m800

engine management system

smaller. faster. better.

MoTeC m800
engine management system

MoTeC in control

Since **MoTeC** was founded in 1987, the concept has been simple: build a business on the basis of providing quality products and services using the latest technology available. This philosophy of providing the best possible solutions, based on powerful hardware and easy to use software, has lead to MoTeC's great successes, worldwide.

MoTeC combines innovative product designs with an outstanding package of total customer support and an exceptional 2 year product warranty. This has made **MoTeC** one of the world's leading providers of Engine Management and Data Acquisition systems.

The main function of a programmable Engine Management System/ Engine Control Unit (ECU) is to provide full control of the engine over all possible ranges of operating conditions. At any given point (load/rpm site) the user is able to precisely set the amount of fuel injected and the optimum ignition timing.

The number of sites over which the engine is tuned can also be chosen, allowing extra sites for fine-tuning in certain areas (if required).

It does this by taking measurements from a number of sensors, then uses the calibration data to make compensations to the basic engine map based on current operating conditions.

m800 ENGINE MANAGEMENT SYSTEM

The M800 offers the next generation in Engine Management Systems. This system has been developed through rigorous research and practical field-testing. The M800 retains all the best features of our previous ECUs, while offering a combination of unsurpassed power and flexibility.

The M800 features a 60 pin connector

smaller.

• Compact and lightweight, only 500 grams.

• Only half the weight and half the size of the previous generation ECU.

faster.

• Upgraded microprocessor and memory accelerates overall speed.

• A new generation time co-processor enhances control of Fuel and Ignition

• Leading edge processor means data can be logged at up to 200 samples per second.

better.

• A digital triggering system that is customisable and programmable to suit any engine and includes sophisticated diagnostics that monitor the quality of trigger signals.

• The M800 talks to most existing sensors within your vehicle, saving costly additions of new sensors.

DIGITAL TRIGGERING SYSTEM

Flexibility – Programmable Trigger Levels: The DTS gives greater flexibility allowing the exact trigger levels to be set to suit the trigger sensor system. This ensures maximum compatibility with the trigger sensors.

Improved Noise Rejection – Programmable Filter Characteristics: Programmable filter characteristics allow the noise filter characteristics to be adjusted to suit the sensor system which gives improved noise rejection. This ensures the integrity of the trigger signals even in the most noisy environments.

Advanced Diagnostics: The DTS continuously monitors the quality of the trigger sensor signals and will give a warning if the quality of the signal is poor allowing trigger system problems to be rectified before they cause an operational problem.

Accuracy: Precision timing accuracy due to true zero crossing detection for magnetic trigger sensors.

m800 SOFTWARE

The M800 software has been designed with an emphasis on useability, which enables you to quickly optimise the setup of your vehicle. It is both user friendly for the beginner and a powerful tool for experts. All software is menu driven and has extensive help screens.
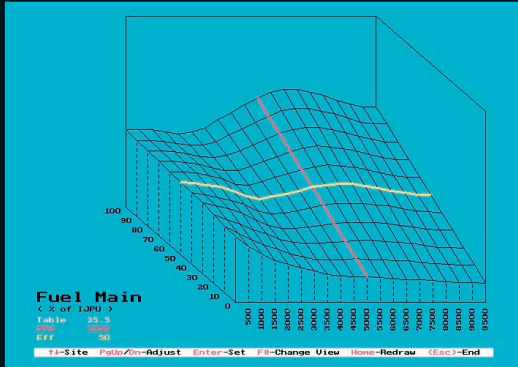
The key software is:

EMP Tuning Software

The EMP software is designed for setup, tuning and diagnostics of the M800. Tuning may be done on-line (with the ECU connected) or offline. The EMP software allows viewing of all sensor readings, output settings, status reading, compensations and diagnostic errors.

Other features include: Quick Lambda (automated fuel adjustment), 3D graphing of calibration tables, site target, output testing, files comparison, table inter-polation, table copy, table export, table mathematics and on-line help.

