

POWER RECIPES –

CHEVROLET GEN III

Archives
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Although the Gen III engine has only been available for the last four years in Australia, there seems no limit to its power potential

It was a sad day for Holden V8 fans when Holden announced it was finally going to put the venerable Holden V8 out to pasture. Although it almost happened back in 1984 when Holden killed off the 4.2L version, public opinion kept the demand for the cast-iron engine coming long and strong.

Still, no-one had any really kind words for the 4.9L version of the Holden V8 in 1986 and it's a wonder that it survived past that year, but survive it did. By 1988, with the introduction of EFI, it finally started to hit its stride.

For an engine to survive for more than 30 years as the premier power plant for any company was an amazing achievement, but it had to end sometime. Holden looked at investing in an overhead cam, three-valves-per-cylinder conversion, but it was not economically feasible.

Holden decided to adopt the Gen III V8 as used in the now defunct F-body Camaro, Firebird and C-5 Corvette, which had proven to be a willing power plant. With relatively low weight by the virtue of the alloy block and heads, and high strength bottom-end design incorporating crossbolted six-bolt main caps, the Gen III was capable of taking out whatever the Australian public could dish out.

Still, it was not without its critics. Many thought the basic configuration of 5.7L would be too large a capacity for most Australians with an eye for fuel consumption. Then there was the power output, which, at 350hp (260kW) for the basic package, was deemed too big a step for a populace that had been previously fed a diet of 180kW (240hp) V8s.

Then there was also the technology factor; while the engine was new, the technology

involved in it was not. Still using an overhead valve (OHV) configuration, along with pushrods and rockers, it was like we were still in the 1950s, but it was a proven configuration.

Was it too big? Was it too powerful? Well, the Holden engineers had the answer to the question of too powerful. They hobbled the new Delphi ECU package with a fuel and spark program that involved fattening up the air/fuel ratios and pulling significant amounts of ignition timing out of the tune-up. In one foul swoop, they had created a whole new industry that would seek to revive the engines back to, even exceeding, their intended power outputs.

When it hit the market, the Gen III outsold everyone's expectations, including Holden's competitors. Even with the power restricted to 220kW, new owners were raving about their new power plants and the fuel consump-

tion was better than previous models. Was it all good, though?

Not long after the Gen III was released, the stories had started. We heard of many engines requiring a full rebuild after just 20,000km or less. Oiling issues that may have been related to using synthetics at start-up, coupled with a faulty batch of pistons and pins, made buying an early Gen III somewhat of a lottery.

These issues were fixed as the new models fell into line, and after a while the reports of dead engines stopped coming. Holden also started increasing the engine output almost immediately, with the VX range receiving an extra 5kW for its Gen III engines taking the power to 225kW. This increased to 235kW in the performance models (SV8 and SS) in the VY range, and now it has reached a heady 250kW in the VZ performance models.

Over in the HSV camp, the power upgrades were just as erratic, with the power output starting at 250kW for the base models and then increasing to 255kW for the VX. From there, the power jumped another 5kW for the VY to 260kW, and then HSV shocked everyone by bumping the output to a massive 285kW for the VY Series II.

With the HSV GTS receiving a 300kW engine from the start, it disappointed many punters that its power had not been increased along with the rest of the HSV range. What had started as a 50kW gap was now just 15kW, and many were questioning what they were getting for their extra dollars.

In the aftermarket, though, newly developed parts had been flying thick and fast, and



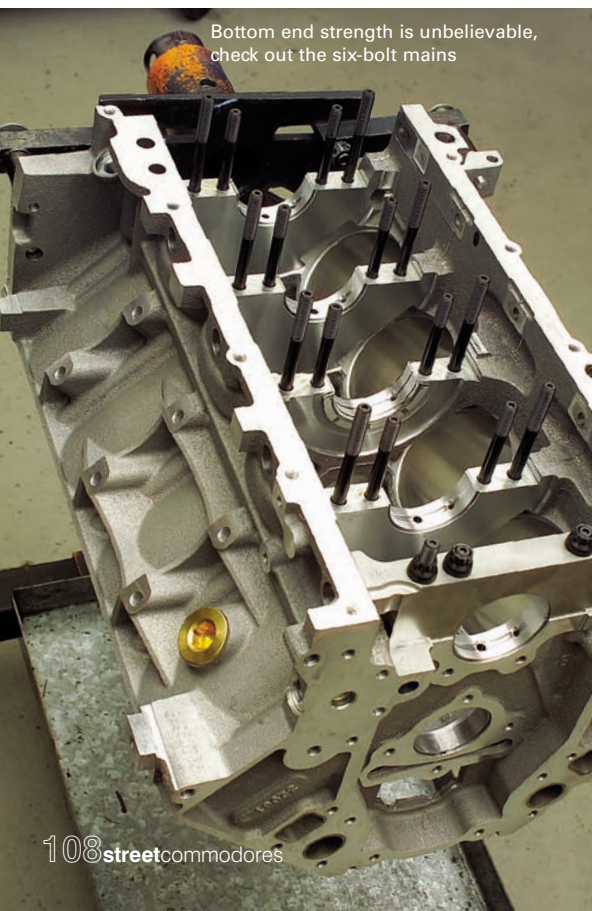
The Pontiac GTO shares the same engine as the Aussie Commodores

