

## E11 Series

### Fuel and Ignition Control System

## E11 System Description

The HALTECH E11 is a powerful "real-time" programmable fuel injection system computer designed for those seeking optimum performance. With the large number of outputs available for controlling ignition and fuel, the E11 is well equipped to run engines with sequential fuel and modern multi-coil ignition systems.

The programming software for the E11 is the latest Halwin software package that is included with the ECU. This software takes advantage of the Windows™ graphical environment to provide a user friendly software package. The Halwin software allows access to adjustment of all settings and calibration maps. In addition the software is capable of displaying live data in the form of graphical gauges for easy viewing whilst connected to the ECU.

#### User Configurable Outputs:

- |                           |                        |
|---------------------------|------------------------|
| *Closed loop idle speed   | *Closed loop O2 Sensor |
| *Electronic boost control | *Deceleration fuel cut |
| *Thermofan                | *NOS enable            |
| *BAC valve                | *Shiftlight            |
| *Stall saver              | *Anti-lag              |
| *Turbo timer              | *VTECH                 |
| *Rev limiter              | *Air con               |
|                           | *Intercooler fan       |
|                           | *Aux. fuel pump        |
|                           | *Staging signal        |
|                           | *Torque convertor      |
|                           | *Dual intake valve     |

(not all functions are available at the same time)

The E11 System has adjustable fuel maps each with 32 load bars and 32 RPM ranges. The E11 will run up to 16000 rpm with better resolution and greater accuracy than ever before.

Injectors can be controlled directly, fired all together, in batches, or can be staged when running high boost turbo or superchargers.

#### Typical Applications:

- Conversion from carburetion to fuel injection
- Control of fuel injection/ignition on modified engines
- Race and rally applications of all descriptions
- Design and development purposes
- Educational use by universities and colleges
- Original equipment in cars and motorcycles

The patented HALTECH system of programming virtually eliminates the input of numbers. You simply manipulate graphics in the form of bar graphs by pressing keys that allow you to increase or decrease the amount of fuel delivered at that particular load point. The process is repeated for all load points in each rpm range.

#### E11 Kit Contents:

- Electronic Control Unit (ECU)
- Flying lead wiring loom
- 2 x Power Relays
- Air Temperature Sensor
- Coolant Temperature Sensor
- MAP Sensor (Extra)
- Throttle Position Sensor
- Communication Cable
- Programming Software
- Instruction Manual

#### System Features:

- Piston Engines 4,5,6,8, 10 and 12 cylinders
- Rotary Engines 2,3 and 4' rotors
- Max Operating RPM: 16000 RPM
- Variable RPM range map points
- Map resolution: 32 RPM ranges by 32 load points for all 3D maps

#### Trigger Signal Type:

- Hall Effect Sensor
- Optical Sensor
- Inductive Magnetic Reluctor

#### Trigger Pattern:

- Single Pulse per Cycle
- 24 Tooth Multi-tooth
- Nissan Optical
- Bosch Motronic
- Subaru
- Chevrolet LS1

#### Ignition Configuration:

- Single Distributor
- Twin Distributor
- Direct Fire Wasted Spark
- Direct Fire Coil on plug
- Ignition toggle support for rotary engines

#### Injector Firing Mode:

- Sequential
- Multi-Point
- Batch
- Staged

#### ECU Inputs:

- Crank Position Sensor
- Cam Position Sensor
- MAP Sensor
- Throttle Position
- Coolant Temperature
- Air Temperature
- Barometric Pressure
- Oxygen Sensor
- Road Speed
- Auxiliary Analog Input (x8)
- Auxiliary Digital Input (x5)

#### ECU Outputs:

- Injector Drivers: 12
- Fuel Pump Relay Control
- PWM outputs (x4)
- Idle air control (IAC)
- Closed loop correction

#### Accessories:

- Boost/Fuel/Ignition Trim module
- Idle Air Control Motor
- Oxygen Sensor
- Electronic boost control solenoid
- Ignition Modules
- Ignition Coils

#### Data Storage

#### Features:

- Map Storage and Retrieval
- Laptop Data Logging
- On Board Data Logging

\*Available upon special request

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### E11 Specifications

#### Engine Suitability

Up to 16,000 rpm | 4, 5, 6, 8, 10, 12 cylinders | 2 - 3 rotors  
Normally aspirated or supercharged up to 200 kPa (30psi). Higher boost pressure MAP sensors available by special arrangement.  
Load sensing by throttle position or manifold pressure.  
Multipoint, Batch, Staged or Sequential injection patterns.  
Distributed ignition systems, or direct fire systems with 1 to 6 coils.

#### Power Requirements

Power Source: 8.6 to 16 Volts DC  
Consumption

Haltech ECU: 470 mA at 12 Volts  
Injector Load: Dependent on injector type. Approx. proportional to injector duty cycle. (Typically 0.6 Amps per injector)

#### Physical Specifications

ECU DIMENSIONS:

LENGTH: 134 mm (5.28"), Width: 198 mm (7.8"), Depth: 42 mm (1.65")  
WEIGHT: ECU: 680g (1.5 lb), Loom: 1.92kg (4.2 lb), Sensors: 500g(1.1 lb)

#### Input Sensors

MANIFOLD ABSOLUTE PRESSURE (MAP) Sensor (SUPPLIED SEPARATELY AT EXTRA COST)

1 Bar - 100kPa to 0kPa (Naturally Aspirated)  
2 Bar - 100kPa to 100kPa (up to 1 Bar or 15 psi boost)  
3 Bar - 100kPa to 200kPa (up to 2 Bar or 30 psi boost)  
Higher boost pressure MAP sensors available by special arrangement

TEMPERATURE SENSORS (Air and Coolant)

NTC temperature dependent resistor type.

