Engine Control Units

M1 Series ECU's

Advances in technology have increased the demands on a vehicle's components, especially the ECU. This demand has reached the point where a single firmware to ECU configuration cannot meet the market's ECU requirements (even with increased capacity and processor speed).

The M1 series was conceived by MoTeC to overcome this one-to-one, firmware to ECU limitation, by designing a system where operational efficiency, advanced features and flexibility are its primary objectives. At its core, M1 provides the ability to develop a suite of flexible and tailored solutions (packages), making it ideal for any application (however complex) and category management.

Key advantages of M1 systems:

- Latest generation high performance processor
- Large logging memory, fast Ethernet downloads
- Compact and lightweight in robust magnesium enclosures
- Supports direct injection and port injection applications
- Supports advanced logging features including Pro Analysis (i2 Pro)
- Advanced security system, incorporating an anti-tampering microprocessor
- Access log-in levels for multiple users
- Suitable for modern engines with DBW, Cam Control and multiple CAN buses
- Advanced logging features, high speed, multiple logs (with access logins)
- I/O expansion using E816, E888 expanders
- Flexible tuning software
- Programmable digital input system for Ref/Sync, wheel speeds etc.
- Programmable trigger levels, diagnostics
- All Low Side and Half Bridge outputs have PWM capability

MOTEC'S DISTINCTIVE RANGE OF M1 ECU SOLUTIONS

Targeted Solutions - We've done the configuration work for you, tailoring the ECU firmware to a specific vehicle or engine. In some cases this includes integration with vehicle control systems beyond the engine, for example, stability control, cruise control. Complete Plug-In kits are available for some applications, including any additional hardware and wiring looms as required. See targeted solutions for Vehicle, Bike, PWC or Snowmobiles

GP (General Purpose) Solutions - MoTeC's GP Solutions offer the flexibility to suit numerous port and direct injected gasoline engines. Comprising of:
- **GPA** (Advanced)
- **GPR** (Race)
- **GPRP** (Race with Paddle shift)
- **GPRDI** (Race with Direct Injection)
- **GPRPDI** (Race with Paddle Shift and Direct Injection)

These variants that can be configured to suit a wide range of applications.

Development Solutions - Those who are skilled at coding can now develop fully customised control strategies at the firmware level, creating unique ECU functionality for themselves or other customers. Developers can build custom controls into an existing package, or create a new project from scratch. In either instance, the resulting firmware can be loaded into a single Development ECU or rolled out for customers around the world to purchase.

Ruggedised - Sometimes an extra level of protection for electronic components is required, such as marine applications or environments subject to dirt or dust. Our Ruggedised M1 hardware ensures maximum longevity under these extreme conditions.

M130 ***M150*** ***M170*** ***M190*** ***M142*** ***M182***

M1 Series ECU's con'd

MoTeC's M1 ECU range begins a new era in engine control.meaning of customisation, delivering total control without compromise Highly advanced security strategies make these ECUs ideal for both category managed and unrestricted applications.

The M142 and M182 are Diesel / Direct Injector ECUs that offer full control for most modern high pressure injectors, without the need for additional amplifier boxes.

FEATURES

- Small and light in robust magnesium enclosure
- Port injection injector type (M130, M150, M170, M190)
- Diesel and Direct injection control without the need for an external controller (M142, M182)
- Large logging memory
- Latest generation high performance processor
- Suitable for modern engines with DBW, Cam Control and multiple CAN buses
- Advanced logging features, high speed, multiple logs (with access logins)
- I/O expansion using E816, E888 expanders
- Flexible tuning software
- Robust and comprehensive security features
- Programmable injector drive characteristics
- Programmable digital input system for Ref/Sync, wheel speeds etc.
- Programmable trigger levels, diagnostics
- All Low Side and Half Bridge outputs have PWM capability

CONFIGURATION

The M1 series ECUs come with three configuratoin options.

Locked Configuration

A locked configuration is appropriate when an ECU contains specific firmware to suit the application. The user can tune the engine in the normal way but the ECU can not be re-configured for another application.

Standard Configuration

The standard configuration allows the user to load a selection of firmware packages available from MoTeC. They incorporate different levels of functionality and the user can choose one to suit their requirements. Additional packages can be loaded into the ECU as and when requirements change.

Open Configuration

The open configuration provides a fully flexible ECU solution that can be precisely tailored to individual requirements. Third party developers can be trained to use MoTeC M1 Build software to develop their own control strategies. Intellectual property is protected by the M1 ECU's security system. andremainswiththeECUowner.

