

Project R34

part 3

Story and photos by Ben Ellis

The R34 has had some interesting ups and downs since last issue, but it's serious fun to drive right now

Last issue we had 200.8kW at the wheels from the A'PEXi parts we fitted. At that stage, though, we were still running the standard computer. However, the amount of airflow through the meter was giving the computer cause for concern; it would often retard the ignition advance to zero in the top half of the rev range, bringing us back to barely more than standard power.

The only way to get reliable results from the R34 at this power level is to introduce some programmable controls, either a piggyback module or a complete replacement. The A'PEXi Power FC was the obvious choice, being a straight plug-in option. Not a single wire needs to be changed, yet every aspect of the car's tuning can be modified. After an hour or so of tuning, Croydon Autosports had the power up to 208kW at the same boost.

As you can see by the speed on the dyno chart, the A'PEXi Power FC also gets rid of the speed cut. This meant we could rev to the redline in fourth gear on the dyno. Before, it didn't matter, because the power was already dropping by the time the speed limiter

GCO has machined out the factory compressor cover to within an inch of its life to fit a T4 impeller. The larger inducer area helps, but more specifically the exducer diameter (the part of the compressor hidden by the cover) greatly improves the power-producing ability of the turbo



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hit, but with the Power FC, the power continues to rise thanks to better air/fuel ratios.

In this trim, still running 0.85bar of boost, we took the car to Wakefield Park for a Whiteline test day. The result of this trip more or less guaranteed that we would continue with our engine work.

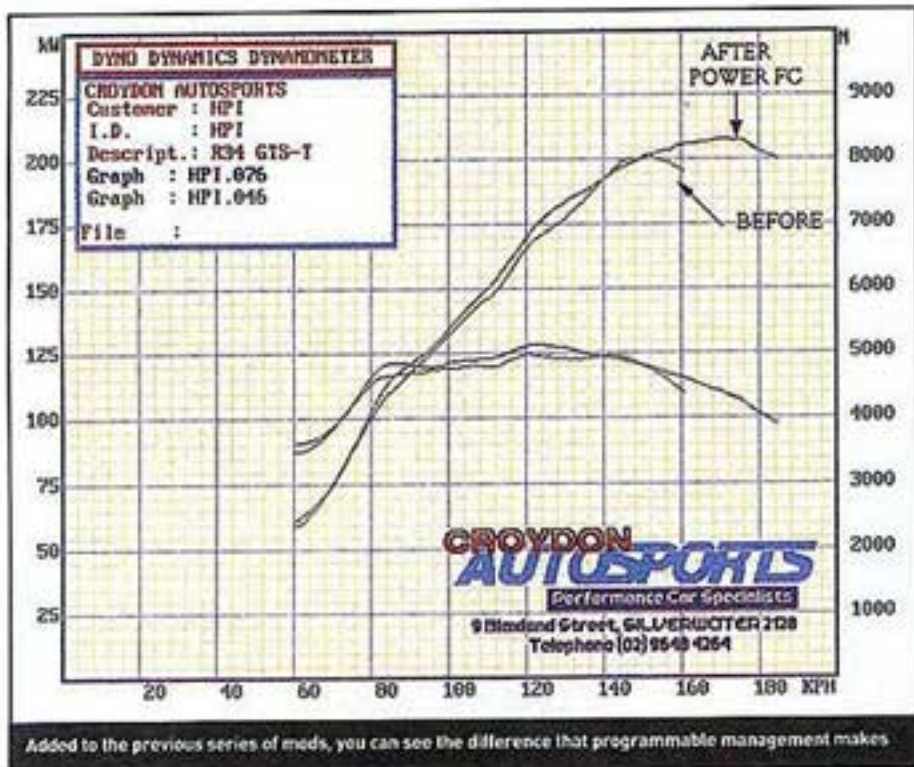
The tendency of Nissan's ceramic turbine wheels to fail at boost levels above 1bar is well known. It came as a bit of a surprise to have it let go at only 0.85bar, but the extra heat generated by five flat-out laps no doubt had a bearing on this. In any case, it was all the excuse we needed

to get a bigger turbo. With an engine power figure in mind of around 450hp, the bolt-on Japanese options included a Blitz K1-450V and the new HKS 2835 Pro for the RB25, but both of these turbos were more than \$4000. It may have been possible to fit a Garrett GT30 with an internal wastegate, but some modifications to the pipework would most likely have been needed.