Operating Range

Continuous -40°C to 100°C (-40°F to 212°F)

Intermittent up to 125°C (257°F)

THROTTLE POSITION SENSOR: 10k rotary potentiometer driven from throttle shaft.

INTERNAL BAROMETRIC PRESSURE SENSOR: Barometric pressure compensation only.

ENGINE SPEED PICKUP: Compatible with most trigger systems:

5 or 12 volt square wave;

Pull-to-ground (open collector)

Internal retractor adaptor for magnetic (or 'retractor') triggers.

Support for most standard tooth patterns.

#### ECU Outputs

INJECTOR DRIVER: 8 x 4/1Amp peak-and-hold current limiting drivers:  
Up to eight low-impedance injectors, Up to sixteen high-impedance injectors  
(Expandable using optional Driver Box.)

IGNITION OUTPUT: To optional Haltech Ignition Module, trigger by ECU, for directly firing the coil. (MAY ALSO BE COMPATIBLE WITH OTHER IGNITERS. ASK YOUR HALTECH DEALER.)

PULSE WIDTH MODULATED (PWM) OUTPUT: 4 x Dedicated PWM outputs.  
Suitable for controlling turbo wastegate, solenoid valves, shift lights, etc.

SPECIAL PURPOSE DIGITAL OUTPUT: Up to 9 special purpose digital outputs depending upon number of channels required to operate the engine.

12Volt logic outputs suitable for switching fans, shift lights, anti-lag, NOS, PWM style outputs, Extra injector outputs, etc.

FUEL PUMP CONTROL: 20A fused relay, features automatic priming and switch-off.

#### System Programming Requirements

COMPUTER: IBM-PC or compatible, preferably laptop or notebooks, 233MHz processor (preferably >400MHz), VGA colour display, Windows 95, 98, 2000 or XP, 4Mb of memory, 10 MB of free Disk space.

DISK DRIVE: CD-ROM drive

SERIAL PORT: Standard RS232C port - 9 pin D connector (25 pin cable available on request), COM1 or COM2 (selectable).

#### Adjustable Features

BASE FUEL MAP: 32 RPM ranges to 16,000rpm (with programmable ranges), 32 Load points per range, up to 32ms with 6.4us resolution.

IGNITION MAP: 32 RPM ranges, RPM to 16,000rpm (with programmable ranges), 32 Load points per range, up to 60° advance, with 0.1° resolution  
CORRECTION MAPS

FUEL Barometric -32 points  
Cold Start Prime - 32 points  
Coolant Temperature Enrichment - 32 points  
Air Temperature Adjustment - 32 points  
Battery Voltage Correction - 32 points  
Closed Throttle (selectable) - 32 points  
Full Throttle (selectable) - 32 points  
Post Start -32 points

IGNITION Crank Advance - 32 points  
Coolant Temperature Advance/Retard - 32 points  
Air Temperature Advance/Retard - 32 points

PROGRAMMABLE REV-LIMIT: selectable as either fuel or ignition  
FUEL CUT ON DECELERATION

ACCELERATOR PUMP: Increase and sustain parameters, coolant enrichment factor, three speed ranges.

IDLE SPEED CONTROL: Target Idle Speed, Cold Idle-up RPM, Post-start RPM setting

CLOSED LOOP CONTROL: With both cruise and idle settings

PROGRAMMABLE OUTPUT OPTIONS

#### Miscellaneous

LAPTOP DATA LOGGING: Engine data information logged at a nominal rate of 40 logs per second, stored to disk. Limited by disk space.

ON BOARD DATA LOGGING: Storage for approximate 2 minutes at 200 logs per second, 6 channels of data. 40 minutes at 10 logs per second, 6 channels, 7 hours at 1 log per second, 6 channels.

REAL TIME PROGRAMMING: Instant, hesitation free adjustment while engine is running.

RUGGED ALUMINIUM CASING: Black anodised with integral cooling fins and mounting brackets.

#### Optional

FULLY TERMINATED AND SHEATHED WIRING HARNESS: In Lieu of Flying Wire Lead Harness.

HALTUNER: Inexpensive dash mounted Air-Fuel Ratio Meter.

IGNITION COILS: Available as Single, Dual and Rotary Pack (4).

IGNITION IGNITER WITH DWELL CONTROL: Available as single and dual igniters.

OPTIONAL IGNITION IGNITER WITHOUT DWELL CONTROL: Available as single, dual and triple igniters.

OPTIONAL MIXTURE / IGNITION / BOOST TRIM MODULE

Provides  $\pm 12\frac{1}{2}\%$ ,  $\pm 25\%$  or  $\pm 50\%$  injection time adjustment for fast tuning.

Provides  $\pm 5^\circ$ ,  $\pm 10^\circ$  and  $\pm 12.5^\circ$  ignition advance adjustment for fast tuning

Provides 0 - 100% boost trim adjustment.

Optional Boost Control Solenoid.

Optional Dual Hall Effect Sensor Kit.

Optional Extra Injector Driver Kit.

Optional Four Wire Heated Oxygen Sensor.

Optional Idle Air Control Motor Housing.

Optional Idle Air Control Motor.