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10^{SECOND} STORMER

A while ago NZPC magazine made a short journey to the capital city to capture the hospitality of the locals and sample their passion for cars. During our stay we were able to spend some time with the man behind this S12 Nissan Gazelle RS-X. Owner Ben Diggles took the time to show us around both of his cars – the other will be featured later, but remains anonymous for now. This car, and I suppose any 10-second car, is well and truly beyond the realms of description in terms of acceleration and sheer power. Ben manages to put it well, though – “antisocial”. This is the exact reason manufacturers such as Ford produce a car full of potential like the XR6 turbo, but with only six pounds of boost. It’s considered unruly to drive around if you can feel any real level of power. Pity for them, I say; they don’t know what they’re missing out on!

The otherworldly acceleration generated by a car such as Ben’s Gazelle is the product of engineering excellence, and no doubt a few little tricks of the trade.

The engine in question is possibly not what you’d expect, unless you’re in the know. It is most definitely from Nissan, but it is not an RB26DETT, 25DET or even 20DET. It is in fact an FJ20ET – an early ‘80s 2.0-litre twin cam four-cylinder turbo.

Some of you may not have even heard of this engine, let alone seen one, but one thing’s for sure; it’s physically big, very strong, and very capable of producing the numbers. The engine as factory-fitted to the S12 RS-X Gazelle was a typical by-product of early ‘80s over-engineering, with strength and cylinder head flow capabilities well beyond that of many modern engine designs (which are often built to the specifications of accountants, not engineers). Besides that, they are cheap these days compared to the RB and SR-series engines, thus providing a perfect platform from which to build a high-power motor.

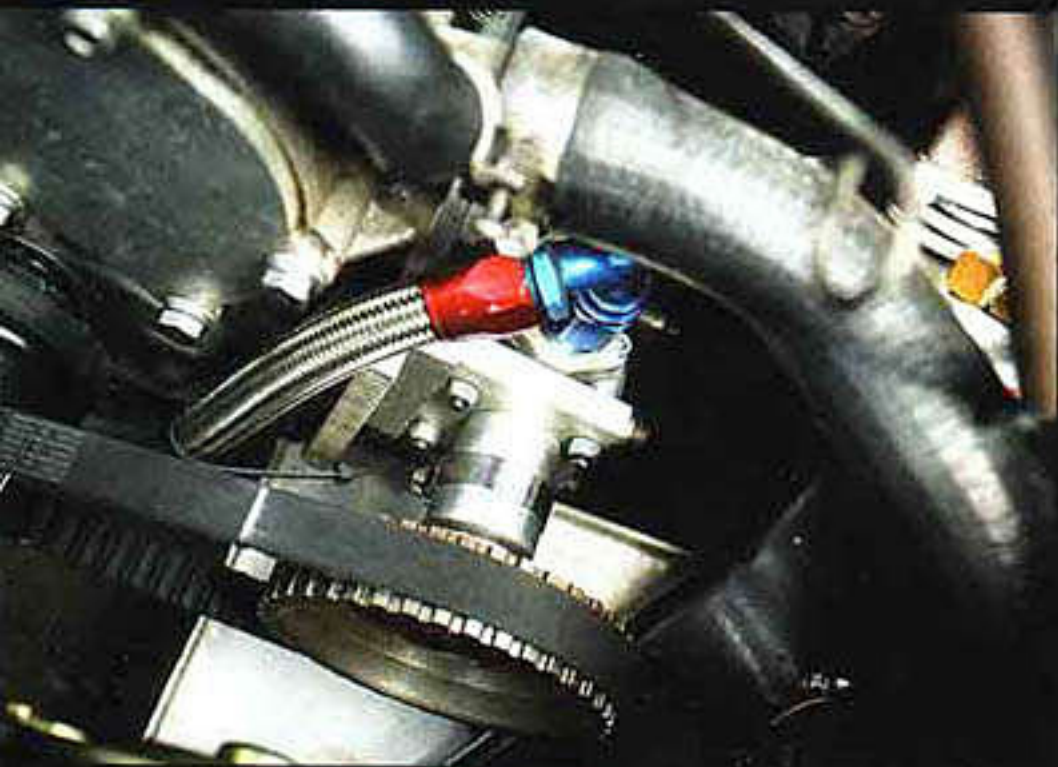
Strength inside the engine is obviously the key to reliability and performance, and Ben has left no stone unturned. The cast iron block is about as stiff as they come, especially compared to alloy blocks, which tend to shift around more under high boost. SPS of Australia machined the forged pistons for this FJ20, chosen thanks to its reputation among many of the big Aussie racers. Joining these to the race-prepared crankshaft is a set of

Carrillo conrods. Now, if you’ve ever seen a comparison between a heavy-duty factory I-beam rod and a Carrillo H-beam rod, you can see why people choose them. Not only is there the quality of steel used in manufacturing, and the fact they’re of H-beam design, but it’s kind of like making a comparison between Kate Moss and Roseanne Barr. You get what I mean, anyway – no offence to either, by the way!

