M1 LAMBORGHINI 07L PACKAGE

Brands use is not an endorsement.

This product is specifically for use with M1 Series hardware.

This package, used with an activated M150, provides a tuning base for the port injected V10 07L engine as used in the Lamborghini Gallardo (2004 onward). It comes with preconfigured settings for reference mode, synchronisation, firing order and engine sensors.

Based on MoTeC's successful GPR-P package it is a versatile and adaptable platform for the operation of this engine with the additional support of paddle shift gearbox control using switched actuators.

⇨ This package is not intended as an OEM ECU replacement. It provides a tuning base for engine modifications, and requires further tuning. Also, no car integration is configured.

Differing from the GPR-P package, this package only supports one injector per cylinder.

Included are many ancillary features commonly found on race cars, such as anti-lag, driver switches (pit switch, launch enable, boost trim, etc.), gearbox control, knock control, intercooler sprays, launch control, gearbox coolant pump, gear shift air pump and traction control. Also accommodated are many systems found on modified road vehicles, which may also be useful in a racing context, such as air conditioning control and four definable control outputs.

The product fully integrates with other MoTeC products, and provides pre-defined CAN messaging for all current display loggers, loggers, E888, VCS, GPS, ADR, BR2, PDM, and SLM.

FEATURES

- Supports one port injector per cylinder
- Supports 2 Coolant Temperature sensors
- Gear dependent torque reduction by throttle limiting, plus switch selection
- CAN transmits for gear shift related channels (template version 1)
- Support for 7 forward gears
- Pre-configured sensor calibrations for Original Equipment (OE) sensors and engine triggers
- Pre-configured reference mode for engine synchronisation and control of 4 camshafts with tuneable inlet and exhaust timing tables
- Pre-configured physical settings for Engine Displacement, Fuel Density, Stoichiometric Ratio, Fuel Pressure, and Injector Linearisation, which allow for simplified engine start-up prior to tuning.
- Configurable turbocharger boost control (using a normal and inverted solenoid output), support for 2 boost pressure sensors
- Switchable Inlet Manifold Runner with position feedback for variable inlet systems
- Optional throttle blip and engine speed matching when clutch is disengaged.
- Gear Shift Actuator Position Sensor.
- Reverse request delay.

- Paddle shift gearbox control for sequential gearboxes with switched actuators and air pump support.
- Configurable on-board knock for each cylinder with up to 4 assignable knock sensors (hardware dependant) and selectable centre frequencies.
- Configurable camshaft control from 1 to 4 cams, plus 1 switched camshaft.
- Drive by wire throttle blip control with engine speed matching.
- Dual bank lambda control supported; requires optional LTC with Bosch LSU4.9 sensor or LTCN with NTK sensor.
- Easy and fast engine tuning using engine efficiency map.
- Engine load modelling based on inlet manifold pressure and inlet manifold temperature. Alternatively, for example, when using individual throttle bodies, throttle position can be used.
- Sensor calibrations available for many common automotive sensors.
- Transient fuelling compensation using physical modelling of fuel film.
- Support of MoTeC devices: ADR, E8XX, PDM, SLM, VCS
- Configurable anti-lag for single turbo with ignition timing limit, fuel volume trim, ignition cut, engine speed limit, boost aim and throttle aim tables.
- Supports 2 coolant fan outputs (PWM controlled).
- Air conditioner support with switched output control.
- Coolant temperature compensations for engine speed limit, ignition timing, fuel mixture, boost limit.
- Coolant pump output with PWM control.
- Coolant pump after-run functionality, optionally with additional pump output.
- Engine speed limiting with ignition cut and/or fuel cut.
- Fuel pump switched output.
- Gearbox position detection via optional sensor or engine speed / wheel speed estimate.
- Paddle shift input hard wired or via CAN, optional linear sensor.
- Optional gearbox shift request via Up Shift Switch / Down Shift Switch or Gear Lever Force sensor.
- Neutral/Reverse actuation can be locked out.
- Gearbox shift support with ignition cut, fuel cut, throttle blip and engine speed matching in forward gears.
- Up/Down actuator control.
- Different gear shift modes: manual, automatic and fault modes.
- Closed loop gear shift strategy including retries for missed shifts.
- Gear shift actuator air pump support with air pressure monitoring.
- GPS acquisition and logging via CAN or RS232 (hardware dependent).
- Intercooler temperature and spray control.
- Lap distance, time and number via BR2 or switched input, with split and sector options.
- Configurable launch control with tables for engine speed, throttle limit, boost aim and fuel volume trim.
- Race time system with trim tables for ignition timing compensation, fuel mixture aim, boost limit and throttle limit.
- Idle closed loop control system using ignition, drive by wire actuation or idle solenoid.
- Engine Load Average channel with tables for engine speed limit, ignition timing trim, fuel mixture aim, boost limit and throttle limit.
- Assist of engine start with dedicated fuel volume and idle compensations during crank and post start.
- Engine run time total for engine hour logging.
- Configurable security for multiple users.
- Configuration of brake state using a switch or a pressure sensor.
- Configuration of clutch state using a switch, a position sensor or a pressure sensor.
- Calculation of clutch slip.
- ECU-internal G-force (acceleration) – longitudinal, lateral, vertical
- ECU CAN receive from a defined CAN ID for data reception from MoTeC devices. Support of 3 CAN buses.
- ECU CAN transmit of the most common channels using standard MoTeC CAN templates.
- 6 configurable switches, 4 rotary switches and 6 CAN switches with each of 9 positions simultaneously mappable to Launch Control, Pit Switch, Anti-Lag, Traction, Auxiliary Time, Race Time Reset, Engine Speed Limit Maximum, Throttle Pedal Translation, Ignition Timing, Fuel Mixture Aim, Boost Limit, Traction Aim and Traction Control Range.
- Analogue tachometer output with configurable output pin and scaling.
- Dual bank drive by wire throttle servo control.
- Throttle Pedal sensor with translation table.
- Use of a Throttle Pedal sensor or a Throttle Position sensor in case of a cable throttle.
- Transmission pump output with transmission temperature threshold and hysteresis control.

