

SD EEC Tuning Guide

This guide aims to provide a basic method for tuning Speed Density (SD) based EECs, i.e. those from the I6 Falcon (V8s use MAF tuning and will hopefully be covered in another guide).

In order to be able to tune your car, you will need some tools:

- A J3 Chip & Programmer (see <http://www.tiperformance.com.au/products.html>)
- A Data Logging device; you will need to log RPM, MAP, and O2 as a minimum. Although this guide shows an Innovate LC-1/SSI-4, T.I. Performance now sell the TechEdge 2J1 / LD02 combo kit at a discounted price. See <http://www.tiperformance.com.au/products.html> for more information.
- A binary and definition for your ECU from the site
- Tom Cloud's EEC Tech Notes from <http://www.tiperformance.com.au/documents.html>
- The Excel log analysis sheet from <http://www.tiperformance.com.au/documents.html>

Logging Hardware

As above, this guide assumes the use of the Innovate LC-1 + SSI-4 setup. I have configured the SSI-4 for RPM on Channel 1, a GM voltage based map sensor on Channel 2 on MAP (can be had from a wrecker for <\$5), and TPS on Channel 4.

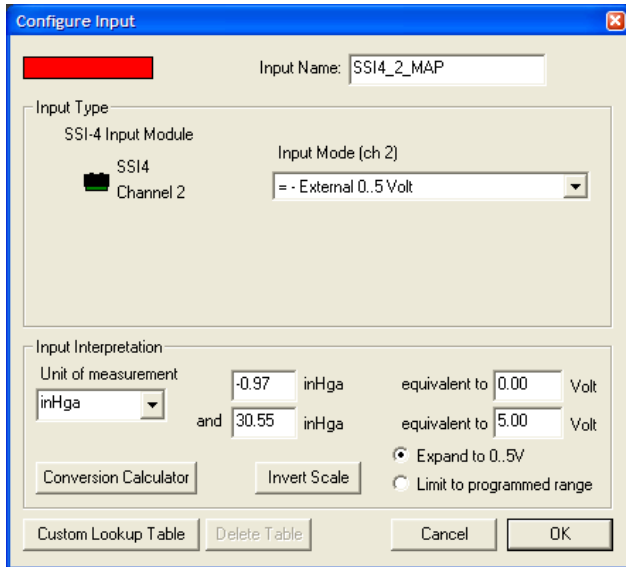
Configure your Data Log

You will need to have configured each channel of the SSI-4 appropriately in order to capture meaningful data. Consult the Innovate documentation for this. We will make one small change to the MAP channel in order to more easily reflect how the EEC measures manifold pressure.



How to configure the MAP channel to show absolute pressure (so we can match against the Ford MAP table when we tune):

Go to Channel Configuration.



Choose inHga, and enter the above parameters to calibrate the sensor.

Start Logging

Connect LogWorks to the log chain.



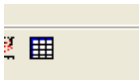
Then, start a new Real time Log (the red record button).



Display an RPM vs MAP chart

This chart is **very** useful for tuning and will update in real time as you drive.

In the log window, hit the chart button.



Configure the chart to match the EEC table scaling using the settings below.

Chart Settings

Horizontal Axis

Channel:

From: to RPM

Number of steps: (max 128)

Vertical Axis

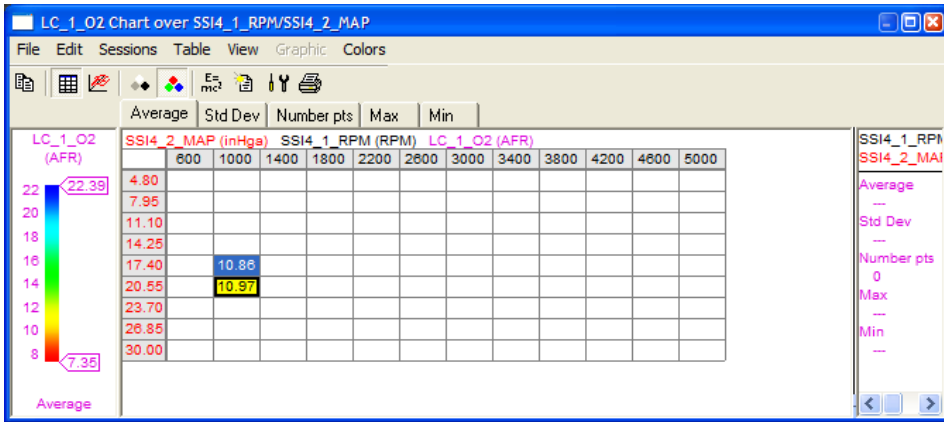
Channel:

