# Emtron Onboard Accelerometer Introduction

Engine Management Systems in the aftermarket world are expected to handle many tasks other than simply controlling an engine. We put a lot of thought into what other features people may need in the future when engineering the KV series ECU's. We decided a must-have item would be an onboard accelerometer for the advanced functions that people will eventually be using.

All KV8, KV12, KV16 ECUs have an internal 3-Axis Accelerometer. This can be used to measure:

- Braking and acceleration g-force (longitudinal acceleration)
- Cornering g-force (lateral acceleration)
- Up/down g-force (vertical acceleration)

The diagram below shows the orientation of each axis:
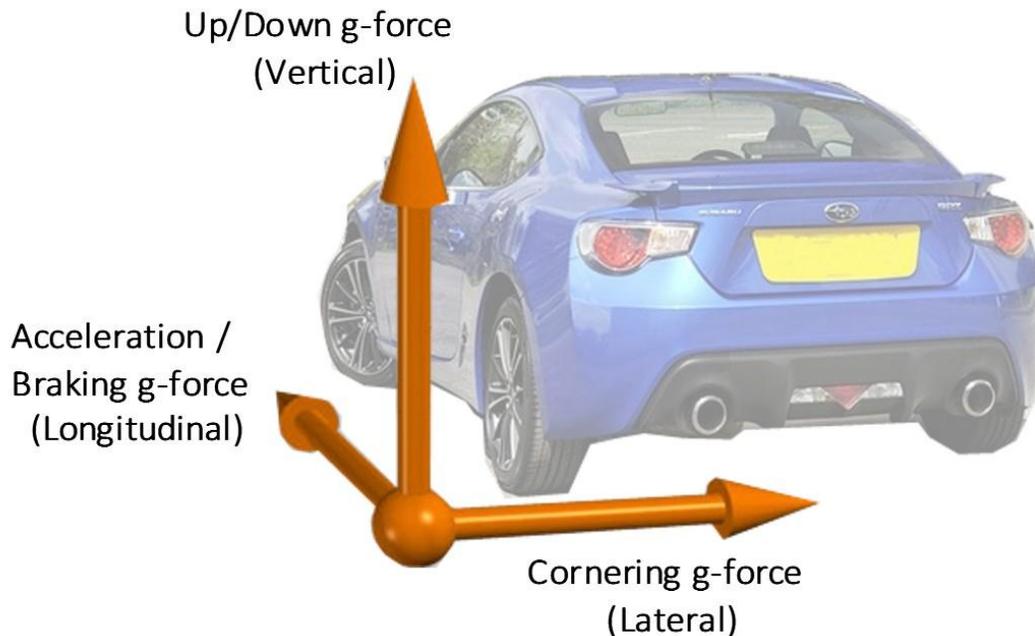
The Longitudinal and Lateral orientation can be configured to suit how the ECU is mounted. By default the following orientation is used:

However, the Long and Lat orientation can be swapped by setting the "Invert Long/Lat" setting to ON. The orientation now becomes:
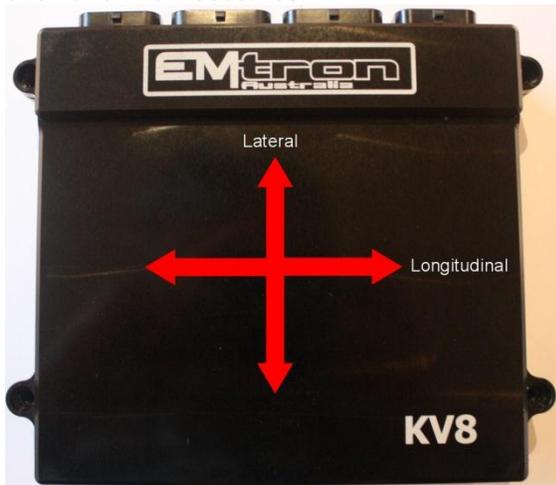
Longitudinal **positive** g-force = Acceleration. Typical values 0.3 to 0.5g
Longitudinal **negative** g-force = Braking. Typical values: -1.5 to -1.8g

Lateral **negative** g-force = Turning Left. Typical value for race car on slicks : -1.8g
Lateral **positive** g-force = Turning Right. Typical value for race car on slicks : 1.8g

Ok, so we have a basic understanding of what the onboard accelerometer can read, but what would one use this for? You will note in the Emtune Software Axis Setup within the 3D tables that G-force runtimes are available. This means you can use these runtimes as an axis parameter.

One motorsport example below shows the Emtron Differential Control Function:

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Throttle/Braking Select Table

Throttle / Braking Select Table ()								
	Driven speed (kph)							
	0.0	30.0	60.0	90.0	120.0	150.0	180.0	210.0
-1.50	100	100	100	100	100	100	100	100
-1.25	100	100	100	100	100	100	100	100
-1.00	100	100	100	100	100	100	100	100
-0.60	50	50	50	50	50	50	50	50
-0.30	0	0	0	0	0	0	0	0
0.00	0	0	0	0	0	0	0	0

G-Force Long (G) (Y-axis label)

By selecting G-Force Long as a Y-axis parameter the ECU can select the correct Differential Control Table based on negative G-force Long levels. In this case a G-Force long of -1.00 is needed to switch to the Braking table.

This is just one simple implementation of using the onboard accelerometer. I am sure you can think of many more applications.