- Traction control with tables for Aim Main, Aim Compensation and Control Range.
- Vehicle speed measurement using wheel speed sensors, estimation or GPS.
- Vehicle speed limiting (pit speed control).
- Configurable warning system with light and CAN output.
- Auxiliary time system with tables for ignition timing compensation, fuel volume trim and fuel mixture aim.
- 4 auxiliary outputs for PWM control of added actuators:
  - Duty cycle tables using Engine Speed and Throttle or Manifold Pressure Axis'
  - Activation based on inlet manifold pressure or throttle position
  - Auxiliary Output 1 includes tables for Ignition Timing Compensation, Fuel Volume Trim and Fuel Mixture Aim
- Optional channels for additional sensors via input pin and/or CAN message, including:
  - Airbox Mass Flow, Pressure and Temperature
  - Ambient Pressure and Temperature
  - Boost Pressure
  - Brake Pressure Front and Rear
  - Brake Switch
  - Clutch Pressure and Position
  - Clutch Switch
  - Coolant Pressure and Temperature
  - Engine Oil Pressure and Temperature
  - Engine Crankcase Pressure
  - Exhaust Pressure Bank 1 and Bank 2
  - Exhaust Temperature (EGT) via TCA Thermocouple Amplifier, Generic CAN, or E888 for Collector, Bank 1 and 2 Collector, and Cylinders 1 to 10
  - Exhaust Lambda via LTC, LTCN, or PLM for Collector, Bank 1 and 2 Collector, and Cylinders 1 to 10
  - Fuel Pressure and Temperature
  - Fuel Tank Level
  - Gear Position
  - Gear Lever Force
  - Paddles
  - Gear Neutral Switch
  - Gear Shift Request
  - Gear Shift Air Pressure
  - Intercooler Temperature
  - Steering Angle and Pressure
  - Transmission Temperature
  - Turbocharger Speed
  - G-Force (acceleration) – Longitudinal, Lateral, Vertical
  - Wheel Speed sensors front/rear left/right, wired or CAN input.