Adding to the build is a set of ARP main studs, which secure the factory two-bolt main caps. >



THE MOST OUTSTANDING ASPECT OF THIS CAR IS THE FACT IT WAS BUILT ON A BUDGET OF AROUND \$100 A WEEK



This area is one of the few weaknesses of the FJ20, with most modern engine designs now using a full girdle system to minimise main cap walking.

The bores themselves have been honed out to +0.5mm, and to be certain no block distortion occurs a custom torque plate was utilised to mimic the cylinder head and provide torsional rigidity.

Torqued down to the block is one of the widest cylinder heads you're ever likely to find on an inline four – check the photos and compare it to the 4G93BT in your GSR!

Controlling the opening and closing of the valves is a pair of what Ben calls 'mild' Kelford cams, which to us means big lift and duration, well at least for a turbocharged engine anyway. From his experience, gathered in his homeland of Australia, Ben has been able to carry out his own porting work, which helped optimise the airflow capability of the cams and head.

In keeping with the need for strength and reliability, ARP head studs secure the head to the o-ringed block, between which a multi-layer steel shim head gasket is sandwiched. Although no engine is indestructible, what you've got here is a combination that should in theory handle just about anything thrown at it, especially with an external high-flow oil pump to keep everything well lubricated.

Next up is where the fun begins, because it's from here that the serious power emanates. Speedtech makes an appearance with the use of a custom exhaust manifold and one of its 'secret' turbos. I say secret, because it's one of those instances where you're better off just accepting the fact that it does the job. All I know is that it's a Garrett GT series, and it's big. Big is a term that could also be used to describe the K&N pod filter installed behind the left headlight. Capable of supporting 600kW, the thing must

be over foot long.

From this rather large filter the air is sucked into the turbo through a four-inch custom aluminium intake, and once out of the compressor housing it charges through Speedtech piping and on to a rather large Herbert Fabrication intercooler. The use of the Nissan parts bin has seen Ben choose a Skyline inlet manifold to evenly disperse the boost into the engine.

Beyond a certain point standard internal wastegates just can't bypass enough gasses to avoid uncontrollable overboost. Ben's external gate of choice is by another Australian manufacturer – Paul Stanek Racing, or PSR for short. Measuring in at a generous 45mm means it should be well up to the task of releasing the unwanted gas. A Turbosmart blow-off valve vents just after the compressor outlet rather than just before the throttle body, to minimise needless heating of the intercooler. What isn't vented by the wastegate or BOV is taken care of by a three-inch mild steel exhaust, finished off with a stainless straight-through muffler. The sound was distinctive FJ20, and as Ben pointed out, quite cammy in its tone. Supplying an animal such as this with the right amount of fuel is no mean feat. To satisfy the appetite for the gas two Bosch pumps have been installed, and through the use of 3/8-inch lines they pressurise a pair of stock FJ20 fuel rails and regulators. On each of these rails are four 550cc/minute Bosch injectors. A 30-litre fuel cell is the fuel source, but I'm sure it needs frequent refilling once the Gazelle hits the strip. Instead of messing around with the stock ignition system, four Nissan coil packs fire their charge through Magnecore KV85 leads and on to the plugs. An MSD Dis4 ignition module provides a more energetic spark ensuring the mixture is burned as efficiently and cleanly as possible.





DRIVER_Ben Diggles

Age: 32
Lives: Wellington
Occupation: Fish and Shellfish Pathologist - Digs Fish Pathology Services

Hobbies: Fishing
Previously owned cars: Datsun 1600, WRX

Dream car: Twin turbocharged 350Z

Why the Gazelle?

Always wanted to build a car with a factory FJ20ET, and this one came with a roll cage already installed for only \$3000. Most FJ20-powered cars in this part of the world are transplants.

Length of ownership: Two years

Build time: It sat under a car cover for six months after buying it, then in someone's garage for another six months. Then it was built over the winter of 2003.



Overseeing the operation of the engine is the duty of a LinkPlus Management System. As with most modules this controls the main parameters of fuelling and ignition timing, as well as the air fuel ratio – possibly the most critical aspect of a turbocharged engine of any level of tune. A fairly recent acquisition of Ben's is the E Boost, by Turbosmart. This unit accurately controls boost, enables faster spool-up and different boost levels in different gears.

