



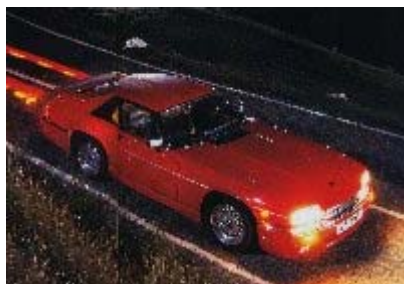
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IMAGINE by Jesse Cross

The Lynx 450T starts off as a standard Jaguar XJS, but, as Jesse Crosse explains, it finishes up with an awesome 450bhp. It's an involved conversion, but is the result everything you'd imagine it to be?

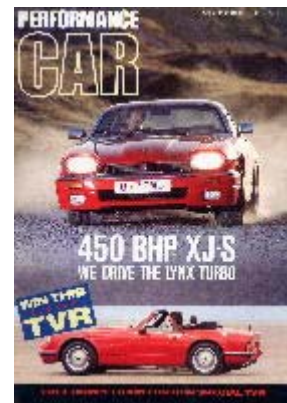
Just imagine, for a moment, that you're sitting at the end of a long, dark, tarmac strip. Imagine, too, that under your right foot is around 450bhp. And in case you're struggling with that idea already, 450bhp adds up rather neatly to five Fiesta 1.6Ss, almost two 911 Carreras, and no less than 11 Mini City Es.

Mind boggling? Perhaps. Awesome? Definitely. But that's the sort of performance that Lynx Cars, a company up to now better known for their magnificent D-Type replicas, are busy cramming under the bonnet of the Jaguar XJS 3.6.



Back at that tarmac strip though, imagination was about to become reality, on a sunny day in July after a pleasant but slightly frustrating drive across country. Frustrating, because while the Oxfordshire countryside is a fine place to try out Lynx's special A-frame rear suspension, designed to control rear wheel geometry a little better than normal, it isn't all that easy to let rip with anything like that sort of power.

The odd squirt is in order, of course, where the quiet rumble from the single-turbocharged AJ6 engine smooths out to something, you might again imagine, akin to the sound of a liquid fuel rocket engine.



And when you do indulge, the effect is startling. There's some turbo lag, but then you'll be reaching for the gearlever in a hurry, while being smeared across the seat like a coat of paint - so enormous is the acceleration.



Merely depressing the throttle pedal is enough to start the rear wheels spinning, despite the large 245/45 VR16 Bridgestone RE71s on 8x16-inch rims (there are 225/50s on the front). Second gear gets you down to business proper, and third takes you over the magical 100mph barrier and beyond. It's then you'll notice the difference between this kind of car and more conventional high-performers. The average, 2-300bhp road-going saloon or coupe is at least thrilling, and let's face it, there aren't that many around. But rise above 300bhp and certainly over 400bhp, and the world takes on an entirely different perspective. In fourth gear, most others will start to tire. The initial flamboyance is tempered by physical considerations, like mass and especially aerodynamic drag. But with a 450bhp motorcar packing somewhere in the region of 500lb ft of torque at 3500rpm, you are talking about very serious and persistent power, even at the upper limits. So the load of fourth gear doesn't worry the Lynx, and neither does fifth. The realisation soon dawns that to find the limits of this car you'll have to be prepared to go very fast indeed. . .

THE PERFORMERS - Lynx call it the 450T. There are three conversions to choose from in what they call the 'Performer' range of engine modifications for the AJ6 3.6-litre Jaguar engine. The 280T is the mildest of the lot and remains within the realms of sanity. At 280bhp and only four to five pounds of boost pressure, there are no modifications to the engine itself, save the addition of the turbocharger system, a special exhaust manifold, intercooler, airbox and modified engine management system. The extra 55bhp puts the power to weight ratio of a 3719lb manual XJS 3.6 up from 140bhp per ton to a respectable 175bhp per ton and provides V12 performance.

The next stage is the 350T, which includes other goodies in addition to the modifications made to the 280. There's a free-flow exhaust, for instance, the injectors are modified, the cams are reprofiled and new pistons give a lower compression ratio, to handle the extra boost.

But the big one is the 450T, and there's more to its heritage than at first meets the eye because there's quite an organisation building up around the original, small. Lynx Cars company. Lynx were originally formed in 1969 by Guy Black, a D-Type fan and former Weslake engineer. In 1973 he went into partnership with Chris Keith-Lucas and it was at that point that the company graduated to building the D-Type replica, as well as



restoring originals. Other Jaguar projects followed, and the company are famous for their 'Eventer', a Scimitar GTE-like estate version of the XJS, and a convertible which preceded Jaguar's own.

Enter Elgan Howell and Stag Electronic Designs Ltd. 'Everything happened by accident really', recalls Mr Howell, who is now Chairman of Lynx Cars and a committed car enthusiast. 'A colleague had his D-Type restored by them and said what an amazing place it was. He suggested I should go and have a look. I did, and I was hooked.' Hooked indeed. He is now a majority shareholder. That was in 1986, and since then Lynx have moved on from premises of 4-5000sq ft to 20,000sq ft. There are probably double the number of employees there now, yet the total is still around 40.