EXAMPLE M150 PINOUT

M150 Connector A - 34 Way

Mating Connector: Tyco Superseal 34 Position Keying 2 – MoTeC #65067

Pin	Designation	Full Name	Description
A01	AT5	Analogue Temperature Input 5	
A02	AT6	Analogue Temperature Input 6	
A03	AV15	Analogue Voltage Input 15	Driver Rotary Switch 1 Voltage
A04	AV16	Analogue Voltage Input 16	Driver Rotary Switch 2 Voltage
A05	AV17	Analogue Voltage Input 17	Fuel Pressure Sensor Voltage
A06	IGN_LS9	Low Side Ignition 9	Ignition Cylinder 9 Output
A07	IGN_LS10	Low Side Ignition 10	Ignition Cylinder 10 Output
A08	IGN_LS11	Low Side Ignition 11	
A09	IGN_LS12	Low Side Ignition 12	Fuel Pump Output
A10	SEN_5V0_C1	Sensor 5.0V C	ECU Sensor 5.0 C Voltage
A11	LA_NB1	Lambda Narrow Input 1	
A12	LA_NB2	Lambda Narrow Input 2	
A13	KNOCK3	Knock Input 3	
A14	KNOCK4	Knock Input 4	
A15	DIG2	Digital Input 2	
A16	DIG3	Digital Input 3	
A17	DIG4	Digital Input 4	
A18	SEN_5V0_C	Sensor 5.0V C	ECU Sensor 5.0 C Voltage
A19	SEN_5V0_B	Sensor 5.0V B	ECU Sensor 5.0 B Voltage
A20	LIN	LIN Bus	
A21	RS232_RX	RS232 Receive	
A22	RS232_TX	RS232 Transmit	
A23	DIG1	Digital Input 1	
A24	BAT_NEG	Battery Negative	
A25	BAT_NEG	Battery Negative	
A26	SEN_0V_C	Sensor 0V C	
A27	SEN_0V_C	Sensor 0V C	
A28	CAN3_HI	CAN Bus 3 High	
A29	CAN3_LO	CAN Bus 3 Low	
A30	CAN2_HI	CAN Bus 2 High	
A31	CAN2_LO	CAN Bus 2 Low	
A32	BAT_NEG	Battery Negative	
A33	SEN_0V_B	Sensor 0V B	
A34	SEN_0V_A	Sensor 0V A	

M150 Connector B - 26 Way

Mating Connector: Tyco Superseal 26 Position Keying 3 – MoTeC #65068

Pin	Designation	Full Name	Description
B01	OUT_HB9	Half Bridge Output 9	Gear Shift Actuator Up Output
B02	OUT_HB10	Half Bridge Output 10	Gear Shift Actuator Down Output
B03	UDIG8	Universal Digital Input 8	
B04	UDIG9	Universal Digital Input 9	
B05	UDIG10	Universal Digital Input 10	Driver Switch 3
B06	UDIG11	Universal Digital Input 11	Driver Switch 4
B07	UDIG12	Universal Digital Input 12	
B08	INJ_LS5	Low Side Injector 5	
B09	INJ_LS3	Low Side Injector 3	
B10	AV9	Analogue Voltage Input 9	Throttle Servo Bank 1 Position Sensor Main Voltage
B11	AV10	Analogue Voltage Input 10	Throttle Servo Bank 1 Position Sensor Tracking Voltage
B12	AV11	Analogue Voltage Input 11	Throttle Servo Bank 2 Position Sensor Main Voltage
B13	BAT_POS	Battery Positive	ECU Battery Voltage
B14	INJ_LS6	Low Side Injector 6	Boost Actuator Voltage
B15	INJ_LS4	Low Side Injector 4	
B16	AV12	Analogue Voltage Input 12	Throttle Servo Bank 2 Position Sensor Tracking Voltage
B17	AV13	Analogue Voltage Input 13	
B18	AV14	Analogue Voltage Input 14	Gear Sensor Voltage
B19	BAT_POS	Battery Positive	ECU Battery Voltage
B20	OUT_HB7	Half Bridge Output 7	Throttle Servo Bank 2 Motor Output
B21	OUT_HB8	Half Bridge Output 8	Throttle Servo Bank 2 Motor Output
B22	INJ_PH9	Peak Hold Injector 9	Fuel Cylinder 9 Output
B23	INJ_PH10	Peak Hold Injector 10	Fuel Cylinder 10 Output
B24	INJ_PH11	Peak Hold Injector 11	
B25	INJ_PH12	Peak Hold Injector 12	
B26	SEN_5V0_A	Sensor 5.0V A	ECU Sensor 5.0 A Voltage

