

M1 SERIES ECUS

NEW GENERATION ENGINE MANAGEMENT SYSTEMS



Race smart.



>>> THE FUTURE OF ENGINE CONTROL

Endless possibilities, total control.



With the introduction of the MoTeC M1 Series ECUs comes an exciting new era of engine control. The M1's unique technology redefines the meaning of customisation, delivering total control without compromise, and highly advanced security strategies make these ECUs ideal for both category managed and unrestricted applications.

Numerous models will be phased into the M1 family over time, including direct injection (diesel and gasoline), Plug-In systems and specially sealed units for marine installations.

The M1 magnesium alloy casings are robust, lightweight and well suited to the extremes of motorsport. They are incredibly compact to suit a wide range of applications and are specially finished for maximum heat dissipation.

SECURITY

The M1 ECU allows different levels of access for different users e.g. engine tuner, chassis tuner, data engineer, and scrutineer. Each user can have a separate login to restrict access to particular areas of tuning and data logging.

The M1's advanced security system is based on public-key cryptography, the cornerstone of secure internet transactions, so it is virtually impossible to change the ECU function without authorised permission. Security is enforced by the ECU and protected by a microprocessor with integrated measures to prevent tampering.

USER CODING IS THE FUTURE

Traditionally, ECU customisation is limited to generic strategies where only the data can be modified. Now, MoTeC M1 technology takes custom configuration to a new level, allowing users to create algorithms and ECU functionality specifically for their application.

By investigating and experimenting with their own control strategies and developing their own intellectual property, customers can gain a distinct performance advantage and stay ahead of their opposition.

M1 SERIES FEATURES*

- Unprecedented flexibility and customisation
- Configurable firmware, supported by MoTeC training, allows users to define their own ECU functionality
- Latest generation high performance processor
- Extremely compact and lightweight in robust magnesium cases
- Direct injection diesel and gasoline capability
- Sequential gearbox control
- Suitable for modern engines with multiple Drive by Wire, variable cam control, multiple CAN buses etc.
- Broad range of models to suit cars, bikes, boats and custom vehicles
- Solutions for every level, from professional teams through club competition and weekend racers down to road going performance enthusiasts
- M1 series suits category management applications due to advanced security features and comprehensive configurability
- Extensive I/O on larger models (M190 has 52 outputs, 43 inputs, 6 communication ports)
- Input expansion using VIMs/SVIMs
- Large logging memory (up to 250 MB) with Ethernet for fast downloads
- Advanced logging features (high speed, multiple logs (with access logins), Pro Analysis)
- Knock measurement inputs
- Programmable injector drive characteristics and full diagnostics
- Programmable Digital Input system for Ref/Sync, wheel speeds etc. with programmable trigger levels and full diagnostics
- Ref/Sync (crank/cam sensor) waveform capture
- Lambda measurement via MoTeC LTC Lambda to CAN modules - allows for many Lambda sensors
- Compatible with MoTeC's new IGN4 compact 4 channel ignition coil amplifier and DHB Dual Half Bridge module
- Compatible with existing MoTeC products such as SLM Shift Light Module, Dash Loggers etc.
- All Auxiliary Outputs have PWM (Pulse Width Modulated) capability
- Built-in 3 axis accelerometer

*Some features are planned for future releases. Not all features will be available on all models.



M1 SERIES ECUs



CATEGORY MANAGEMENT

The combination of an advanced security strategy, configurable firmware and a high performance processor make the M1 ECU an ideal choice for categories with restrictions in place for either performance parity or cost containment. Firmware can be written specifically for the category, limiting the functionality to the class requirements.

Multiple data logging sets are available which can be partitioned with restricted access to allow generation of both judicial (scrutineering) and team data from the same device. The M1 ECU's security system prevents unauthorised access to data and implementation of unspecified functionality.

SELECTABLE CONFIGURATION LEVELS

MoTeC M1 Series ECUs are available with various levels of configurability to provide each user with the ideal solution for their needs. The most suitable choice of ECU is a combination of hardware selection, determined by output and connector requirements, and a configuration level, determined by the scope of flexibility required for the particular application.

TARGETED APPLICATION

M1 ECUs can be supplied for a specific engine or engine/chassis combination. The ECU contains specific firmware to suit the application, for example, a particular make and model of vehicle or a controlled race series. The ECU allows the user to tune the engine in the normal way but the ECU cannot be re-configured for another application.

STANDARD ENABLE

Standard Enable ECUs allow the user to load a selection of firmware packages available from MoTeC. The firmware packages will incorporate different levels of functionality and the user can choose from a selection of packages to customise the ECU to suit requirements. Additional packages can be loaded into the ECU as and when requirements change.

DEVELOPMENT LICENCE

MoTeC provides a fully flexible M1 ECU solution that can be precisely tailored to individual requirements. Customers can be trained to use MoTeC's *M1 Build* software to develop their own control strategies, or they can contract the services of a specially authorised System Integrator. These third party developers must meet stringent criteria before qualifying for this status. Intellectual property is protected by the M1 ECU's security system and remains with the ECU owner.



DATA LOGGING

In many applications the M1 ECU can control both engine and chassis, as well as being a fully featured data logger.

All models feature a large logging memory and options for advanced features such as high speed logging (up to 1 kHz), multiple independent logging systems with separate security, and input expansion using VIMs (Versatile Input Modules).



