



# Performance Analysis - Street Car

## Application Note - Advanced Dash Logger



### Introduction

We spend so much time and money on our street machines trying to improve their performance and handling without really knowing how effective each modification has been. Unless you are able to dyno your vehicle after each change, or spend time on a race track, a gut feeling is what we usually go by. Now there is a solution to quantifying your changes and have fun doing it.

The primary objectives are:

1. Quantifying Acceleration improvements
2. Quantifying Handling improvements
3. Data analysis of a street vehicle
4. Supplementary Dash display unit



### Solution

#### Quantifying Acceleration Improvements:

There are a number of ways to determine an improvement in performance and therefore acceleration;

- ◆ Longitudinal G force
- ◆ Time over a given speed or distance  
(0 to 60 kmh, 0 to 100 kmh, 0 to 400 metre distance)

The **MoTeC** Dash Logger can measure most existing sensors and many additional sensors to calculate these results.

Components used:

- ◆ **MoTeC Dash Logger** - Fitted to the dash board or centre console area
- ◆ **2 Axis accelerometer** – Measures Lateral (cornering) and Longitudinal (Accel. and Decel.) G's. Fitted into the centre console
- ◆ **Speed Input** – Pulses from existing vehicle engine management systems or speedo
- ◆ **RPM Input** – Pulses from existing vehicle engine management systems or tachometer

The **MoTeC** Dash logger is programmed to initiate timers upon the detection of movement of the vehicle off the line. Movement is determined by detecting either longitudinal G's or speed above 0 kmh. In either case 3 separate timers are started, 0 to 60 kmh, 0 to 100 kmh and 400 metre distance. The Dash will stop each timer respectively when each of the speeds/distance are reached. Each timer is reset back to zero when the vehicle returns to 0 kmh.

The Dash logger will instantly display the result of each timer immediately after the speeds/distance are reached. In addition a 400 metre terminal speed is also displayed. The results of each take off are logged in memory for detailed analysis at a later time.

We now have the means to very accurately determine acceleration times each and every time you take off.

# Performance Analysis - Street Car

## Solution (continued)

### Quantifying Acceleration Improvements

With the 2 axis accelerometer (Longitudinal and Lateral) fitted and speed being detected directly off the speedo, some extraordinary information can be derived. Not only can you actively watch the lateral and longitudinal G's on the Dash display unit, but all the data can be logged for later analysis.

The logged data can be viewed in graphical or numerical format. Furthermore, by enabling Pro Logging in the **MoTeC** Dash logger, virtual instrument displays and track mapping is also available.

The track map offers an exciting way of viewing the data on a map. The map is automatically drawn from the data collected during a run. From this data, comparisons with other runs can be determined. Information overlaid on the track map can include: braking points, speed, lateral and longitudinal G's, time and many others.

### Dash Display

The Dash Logger system can derive and display almost any function of the vehicle including:

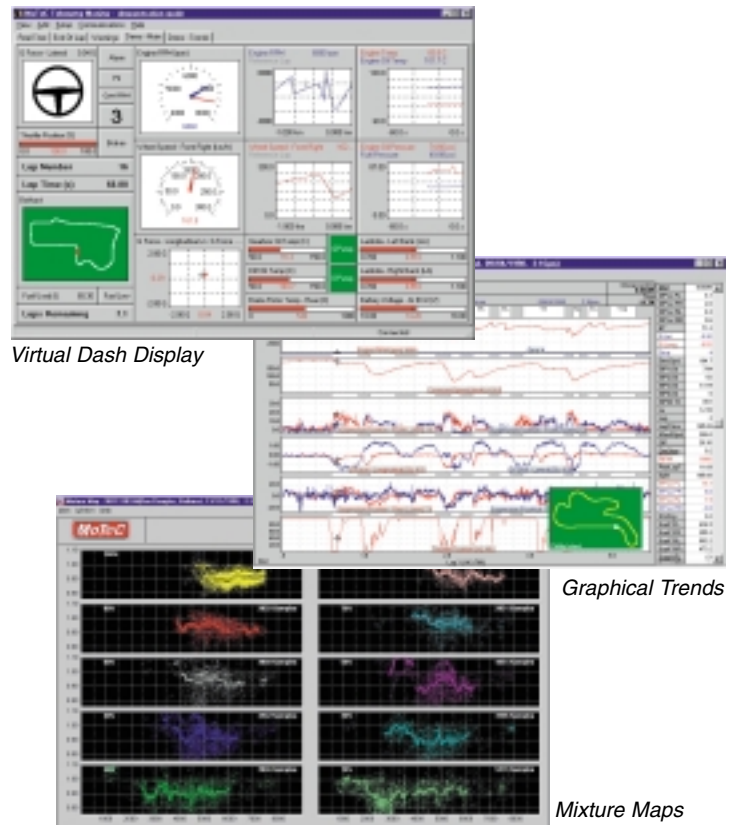
#### Vehicle Speed

- ◆ Engine RPM on either the bar graph or a numerical object
- ◆ Trip Distance and times
- ◆ Odometer
- ◆ Statistics – Min/max etc.
- ◆ Shift Light
- ◆ Gear positions
- ◆ Alarm messages (eg: "Revving Too High")

Many other sensor can be connected for measurement of temperature, pressure etc.

By pairing the **MoTeC** Dash Logger with a **MoTeC** Engine Management System (ECU), all data available to the ECU is then available for displaying and logging in the Dash. This can include: Engine temperature, MAP(boost), throttle position, etc.

Data stored in the ADL is easily unloaded to a PC when required. All software is provided with the Dash logger for this. Telemetry and live data export is also an available feature.



### Equipment

- **MoTeC** Advanced Data Logger
- IBM Compatible Pentium Windows computer (laptop preferred)
- Sensors and transducers
  - a wide range of sensors, amplifiers, transducers, lights and buttons
- Dash Manager and Interpreter Software

### ADL Specifications & Features

- Fast 32 Bit microprocessor
  - Manufactured Quality standard: ISO 9002
  - Input Channels (max. 250):
    - Analog (28), Digital (12), Lambda (2), Serial
  - 8 Auxiliary Control Outputs - Open collector or pulse width modulated
  - Fast sampling rates, 1 to 1000Hz, per channel
  - Advanced Math Functions
  - 4 Mbyte Flash Memory
  - High Speed computer communications (download times of 19 seconds per Mbyte)
  - Multiple ADL's can be linked to together to share information
  - Telemetry support for Modems, GSM devices and GPS systems
  - Fully programmable with easy to use 32 bit software
  - High contrast LCD, custom built for harsh environments
  - Weight: 385 grams
  - Size: 180mm x 91mm x 18 mm (without plug)
- \* For further details, refer to the *Advanced Dash Logger brochure and specification sheet*

Specifications are subject to change without notice.  
Product and company names are trademarks or trade names of their respective companies.  
Copyright MoTeC Australia Pty Ltd, 12/99



Engine Management and Data Acquisition Systems

**MoTeC Australia Pty Ltd**  
Factory 7, 8-9 Gabrielle Crt  
Bayswater North, 3153  
Victoria, Australia  
Ph: 61 3 9761 5050  
Fax: 61 3 9761 5051

[www.motec.com.au](http://www.motec.com.au)