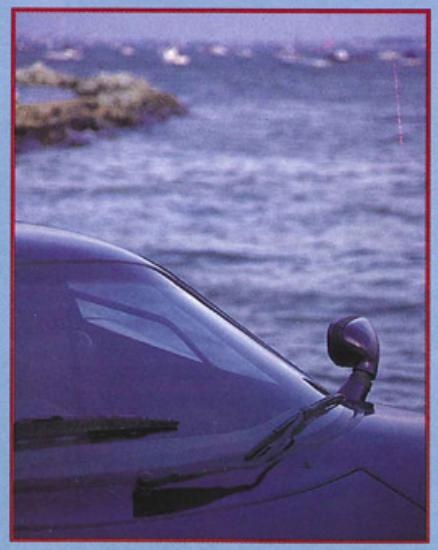
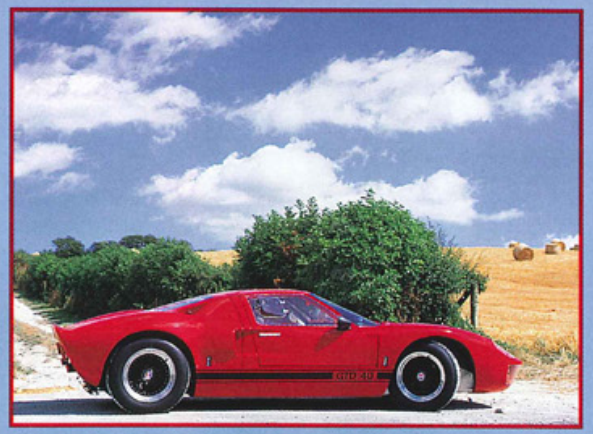
SPECTRE R42





R42 centre monocoque is immensely strong, idea came from racing version of GTD40.

That the Spectre R42 looks like a Ferrari or some other Italian thoroughbred sports car is no accident; it has been designed right from its earliest stages to take a pot shot at the products of the Modena factory. And to discover why this car exists we go back more than four decades, to a titanic battle that took place throughout the mid 'sixties. The cast of characters reads like a "Who's Who" of recent motoring legend, with such characters as Lee Iacocca, Enzo Ferrari and Carroll Shelby taking centre stage, aided and abetted by a troupe of highly-regarded engineers including Len Bailey, John Wyer and Roy Lunn.

Back then the dominant name in endurance racing was Ferrari, but Ford vice president Lido "Lee" Iacocca – probably the most politically-minded automobile company executive of all time – had designs on putting the Ford name on the roll of honour listing winners of the Le Mans 24 Hour Race. At that point Iacocca didn't really care how he was going to fulfil this ambition; he simply needed to do so. The shortest route to getting the Ford oval onto the nose of a Le Mans winner would have been to simply buy up Ferrari, a company that had masses of prestige but little in the way of financial resources. Back then Enzo Ferrari considered himself to be essentially a race car constructor, and was building and selling road-going versions and variants of his cars simply to fund his racing activities, but he was already beginning to realise that if his marque was to survive he needed to be on a more secure financial platform. So when executives from Ford of Italy arrived on his doorstep one day in 1963, bearing a message from Lee Iacocca that the American car company was interested in the wholesale buying out of Ferrari, they were well-received; what Iacocca was unaware of at that point was that he was a step behind the wily Italian, who had already made an overture via the German Consulate in Italy to Robert Layton of Ford Germany suggesting that his company was for sale. Il Commendatore had set a firm price tag of $18 million on his car company, and attached a few strings – the main one being that he would be free to run Scuderia Ferrari, the racing team, his way and with no outside interference – but whilst this amount was roughly twice what Ford felt to be the brand's value, Iacocca decided that it was still a price worth paying.

Unfortunately negotiations soon became a battle of wills, with negotiators from either side caught between a rock (Ferrari) and a hard place (Iacocca). It therefore didn't take long for the entire scenario to crumble. Iacocca, for example, was putting more and more pressure on his emissary Don Frey to find out what Ford would be getting for their money, whilst Enzo Ferrari soon realised that there was no way that Ford would be simply the sleeping partners that he craved, prepared to bank-roll the Ferrari operation but to otherwise keep their nose out of his business. According to former senior Ford executive Walter Hayes, the turning point came when Enzo Ferrari walked into the Modena factory one morning and found the place heaving with Ford auditors making a stock inventory, and was less than happy because at that point no formal agreement had been reached and so the Ford staff were considered by him to be intruders. Shortly afterwards the planned announcement of a merger was torn up, and Ferrari went his own sweet way again until a crisis some years later forced him into the arms of Giovanni Agnelli's Fiat group.