SECURITY

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.

A password feature grants different levels of access for different users e.g. an engine tuner, a drive train tuner, and a data analysis engineer.

This is also suitable for Control ECUs. Scrutineering teams can have access to extra information and are able to lock down selected parts of the ECU, while other team members can access selected tuning parameters.

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.

UPGRADES

- Various Logging Options are available.
  The logging licence determines the number of channels and the sample rates available, there are 3 levels available:
  - **Logging Level 1 Licence**
    Comes standard with the product. This diagnostic logging includes a fixed log set and rate.
  - **Logging Level 2 Licence**
    Is an optional upgrade which includes one fixed log set, 200 channels (including diagnostics) and a maximum 200 Hz sample rate.
  - **Logging Level 3 Licence**
    Is an optional upgrade which includes eight fixed log sets, 2000 channels and a maximum 1000 Hz sample rate.
- Configuration:
  - Locked Configuration
  - Standard Configuration
  - Open Configuration

SOFTWARE

- Microsoft Windows™ based software
- PC Tuning software 'Tune' - Used to tune fuel and ignition, set up sensors, outputs and available functions
- PC Software 'Build' - Used to create a custom software package with user specific functions

Web	Item Number	Description
	M130	M1 ECU 60 POS PLASTIC
	M130 M	M1 MARINE ECU 60 POS PLASTIC
	M150	M1 ECU 120 POS PLASTIC
	M150 M	M1 MARINE ECU 120 POS PLASTIC
	M170	M1 ECU 66 POS AUTOSPORT
	M190	M1 ECU 136 POS AUTOSPORT
	M190 M	M1 MARINE ECU 60 POS PLASTIC
	M142	M1 ECU 120POS PLAS DIRECT INJ
	M182	M1 ECU 136 POS AS DIRECT INJ

M1 Series Hardware Comparison Chart

Injector						
Direct Injector Outputs					8	12
Max hold current (A)					12	12
Injector Voltage (max)					90 V	90 V
Peak & Hold Outputs (can also drive saturated)	8	12	8	12		
Low Side Outputs				12	6	6
Ignition						
Low Side Ignition Outputs (max)	8	12	8	12	8	12
Auxiliary Outputs						
Low Side Output	2	6	2	6	6	6
Half Bridge Output	6	10	6	10	10	10
Inputs						
Universal Digital Input	7	12	8	12	12	12
Digital Input		4		4	4	4
Analog Voltage Input	8	17	8	17	17	17
Analog Temp Input	4	6	4	6	6	6
Lambda (Narrow band)	0	2	0	2	2	2
Data						
CAN Bus/RS232/LIN	1/0/0	3/1/1	1/0/0	3/1/1	3/1/1	3/1/1
Logging Memory (MB)	120	250	250	250	250	250
Physical Size (mm)						
107x127x39 (mm)	✓		✓			
162x127x39 (mm)		✓		✓	✓	✓
Weight (g)	290g	450g	310g	490g	490g	530g
No. of Connectors						
Plastic	2	4			4	
Autosport			1	3		3
Pins	60	120	66	136	120	136

M84

The new MoTeC M84 ECU delivers a unique package of professional-level features at an entry-level price. Designed with the same sophisticated technology that leading motorsport teams trust worldwide, this is intelligent, race proven control with just the right amount of versatility.

Engine Tuning Features

Windows based ECU Manager tuning software with user definable screen layouts
Individual cylinder tuning of both fuel delivery and ignition timing
Suits modern engines, including those with coil per cylinder ignition
Fully configurable axis points on all tables
Highly configurable crank and cam trigger inputs to suit almost all OEM sensors and tooth patterns
Single Wideband Lambda input (dual optional)

Additional Distinct Features

Capable of advanced control functions, such as:

- Traction control
- Overrun boost enhancement (anti-lag)
- Gear change ignition cut (flat shift)
- Boost control
- NEW: Nitrous injection
- Dual stage injection (Hi/Lo injection)

Configurable sensor inputs including custom calibrations
Capable of receiving and transmitting data via the CAN bus
Capable of receiving data from two Lambda measurement devices via CAN
Integrated advanced diagnostics, including injector and crank trigger diagnostics
Ref/Sync capture displayed on the built-in digital oscilloscope

Data Acquisition

Internal data logging (512 kB) with fast download via CAN
State of the art i2 Standard data analysis software
Now with 100 Hz max logging rate