From: to inHga

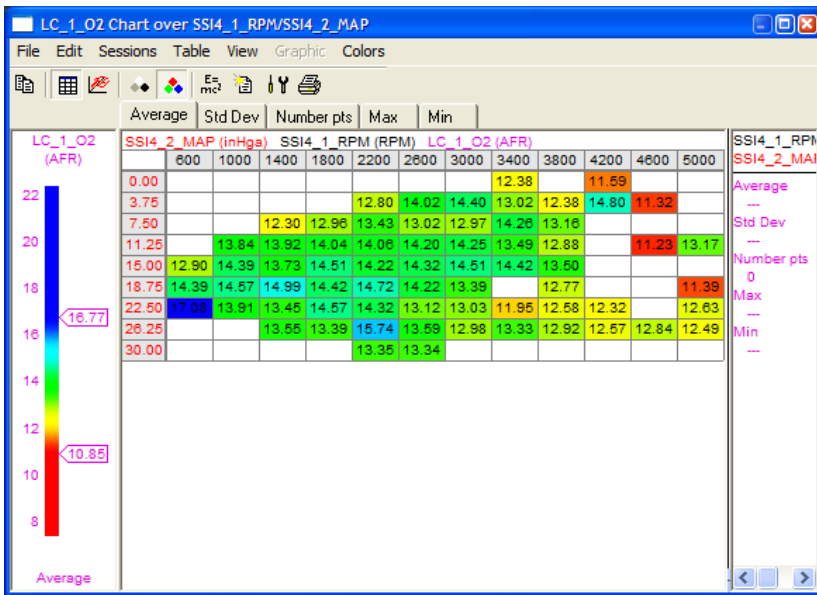
Number of steps: (max 128)

Chart Content

Channel:



Once you have collected a decent sample set, you will start to see the chart fill in. Use the colour function and the sliders on the left to adjust the shading and highlight exceptional AFR values (red and blue below).

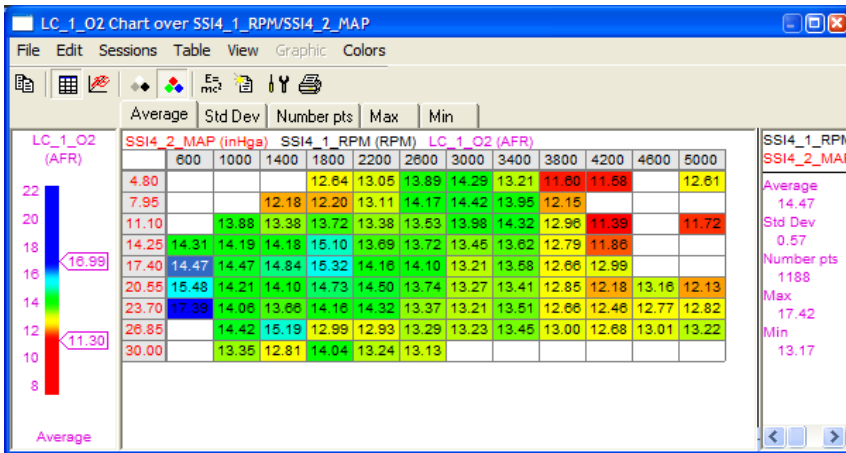


Analysing your log

Using the LogWorks tool, you can view your resultant log in a number of ways. Visualising WOT or part throttle runs on the timeline is a good way start off, as you can highlight segments of your log where things aren't as they should be. Below is a run showing a WOT run. Note it starts off at part throttle before opening up the tap.



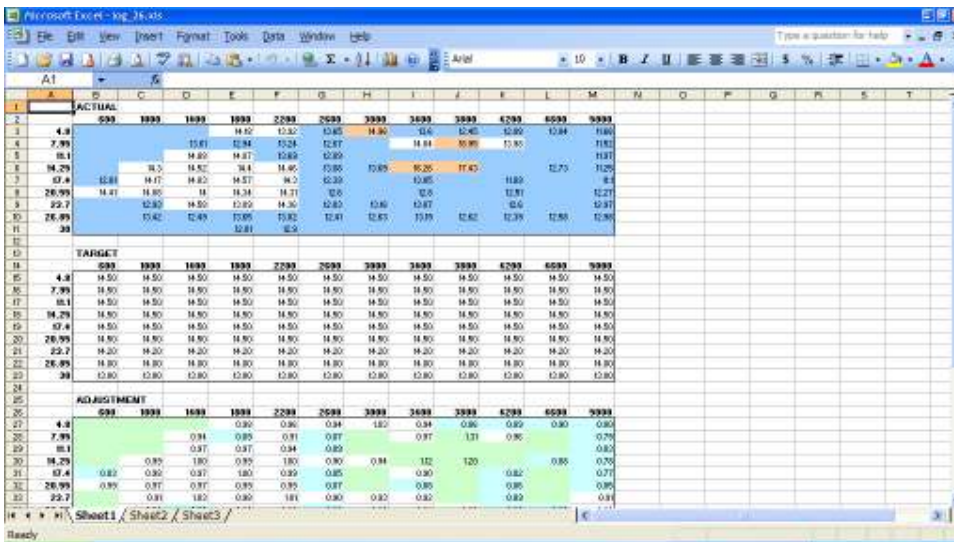
Also useful is the chart view we created in the previous step. This is good for tweaking a tune once you have the basics right.