Unhappy with the way that his plans had been rejected, Iacocca took the attitude that "if you can't join 'em, beat 'em", and within a matter of days had plans in his hand for a Ford endurance race team. They had no car at that time, but the bones of an infrastructure were ready to be put in place, as part of the novel, radical even, Total Performance package which encompassed all persuasions of motor sport from drag racing to the Indianapolis 500. A pivotal figure in this sudden branching out by Ford into motor sport was the Texan racing driver Carroll Shelby, who had already forged links with Ford through his Cobra road-racer, and acting on Shelby's advice that Britain was then, as now, home of the best race car designers and engineers in the world, Iacocca took the decision to base the endurance racing operation in England, at Slough. And it was an English designer, Eric Broadley, who

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SPECIFICATIONS

Spectre R42

Manufacturer		Spectre Sportscars Limited, Spectre House, Creekmoor, Poole, Dorset BH7 7DB.	Transmission		Five speed transaxle, running in-line astern of engine.	Suspension	Front	Fully Rose-jointed independent dual wishbone, co-axial spring and damper units with adjustable seat platforms, anti-roll bar.
Engine		All light aluminium alloy V8, four chain driven camshafts, 32 valves.	Gear Ratios	1	3.50:1		Rear	Fully Rose-jointed independent dual wishbone, co-axial spring over damper units with adjustable seat platforms, anti-roll bar.
Fuel & Injection Systems		Sequential electronic fuel injection. Digitally mapped electronic ignition. Lambda feedback, fully catalysed exhaust.		2	1.89:1	Body		Two door coupé, central honeycomb and aerospace aluminium alloy central monocoque chassis, tubular steel sub-assemblies, carbon composite outer panels.
Bore x Stroke		90.10mm x 90.10mm		3	1.23:1	Dimensions	Length	4,115mm
Compression Ratio		10.0:1		4	0.81:1		Width	1,854mm
Power & Torque		350 b.h.p. @ 6,000 r.p.m. 405 lb/ft @ 4,000 r.p.m.		5	0.60:1		Front Track	1,600mm
			Final Drive Ratio		3.88:1		Rear Track	1,549mm
			Steering		Variable rate power-assisted rack and pinion, 2.8 turns lock to lock.		Height	1,092mm
			Brakes & Wheels		Vented front discs with four pot callipers, vented rear discs with two pot callipers. Split dual circuit, servo assistance, Bosch 4 channel anti locking. Cast aluminium alloy wheels 8.5J x 17" front with 235/45ZR17 tyres, 11J x 17" rear with 315/35ZR17 tyres.		Wheelbase	2,489mm
							Kerb Weight	1,050kg

provided the bones of the car; he had already designed a mid-engined race car which used Ford power and this had raced a couple of times, albeit with only modest results.

The new Special Vehicle Operations (SVO, in Ford-speak) organisation, which was formalised under the leadership of former Aston Martin race team manager John Wyer, started to develop the Broadley car (which for historians was the Lola Mk 6) and to evolve it into the car that we now know as the Ford GT40. Roy Lunn, Len Bailey and Carroll Shelby were all instrumental in the creation and development of the forty inch high race car, which was the Lola chassis clothed in a Ford-styled bodyshell, and powered by any of several different American-built Ford V8 engines. The car's Le Mans début in 1965 was dogged by bad luck and yet again the honours went to Ferrari, but a year later the tables turned, and to totally humiliate Ferrari the three leading Fords were orchestrated so that they crossed the line together at the chequered flag. By the time that the last GT40 rolled off the line at the purpose-built SVO facility in Slough in 1969 the car had, in various guises and with constantly evolving mechanical and body packages, won the Le Mans 24 Hour race four times in succession, as well as taking the chequered flag at countless other prestigious races too. As for Ferrari, their 1966 trouncing at Le Mans by the Ford GT40 was sufficient to have them withdraw totally from that arena …

Which is a very roundabout way of getting to the Spectre R42. The man behind R42 is an Englishman, a sometime wrestling champion and former street rod constructor who answers to the name of Ray Christopher. From creating radical custom show specials such as a milk float with supercharged, mid-engined V8 power and a high-performance car chassis with helicopter "bubble" cockpit, Ray Christopher became interested more than a decade ago in the world of replica Ford GT40s. There were already a couple of companies making kits of cars which were based around the looks and format of the Le Mans-winning Ford, but in all honesty they were dynamically very much in Division Two – not at all the kind of thing that you might reasonably expect to meet the high standards of Ray Christopher, and sure enough they didn't. So he joined with two partners to set up a company in Manchester, the sole intention of which was the building of high quality road-going evocations of that dramatic and forceful Ford race car under the GTDevelopments banner.

