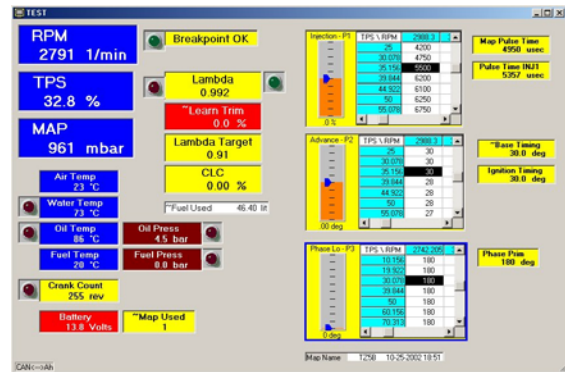
- Aluminium enclosure fully sealed with O-rings and fitted with a SJT MIL specification connector.
- Dimensions are 163.7 (including connector) x 181.5 x 38 mm, weight 725 grams.

Mapping software

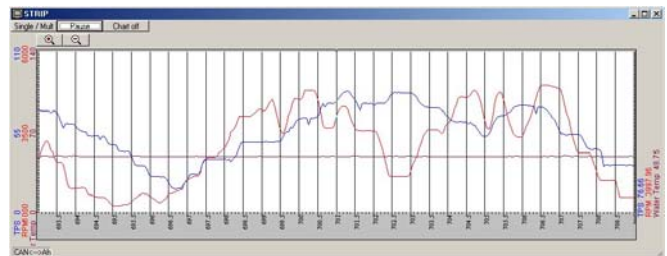
- Software is easy to understand and logic to operate.
- Alterations in real-time of injection, phase, spark advance, boost pressure, idle speed and target lambda value can be done by use of a mapping controller or from the keyboard.
- The ECT communication software runs under Windows 95/98/ME/2000/NT/XP. It is very easy to design individual displays with text, data, potentiometers, LED's, strip charts etc. Any ECU parameter can be altered working either on-line or off-line.
- Full on-line editing of complete map. ECU map is password protected.
- Data acquisition during the mapping procedure with adjustable sampling rate is available.



Lambda Control Calibration



Example of User Defined Display Screen



Easy Configuration of Strip Charts