Web	Item Number	Description
	M84	M84 ECU

Outputs

8 x Injector outputs - high or low ohm
6 x Ignition outputs
8 x Auxiliary outputs - for functions such as boost control, idle speed stepper motor and many more

Inputs

Throttle Position
Manifold Pressure
Mass Air Flow
Fuel Pressure
Oil Pressure
Exhaust Temperature
Gear Position
User 1
Air Temperature
Coolant Temperature
User 2
3 x Switched Analogue Temperature
2 x Lambda Inputs (supports Wideband and Narrowband sensors)
4 x Digital Inputs (wheel speed or switch)

Communications

1 x CAN
1 x RS232

Physical

Case size 147 x 105 x 40 mm
Weight 500 grams
1 x 34 pin and 1 x 26 pin waterproof connector with gold plated contacts

M400

Developed with the same advanced technology as our revolutionary M800 and M880 models, the MoTeC M400 reflects the demand for sophisticated electronics to control today's highly evolved engines.

Engine Tuning Features

Windows based ECU Manager tuning software with user definable screen layouts
Individual cylinder tuning of both fuel delivery and ignition timing
Suits modern engines, including those with coil per cylinder ignition
4D fuel and ignition tables for engine mapping based on three channels ‡
Fully selectable input channels for all tables, including internal channels ‡
Fully configurable axis points on all tables ‡
Highly configurable crank and cam trigger inputs to suit almost all OEM sensors and tooth patterns
Free access to Wideband Lambda and data logging for initial tuning. Available for the first 8 hours of engine running time

Additional Distinct Features

Suitable for engines requiring the latest complex control functions, such as:

- Continuously variable camshaft control (up to 2 inlet and 2 exhaust cams)
- Drive by Wire throttle control

Capable of all other modern control functions, such as:

- Traction control
- Overrun boost enhancement (anti-lag)
- Gear change ignition cut (flat shifts)
- Boost control
- Nitrous injection
- Dual stage injection (Hi/Lo injection)

Fully configurable sensor inputs including custom calibrations
Configurable receiving and transmitting data via the CAN bus
Capable of receiving data from multiple Lambda measurement devices via CAN
Integrated advanced diagnostics, including injector & crank trigger diagnostics
Switchable between multiple configurations ‡
Ref/Sync capture displayed on the built-in digital oscilloscope ‡

Data Acquisition

Internal data logging (512 kB) with fast download via CAN
Three engine histogram logs including a tell-tale log ‡
State of the art i2 Standard or i2 Pro data analysis software
Upgradable with optional functionality to make additional features available when you want them, activated through a simple password system.

Web	Item Number	Description
	M400	M400 ECU

Outputs

4 x Injector outputs—high or low ohm
4 x Ignition outputs
8 x Auxiliary outputs—for functions such as camshaft control, drive by wire throttle, boost control, nitrous injection, idle speed stepper motor and many more

Inputs

8 x Analogue voltage inputs—fully configurable including custom calibrations
6 x Analogue temperature inputs—fully configurable including custom calibrations
1 x Wideband Lambda input—for Lambda measurement and control
4 x Digital/speed inputs—for wheel speeds and function activation

Communications

1 x CAN
1 x RS232

Physical

Case size 147 x 105 x 40 mm
Weight 500 gram
1 x 34 pin and 1 x 26 pin waterproof connector with gold plated contacts

‡ Only available with Version 3 software

M600

Developed with the same advanced technology as our revolutionary M800 and M880 models, the MoTeC M600 reflects the demand for sophisticated electronics to control today's highly evolved engines.

Engine Tuning Features

Windows based ECU Manager tuning software with user definable screen lay-outs
Individual cylinder tuning of both fuel delivery and ignition timing
Suits modern engines, including those with coil per cylinder ignition
4D fuel and ignition tables for engine mapping based on three channels ‡
Selectable channels for table axes ‡
Fully configurable axis points on all tables ‡
Highly configurable crank and cam trigger inputs to suit almost all OEM sensors and tooth patterns
Free access to wideband Lambda and data logging for initial tuning. Available for the first 8 hours engine running time

Additional Distinct Features

Suitable for engines requiring the latest complex control functions, such as:

- Continuously variable camshaft control (up to 2 inlet and 2 exhaust cams)
- Drive by wire throttle control

Capable of all other modern control functions, such as:

