

HOT CHIPS – DIY EFI ECU

The two leading DIY options for your new-generation pre-AU Falcon are the long established TwEECer and the new player J3 chip. This DIY strain of ECU modification works by using a programmable chip to interface with the J3 diagnostics port in EEC ECUs.

In Australia we are lucky to be able to draw on the experience of a huge number of DIY tuners in the US and Europe modifying the large number of EEC-controlled vehicles in their markets, including the massively popular Mustang in the US and Focus in Europe.

The only thing holding back these DIY J3 port chip solutions is the availability of definitions for the various ECU binaries. Creating a 'definition' is the arduous process of figuring out what bits of code do what in the actual management of the engine.

A number of Aussie enthusiasts are putting in heaps of man-hours and making the definitions available for other enthusiasts, including Jason Bolger and Jaysen Anderson @ <http://www.tiperformance.com.au/> Jason answered some questions via email.

Glen Fuller: How did you get involved with the EEC tuning scene?

Jason Bolger: I got involved out of an interest in technology and in cars. I had seen there was plenty of work going on in the US and Europe for 5L and 4cyl applications, but found there were very few people in Australia who could tune our locally built Falcons. With the help of an EEC guru in the UK, we were able to crack our local 6cyl boxes and produce a working definition; another local guru has helped out with support for local V8 boxes.

GF: How strong is the tuning scene in Australia at the moment?

JB: In a general sense, the local tuning scene is huge, with loads of options for other manufacturers and even newer Ford cars (BA onwards). However, support for late-model Fords is just starting to gain momentum as people start to realise what is possible with this technology.

GF: What projects are you working on at the moment?

JB: I recently finished help CVE Performance in tuning one of their customer's cars, an EL Fairmont Ghia 6cyl with a GRA LPG Turbo set-up that produced 191rwkW after the tune. See a pic of Paul tuning it here: <http://boostedfalcon.net/viewtopic.php?p=154104#p154104>

I am in the middle of installing an EL ECU into an EBII Fairmont, mostly to use the EL ECU's thermofan outputs to run a set of EL fans, but also to give it a tune to suit the mild mods it currently has; a Wade 1604 camshaft, some headwork, Pacemaker PH4480 extractors, high-flow cat and a Lukey 2.5in cat-back exhaust.

When I find the time I tweak the tune in my EF Fairmont, which has a stock bottom end, Wade 1521a camshaft, ported cylinder head by AFD, JMM Race Series extractors, 2.5in Lukey exhaust system with a metal cat, JMM 3000rpm high-stall, 3.9 diff gears in the LSD bum and a few other bits and pieces.

Prior to the chip, it wouldn't idle without hunting and pouring out black clouds of fuel smoke, but with a tune it will sit on 750rpm at 14.7:1.

GF: Is a retune after a cam change one of the primary uses of the J3?

JB: Falcon 6cyl EECs use what is called a Speed Density based tuning logic. This relies solely on the engine's MAP sensor, which senses intake manifold pressure or vacuum, to determine load on the engine.

When the camshaft is changed, vacuum levels for each load point change too, meaning the computer has a false sense of what the engine is really doing. This results in poor cold starting, bad or hunting idle, a doughy midrange and terrible fuel economy. Remapping the tables in the EEC can solve all of these problems; using a J3 chip is a way of loading this revised tune into the EEC.

GF: How does a J3 chip work?

JB: EEC-IV and EEC-V ECUs come factory equipped with a J3 Service port. A J3 chip is a device that uses this port to override the flash memory that contains the programming inside the EEC with that on the chip. Chips can come with switching modules to allow running different tunes (ours can run up to four tunes).

GF: What is needed to install and tune a J3 chip in a car that has, for example, a wild cam?

JB: The installation of a J3 chip requires cleaning the factory port to ensure good contact and simply slotting the chip onto the J3 port.

DIY tuning, however, requires a basic understanding of how the EEC operates in various modes (idle, warm up, closed loop, WOT) and which

tables to modify in order to affect those modes. Along with this, you will need a way to monitor the engine; good data logging equipment is a must. I use an Innovate LC-1 WBO2 & SSI-4 Four Channel data logger to monitor the AFR, RPM, throttle position, intake temperature, and manifold pressure. By analysing the log outputs, one can make further changes and compare logs to see how they affect the vehicle.