The easy option for a bolt-on upgrade was to send the turbo to GCG turbochargers. This is one of the only companies willing to rebuild the ceramic, ball-bearing turbo found in the RB20 and RB25 (actually made by Hitachi). This not only has a ceramic turbine wheel, but also a nylon impeller. The result is an incredibly light weight, which helps spool-up time, but it makes for a very fragile turbo.

The rebuilt turbo uses a steel exhaust turbine and alloy compressor wheel. The compressor is a T4 57-trim, which requires the standard 'snout' of the compressor housing diameter to be machined out by over 5mm, leaving an amazingly thin-wall snout. The exhaust housing is also machined to suit the bigger exhaust wheel. Once refitted, however, it looks no different to a standard turbo (apart from the XTR badge). For not much more than \$2000, it was a much cheaper option than the Japanese turbos.

Before fitting the turbo, Croydon Autosports installed the Tomei fuel pump I bought on my last trip to Japan, which is rated to support

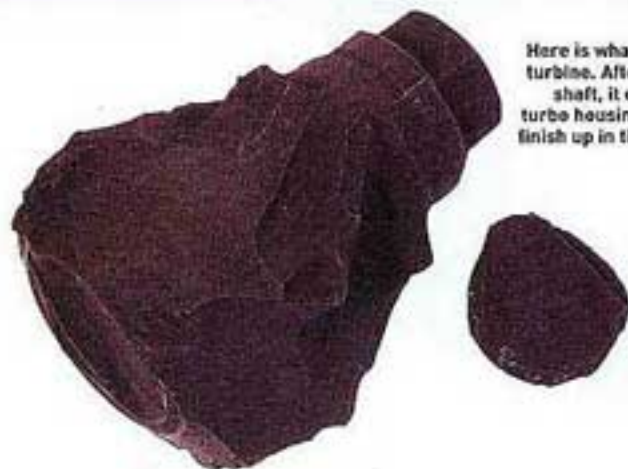




Plugging in the Power FC and tuning to suit, the new boost gained over 7kPa at the top end and gave a smoother overall power curve



The exhaust housing is also machined to fit a larger, steel turbine wheel. Boost comes on more gradually now, but power has improved markedly even at the same boost, and this one shouldn't fly apart at higher boost



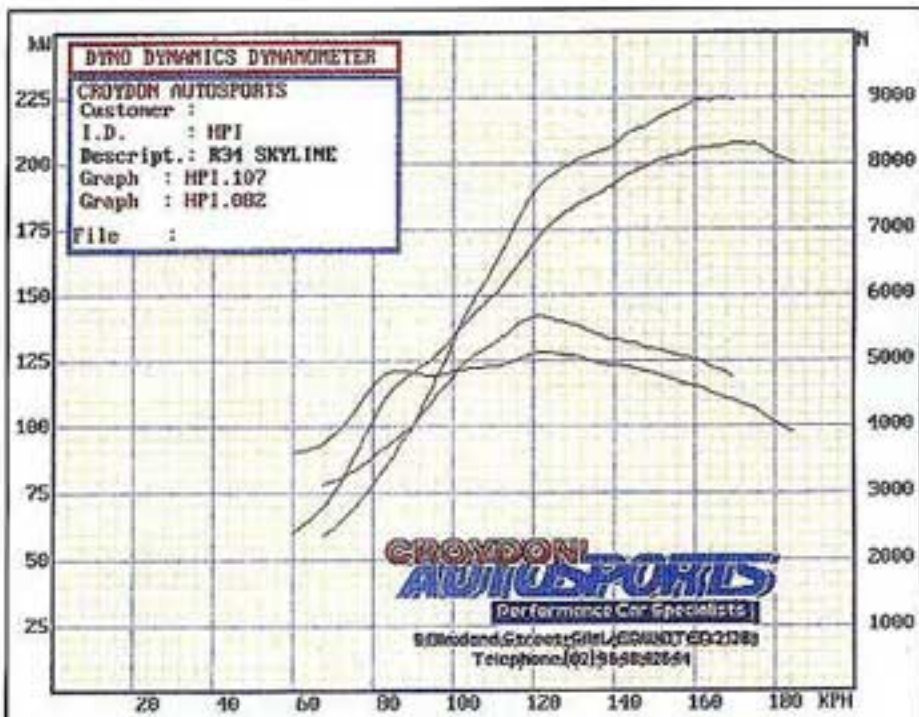
Here is what's left of the ceramic turbine. After detaching from the shaft, it destroyed itself in the turbo housing and was spat out to finish up in the catalytic converter

