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**For Your Total Auto Care
& Suspension Specialists**

SHOWROOM STOCK SURPRISE

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written by Steve Bijok,

(Co- Author "Training WRX" currently with *MRT Performance* for implementation of "new projects")

Modifications:

- EcuTeK reflashed and retuned OEM ECU
- Complete turbo back exhaust (not MRT)
- 500 HP (in tank) Fuel pump.
- Custom (confidential) mods to OEM Blow off Valve and cooling system
- Whiteline Group 4 struts, sway bars and custom suspension mods.

EcuTeK and the EVO6.5 "Tommy Makinen" model

This week we had a rare Australian Delivered EVO 6 Tommy Makinen in through the doors of **MRT Performance** for some specialised tuning work in preparation for use in the upcoming Dutton's Rally series (kicking off in April). The car is to be entered in the showroom stock category making it a perfect candidate to test out EcuTeK's recently released "Flash EVO" tuning software.



Basic preparation before the serious Dyno tuning kicked off included covering some of the basics such as an engine health check (compression Test) a set of colder spark plugs and some special Group N special tweaks to the engines cooling system, blow-off valve and boost control system.



Another mandatory modification for the Evolutions is a fuel pump upgrade, (the OEM pump was tested to be inadequate on pressure and flow, when pushed to new levels) although this is not so easy on the Makinen compared to the later models as the fuel tank has to be removed from the car in order to do the pump swap. 3 hours later after removing and refitting the exhaust, rear driveshaft and associated parts the tank was back in and a fuel flow test showed a healthy 50% increase in flow over stock.

Next it was time to connect up the trusty laptop and begin the process of reflashing the Makinen's *brain-box* (ECU). Without going into too much computer jargon this involves querying the EVO6 ECU to establish that it is a supported ECU and that a standard ROM file or "Tuning Template" for this model car exists on our EcuTeK Database. Normally this goes reasonably smoothly and tuning can begin, but for some reason in this particular case communication could not be established.



Several hours later spent pouring over wiring diagrams for the EVO6 a solution was found for the lack of communication between the OBDII plug that is used by the Flash EVO software and the Makinen's computer. Australian delivered cars feature an immobiliser system that reads an embedded code within the Mitsubishi computer on start up and it was the immobiliser module that was responsible for scrambling the link between Flash EVO and the car. A quick wiring modification was made and the EVO6 was backed into MRT's newly commissioned Dyno Test cell.



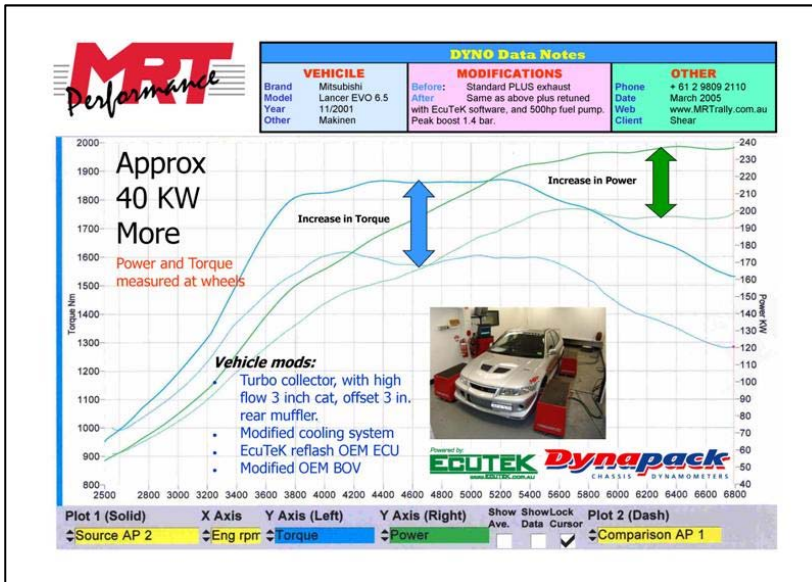
NOTE: this wiring mod is simply to allow a reliable method of communication in the OEM harness, if not for the "non factory modifications" that were done by Mitsubishi Australia, (with the aftermarket alarm), this would not be needed.

After approximately an hour of Dyno testing enough data was gathered to start modifying the Tuning Template for the car. Several areas needed to be fixed such as lean spots around peak torque and low RPM/High Load, a lumpy boost curve that tapered off significantly above 5000Rpm and at the same time overly rich high RPM fuel mixtures.

Mitsubishi use two distinct fuel and ignition maps and label them simply as a "low octane" and "high octane" maps, meaning that if the factory knock sensor detects spark correction over a certain amount the engine will revert back to richer mapping and a more conservative ignition map to protect the engine. In order to



maintain this inbuilt safety margin all numbers contained in the Low octane maps are checked for accuracy and left essentially unchanged during the tuning process in-case of a batch of bad fuel. More than 90% of all changes made were confined to the calibration numbers concerning the high octane fuel and ignition maps.



A large amount of effort also went into smoothing out the boost curve and ensuring that it peaks at a “pump fuel friendly” (98 Octane) 1.4Bar , 20Psi tapering off only after 6000Rpm so as not to over speed the stock factory turbo. At the same time new settings were dialled in to slightly increase the over boost cut threshold as well as removing the factory 180Km/h speed limiter.

Many hours (and ECU reflash’s later) the Makinen was ready for its final Dyno power run and we were not to be disappointed. Power climbed from 200Kw at the wheels to an impressive 237Kw. Peak torque soared by 20% and the torque curve now remains essentially flat between 3700 and 5200Rpm indicating this car is going to be incredibly responsive to drive on the road. General refinement has not suffered in the slightest and the mighty Makinen will pull from 1400RPM in 5th gear without protest.

Full marks to EcuTeK and the Flash EVO software package!



MORE INFORMATION:

- www.EcuTeK.com.au
 - Road or custom dyno tunes available.
- www.MRTrally.com.au
- Complete tuned suspension kits available.
 - Refer the MRT web site under “products”
- Ready made bolt on parts such as:
 - Exhausts
 - Airfilter kits
 - Fuel pumps
 - Intercoolers

For discussion on this model, refer the www.MRTrally.com.au/forums

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