Interpret - Analysis

The Interpret software provides advanced tools to assist in analysing the logged data quickly and efficiently. Data can be collected from M800's internal log memory, by telemetry, or by direct connection to a PC. The information contained within the log files can be viewed numerically or graphically.

m800 UPGRADES

The M800 has various options which are field upgradable using a password and enabling system. Upgrade options include:

Logging

Gives you access to continuous recording of the operating parameters of the engine and vehicle including diagnostic features.

Pro Logging

Enables advanced data analysis with Graph Overlays, XY Plots, Maths Functions, Virtual Instrument Display and Track Maps.

Wideband Lambda
(air fuel ratio)

Allows the use of NTK, UEGO or Bosch LSU high accuracy Wideband Lambda sensors.

Telemetry

Enables the transmission of data from the M800, whilst in operation, to another point (e.g. the pits) in real time.

DIAGNOSTICS MONITORING SYSTEM

The diagnostics monitoring system monitors all aspects of the ECU operation, including:

Advanced diagnostics on the Digital Trigger System.

Open Circuit and Short circuit detection on the Injector, Ignition and Auxiliary Outputs.

Sensor fault detection on the sensor inputs.

This system helps to identify many of the wiring and sensor faults that may occur during operation allowing problems to be fixed quickly, particularly when combined with the ECU's powerful data logging system.

INDIVIDUAL CURRENT SETTING OF INJECTORS:

The current drive characteristics of each injector output is individually programmable. This allows different types of injectors to be used in Hi/Lo injector applications.

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INPUTS

OUTPUTS

POWER

Ref and Sync Trigger

- Magnetic Sensors (User Programmable Trigger Levels)
- Hall Sensors

6 Temperature Inputs

User Programmable as

- Engine Temperature
- Air Temp
- Oil Temperature
- Other sensors configurable

8 Voltage Inputs

User Programmable as

- Map Sensor
- Mass Air Flow Sensor
- Gear Position
- Other sensors configurable

2 Lambda Sensor Inputs

User Programmable as

- Narrow Band and
- High Speed Wide Band

4 Digital Inputs

User Programmable as

- Wheel Speeds
- Nitrous Control
- Speed Limiting

8 Fuel Injector Drivers

- Programmable Current Outputs
- Unused outputs can be used as Auxiliary Outputs

Ignition Drivers

- Up to 6 outputs for multi coil applications
- Unused outputs can be used as Auxiliary Outputs

8 Auxiliary Outputs

Programmable as

- Waste Gate Control
- Idle Up valves
- Fuel Pump Relay
- Stepper Motor Control
- Driver Warning Lights
- Additional Devices

Sensor Power Supply

MoTeC m800 engine management system

COMMUNICATIONS

- CAN for diagnostics
- RS232 for tuning and telemetry

M880

Other products available in this range include:

M880: Based on the M800 with an Autosport (military type) connector and 4 Mb of logging memory.

M1600: Specifically developed to support engines that require high numbers of injectors to be individually controlled, such as 6, 8, and 10 cylinder engines with high and low injectors controlled fully sequentially, and of course conventional V10, V12 and V16 full sequential engines.

MoTeC **Support:** With *MoTeC* you can be assured of the highest level of customer support; our dealers are fully trained to the MoTeC standard and comprehensive information is provided at the MoTeC website (including downloadable diagrams, software and application notes). MoTeC also runs seminars with worldwide experts on engine management and data acquisition. All backed up by a full two year worldwide warranty.