The M1 series uses the acclaimed *i2 Standard* or *i2 Pro* analysis software, providing extensive data analysis features. (See separate brochure)





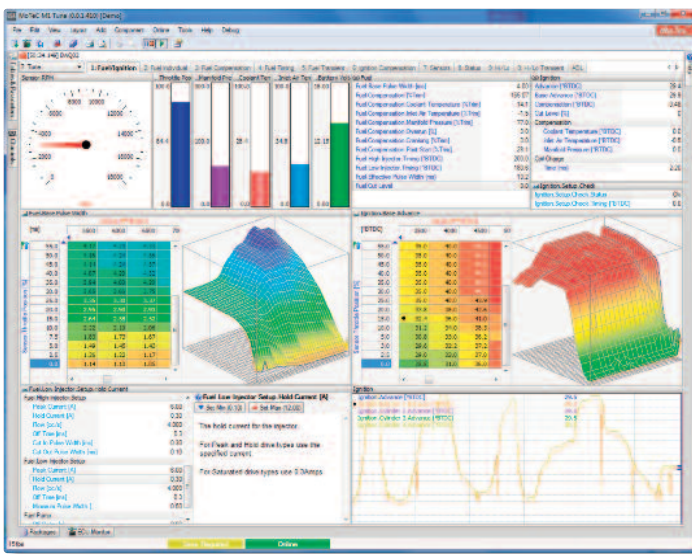
SOFTWARE BUILD & TUNE

M1 TUNE SOFTWARE

M1 Tune provides access to the tuning features of the M1 ECU. It is highly flexible, allowing multiple, customised screen layouts similar to the *i2Data Analysis* software.

The program is unique in that it adapts to any customisations that have been made to the ECU via the *M1 Build* software. As Tables, Parameters or Channels are added, *M1 Tune* automatically conforms to provide access to these items.

It also features on screen logging whereby data from the ECU is automatically recorded for quick and easy analysis directly on the tuning screens.

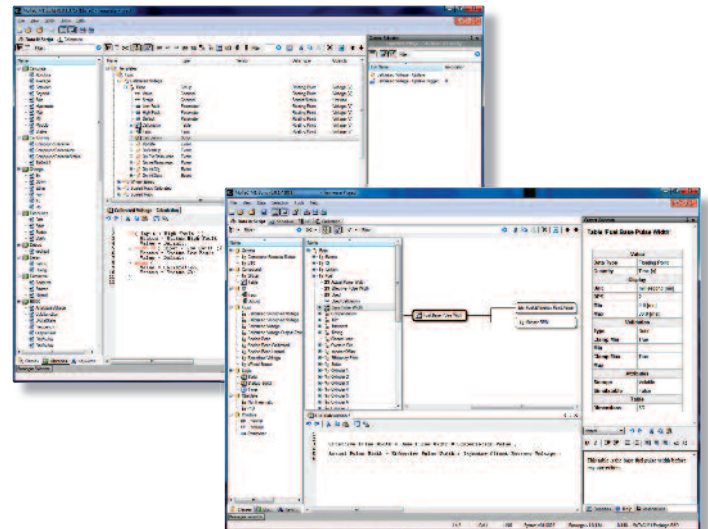


M1 BUILD SOFTWARE

M1 Build customises the functionality of the ECU, providing an unprecedented level of control. It allows the user to add Tables, Parameters and Channels and to enter 'Script' that defines how the ECU operates. The Script is a 'C' like programming language that enables entry of logic, calculations and algorithms.

For most customers it is not necessary to use the *M1 Build* software because MoTeC will provide flexible configurations for many applications, and will also offer a service to customise the operation of an ECU. However, customers wanting to perform their own ECU customisation can be trained in the use of *M1 Build*.

MoTeC will also support third party developers known as *System Integrators*, who, once qualified, can provide customisation services to end users.



MODEL SPECIFICATIONS

FEATURES	MODEL SERIES	M130 SPORT	M141/M142 SPORT	M150 SPORT	M170 PRO	M181/M182 PRO	M190 PRO
Connector (Type/Number of Pins) P = Plastic Connector (Sport) AS = Autosport (Pro)		P/60	P/120	P/120	AS/66	AS/136	AS/136
Injector Type P = Port Injection D = Direct Injection		P	D	P	P	D	P
Injector Outputs ^ H = High Ohm L = Low Ohm Peak & Hold D = Direct Injection		8L	8D	12L	8L	12D	12L + 12H
Ignition Outputs (max ^)		8	8	12	8	12	12
Aux Outputs Low Side/Half Bridge		2/6	6/10	6/10	2/6	6/10	6/10
Inputs (AV/AT/Knock)		8/4/2	17/6/4	17/6/4	8/4/2	17/6/4	17/6/4
Digital Inputs (UDIG/DIG)		7/0	12/4	12/4	8/0	12/4	12/4
CAN Bus/ RS232/ LIN		1/0/0	3/1/1	3/1/1	1/0/0	3/1/1	3/1/1
PC Comms (Ethernet)		Y	Y	Y	Y	Y	Y
Maximum Logging Memory Size (MB)		120	120	120	250	250	250
Options for Logging Input Expansion, Multiple Logs, Fast Logging, Pro Analysis, Telemetry etc.		Y	Y	Y	Y	Y	Y
Size (mm)		107 x 127 x 39	162 x 127 x 39	162 x 127 x 39	107 x 127 x 39	162 x 127 x 39	162 x 127 x 39
Weight (approx.)		300g	500g	450g	300g	540g	480g

^Unused injector and ignition outputs can be used as low side auxiliary outputs.

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