- Traction control
- Overrun boost enhancement (anti-lag)
- Gear change ignition cut (flat shifts)
- Boost control
- Nitrous injection
- Dual stage injection (Hi/Lo injection)

Fully configurable sensor inputs including custom calibrations
Configurable receiving and transmitting data via the CAN bus
Capable of receiving data from multiple Lambda measurement devices via CAN
•ntegrated advanced diagnostics, including injector & crank trigger diagnostics
Switchable between multiple configurations ‡
Ref/Sync capture displayed on the built-in digital oscilloscope ‡

Data Acquisition

Internal data logging (512 kB) with fast download via CAN
Three engine histogram logs including a tell-tale log ‡
State of the art i2 Standard or i2 Pro data analysis software
Upgradable with optional functionality to make additional features available when you want them, activated through a simple password system.

Web	Item Number	Description
	M600	M600 ECU

Outputs

6 x Injector outputs—high or low ohm
6 x Ignition outputs
8 x Auxiliary outputs—for functions such as camshaft control, drive by wire throttle, boost control, nitrous injection, idle speed stepper motor and many more

Inputs

8 x Analogue voltage inputs—fully configurable including custom calibrations
6 x Analogue temperature inputs—fully configurable including custom calibrations
2 x Wideband Lambda inputs—for Lambda measurement and control
4 x Digital/speed inputs—for wheel speeds and function activation

Communications

1 x CAN
1 x RS232

Physical

Case size 147 x 105 x 40 mm
Weight 500 gram
1 x 34 pin and 1 x 26 pin waterproof connector with gold plated contacts

‡ Only available with Version 3 software

M820

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

Engine Tuning Features

- Windows based ECU Manager tuning software with user definable screen layouts
- Individual cylinder tuning of both fuel delivery and ignition timing
- Suits modern engines, including those with coil per cylinder ignition
- 4D fuel and ignition tables for engine mapping based on three channels ‡
- Selectable channels for table axes ‡
- Fully configurable axis points on all tables ‡
- Highly configurable crank and cam trigger inputs to suit almost all OEM sensors and tooth patterns
- Free access to wideband Lambda and data logging for initial tuning. Available for the first 8 hours engine running time

Additional Distinct Features

Suitable for engines requiring the latest complex control functions, such as:

- Continuously variable camshaft control (up to 2 inlet and 2 exhaust cams)
- Drive by wire throttle control

Capable of all other modern control functions, such as:

- Traction control
- Overrun boost enhancement (anti-lag)
- Gear change ignition cut (flat shifts)
- Boost control
- Nitrous injection
- Dual stage injection (Hi/Lo injection)

Fully configurable sensor inputs including custom calibrations
Configurable receiving and transmitting data via the CAN bus
Capable of receiving data from multiple Lambda measurement devices via CAN
Integrated advanced diagnostics, including injector & crank trigger diagnostics
Switchable between multiple configurations ‡
Ref/Sync capture displayed on the built-in digital oscilloscope ‡

Data Acquisition

Internal data logging (1 MB) with fast download via CAN
Three engine histogram logs including a tell-tale log ‡
State of the art i2 Standard or i2 Pro data analysis software
Telemetry and remote logging options
Upgradable with optional functionality to make additional features available when you want them, activated through a simple password system

Web	Item Number	Description
	M820	M800 ECU W/ADVANCED FUNCTIONS

Outputs

8 x Injector outputs—high or low ohm ‡
6 x Ignition outputs ‡
Optional injector / ignition configurations:
(requires 10/12 Cylinder Sequential upgrade)
10 high ohm injector outputs / 4 ignition outputs
12 high ohm injector outputs / 2 ignition outputs
8 x Auxiliary outputs—for functions such as camshaft control, drive by wire throttle, boost control, nitrous injection, idle speed stepper motor and many more

Inputs

8 x Analogue voltage inputs—fully configurable including custom calibrations
6 x Analogue temperature inputs—fully configurable including custom calibrations
2 x Wideband Lambda inputs—for Lambda measurement and control
4 x Digital/speed inputs—for wheel speeds and function activation

Communications

1 x CAN
1 x RS232

Physical

Case size 147 x 105 x 40 mm
Weight 500 gram
1 x 34 pin and 1 x 26 pin waterproof connector with gold plated contacts

‡ Only available with Version 3 software

M880

The M880 is MoTeC's top of the line ECU. Developed for motorsport professionals, it takes the M800 engineering one step further with an Autosport connector, Advanced Functions‡ as standard and an optional 4 MB logging memory.

