Project Step 2

Gear shift indicators are all over the internet. What is harder to find is an interface that allows you, the user, to know your shift points (SPs). They exist but an easy to read, and use interface is even rarer. In the next few paragraphs, I will explain the purpose, inputs, and output of my Breakout Shifting Interface.

SPs are when a transmission should shift gears up or down. If you have a manual transmission (MT) vehicle the choice is up to you, the driver, when to shift and knowing your SPs can get you the optimal acceleration and torque out of every gear. My interface will allow even the most novice racer to easily interpret data from your vehicle.

In order the calculate SPs you first need inputs from the vehicle. Every vehicles SPs are different, however, to calculate yours the inputs are fairly basic. Torque vs flywheel rpm data, transmission and differential (final) gear ratio data, and drive wheel diameter for your vehicle. All these can be obtained from a Dyno test.

After all the numbers have been entered simply click the Calculate button wait a second or two for the next screen to populate the numbers. The result will be a simple screen displaying at what RPM and speed (MPH) to upshift in every gear.

Knowing how to drive a MT is a dying art that is close to being limited to those who love and crave speed. This application will help them get that extra boost out of every throw of the shifter. I’ve explained the purpose of my application, what information needed from the user and what the result will be to said user. As for the calculation behind the seen I’ve included an example below.

Example: Which is a better shift point from 2nd to 3rd gear, 4000 rpm or 5000 rpm?

Data: Torque --- 296 ----- 310 ---- 290 ----- 280

RPM x1000 ---- 2.6 ----- 3.3 ---- 4.0 ----- 5.0

Gear -- 1 --- 2 --- 3 --- 4 --- 5 --- 6

Ratio - 4 -- 2.3 - 1.5 - 1.2 - 1.0 - 0.85

Calculation:

2nd gear Output Shaft Torque @ 4000 flywheel rpm = 290\*2.3=667

Output Shaft Speed = 4000/2.3=1739

3rd gear flywheel rpm @ 1739 output shaft speed = 1739\*1.5=2600

Output shaft torque = 296\*1.5=444

Torque drop=667-444=223 @ 4000 rpm

2nd gear Output Shaft Torque @ 5000 flywheel rpm = 280\*2.3=644

Output Shaft Speed = 5000/2.3=2174

3rd gear flywheel rpm @ 2174 output shaft speed = 2174\*1.5=3300

Output shaft torque = 310\*1.5=465

Torque drop=644-465=179 @ 5000 rpm

Since the drop in torque is less at 5000 rpm, this is a better shift point than 4000 rpm