HALTECH™
ENGINE MANAGEMENT SYSTEMS

E11v2 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. The E11 has a total of 14 fuel and ignition outputs. Unused fuel and ignition outputs are available as auxiliary outputs. In addition, the E11 has 4 PWM outputs, 7 analogue inputs, 4 digital inputs, closed loop idle control and dedicated outputs for stepper motor idle control.

With a large number of outputs available for controlling fuel and ignition, the E11 is well equipped to run engines with sequential fuel and modern multi-coil ignition systems.

Most OEM coils and ignitors, and most aftermarket coils and ignitors can be controlled by the E11, all configurable via Halwin.

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 02 Sensor
*Electronic boost control		*Deceleration fuel cut
*Thermo-fan	*NOS enable	*Intercooler fan
*Shiftlight	*Aux. fuel pump	*Tacho (5v,8v,12v)
*Stall saver	*Anti-lag	*Staging signal
*Turbo timer	*VTECH	*Torque convertor lock up
*Rev limiter	*Air con	*Dual intake valve
*Load Switch	*Extra Injector	*Air Conditioner
*RPM Switch	*TPS Switch	*Engine Control relay

*BAC valve (2 wire & 3 wire IAC)

(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.

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

E11 Kit Contents:

Electronic Control Unit (ECU)
Flying lead wiring loom
3 x Power Relays
Air Temperature Sensor (Extra)
Coolant Temperature Sensor (Extra)
MAP Sensor (Extra)
Throttle Position Sensor (Extra)
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
Multi-tooth
Nissan Optical
Bosch Motronic
Subaru
Mitsubishi Std

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
Throttle Body (Batch)
Staged

ECU Inputs:

Crank Position Sensor
Cam Position Sensor
MAP Sensor (1,2 and 3 Bar)
Throttle Position (potentiometer type)
Coolant Temperature
Air Temperature
Barometric Pressure
Oxygen Sensor
Road Speed
Auxiliary Analog Input (x7)
Auxiliary Digital Input (x4)

ECU Outputs:

Injector Drivers: 12
Up to 12 injector Outputs
Fuel Pump Relay Control
PWM outputs (x4)
Idle air control (IAC)

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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E11v2 Series
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E11v2 Specifications

Engine Suitability
Up to 16,000 rpm | 4, 5, 6, 8, 10 | 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.
Distributor ignition systems, or direct fire systems with 1 to 6 coils.

Power Requirements
Power Source: 8.6 to 16.5 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: 170 mm, Width: 145 mm, Depth: 42 mm
WEIGHT: ECU: 650g (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
ENGINE SPEED PICKUP: Compatible with most trigger systems:
5, 8 or 12 volt square wave;
Pull-to-ground (open collector)
Internal reluctor adaptor for magnetic (or 'reluctor') triggers.
Support for most standard tooth patterns.
(Please contact Haltech or its representatives for further assistance).

ECU Outputs
INJECTOR DRIVER: 12 x 4/1Amp peak-and-hold current limiting drivers:
Up to twelve low-impedance injectors or Up to twenty four 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, 32 Load points per range, (with programmable ranges) up to 32ms with 6.4us resolution.
IGNITION MAP: 32 RPM ranges, RPM to 16,000rpm, 32 Load points per range (with programmable ranges), up to 60° advance, with 0.1° resolution
CORRECTION MAPS

FUEL
- Barometric – 32 points
- Cold Start Prime - 32 points
- Coolant Temperature Enrichment - (2D - 32 points) (3D – 256 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
- Throttle Pump Enrich -32 points
- Throttle Pump Sustain -32 points
- Throttle Pump Decay -32 points
- Throttle Pump Temp -32 points
- End of injection – 32 points
- Staged Injection Angle Split Map – 32 points
- Staged Injection Map – 32 points
- Individual Cylinder Trimming +/- 12.5%

IGNITION
- Crank Advance - 32 points
- Coolant Temperature Advance/Retard - 32 points
- Air Temperature Advance/Retard - (2D - 32 points) (3D – 256 points)
- Individual Cylinder Trimming +/- 10°

PROGRAMMABLE REV-LIMIT: selectable as either fuel or ignition
FUEL CUT ON DECELERATION
ACCELERATOR PUMP: Enrichment, sustain and decay parameters.
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 CLOSED LOOP CONTROL: With both cruise and idle settings

Miscellaneous
LAPTOP DATA LOGGING: Engine data information logged at a nominal rate of 40 logs per second, stored to disk. Limited by disk space.
STORAGE FOR APPROX: 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
HALTUNER: Inexpensive dash mounted Air-Fuel Ratio Meter.
IGNITION COILS: Available as Single, Dual and six pack.
OPTIONAL IGNITION IGNITER WITHOUT DWELL CONTROL: Available as single, dual and triple igniters. CDI ignition available on request
OPTIONAL MIXTURE / IGNITION / BOOST TRIM MODULE
Provides ±12½%, ±25% or ±50% injection time adjustment for fast tuning.
Provides ±5°, ±10° and ±12.5° 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.
Optional Idle Air Control Motor Housing.
Optional Idle Air Control Motor.

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