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ENGINE MANAGEMENT SYSTEMS	M800	M880
GENERAL		
Microprocessor - 3.3V 32 Bit with generation time co-processor and 32MHz internal operation	✔	✔
Quality Standard	ISO 9002	ISO 9002
Manufacturing Standard - IPC-S-815-A Class 3 High Reliability	✔	✔
Warranty Parts & Labour	2 year	2 year
Burn in –10 to 70 Deg C for 32 hours	✔	✔
ECU Control Software stored in updatable memory	✔	✔
High RFI Immunity	✔	✔
Low heat generation	✔	✔
Battery transient protection	✔	✔
Environmentally sealed electronics	✔	✔
Water-proof connector with gold plated contacts	✔	✔
Autosport connector	✘	✔
Case Size (mm)	147 x 105 x 40	147 x 105 x 40
Weight (kg)	0.500	0.525
Communication to PC or Dash Logger: - RS232 and CAN (PC via optional interface cable)3	✔	✔
Cylinders	1,2,3,4,5,6,8,10,12	1,2,3,4,5,6,8,10,12
Engines 2 stroke, 4 stroke, Rotary (1 to 4)	✔	✔
Maximum RPM	> 20,000	> 20,000
OPERATING CONDITION		
Internal Temperature Range (Deg C)	-10 ~ 85 Deg	-10 ~ 85 Deg
Ambient Temperature (Deg C) (Depending on load & ventilation)	-10 ~ 70 Deg	-10 ~ 70 Deg
Operating Voltage	6 ~ 22V DC	6 ~ 22V DC
Operating Current (ECU only)	0.5 A max.	0.5 A max.
Reverse Battery Protection	External Fuse	External Fuse
COMPUTER SOFTWARE		
Tuning, setup, diagnostic & utility software	✔	✔
Computer Requirements	IBM PC, DOS, Win 95/98/NT4/2000	IBM PC, DOS, Win 95/98/NT4/2000
Built-in help system	✔	✔
Advanced Analysis Software: Graph Overlays, XY Plots, Maths Functions, Virtual Instrument Display, Track Maps	Opt 3	Opt 3
INJECTION		
Number and Type	8 sequential	8 sequential
User Programmable Current	0.5 ~ 6 Amp peak	0.5 ~ 6 Amp peak
Individual Programmable Peak Current	✔	✔
Individual Programmable Hold Current	✔	✔
User Definable Battery Compensation	✔	✔
FUEL CALIBRATION		
Accuracy	0.00001 sec	0.00001 sec
RPM & Load Sites are user programmable	✔	✔
Main Table (3D) - RPM sites x Load sites	40 x 21	40 x 21
End of Injection Primary & Secondary (3D) - RPM sites x Load sites	20 x 11	20 x 11
Overall Trim	✔	✔
Individual Cylinder Trim	✔	✔
Individual Cylinder Tables (3D) – RPM sites x Load sites	20 x 11	20 x 11
Secondary Injector Balance Table (3D) - RPM sites x Load sites	20 x 11	20 x 11
Adjustable MAP, Engine & Air Temperature Compensations	✔	✔
Auxiliary Compensations	5	5
Gear Compensation	✔	✔
Accel./Deccel. Clamp, Decay & Sensitivity	✔	✔
Cold Start (5 parameters)	✔	✔
Number	6	6
1 output may drive up to 8 coils using the MoTeC Ignition Expander or CDI	✔	✔
Ignition Interface allows connection to most OEM Ignition systems	✔	✔
Programmable Ignition Current	✔	✔
Accuracy	0.25 degree	0.25 degree
RPM & Load Sites are user programmable	✔	✔
Main Table (3D) - RPM sites x Load sites	40 x 21	40 x 21
Overall Trim – % or Degrees	✔	✔
Individual Cylinder Trim	✔	✔
Individual Cylinder Tables (3D) – RPM sites x Load sites	20 x 11	20 x 11
Adjustable MAP, Engine & Air Temperature Compensations	✔	✔
Auxiliary Compensations	5	5
Gear Compensation	✔	✔
Accel. Adv. Clamp, Decay & Sensitivity	✔	✔
Dwell Time – RPM x Battery Voltage	10 x 11	10 x 11
Odd Fire engine capability	✔	✔
Rotary Ignition Split	✔	✔
Main Table (3D) - RPM Sites x Throttle or Gear Sites	20 x11	20 x11