while many were claiming that they could alter the parameters within the ECU, only a few could make it stick. Many people paid good money for tunes that reverted to the standard programs after just a few weeks. Dave Alexander at SAS is still credited with being the first guy in Australia to be able to get into the program and make a tune that would stick. However, two programs from the US would soon change the amount of tuners that could get into the Delphi ECU.

along by detuning the engines from the start, and has not been as proactive as Ford in trying to stop the aftermarket's progress.

Why would they, after all?

By creating this hole for the aftermarket to fill, Holden has essentially created a cult following where people buy the vehicles from Holden with the view to modify them further, right from the start. With tales of Ford threatening legal action against those who try and create similar programs for Ford ECUs, you really have to wonder why?



Bottom end strength is unbelievable, check out the six-bolt mains

Forced induction has a couple of variations, but they all end up with the same thing – horsepower, and plenty of it

When EFI Live and LS1 Edit hit the scene, it didn't change the industry overnight. No, it took a few more days than that.

By using EFI Live to monitor the parameters of an engine on the dyno, be it chassis or engine, a tuner could log all the parameters within the Gen III as it happened during a power run. A quick view of the log would tell the tuner where the engine was running fat or lean, and then they could use LS1 Edit to change those parameters within the program. The tuner would then create a new program map for the engine and 're-flash' the ECU with the new program that would, if the tuner knew his stuff, produce more power.

As we said before, Holden helped this process

So, how much power can you make from the Gen III engine? Looking at what has been happening both here and overseas, the sky is the limit. Check out these power recipes, but remember we're only talking about the engine here; changing the driveline to suit your new engine is up to you.

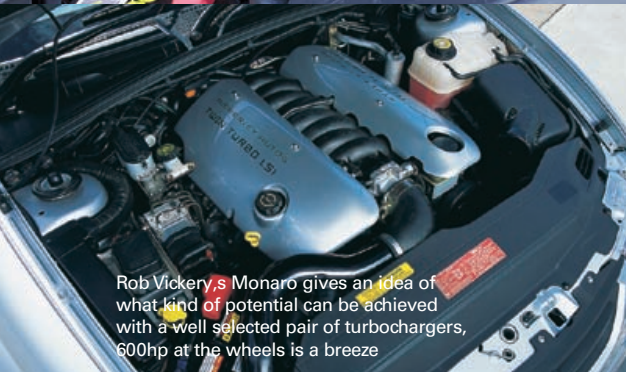
LOW HEAT – 300kW

The rules are different for the Gen III, and the first stage is 300kW of pumping power that is simple to achieve. Cold-air induction, quality headers and exhaust, and a MAF-less tune.

While there are many workshops still retaining mass airflow meters (MAFs) and trying to sell people high-performance MAFs



While HSV engines might have more punch from the factory, they are essentially what the Gen-III, in its LS1 form was supposed to be all along



Rob Vickery's Monaro gives an idea of what kind of potential can be achieved with a well selected pair of turbochargers, 600hp at the wheels is a breeze

Performance springs such as these are necessary due to the inherent weakness of the stock Gen-III valve springs



Most thought the open deck design was going to be a hassle on the Gen-III but it has more than proven itself up to 600kW



Those of you with smaller bank accounts might as well stop reading right here

and throttle bodies, the truth is they are not necessary. Even industry stalwarts who at first turned their noses up at the MAF-less tune are seeing the light. Usually a Gen III-powered vehicle will make at least 20hp more at the wheels tuned MAF-less when compared to a tune using a MAF

As for headers, you want to stick with the quality companies, and depending on where you want your power delivery, it's your choice of Tri-Y or four-into-one. Both will offer excellent performance, but the four-into-ones will deliver more top-end power.

Cold air is necessary to feed the engine and maximise power, but you need to rip off the factory plastic, turtle-style cover to allow the heat to dissipate out of the intake. A MAF-less tune will cost around \$1500, while the exhaust and cold air will probably add another \$2000 to the price, but that's cheap for attaining an HSV GTS level of performance.

HOT STUFF – 400kW

There are two ways of attacking this level: one uses forced induction, the other uses a better-breathing naturally aspirated engine.