Web	Item Number	Description
	M880	M880 ECU

Engine Tuning Features

Windows based ECU Manager tuning software with user definable screen layouts
Individual cylinder tuning of both fuel delivery and ignition timing
Suits modern engines, including those with coil per cylinder ignition
4D fuel and ignition tables for engine mapping based on three channels ‡
Selectable channels for table axes ‡
Fully configurable axis points on all tables ‡
Highly configurable crank and cam trigger inputs to suit almost all OEM sensors and tooth patterns
Free access to wideband Lambda and data logging for initial tuning. Available for the first 8 hours engine running time

Additional Distinct Features

Suitable for engines requiring the latest complex control functions, such as:

- Continuously variable camshaft control (up to 2 inlet and 2 exhaust cams)
- Drive by wire throttle control

Capable of all other modern control functions, such as:

- Traction control
- Overrun boost enhancement (anti-lag)
- Gear change ignition cut (flat shifts)
- Boost control
- Nitrous injection
- Dual stage injection (Hi/Lo injection)

Fully configurable sensor inputs including custom calibrations
Configurable receiving and transmitting data via the CAN bus
Capable of receiving data from multiple Lambda measurement devices via CAN
Integrated advanced diagnostics, including injector & crank trigger diagnostics
Switchable between multiple configurations ‡
Ref/Sync capture displayed on the built-in digital oscilloscope ‡

Data Acquisition

Internal data logging (1 MB or 4 MB) with fast download via CAN
Three engine histogram logs including a tell-tale log ‡
State of the art i2 Standard or i2 Pro data analysis software
Telemetry and remote logging options
Upgradable with optional functionality to make additional features available when you want them, activated through a simple password system.

Outputs

8 x Injector outputs—high or low ohm ‡
6 x Ignition outputs ‡
Optional injector / ignition configurations:
(requires 10/12 Cylinder Sequential upgrade)
10 high ohm injector outputs / 4 ignition outputs
12 high ohm injector outputs / 2 ignition outputs
8 x Auxiliary outputs—for functions such as camshaft control, drive by wire throttle, boost control, nitrous injection, idle speed stepper motor and many more

Inputs

8 x Analogue voltage inputs—fully configurable including custom calibrations
6 x Analogue temperature inputs—fully configurable including custom calibrations
2 x Wideband Lambda inputs—for Lambda measurement and control
4 x Digital/speed inputs—for wheel speeds and function activation

Communications

1 x CAN
1 x RS232

Physical

Case size 147 x 105 x 40 mm
Weight 525 gram
1 x 66 pin Autosport connector

‡ Only available with Version 3 software

M800 Plug-In ECUs

These ECUs are designed as plug in boards to replace the OEM computers in a number of high performance late model vehicles. Complete with an OEM connector, they provide the flexibility and performance of a MoTeC M800 ECU without the necessity of rewiring the car or building adaptor looms. They simply plug into the factory wiring harness using the original sensors, ignition modules and fuel system. The units are built to operate with saturated drive fuel injectors.

Engine Tuning Features

Windows based ECU Manager tuning software with user definable screen layouts
Individual cylinder tuning of both fuel delivery and ignition timing
Suits modern engines, including those with coil per cylinder ignition
4D fuel and ignition tables for engine mapping based on three channels ‡
Selectable channels for table axes ‡
Fully configurable axis points on all tables ‡
Highly configurable crank and cam trigger inputs to suit almost all OEM sensors and tooth patterns
Free access to wideband Lambda and data logging for initial tuning. Available for the first 8 hours engine running time

Additional Distinct Features

Possibility to communicate directly with MoTeC diff controllers for the same vehicles
Suitable for engines requiring the latest complex control functions, such as:

- Continuously variable camshaft control (up to 2 inlet and 2 exhaust cams)
- Drive by wire throttle control

Capable of all other modern control functions, such as:

- Traction control
- Overrun boost enhancement (anti-lag)
- Gear change ignition cut (flat shifts)
- Boost control
- Nitrous injection

Fully configurable sensor inputs including custom calibrations
Configurable receiving and transmitting data via the CAN bus
Capable of receiving data from multiple Lambda measurement devices via CAN
Integrated advanced diagnostics, including injector & crank trigger diagnostics
Switchable between multiple configurations ‡
Ref/Sync capture displayed on the built-in digital oscilloscope ‡

Web	Item Number	Description
	M800-EVO4-7	EVO 4-7 AND EVO 8 RS
	M800-EVO 4-8	EVO 4-8
	M800-EVO8GSR	EVO-8 GSR
	M800-EVO9	EVO 9
	M800-EVO X †	EVO X
	M800-WRX7	WRX 7/8
	M800-WRX9	WRX 9/10

Data Acquisition

Internal data logging (1 MB) with fast download via CAN
Three engine histogram logs including a tell-tale log ‡
State of the art i2 Standard or i2 Pro data analysis software
Telemetry and remote logging options
Upgradable with optional functionality to make additional features available when you want them, activated through a simple password system.