550hp, whereas the standard item is getting iffy at 400hp. Though we would be running standard fuel pressure at first, a bigger fuel pump is always good insurance.

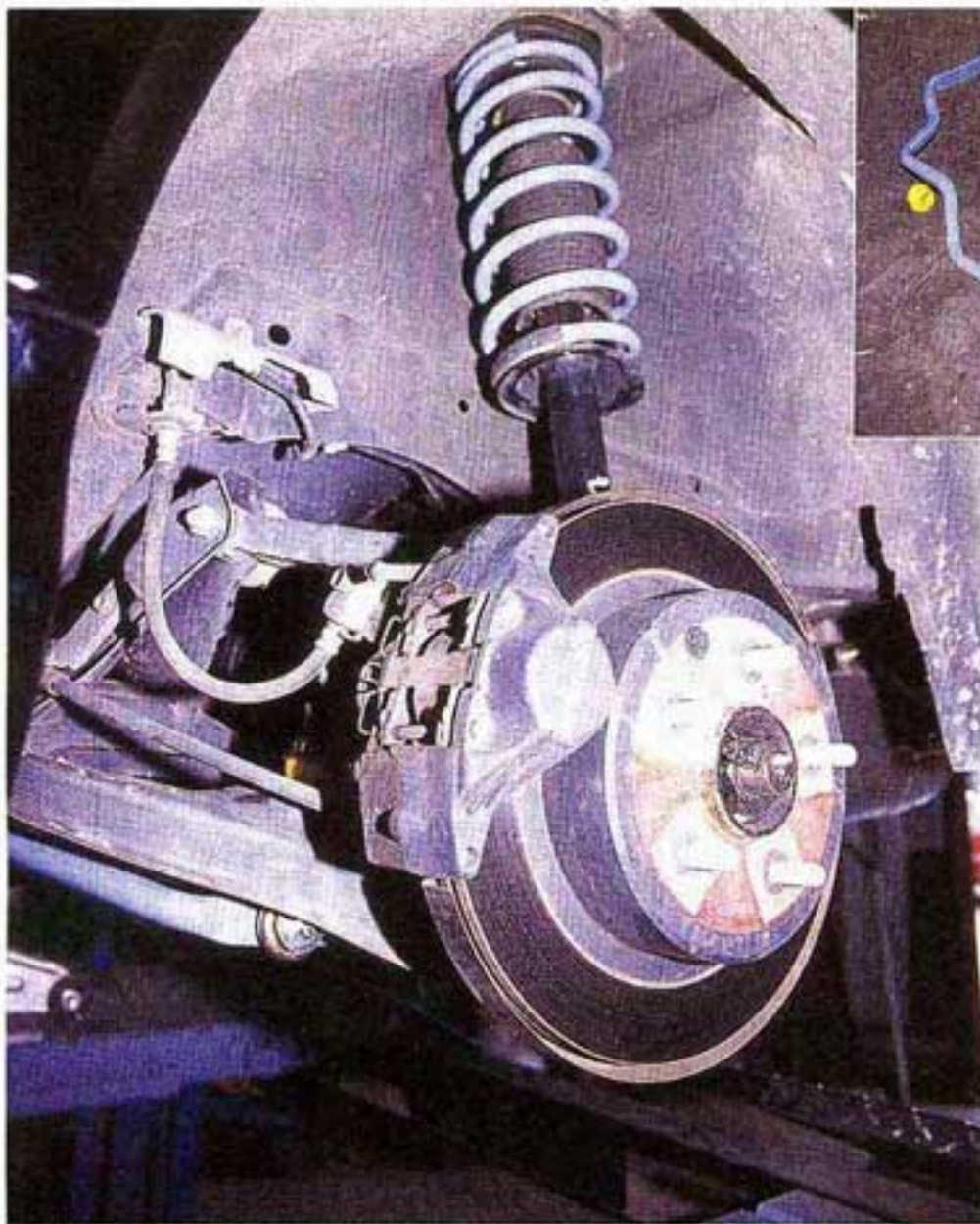
After another hour or so of tuning, we had a new peak power figure of 225kW, still with only a tiny boost increase to 0.9bar. The turbo can handle more boost than this, but there were a couple of things stopping us from going further. First, the injectors were already at 90 per cent duty cycle, so it would take at least a rising-rate regulator to maintain safe air/fuel ratios at higher boost. Second, the clutch started slipping on the dyno.