We will tackle the NA engine first because it's the hardest, but not too hard mind you. If you're handy with the tools, you could tackle this one yourself, but most choose to use workshops these days to fit a head-and-cam package, and really we don't blame them.

Several workshops and performance-head businesses offer pre-ported heads these days, and when combined with the right camshaft, making 400kW at the flywheel is a breeze. The camshafts are not necessarily too big either and the engines will tend to idle almost like stockers, but the free-flowing exhaust will leave no doubt that you have something

more than standard under the hood.

A typical head-and-cam package will cost you around \$4000 plus fitting, and will usually include performance valve springs. Again, no need for custom throttle bodies or MAFs, but you will need to ensure that you have the LS6 manifold on your engine rather than the LS1 manifold. Usually you will only have to worry about this if you have a pre-2002 Gen III because these were fitted with LS1 manifolds, whereas the LS6 manifold was fitted to VX and later models. It's worth around 15hp at the wheels or so and is relatively cheap horsepower if you pick one up second-hand.

Forced induction has a couple of variations, but they all end up with the same thing – horsepower, and plenty of it. Using a CAPA intercooled Vortech kit, this level of power is merely a bolt-on, but changing the valve springs is a good idea because Gen IIIs suffer from weak valve springs, especially with forced induction.

If the linear power curve of the Vortech combination doesn't take your fancy, then how about the instant boost delivery of the Eaton M112 kit sold by Mark's Workshop? While it doesn't make the horsepower quite as easy as the Vortech, the Eaton makes up for

it with masses of low-down torque and full boost at low rpms.

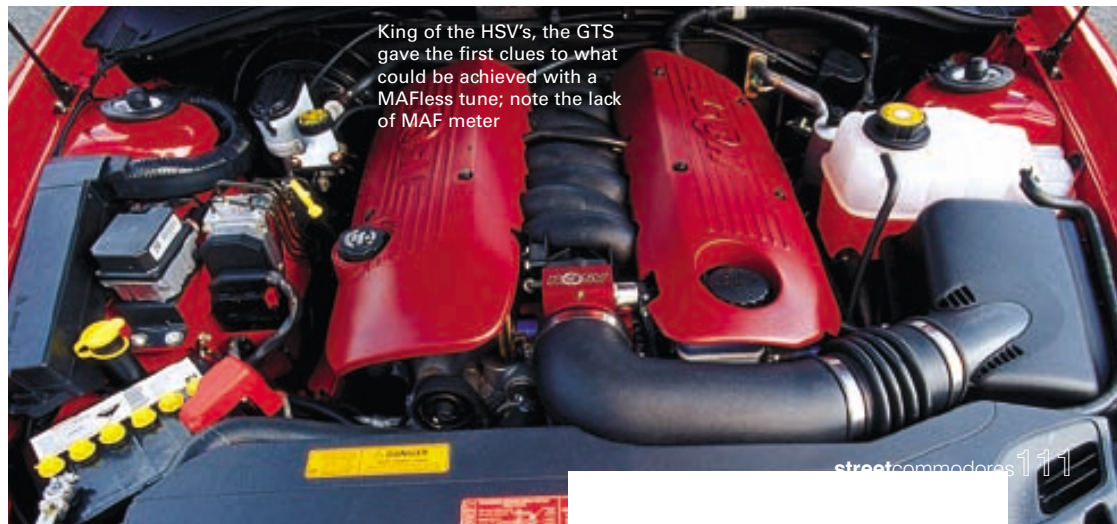
Of course, both systems will need to be used with quality headers and free-flowing exhausts. At the end of the day, they are not cheap, with either set-up leaving you with little change from \$20,000 fitted and tuned, especially after factoring in the exhaust and valve springs. Money isn't everything, right?

COOKING WITH GAS – 500kW

Adding a cam and cranking up the boost to 14psi on your Vortech set-up will get you here in a flash, but the bottom end will begin to become a question at higher rpms.

There is another way, and that is by going to a stroker set-up such as the Lunati or COME stroker kit. Either of these will punch the Gen III out to 6.3L or so, and when combined with a head-and-cam package, the power is there to be had.

The COME option is a little cheaper, but the Lunati kit is a well-engineered piece of work that will show you where the extra dollars went with just a glance. Of course, both necessitate full engine removal and disassembly, so it's not a same day, drive-in-drive-out operation.



King of the HSV's, the GTS gave the first clues to what could be achieved with a MAFless tune; note the lack of MAF meter

Alternative set-ups like this custom 8-throttle body manifold have been quite successful at the track



It is serious horsepower we're talking about here and some serious dollars too, especially with the Lunati kit costing \$6500 (the price has come down significantly too) for parts alone. So with all the work involved, plus exhaust and head/cam package, you're talking about the \$15,000+ zone pretty easily once it gets tuned.

