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**Whether you're after power for power's sake or power for towing's sake, this twin turbo LandCruiser could be the answer to your prayers. Story and photographs by PETE CARDIGAN.**

**T**HERE is something benign about LandCruisers that makes it hard for people to take them seriously. Hot street kids know a Cruiser's no threat to their V8s, and generally speaking you can't tow anything heavy with the damn things because they're underpowered for it.

All that's been changing, thanks to aftermarket efforts to boost the utilitarian 4WD into something more utilitarian.

The latest effort to give the LandCruiser a bit more bite comes from Advanced Induction Technology (AIT), turbo specialists with a background in high performance engines, who have now decided that two turbos are better than one.

The company has introduced a fully engineered Garret twin-turbo package for Toyota's 3F, a four-litre petrol engine. Having just driven the hairy beast, we believe that with a theoretical (and totally believable) maximum geared speed of 210 km/h, it's got to be the quickest 4WD around.

It's a far more capable tower than the standard LandCruiser, too, and will handle heavy towed loads easily through the standard Toyota four-speed auto transmission.

As AIT's managing director and chief engineer, David Inall explained, his company found it necessary to push turbo kit limits a little further after Toyota announced a turbo kit for the LandCruiser diesel.

The LandCruiser petrol auto, not what you'd call a bullet performer, still had heaps of aftermarket development potential. Toyota had turbo'd the diesel LandCruiser but still hadn't blown more power into the 3F petrol six, a natural for some smart turbologist, and a good marketing opportunity as well.



According to David Inall, the petrol-engined auto's poor on-road performance was the real incentive to engineer the twin turbo pack.

"With any sort of real load on the back, the petrol-powered auto LandCruiser degenerates into the kind of vehicle which, in our opinion, shouldn't even be on Australian roads. As soon as it's asked to tow any significant weight, the petrol auto becomes an instant traffic hazard,"

said Inall.

Work on the twin turbo package for the 3F petrol engine began mid-way through 1985. After that came a nine month evaluation program before the kit was ready for sale through AIT's 20 national distributors. David Inall said development of the package cost between \$75,000 and \$100,000, the kind of investment normally required for an engineering exercise of this kind.

David Inall didn't begin the 3F



# CRAZY



engine program with twin turbos in mind. AIT's normal approach before the twin turbo program had been to use single turbochargers with split pulse and exhaust flow, with exhaust pulse division in accordance with the engine's firing order.

That's how the petrol auto conversion started out, but the manifold for the single turbo unit turned out to be extremely difficult to engineers, and its awkward plumbing was near impossible to fit precisely

into the LandCruiser's engine bay.

While AIT was using for prototype the manifold for the development exercise, David Inall eventually came to the conclusion that the manifolding was so difficult on the single turbo system that it made sense to cost the production for a twin turbo kit, with two small turbochargers, each fed by three cylinders.

"As it turned out, doing it that way made it significantly easier. The plumbing for the twin units were

much simpler to manufacture than the same plumbing for a single turbocharger," said Inall.

Once it was decided that twin Garret T2 turbos were going to be less complicated to engineer than a single unit, progress followed relatively quickly.

The only changes made by AIT were engine-related. The driveline behind the turbos remained OEM — driveshafts, diffs, final-drive ratio, the lot.





*And on the seventh day the Lord created a super-Cruiser.*

A large-capacity oil cooler was fitted. The ignition distributor had to be re-curved for turbocharger compatibility, and the carburettor was changed to a pressurized unit, a single Weber from the current production six-cylinder Falcon, complete with all the necessary anti-pollution gear.

The standard inlet manifold was retained, with an adaptor between the manifold and the carburettor. The Weber bolts go straight onto the adaptor and that squares up with the inlet manifold. The carburettor receives forced charge from a central plenum mounted on top of it.