Tuning for a target AFR

To do this we need to bring the chart into Excel so we can do a bit of number crunching on it. To do this:

- In the chart view, choose Edit, Select whole chart. Choose Edit, Copy Selection.
- Paste this in the ACTUAL table in the log analysis spreadsheet (found under documents on the eec site).



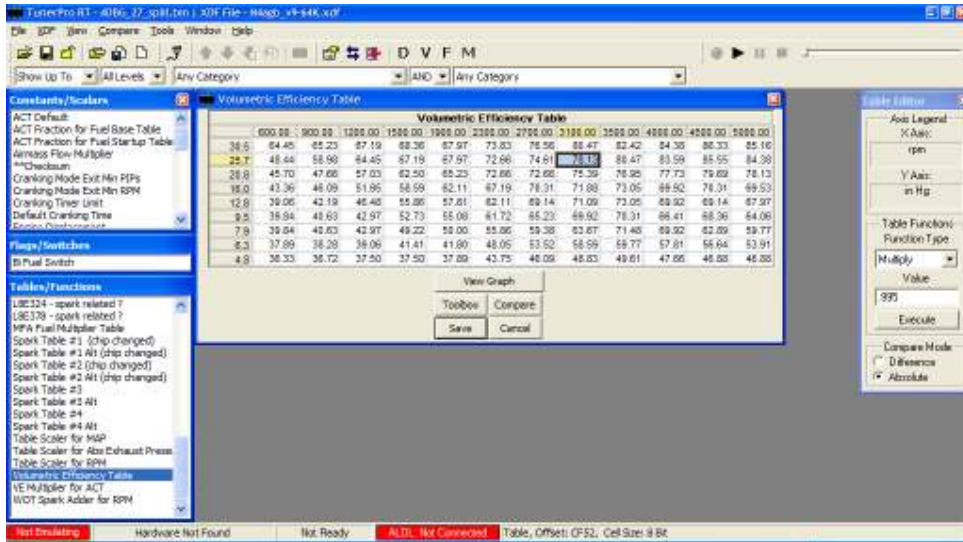
The spreadsheet then calculates the percentage difference from a TARGET AFR value you enter in the second table, and shows this result under ADJUSTMENT.

Altering your AFRs

Using the resulting Adjustment table as a guide, you can modify your VE table by this percentage to reign in your tune.

Use the spreadsheet to find exceptional cells in the chart. Then, in TunerPro, locate the same cell. You will have to approximate the RPM and MAP values for each cell you want to edit as they may not be a 100% match due to the way the EEC and LogWorks scale the tables.

Use the Multiplier function to alter that value, using the figure from the Adjustment table as a guide. Don't be silly; small changes make a lot of difference here, so if Excel suggests *1.5, try starting with *1.1.



Once you have finished tweaking the table, follow the programming guide to send your file to the J3 chip!

Tuning Spark

When tuning spark for the I6, the following tables are used:

Table	Comment
Spark MBT	Spark Maximum Brake Torque. The spark value giving the greatest torque on a stock engine (supposedly). This is lower than the bdlN knock table where the engine responded better to less timing.
Spark BdlN Knock	Spark Borderline Knock. The spark value at the threshold of knock on a stock engine (supposedly).
Spark xxx MPG	MPG tables are used in 'cruise' mode; this is activated after a threshold time (~10s) at a constant throttle above a certain road speed (~80km/h).

- There are 4 tables (as above) – BDLN Knock, BDLN Knock MPG, MBT, MBT MPG.
- The EEC chooses the least value of the two for that mode (Normal or MPG)
- MPG mode is 'cruise' economy mode (unrelated to cruise control or the economy button).
- To keep things simple,
 - use MBT as your base table;
 - copy this into the MBT MPG table.
 - Fill both BDLN tables with 50s.
 - This ensures the ECU ignores the BDLN table and you have one base spark map to tune.
- Be careful! Conservative tunes in the high RPM will save your head gasket and engine from severe damage!

Tuning for common mods

Being an OHC engine, cam changes are very simple in our Falcons. Though good gains can be had, being an SD strategy a cam change throws out the tune quite a lot. Below are a few tips for helping cars with cam changes idle better.

- The biggest changes will need to be around idle. Look at the Fuel Startup Table (a multiplier which richens the mixtures by up to 5x as standard when the car is cold!!). **This will help stop hunting.**
- Idle Speed - I find 750 works well; anything higher can mess with the Dashpot and harm drivability. **This will help stop hunting.**
- Tweak the VE table in your idle cell range (use LogWorks to find out what this is, my Wade 1521a equipped EF idles around 18inHga) to perfect your idle AFRs. **This will help stop hunting.**
- Use the sample 'Modified' tunes from the site as a guide
- Rev and Speed Limiters can be raised under the scaler section – AT YOUR OWN RISK!

Good Luck

Remember, tuning is no precise science and it will take a lot of time to perfect your tune. Small, documented changes are

the way to go to help you incrementally build a perfect tune. Without documentation you will find it very hard to keep track of your work.

If you find this guide useful or have any suggestions please contact us.

Happy Tuning!