

# EFI TECHNOLOGY - EURO-96

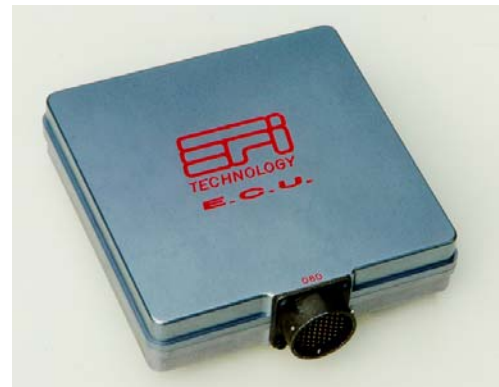
## Presentation

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.

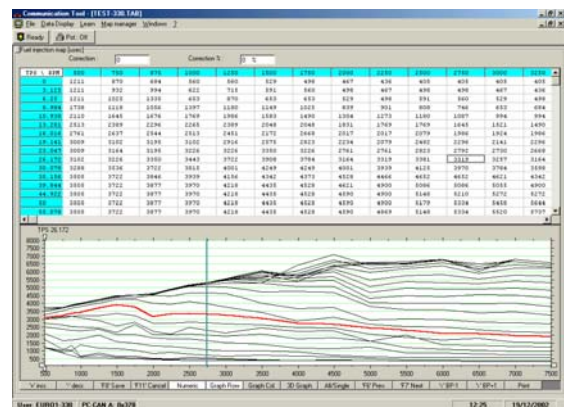
In addition, EFI Technology offers a standard range of racing products - branded "EFI Technology" - including ECU's (capable of handling engines with 1..12 cylinder), ignition coils, sensors and wiring looms.

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## Main Features

- Up to 8 cylinders, aspirated or turbo charged.
- Engine speed in excess of 20,000 RPM.
- Up to 12 high impedance fuel injectors.
- Automatic self-mapping of fuel injection.
- Closed loop control of fuel injection and boost pressure.
- Engine load selectable as TPS, MAP or MAF.
- Trigger disc configuration:
  - 4, 5 or 6 teeth – EFI standard
  - 3 teeth – Porsche
  - 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.
- 2 selectable engine maps.
- 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

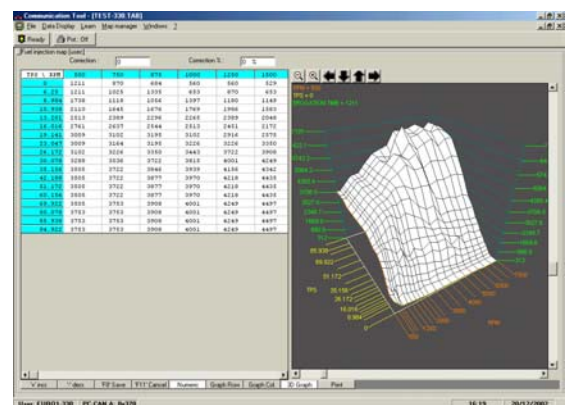
- 1 electromagnetic or 1 Hall effect speed sensor, 1 electromagnetic or Hall effect synchronisation sensor.
- 1 electromagnetic speed sensor.
- 4 linear 0.5 Volt and 4 NTC temperature sensor inputs.
- 1 NTK UEGO linear or standard lambda sensor.
- 3 switched inputs.
- 2 spare PWM drivers.
- All sensor inputs are user configurable.

## Breakpoints

- All breakpoints are user configurable

## Fuel Injection

- 24 x 16 breakpoints in basic fuel map.
- 6 injector drivers with individual trims.
- 12 injector drive capacity - low or high impedance fuel injectors (Peak-and-Hold or On-Off).
- Comprehensive injection trims including programmable fuel injection phase and fuel cut-off.
- Separate fuel injection strategy during cranking.
- Launch control and pit lane limiter.
- Soft and hard cut engine RPM limiters.
- Fuel consumption measurement.
- Transient fuel trim.