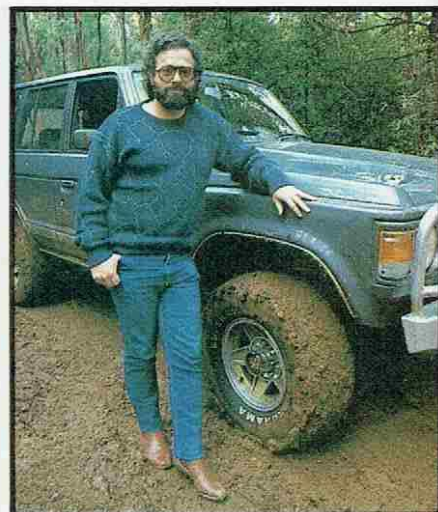
The exhaust manifold is larger than the standard manifold, which allows it to cope with the extra exhaust gas volume. The turbo also incorporates a

wastegate for better boost control. The T2 turbo is water-cooled.

The only standard LandCruiser you can compare the hairy beast with is the leaded, 3F-powered, series 60 wagon — that engine develops 110 kW at 4200 rpm; its best torque is 248 Nm at 2200 rpm.

The turbo LandCruiser develops 60 percent more power at the flywheel, which is 170 kW, and torque peaks at 430 Nm! Peak power and peak torque arrive at the same points in the engine speed range as they do in the standard engine. Theoretical geared speed is 210 km/h at 5000 rpm in the auto's fourth overdrive slot.

There exists of an uneasy peace between aftermarket turbo specialists and original equipment



*David Inall is the powerbroker behind the twin turbo performance package.*

manufacturers. Toyota doesn't like anybody sticking anything on LandCruisers — particularly when Toyota can't match the act. The irony of it is that Toyota's 3F engine is so applicable for turbocharging. It's a wonder Toyota didn't do it before the aftermarketers. According to David Inall the 3F engine is absolutely bulletproof, and he has no doubt whatsoever that the engine is strong enough to cope with the thermal stresses induced by twin turbochargers.

You could rave on about the vehicle's performance endlessly, but what's the point. It's obvious that with so much more power and all that torque — more torque than most five-tonne trucks — the twin turbocharged LandCruiser pulls like a Saturn rocket and has more grunt than most V8s.

For a truck that weighs more than two tonnes, its performance is startling; in fact the only vehicles that are likely to get passed this one are midnight specials or very quick V8s.

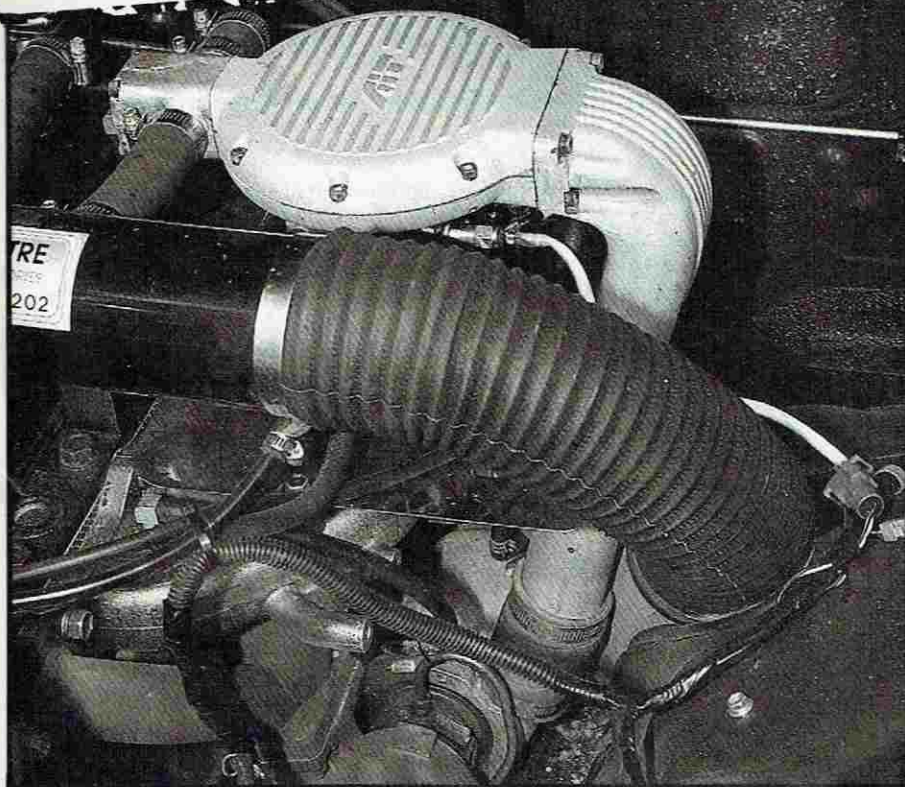
Having all that power respond so readily makes the LandCruiser a much safer proposition during overtaking manoeuvres. Once you've chosen the piece of road on which to overtake, without knocking the auto back a cog you just ease the right foot down, the turbos whistle a happy tune and you're safely back in your lane before you know it.