M150 Connector C - 34 Way

Mating Connector: Tyco Superseal 34 Position Keying 1 – MoTeC #65044

Pin	Designation	Full Name	Description
C01	OUT_HB2	Half Bridge Output 2	Throttle Servo Bank 1 Motor Output
C02	SEN_5V0_A	Sensor 5.0V A	ECU Sensor 5.0 A Voltage
C03	IGN_LS1	Low Side Ignition 1	Ignition Cylinder 1 Output
C04	IGN_LS2	Low Side Ignition 2	Ignition Cylinder 2 Output
C05	IGN_LS3	Low Side Ignition 3	Ignition Cylinder 3 Output
C06	IGN_LS4	Low Side Ignition 4	Ignition Cylinder 4 Output
C07	IGN_LS5	Low Side Ignition 5	Ignition Cylinder 5 Output
C08	IGN_LS6	Low Side Ignition 6	Ignition Cylinder 6 Output
C09	SEN_5V0_B	Sensor 5.0V B	ECU Sensor 5.0 B Voltage
C10	BAT_NEG	Battery Negative	
C11	BAT_NEG	Battery Negative	
C12	IGN_LS7	Low Side Ignition 7	Ignition Cylinder 7 Output
C13	IGN_LS8	Low Side Ignition 8	Ignition Cylinder 8 Output
C14	AV1	Analogue Voltage Input 1	Airbox Pressure Sensor Voltage
C15	AV2	Analogue Voltage Input 2	Inlet Manifold Pressure Sensor Voltage
C16	AV3	Analogue Voltage Input 3	Ambient Pressure Sensor Voltage
C17	AV4	Analogue Voltage Input 4	Air Conditioner Refrigerant Pressure Sensor Voltage
C18	OUT_HB1	Half Bridge Output 1	Throttle Servo Bank 1 Motor Output
C19	INJ_PH1	Peak Hold Injector 1	Fuel Cylinder 1 Output
C20	INJ_PH2	Peak Hold Injector 2	Fuel Cylinder 2 Output
C21	INJ_PH3	Peak Hold Injector 3	Fuel Cylinder 3 Output
C22	INJ_PH4	Peak Hold Injector 4	Fuel Cylinder 4 Output
C23	INJ_LS1	Low Side Injector 1	Inlet Manifold Runner Actuator Output
C24	INJ_LS2	Low Side Injector 2	Gear Shift Actuator Pump Output
C25	AV5	Analogue Voltage Input 5	Gear Shift Actuator Pressure Sensor Voltage
C26	BAT_POS	Battery Positive	ECU Battery Voltage
C27	INJ_PH5	Peak Hold Injector 5	Fuel Cylinder 5 Output
C28	INJ_PH6	Peak Hold Injector 6	Fuel Cylinder 6 Output
C29	INJ_PH7	Peak Hold Injector 7	Fuel Cylinder 7 Output
C30	INJ_PH8	Peak Hold Injector 8	Fuel Cylinder 8 Output
C31	OUT_HB3	Half Bridge Output 3	Exhaust Camshaft Bank 1 Actuator Output
C32	OUT_HB4	Half Bridge Output 4	Exhaust Camshaft Bank 2 Actuator Output
C33	OUT_HB5	Half Bridge Output 5	Inlet Camshaft Bank 1 Actuator Output
C34	OUT_HB6	Half Bridge Output 6	Inlet Camshaft Bank 2 Actuator Output

M150 Connector D — 26 way

Mating Connector: Tyco Superseal 26 Position Keying 1 – MoTeC #65045

Pin	Designation	Full Name	Description
D01	UDIG1	Universal Digital Input 1	Engine Speed Reference
D02	UDIG2	Universal Digital Input 2	Inlet Camshaft Bank 1 Position
D03	AT1	Analogue Temperature Input 1	Inlet Manifold Temperature Sensor Voltage
D04	AT2	Analogue Temperature Input 2	Coolant Temperature Bank 1 Sensor Voltage
D05	AT3	Analogue Temperature Input 3	
D06	AT4	Analogue Temperature Input 4	
D07	KNOCK1	Knock Input 1	
D08	UDIG3	Universal Digital Input 3	Exhaust Camshaft Bank 1 Position
D09	UDIG4	Universal Digital Input 4	Inlet Camshaft Bank 2 Position
D10	UDIG5	Universal Digital Input 5	Exhaust Camshaft Bank 2 Position
D11	UDIG6	Universal Digital Input 6	Driver Switch 2
D12	BAT_BAK	Battery Backup	
D13	KNOCK2	Knock Input 2	
D14	UDIG7	Universal Digital Input 7	Driver Switch 1
D15	SEN_0V_A	Sensor 0V A	
D16	SEN_0V_B	Sensor 0V B	
D17	CAN1_HI	CAN Bus 1 High	
D18	CAN1_LO	CAN Bus 1 Low	
D19	SEN_6V3	Sensor 6.3V	ECU Sensor 6.3 Voltage
D20	AV6	Analogue Voltage Input 6	Throttle Pedal Sensor Main Voltage
D21	AV7	Analogue Voltage Input 7	Throttle Pedal Sensor Tracking Voltage
D22	AV8	Analogue Voltage Input 8	Boost Pressure Bank 1 Sensor Voltage
D23	ETH_TX+	Ethernet Transmit+	
D24	ETH_TX-	Ethernet Transmit-	
D25	ETH_RX+	Ethernet Receive+	
D26	ETH_RX-	Ethernet Receive-	