Outputs

4 x Injector outputs
4 x Ignition outputs
14 x Auxiliary outputs—for functions such as camshaft control, drive by wire throttle, boost control, nitrous injection, idle speed stepper motor and many more

Inputs

8 x Analogue voltage inputs—fully configurable including custom calibrations
6 x Analogue temperature inputs—fully configurable including custom calibrations
2 x Wideband Lambda inputs—for Lambda measurement and control
4 x Digital/speed inputs—for wheel speeds and function activation

Communications

1 x CAN
1 x RS232

Physical

Board sizes to fit into the OEM ECU enclosure
Connector to match OEM connector

‡ Only available with Version 3 software
† **Special Orders Only**

PWC Plug-in ECU's

MoTeC PWC Plug-In ECUs are fully programmable, direct replacements for factory ECUs on a select number of popular PWC models. The kits are based around an M400 Marine ECU which is fully polyurethane-potted, making it specifically suited to the watercraft environment. Complete with a wiring loom and mounting brackets, simply plug into the factory wiring harness using the original sensors and fuel system.

Engine Tuning Features

Windows based ECU Manager tuning software with user definable screen layouts
Individual cylinder tuning of both fuel delivery and ignition timing
Suits modern engines, including those with coil per cylinder ignition
4D fuel and ignition tables for engine mapping based on three channels
Selectable channels for table axes
Fully configurable axis points on all tables
Highly configurable crank and cam trigger inputs to suit almost all OEM sensors and tooth patterns
Free access to wideband Lambda and data logging for initial tuning.

Additional Distinct Features

Possibility to communicate directly with OEM Dash
Suitable for engines requiring the latest complex control functions, such as:

- Continuously variable camshaft control (up to 2 inlet and
- 2 exhaust cams)
- Drive by wire throttle control

Capable of all other modern control functions, such as:

- Launch control
- Overrun boost enhancement (anti-lag)
- Boost control
- Nitrous injection

Fully configurable sensor inputs including custom calibrations
Configurable receiving and transmitting data via the CAN bus
Capable of receiving data from multiple Lambda measurement devices via CAN
Integrated advanced diagnostics, including injector & crank trigger diagnostics
Switchable between multiple configurations
Ref/Sync capture displayed on the built-in digital oscilloscope

Data Acquisition

Internal data logging (500 kB) with fast download via CAN
Three engine histogram logs including a tell-tale log
State of the art i2 Standard or i2 Pro data analysis software
Telemetry and remote logging options
Upgradable with optional functionality to make additional features available when you want them, activated through a simple password system.

Outputs

4 x Injector outputs—high or low ohm
4 x Ignition outputs
8 x Auxiliary outputs—for functions such as drive by wire throttle, boost control, nitrous injection, idle speed stepper motor and many more

Inputs

8 x Analogue voltage inputs—fully configurable, use for e.g.:
-jet outlet pressure
-jet intake pressure
-steering position
-lateral G force
6 x Analogue temperature inputs—fully configurable, use for :
-multiple configuration maps
-extra air or water temperature
-exhaust temperature
1 x Wideband Lambda input—for Lambda measurement and control
4 x Digital/speed inputs—for use with OEM factory speed paddle wheel and function activation e.g. launch control, anti lag and dual RPM limit

Communications

1 x CAN
1 x RS232—for use with GPS
A 5 Hz MoTeC GPS-L5 can be wired direct to the M400 for logging of accurate speed and position.