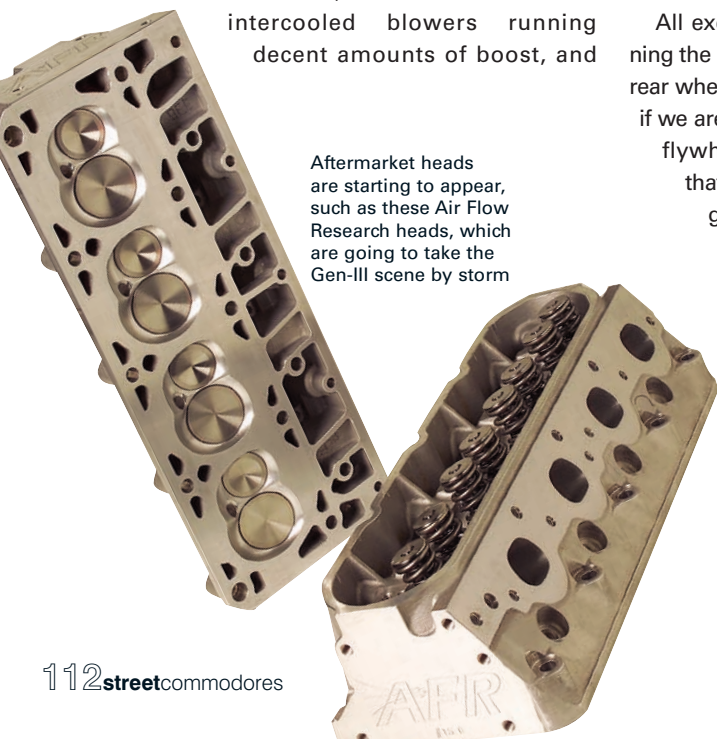
We would be remiss not to mention the Horsepower Factory twin-turbo kit as seen on Rob Vickery's Monaro at the Summernats. At just 8psi, it approaches this level of power on a stock bottom end, and for \$16,000 inclusive it represents good value for money. Unfortunately, it isn't available as a kit; it is a drive-in-drive-out affair where they supply, fit and tune the car for 16 big ones. Add to that the power delivery and smoothness of a twin turbo set-up and it seems crazy not to go this way, doesn't it?

MICROWAVING – 600kW

Those of you with smaller bank accounts might as well stop reading right here because this is where the silly money comes into play.

To date we haven't seen a naturally aspirated car achieve this power level, even using one of the venerated 427 stroker kits, so we're purely in the forced-induction zone.

We're talking forged pistons, aftermarket rods, custom camshafts and intercooled blowers running decent amounts of boost, and



Aftermarket heads are starting to appear, such as these Air Flow Research heads, which are going to take the Gen-III scene by storm



The LS6 manifold is a good flowing piece and no huge gains have been found by switching over to any of the aftermarket manifolds yet



Cam changes can be a pain because the roller lifters are retained under the head and these have to be lifted and held clear of the camshaft if the heads haven't been removed

then a driveline to suit. Start thinking \$25,000 or so for the engine package alone and you start to get the picture.

Currently we can think of only a handful of cars that have achieved this level, and nearly all have had large amounts of dollars thrown at them.

All except one – Rob Vickery's Monaro running the Stage II 10psi kit that made 611hp at the rear wheels at the Summernats which, shoot us if we are wrong, is pretty close to 600kW at the flywheel. For \$20,000 drive-in-drive-out, that's not a bad deal, but we still think that getting yourself some forged pistons and good rods would be a relatively cheap (Okay, so it's around \$3500 to \$4000, but it's all relative) and sound investment.

THERMONUCLEAR – 1000kW

Well, there are a few guys shooting for this figure in Australia, but none have reached it so far. Let's be honest, at this point you're not talking about running the alloy

block anymore because they just aren't up to the performance, even the C5R. At this level, you start with the cast-iron 6L Gen III as used in the H2 Hummer and work from there.

Everything has to be replaced, head studs have to be enlarged to 0.5in, and the Americans are currently playing with main stud girdles to keep everything together in the bottom end. Aftermarket heads, rods, pistons, crankshaft and even intake manifold are needed, which will pump the engine bill up to house-deposit prices, and we're talking Sydney house deposits here.

Add to this the style of forced induction you wish to use and then you have to find a chassis to fit it to. Currently there is one US car making this power and it uses a single-turbo set-up funnily enough, but some heavy-duty engineering has gone into making it possible. Like we said before, others are trying here in Australia, but at the moment all we've seen are broken engines and broken bank accounts.

So there you have it people, the Gen III is an engine with almost unlimited potential, but beware of the horsepower bug – if it bites, you might just end up with a second mortgage. **SC**