ENGINE MANAGEMENT SYSTEMS	M800	M880
Overall Trim	✔	✔
Engine & Air Temperature Compensation	✔	✔
Auxiliary Compensation	1	1
TRIGGER SENSORS		
20 MegaSample Trigger Inputs	✔	✔
Directly Compatible with most OEM trigger systems including: Hall, Magnetic and Optical types; Multi-tooth (eg: Mazda and Toyota); 1 or 2 Missing Teeth (eg: Posche); Many other special types including: Ford narrow tooth, Nissan optical, Harley Davidson	✔	✔
Digital Signal Processing with Advanced Diagnostics	✔	✔
SENSOR INPUTS		
Throttle Position, Manifold Pressure, Engine and Air Temperature	✔	✔
Auxiliary Sensor Inputs	10	10
Digital/Speed Inputs	4	4
AIR FUEL RATIO INPUTS		
Narrow Band Air Fuel Ratio	✔	✔
Wideband Air Fuel Ratio	Opt 2	Opt 2
NTK or Bosch LSU Type	2	2
Range – Lambda	0.70 to 32.0	0.70 to 32.0
Resolution – Lambda	0.001	0.001
Useable as Auxillary Sensor Inputs	2	2
DATA LOGGING		
Allows Logging of all ECU parameters	Opt 1 or Opt 2	Opt 1 or Opt 2
Memory Size	1Mb	4Mb
Individual Parameter & Rate Selection	✔	✔
Logging Rate – Sets / second	1 to 200	1 to 200
Logging Time – 28 Par. + Diag. at 5/sec	76 minutes	304 minutes
Interpret Software – Graphical Analysis	Opt 1 or Opt 2	Opt 1 or Opt 2
— Advanced Analysis	Opt 3	Opt 3
Maximum parameters logged	128	128
Maximum logging throughput	10 kbytes/sec	10 kbytes/sec
SPECIAL FUNCTIONS		
Traction Control & Launch Control	2, 3 or 4 wheel	2, 3 or 4 wheel
Narrow Band Lambda Control	✔	✔
Wideband Lambda Control	Opt 2	Opt 2
Gear Change Ignition Cut	✔	✔
Over Run Boost Enhancement	✔	✔
Warning Alarms (Sensor HI / LO)	✔	✔
Gear Detection	✔	✔
Ground Speed Limiting	✔	✔
Dual RPM Limit	✔	✔
Nitrous Oxide Enrich / Retard	✔	✔
Air Conditioner Request	✔	✔
Over Run Fuel Cut	✔	✔
Standard Sensor Calibrations	✔	✔
Programmable Sensor Calibrations	✔	✔
RPM Limit, Hard or Soft cut, fuel and/ or ignition	✔	✔
Number of Auxiliary	8	8
All outputs are PWM or switched capable	✔	✔
4 Wire Stepper Motor Capable	✔	✔
Number of Outputs with High and Low Side drive	6	6
Auxiliary Outputs can be used for: Turbo Wastegate Control, Idle Speed Control; Fuel Used Control, Tacho Output; Shift Light, Driver Warning Alarm; RPM / Load dependent device; User definable Table (20x11) with selectable axis parameters; Slip Warning, Fuel Pump Relay; Thermatic Fan, Air Conditioner Fan and Clutch		
Injector Outputs may be used for general functions as per Auxiliary outputs	✔	✔
Ignition Outputs may be used for general functions	✔	✔
Injectors Open Circuit, Short Circuit, Peak Current not reached	✔	✔
Sensors Open & Short Circuit	✔	✔
Auxiliary Outputs Open & Short Circuit	✔	✔
Ref/Sync noise warning & error diagnostics (noise, runt pulses and amplitude)	✔	✔
Operating Errors: RPM Limit Exceeding, Injector overduty, Over Boost, Low Battery, REF Error etc.	✔	✔
Allows real time monitoring & data acquisition via a telemetry link	Opt 4	Opt 4

Notes: ✔ - Standard ✘ - Not available Opt 1 - Logging Opt 2 - Lambda & Logging Opt 3 - Pro Logging Opt 4 - Telemetry

www.motec.com.au

MoTeC Research Centre
121 Merrindale Drive
Croydon South, 3136
Victoria, Australia
Tel: 61 3 9761 5050
Fax: 61 3 9761 5051

MoTeC Europe Ltd
Unit 14, Twyford Mill Industrial Estate
Oxford Rd, Adderbury, Nr Banbury
Oxon, UK OX17 3HJ
Tel: 44 8700 119 100
Fax: 44 8700 111 922

MoTeC Systems USA
5355 Industrial Drive
Huntington Beach
California, 92649 U.S.A
Tel: 1 714 895 7001
Fax: 1 714 897 8782

For more information, contact your local MoTeC dealer

AUSTRALIA   EUROPE   USA   ASIA   Over 40 countries