Physical

Case size 147 x 105 x 40 mm
Weight 900 gram
1 x 34 pin and 1 x 26 pin waterproof connector with gold plated contacts

Web	Item Number	Description
	M400 YAMAHA	MARINE ECU W/YAMAHA ADAPTOR
	M400 KAWASAKI	MARINE ECU W/KAWASAKI ADAPTOR
	M400 SEADOO	MARINE ECU W/SEADOO ADAPTOR
	M400 HYDROSPACE	MARINE ECU W/HYDROSPACE ADAPTOR

Snowmobile Plug-In ECU's

MoTeC PWC Plug-In ECUs are fully programmable, direct replacements for factory ECUs on a select number of popular PWC models. The kits are based around an M400 Marine ECU which is fully polyurethane-potted, making it specifically suited to the watercraft environment. Complete with a wiring loom and mounting brackets, simply plug into the factory wiring harness using the original sensors and fuel system.

Engine Tuning Features

Windows based ECU Manager tuning software with user definable screen layouts
Individual cylinder tuning of both fuel delivery and ignition timing
Suits modern engines, including those with coil per cylinder ignition
4D fuel and ignition tables for engine mapping based on three channels
Selectable channels for table axes
Fully configurable axis points on all tables
Highly configurable crank and cam trigger inputs to suit almost all OEM sensors and tooth patterns
Free access to wideband Lambda and data logging for initial tuning. Available for the first 8 hours engine running time

Additional Distinct Features

Possibility to communicate directly with OEM Dash
Suitable for engines requiring the latest complex control functions, such as:

- Continuously variable camshaft control (up to 2 inlet and 2 exhaust cams)
- Drive by wire throttle control

Capable of all other modern control functions, such as:

- Traction control
- Overrun boost enhancement (anti-lag)
- Boost control
- Nitrous injection

Fully configurable sensor inputs including custom calibrations
Configurable receiving and transmitting data via the CAN bus
Capable of receiving data from multiple Lambda measurement devices via CAN
Integrated advanced diagnostics, including injector & crank trigger diagnostics
Switchable between multiple configurations
Ref/Sync capture displayed on the built-in digital oscilloscope

Data Acquisition

Internal data logging (500 kB) with fast download via CAN
Three engine histogram logs including a tell-tale log
State of the art i2 Standard or i2 Pro data analysis software
Telemetry and remote logging options
Upgradable with optional functionality to make additional features available when you want them, activated through a simple password system.

Available for the following crafts:

Yamaha - Apex 2006-10, RTX, RTX ER, GT, ER, LTX, LTX GT and MTX
SkiDoo - 2009-Current, MXZ, MXZ-X, Renegade, Renagade X, GSX

	M400 SKI-DOO KIT	**SKI-DOO 2009 REV-XR**
	M400 YAMAHA APEX	**YAMAHA APEX 2006-9**

Outputs

4 x Injector outputs—high or low ohm
4 x Ignition outputs
8 x Auxiliary outputs—for functions such as drive by wire throttle, boost control, nitrous injection, idle speed stepper motor and many more

Inputs

8 x Analogue voltage inputs—fully configurable, use for:
-throttle position
-manifold pressure
-exhaust temperature
-steering position
-lateral G force
6 x Analogue temperature inputs—fully configurable, use for:
-multiple configuration maps
-extra air or water temperature
1 x Wideband Lambda input—for Lambda measurement and control
4 x Digital/speed inputs—for use with OEM factory buttons and function activation e.g. launch control, anti lag and dual RPM limit

Communications

1 x CAN
1 x RS232—for use with GPS
A 5 Hz MoTeC GPS-G1 can be wired direct to the M400 for logging of accurate speed and position.

Physical

Case size 147 x 105 x 40 mm
Weight 900 gram
1 x 34 pin and 1 x 26 pin waterproof connector with gold plated contacts