Howell is a practical man and an electronic engineer. In the late 1960s he worked for Hawker Siddeley and Marconi Avionics on advanced aircraft applications like head-up displays. From there he went into business developing credit card systems ('we were ahead of our time and the market wasn't ready') and from that into consultancy. It was then he realised there was a huge hole in the market for programming devices of the sort used to configure Eproms, the programmable chips used in all types of computers from Amstrads through to engine management systems.

'When I first needed to use one of these things I had to make it first. That's when I realised other people must have the



same problem.' He was right, they did. Now Stag are one of the two principal manufacturers of Eprom programming equipment in the world. And that experience and knowledge is being applied to the development of highly specialised engine management systems of the sort needed for controlling turbochargers fitted to hitherto normally aspirated engines.



He's a modest man and highly practical. It's somehow difficult to adjust to someone who, though adept in business (and all learned 'the hard way'), is just about as unassuming as its possible to be in a country whose senior management seems generally obsessed with big desks and pin-striped suits.

Elgan Howell though is clearly not interested in the limelight, and where the current success of Lynx is concerned, he is quick to heap praise upon its own employees and on managing director Chris Keith-Lucas.

For his part, of course, Chris Keith-Lucas is equally happy about Lynx's change of fortunes and their dramatic expansion.



LEARNING TO MANAGE - When Guy and I started out in 1973 we were both only 22. I think I can say we were good technicians, but we weren't particularly good managers.' He laughs: 'In fact we probably couldn't organise a piss-up in a brewery to be honest. But we weren't that bad. There wasn't the interest in classic cars that there is now, and we saw a lot of people come and go. We held our company together when others disappeared and later became quite good at it. 'But Elgan brought additional professionalism. Once the company started growing in terms of numbers of people, we needed someone to tell us how to do it. And while we were by no means in serious trouble, the extra finance has helped us equip further and move into our splendid new establishment.'



The original partner, Guy Black, took the opportunity to turn to his other love, vintage aircraft, full-time - and he now has no stake in Lynx at all. He has been involved, says Keith-Lucas, in the recent attempt to re-enact the Bleriot flight across the channel. Everybody has remained good friends too. But the Performer projects are something of a family affair. 'It's actually a three-way thing', explains Howell, because there's another Howell involved too. Son Gareth's turbocharging business, Atford, looks after the engine side of the Lynx XJSs.

Atford started in the turbocharging field at about the same time that Ford launched the Sierra Cosworth in 1986, and not surprisingly much of the work they've done has centred around that car.

The business has become a three-way thing, because the electronic skills available at Stag, plus the engineering strengths of Atford (combined with a feel for electronic matters) provide the means efficiently to integrate the two areas, something that's important in successful engine



management.

Elgan Howell believes in the long term aspect of business. Among other things they are a fair way along the road to producing much smaller, much neater ECU'S for cars than ever before, using the latest technologies to design and manufacture the necessary circuit boards. Howell's idea is that one day people will be able to plug cassette-sized ECU'S into their cars to provide the particular characteristics they want. So the same car could have its performance characteristics changed at will, to suit whoever was using it, in much the same way as the Corvette ZR1 has a switchable performance limiter for when junior wants to take his new girlfriend to the drive-in movie.

For the turbocharger installations. Stag have designed an additional ECU to run in conjunction with the existing Lucas unit. The original, remember, is designed only to deal with a normally aspirated engine, while the new component handles the turbocharger management. It monitors manifold air pressure, temperature, and flow (using a modified version of the standard flow meter), and adjusts injection and ignition accordingly.

There's no control of boost as yet, that being mechanically set by the wastegate; and the injection, like the original, is not yet sequential. Non-sequential injection means that when one injector fires, all six do, the fuel lying in the intake tract until the inlet valve opens on the induction stroke. Sequential injection means that each injector fires only when its cylinder is on the induction cycle, which is far more efficient.

Stag, who have the most sophisticated CAD system in the UK for designing and producing integrated circuits, have already produced a prototype sequential ECU for the Jaguar engines, which does away with the original completely. It will be able to drive up to 12 injectors and yet is smaller than current production four-injector units; when it does, says Howell, it should be possible to make a V12, for example, far more economical.



Meanwhile, the six-cylinder turbo engine uses Weber injectors that are double the size of the original Lucas units and very expensive, says Gareth Howell. The system drives these injectors using half the number of signals when off-boost, to avoid overfuelling the engine. The compression ratio has been dropped by using forged Cosworth pistons (costing £100 each), the small-ends have been modified to accept the bigger gudgeon pins and everything is balanced, lightened and blueprinted. The head is ported, the cams have extended duration of an extra 4.0 degrees and 50 thou extra lift. Perhaps most important is the work on the block. The cylinder liners are removed: the block is bored and bigger ones fitted. The final bore size is 95.3mm instead of 91.0mm, pushing the capacity up to 4.0 litres. The surface of the block is machined to take a nitrogen-filled, stainless steel sealing ring round each bore; to contain the pressure of an engine running with 12psi boost.