Map Overview with 3-dimensional Graphics

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## Ignition

- 24 x 16 breakpoint basic spark advance map, 0.25 degree resolution.
- 3 built-in ignition power drivers, max load > 15 Amps.
- Comprehensive spark advance trims.
- Separate spark advance strategy during cranking.
- Separate spark advance strategy in idle speed.
- Programmable ignition coil dwell time.
- Launch control and pit lane limiter.
- 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

- HEGO closed loop lambda 1 control.

## Turbo Charged Engines

- Closed loop boost control with anti lag control.

## Idle Speed Control

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

## External switches

- Fuel and spark advance map corrections.
- Launch control or pit lane speed limiter.
- Power shift.
- Anti Turbo Lag strategy.
- Map switch to select between two engine maps.
- Fuel calibrator.

## Aux. outputs

- Programmable gear shift light.
- RPM signal for tachometer.
- Fuel pump driver
- Programmable camshaft position as function of throttle position and RPM.
- Programmable variable intake length system as function of throttle position and 3 RPM limits.

## Diagnostics

- 16 channels monitored, high/low limits for each sensor channel set by user.
- Error detecting time and conditional parameters configured by the user.
- Highest 12 engine speed levels and the first 12 errors for each channel are stored in memory.

## Communication Link

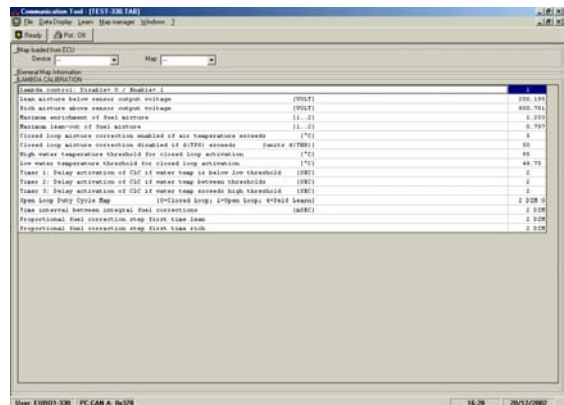
- CAN link to external data acquisition systems, dashboards and PC communication.
- Programmable serial data link to external data acquisition systems and dashboards.

## Enclosure and Components

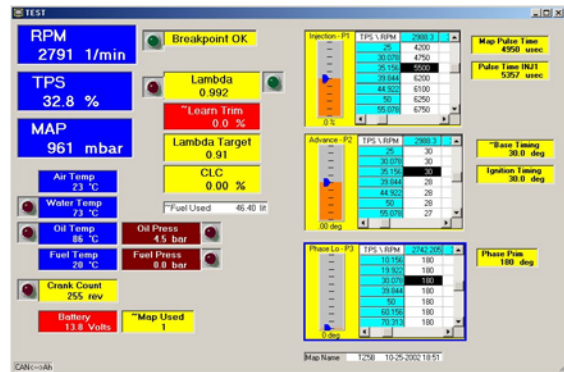
- Aluminium enclosure fully sealed with O-rings and fitted with a SJT MIL specification connector.
- Dimensions 178 x 166 x 40 mm, weight 770 grams.

## Mapping software

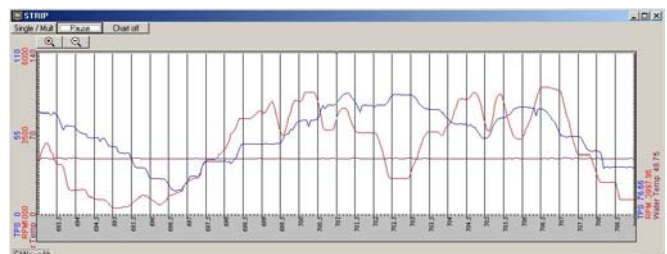
- Software is easy to understand and logic to operate.
- Alterations in real-time of injection, phase, spark advance, boost pressure, idle speed and target lambda value can be done by use of a mapping controller or from the keyboard.
- The ECT communication software runs under Windows 95/98/ME/2000/NT/XP. 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