The power is particularly useful when you're towing something heavy. Most times the standard LandCruiser becomes something of a traffic hazard when towing heavy loads, but not with twin turbos up front. Sure you know you're towing, but the truck

*Continued p45*



# ALL DRESSED UP



Neat alloy plenum chamber is underbonnet highlight.

doesn't bog down like the standard vehicle under load, and it keeps pace with freeway traffic with no difficulty. If you tow a big trailer-sailer or a two-tonne horsefloat, this particular spec will do the job a lot easier than your standard turbo diesel or petrol-engined LandCruiser.

A word on the vehicle's handling: our test vehicle was fitted with Supa-Ride suspension front and rear, a combination that improved the handling of the LandCruiser wagon markedly. It was my opinion after driving it that with a potential top of 210 km/h, I wouldn't like to do anything like that speed with Toyota's standard leaf spring suspension underneath me.

My opinion is that if you're going to go this fast, get a suspension kit that'll keep you on your side of the road.

David Inall says fuel consumption should not vary greatly from the standard 3F-powered LandCruiser, although the number of variables influencing fuel consumption make it impossible to guarantee specific fuel figures. David Inall says the owner of a twin turbo LandCruiser could expect

to more or less equal the consumption for a standard petrol auto 60-series wagon, about 16 l/100 km on the freeway and about 20 l/100 km around town.

Good turbo conversions aren't cheap; if you want all the trick gear you've got to pay for it.

AIT's twin Garret pack is relatively expensive, but you've got to ask yourself, compared to what? Fully installed it'll cost the best part of four grand, and that includes \$700 to \$800 installation as well as full federal certification, which is probably worth several hundred dollars in itself.

Advanced Induction Technology takes the view that marketing any product is easier if it carries national type approval. That way the owner of the vehicle won't get hassled by individual State authorities if moving from one to another.

AIT had to get the Garret pack past unusual federal emission requirements for petrol-engined vehicles with a gross vehicle mass over 2.7 tonnes. It was tricky, but having passed the test AIT was given Second Manufacturer status plates for

the LandCruiser, which means the package is legal in all States, even Queensland where statutory authorities take a dim view of aftermarket turbos on petrol engines.

Warranties can be tricky on turbo retrofits but David Inall gets around the problem by re-insuring the driveline through Lloyds of London. Lloyds ensure that the consumer's warranty will be honoured if anything AIT puts on the vehicle causes damage to any component between the cooling fan and the rear diff.

Such warranties are vital: Toyota would be entitled to void vehicle warranty if AIT's gadgets broke anything in the driveline.

As it's difficult to compare the twin turbo with anything from the OEM, it's probably better to assess the vehicle from a different point of view — the probable cost of improving engine performance any other way.

You could go the alternative route and stick a dirty big V8 under the hood, but the cost of V8 re-engineering has become prohibitively expensive, and getting a legal V8 with real muscle isn't as easy as it used to be.

David Inall claims the twin turbo pack is the way to go if you really need the kind of power and torque that you can't get from any OEM.

The twin turbo LandCruiser puts out as much grunt as the 5.8-litre Ford Bronco used to, and that was the most popular towing vehicle Australian outdoor drivers ever had.

## WE WANT YOUR 4WD!

Alright, so we know things are pretty tough and the PM's making those belt-tightening noises again. So maybe we can't all buy new 4WDs this year, but the prattling polities can't kill our creativity and initiative. *Overlander* is going to be paying more attention to the aftermarket end of the industry from now on, with articles on improved vehicles such as this Cruiser.

We also want to hear about how you've improved the performance and looks of your 4WD.

If you reckon your unit is good enough to appear in *Overlander*, take some colour pics and/or B&W, write down what you've done to it, and send the info to:

*Overlander*  
180 Bourke Road  
Alexandria  
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