MoTeC ECU Options

✓ = Available

Description	OEM	M84	M400	M600	M820	M880
Hours free logging & wideband lambda	*8*		*8*	*8*	*8*	*8*
M880 512K LOG *(Logging 512K)*			✓	✓		
M880 1MLOG *(Logging 1MB)*	✓				✓	✓
M880 4M LOG *(Logging 4MB (Must have Logging 1MB))*						✓
M880 1LA *(Single Wideband Lambda)*	✓		✓	✓	✓	✓
M880 1-2LA *(Upgrade Single to Dual Wideband Lambda)*	✓			✓	✓	✓
M880 2LA *(Dual Wideband Lambda)*	✓			✓	✓	✓
M880 ADV *(Advanced Function (Launch Control/Traction Control (2, 3, or 4 Wheel), Gear Change Ignition Cut (flat shifts), Overrun Boost Enhancement (anti-lag)))*	✓		✓	✓	✓	✓
M880 CAM *(Cam Control)*	✓		✓	✓	✓	✓
M880 DBW EN *(Drive By Wire)*			✓	✓	✓	✓
M880 ORB[3] *(Overrun Boost Enhancement)*	✓		✓	✓	✓	✓
M880 10/12 EN *(10/12 Cycle Operation)*					✓	✓
M880 MULTI PU *(Multipulse / Multispark)*					✓	✓
M880 PRO ANALYS *(Pro Analysis (Multiple Overlays, Advanced Math Functions, Unlimited Projects, Display Components, Workbooks and Worksheets, Damper Analysis, Synchonised Video))*	✓				✓	✓
M880 REM LOG *(Remote Logging (Requires Telemetry))*					✓	✓
M880 SERVO ENAB *(Servo Control)*					✓	✓
M880 TELEM *(Telemetry)*					✓	✓
M84 1-2LA *(Upgrade Single to Dual Wideband Lambda)*		✓				
M84 ADV *(Advanced Function (Launch Control/Traction Control (2, 3, or 4 Wheel), Hi/Lo Injection (secondary injection), Gear Change Ignition Cut (flat shifts), Overrun Boost Enhancement (anti-lag)))*		✓				
M84 GEAR CHANGE [¬] *(Gear Change Ignition Cut (flat shifts))*		✓				
M84 HI-LO INJ [¬] *(Hi/Lo Injection (secondary injection))*		✓				
M84 ORB [¬] *(Overrun Boost Enhancement)*		✓				
M84 TRAC CNTRL [¬] *(Launch Control/Traction Control (2, 3, or 4 Wheel))*		✓				

MoTeC ECU Comparison Chart

These are the main specifications of the MoTeC ECU range to compare the suitability of the different models for your application.

✓ standard available
× not available
option - requires optional upgrade

ECU Comparison Table	M84	M400	M600	M800	M880
Number of cylinders					
Sequential	up to 8	up to 4	up to 6	up to 8 opt 12	up to 8 opt 12
Group fire mode	up to 8	up to 4	up to 6	up to 12	up to 12
Rotary	2,3,4	2	2,3	2,3,4	2,3,4
Outputs					
Injector outputs	8	4	6	8*	8*
Ignition outputs	6	4	6	6*	6*
Auxiliary outputs	8	8	8	8	8
Option to use spare outputs as auxiliary outputs	×	×	×	✓	✓
Individual cylinder tables	×	✓	✓	✓	✓
Inputs					
Trigger inputs (Ref/Sync)	2	2	2	2	2
Analogue voltage inputs	8	8	8	8	8
Analogue temperature inputs	3	6	6	6	6
Digital/speed inputs	4	4	4	4	4
Wideband Lambda inputs (option)	2 x 5-wire (single included, dual option)	1 x 5-wire (option)	2 x 5-wire (option)	2 x 5-wire (option)	2 x 5-wire (option)
Communication					
RS232	✓	✓	✓	✓	✓
CAN	✓	✓	✓	✓	✓
Data acquisition and telemetry					
Data logging (option)	512 kB included	512 kB	512 kB	1 MB	1 or 4 MB
Maximum logging rate	100 Hz	200 Hz	200 Hz	200 Hz	200 Hz
Track mapping	✓	✓	✓	✓	✓
Data analysis using i2 Pro	×	option	option	option	option
Telemetry	×	×	×	option	option
Remote logging	×	×	×	option	option
Functions and features					
Boost control	✓	✓	✓	✓	✓
Nitrous Injection	✓	✓	✓	✓	✓
Dual stage injection (Hi/Lo injection)	option	✓	✓	✓	✓
Ground speed limiting	✓	✓	✓	✓	✓
Traction and launch control	option	option	option	option	✓
Overrun boost enhancement (anti-lag)	option	option	option	option	✓
Gear change ignition cut (flat shifts)	option	option	option	option	✓
Stepper motor idle control	✓	✓	✓	✓	✓
Continuously variable camshaft control	×	option	option	option	option
Drive by wire throttle control	×	option	option	option	option
Servo motor control	×	×	×	option	option
Multi-pulse / Multi-strike	×	✓	✓	✓	✓
Expander Compatibility	IEX, CDI-8	IEX, CDI-8, E888, E816	IEX, CDI-8, E888, E816	IEX, CDI-8, E888, E816	IEX, CDI-8, E888, E816
Multi-Config	×	✓	✓	✓	✓
Password Protection of Configs/Logs	×	✓	✓	✓	✓