As you can imagine, the gearbox behind an engine of this power would have to be fairly burly, but what you'll find is not a custom-built drag special, but an R32 GTS-T five-speeder. A Nismo

steel flywheel connects the drive, and a Quartermaster twin plate clutch carries it on through the 'box and on to a custom one-piece driveshaft.

A stock R200 3.9:1 differential cops the abuse from there on in, but measuring in at 200mm, or eight inches, means it's quite large for a factory unit. When on the strip Ben previously ran with Hoosier Q/T Pro 26x9.5x16 slicks. This season Ben hopes to secure more impressive 60-foot times with a brand-spankers set of Mickey Thompson ET Streets in 26x11.5x16. These are wrapped around a pair of Toyota Supra 16x9-inch alloys, which are surprisingly light, and combined with the favourable five stud

pattern make them ideal for drag racing. For street use, however, a set of Dunlop 245/40R16s are used, also on Supra rims. Up front Weld Draglites are used with 185/65R15 tyres to do the steering, and certainly make the S12 look the part at the strip. Some of you may recall the Gazelle having a recent mishap with the wall at Manfeild, but that is all history now. The car has been completely resprayed in silver thanks to the lads at Bodyworks in Petone. With the new colour it certainly looks the business on the exterior, and the same applies inside too. Lightweight buckets with harnesses have been installed, the old heavy door trims binned >

THANKS

Ben would like to thank the following:

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Andre @ Speedtech
Jeff Watson
Phil @ Link
The Wellington crew – Scott, Graeme, Terry and Hunty
Turbosmart
The boys at Bodyworks
Tim sillay for helping out with a few things



10 SECOND STORMER



SPEC_1984 Nissan Gazelle RS-X

Engine: FJ20ET (factory-fitted) 2.0-litre DOHC 16-valve turbo, cylinder block O-ringed, torque-plate bored and honed to +0.5mm, high flow external oil pump, SPS (Melbourne) forged pistons, Carrillo conrods, race-prepped crankshaft, NZDRA-approved steel crank pulley, ARP main studs and head studs, Kelford Cams mild grind, self-ported head, steel multi-layer shim head gasket, Speedtech-spec Garrett GT turbo, Speedtech custom exhaust manifold and intercooler piping, DR30 Skyline inlet manifold, Herbert Fabrication custom intercooler, K&N 597kW (800hp) pod filter, four-inch custom aluminium turbo intake pipe, Turbosmart blow-off valve, PSR 45mm wastegate, two Bosch fuel pumps, two Nissan FJ20 fuel rails and regulators, eight 550cc/minute Bosch injectors, two 3/8-inch fuel lines, four Nissan coil packs, Magnecore KV85 ignition leads, MSD Dis4 Ignition Module, LinkPlus engine management with KnockLink and LambdaLink, Turbosmart E Boost, full three-inch mild steel exhaust, S12 Nissan radiator

Driveline: Nissan R32 GTS-T five-speed manual, Nismo steel flywheel, Quartermaster twin plate clutch, custom one-piece driveshaft, stock R200 LSD (3.9:1)

Suspension: Stock except for after market dampers

Brakes: Stock

Wheels/tyres: Front - Weld Draglite 15x5 with 185/65R15 tyres: rear (race) 16x9 Supra rims with Mickey Thompson ET Streets, 26x11.5x16 (2003/4 season)

Exterior: Full respray in silver

Interior: Two lightweight race buckets, harnesses, rear half fully stripped, fuel cell enclosed in rear compartment, lightweight alloy door panels, displays for LambdaLink and KnockLink

ICE: Not required

Performance: Best to date - 10.91 @ 132mph (212.5kph) - 0-60 foot - 1.86 seconds. Should definitely improve this season.

and in their place are lightweight alloy panels. A six-point Karl Robinson roll cage was actually in the car when Ben made the purchase a couple of years back, so that has obviously stayed in place. Other necessities are the readouts for the Knock and Lambda link, giving Ben all the info needed to keep an eye on the engine.

The most outstanding aspect of this car is the fact it was built on a budget of around \$100 a week. To put things in perspective, this car was purchased and constructed for the price of a bog standard Evo I or WRX. It has come this far on a budget many would deem impossible, but with his personal ability and knowledge learned through experience, and the help of friends, Ben has entered the 10-second club well and truly against the odds.

To date, Ben's best performance has seen him net a 10.91 at 132mph, with a 60-foot time of only 1.86 seconds. Remember, it's the trap speed that conveys the true power output of the engine, and 132mph, or 212.5kph, is heaps for a high 10-second pass. This season Ben expects to see his times drop substantially, especially through the use of the new slicks and a thorough dyno tuning session. •