The valves, surprisingly, remain as standard. 'We were particularly worried about the exhaust valves', recalls Gareth, but after testing we found that they were easily man enough for the job'.

A JOB FOR THE PLUMBER - In the sump there is an internal oil-rail similar to that used in the Ford RS500 engine, to squirt oil onto the bottoms of the pistons. Its jets are interchangeable to enable the pressure to be set exactly. If the holes are too big then the pump can't keep up, too small and not enough lubricant will reach the superheated pistons.

The rest of the engine bay needs a good deal of work too on these modified Jaguars, because the turbo and relevant plumbing takes up so much room. Working back from the front, there's an oil cooler, followed by an RS500 intercooler with a five-core unfin radiator below it (custom built by the Serk competition department at Park Royal), then finally there's the air-conditioning radiator next to the engine.

'I reckon we're using the biggest cooling fan fitted to any car', says Gareth Howell - dragging out a huge, commercial, 15½-inch Kenlowe fan from behind a cupboard and holding up the massive relay that switches it on.

It's a 44 amp motor, but luckily the Jaguar's got a 115 amp alternator. . . ' The power steering reservoir has been changed to make it fit, and there's a different fuel-pressure regulator. The cause of all this is a huge Garrett turbocharger, based on the T4 but designed especially for the Bentley Mulsanne. It exhausts through an external wastegate system ('the best type') into a huge stainless steel, 3 1/2-inch pipe which which splits into two 2 1/2-inch units before joining a flat box which fits under the rear subframe. The volume of the box is equivalent to a six-inch diameter pipe, contains webbing and is so strong you can use it as a jacking point.

The standard exhaust system goes over the axle rather than under it, but the extra diameter of the Lynx system prevents that.

SUSPENSION REVISIONS - The rear suspension is drastically modified. Lynx developed an A-Frame for their D-Type replicas, which use E-Type suspension components. Normally, there are rear trailing arms with transverse links on the XJS. The trailing arms pick up on the bodysell, while the links pivot from the subframe, which also carries the differential with its inboard discs.

'Although it's difficult to see geometrically why the rear wheels to some extent fall over in corners with the standard set-up, they do, says managing director Chris Keith-Lucas. 'Now you really can get one of our cars a long way out of line, drive it in an extremely sporting manner, and still get it back.'



The A-Frame assembly, manufactured partly from high carbon, EN24 steel, and mild steel tubing, also helps locate the subframe and stops it winding-up under the enormous power. At the rear there are twin adjustable spring/shock units on each side (with adjustable spring platforms, racing style, so the ride height is adjustable) while the front has progressive springs with adjustable Spax shock absorbers too.

All that adds up to a car with sub-five second 0-60mph capabilities and a top speed probably approaching 180mph. The prototype wasn't ready for testing when we tried it but we've an open invitation for the day it is.

'We did a lot of development on the suspension', Keith-Lucas remembers, 'the extra stiffness on the back dictated the same for the front. We worked up through a series of harder springs then moved on to progressives'.

It was important that the ride didn't suffer too much. 'The car is still a Jaguar, we didn't want to turn it into something else.' The car is bodykitted by Lynx, something that was developed just under two years ago. The latest version, shown here, was completed only a couple of months ago. There's a leather interior too, and a competition clutch. You can also opt for AP Racing four-pot calipers and rotors; though the standard units are four-pot too, they're just not quite as extreme.

And the cost of this indulgence? Well, like most made to measure things it's expensive, and bear in mind that all the following prices are ex-VAT. The 450T engine conversion is £11,900, the exhaust system £1250, clutch £346, bodykit £1850 (£85 extra for front brake airducts) A-frame £350, spring and damper kit £905; and relocation of the steering rack £320. The wheels are £192 each and the tyres £242 for the front and £286.90 for the rear. Lynx 'strongly recommend' the clutch and the entire suspension set-up, but you've got to have them on the 450T, the standard clutch would last about 10 seconds, and the standard rear suspension would very likely disappear through the floor without the A-frame. The exhaust system is also mandatory.

The lesser 3.6-litre engine conversions cost £5200 and £7500 respectively, plus the exhaust and what have you.

But what the hell. To compare the all-in price with alternatives for the money really wouldn't be the point. Elgan Howell had a Testarossa on order until he got tied up with Lynx, then decided 'it wouldn't seem appropriate'. Despite the professionalism within the company, Lynx are enthusiasts to a man. They build cars for enthusiasts and the order books are filling up. These supercars are built in Welwyn Garden City and St Leonards-on-Sea, not Maranello. They're a little bit of England, and that's always a nice touch.