The different character of the turbo is as obvious on the dyno sheet as it is on the road. Instead of the turbo rapidly reaching full boost at around 2600rpm, it gradually builds to reach the peak at around 3200rpm. It starts making boost from around the same revs, but takes longer to reach the peak. Surprisingly, the result is a much more progressive power curve, which actually makes the car easier to drive on the limit, despite the extra power.

In any case, 225kW at the wheels represents a 52 per cent gain over the stock figure of 148kW. Based on the standard flywheel figure of 206kW, this theoretically equates to 313kW at the flywheel, or around 420hp. Before we can get to 450hp, I will need a new clutch and a fuel-pressure regulator. I also have my eye on a set of Tomei camshafts ...



The new torque curve demonstrates the difference in power delivery, which is actually more progressive than before, while the extra 17kW across most of the power range is even more fun. Clutch slip and injector limitations prevented us going any further ... for now



A brake-pad upgrade to A'PEXi GT-spec on the front and N1-spec on the rear has truly done wonders for the braking feel and outright power – the GT pads offer terrific 'bite' when the pedal is first depressed



The Whiteline swaybars developed for the R33 GT525t are also applicable to the R34

Before we get too much further with the power development, we need to make sure the car is going to stop and turn just as well. Whiteline was put in charge of the turning department, while A'PEXi supplied a set of GT-spec pads for the front, and N1-spec pads for the rear of the Skyline. The N1 series is the 'step one' upgrade for street use, while the GT-spec pads are 'step two', with much higher metal content and temperature-handling ability. When dead cold, they squeak slightly, but as soon as they have been used once or twice, they behave perfectly well on the road.

The difference in braking feel and power over the standard pads is awesome. At Wakefield Park, they were the single most impressive aspect of the car, not fading even slightly. Strange as it sounds (given that they slow down the car), they are probably the best value-for-money performance upgrade we have made to the car.

After fitting the pads, Whiteline experimented with the springs. The R34 is not the same as an R33 underneath. Though the overall design is very similar, it required completely different springs to the R33, which ultimately reduced the ride height by 30mm front and rear. The rates are also noticeably higher, without being too harsh on the road.

Swaybars were easier, as the R33 parts did fit. Both front and rear bars feature Whiteline's 'blade' adjustment, which makes it easy to increase or decrease the bar rate to finetune the car's handling.

Upgrading the dampers was more of a problem. None of the R33 or even R34 GT-R parts were applicable, so shock absorbers had to be ordered from KYB in Japan. Unfortunately, they didn't arrive in time for the Wakefield track day, so we can't comment too much on the car's new handling. Next issue we should have a further update on the suspension work.

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