Alternatively, one can visit a good tuner. CVE Performance in Melbourne distributes our gear and has many years of experience in dyno tuning vehicles to suit engine modifications.

GF: How is it different to a standalone ECU? Better/worse?

JB: Remapping a factory ECU has many benefits over an aftermarket unit, including cost (both of the unit itself and installation), integration with factory equipment, and simplicity. However, aftermarket ECUs generally have wider support in the tuning community at present.

GF: What online sources would you recommend for those who intend to tune their own car?

JB: www.fordfuelinjector.com is a good starting point for beginners, and of course, <http://boostedfalcon.net>. The forums are a great way to share innovations and ideas like this with likeminded people.

GF: What is the hardest part about tuning?

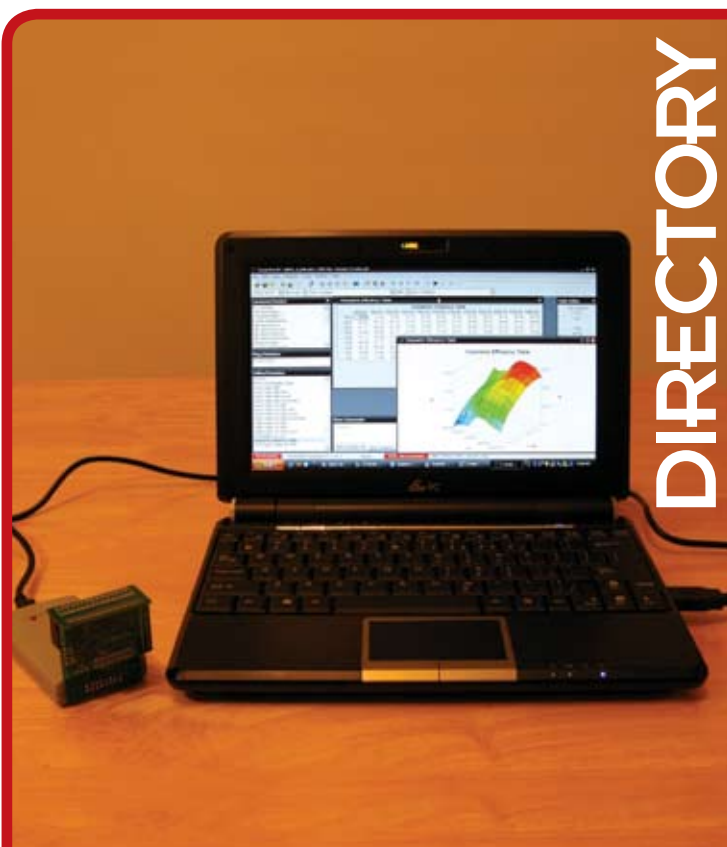
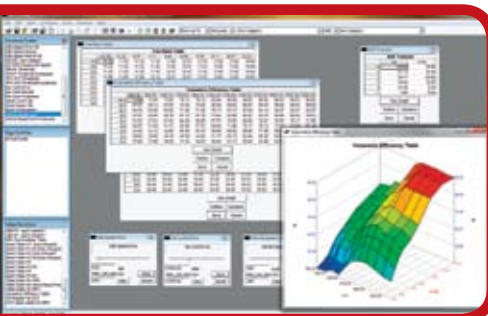
JB: Creating definition files is not for the faint of heart! But as the hard work has been done for EF/EL ECUs, that shouldn't worry anyone. The hardest part about tuning itself is the time required to get a tune spot-on, and making sure you have good quality information from which to tune.

GF: How much work have you put into developing the Aus-spec EEC tuner kits?

JB: Hundreds of hours of research, development, testing, trial and error have been spent in getting this solution available to the public. So far we have probably sold around 50 chips.

GF: Who has been involved?

JB: Big thanks to Derek for his help with the 6cyl gear, Jaysen for his help with the V8s, Andrew for the hardware, and more recently Paul for distributing our gear! ■



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