Early experiments took place around a chassis of his own design and a bought-in bodyshell, but whilst the former was soon found to be heading in the right direction the latter most definitely left much to be desired, and was costing a fortune in remedial work by specialist body builder and sprayer Alan Fishwick before it could be passed as acceptable. What was more, the Dorset-born Christopher was less than happy working in Manchester, and persuaded one of his partners to join him; family commitments precluded the third member of the triumvirate from moving south. Setting up shop in a modest light industrial unit a mile or so out of the town centre – and coincidentally just a couple of miles from Penske Cars, that most successful of all IndyCar constructors – the company continued where they had left off after moving from Manchester, producing stunningly effective, beautifully finished road-going evocations of the Ford racer known as the GTD40. Bodyshells were being sourced locally, hand-laid in fine-quality glass reinforced laminates, and the chassis development too continued apace. It took only a glance at their products to realise that they were something special, but perhaps the greatest accolade came four or five years ago when Len Bailey, chassis designer of the original Ford GT40s at Slough, test-drove a GTDevelopments car and declared it to be better than the Ford product.

As a part of the GTD40 programme, which had been a rolling development agenda with no two of the hundreds of cars that they have built ever being identical, Christopher developed a monocoque central tub, using aerospace alloys and honeycomb. Using this with front and rear sub-assemblies to carry the running gear gave a considerable weight advantage over the tubular chassis that had previously been used on all GTD cars, yet did so without compromising the chassis stiffness which was one of the car's virtues and which allowed the suspension system to work perfectly throughout its intended movement range. The creation of the new monocoque tub benefited two distinct products, one being the increasingly-successful race versions of the GTD40, and the other an all-new car that Ray had been carrying about in his head for some time. That car was to become the R42.

It is an accepted fact that the best-handling sports cars have their engines situated between the driving seats and the rear wheels, and that they have their road wheels scattered as far as possible apart. But unfortunately for many manufacturers, the desire to meet these design criteria has been tempered by the need to bring the cars to market within a price confine that has forced them to gradually evolve existing designs, and to use established build techniques. Blend these difficulties with the requirement to pass existing and projected safety legislation (the crash test, for instance), and the result is invariably an increasingly heavy car. Ferrari's F355, for example, can be traced right back as far as the 308GTB in terms of layout and concept, but whilst the 308GTB was a relative lightweight 1,200 kg, the F355 tips in at a little over 1,450 kg despite the use of copious quantities of aluminium in its construction. But if you start with a clean sheet of paper then you can redefine the way that you meet your targets and objectives. Gordon Murray found that out when he started to pen the F1 road car project for McLaren, and so did Ray Christopher when he started to formalise his ideas for R42.

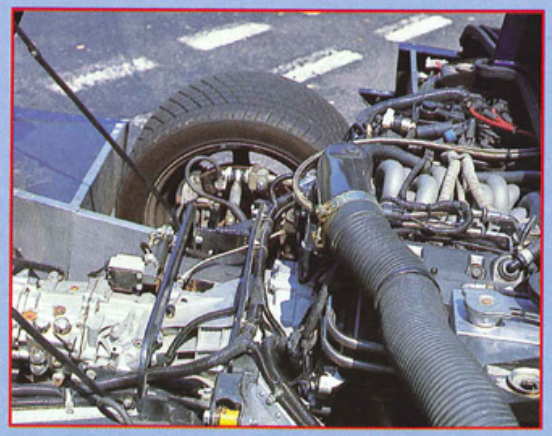
The central monocoque, integral to the scheme of things, was taken a stage further and altered to suit the different requirements of the proposed car that was, at that stage, still very much a loose collection of thoughts and ideas. It was possible to do away with the huge sills which are an integral part of the GTD40 – these are home to the twin fuel tanks, placed there by Len Bailey when he had first designed the GT40 back in 1963 – and it was also possible to make the cabin wider and generally more spacious. Wishbone suspension was designed which offered full adjustability by fitting Rose joints at the end of every link, and a set of competition-standard brakes were developed. Whilst the first complete chassis was under development Ray Christopher had his Magic Markers out, and was busy creating a set of "clothes" for the car which would need to satisfy three criteria; the bodyshell would have to look right, would have to be relatively simple to produce, and would have to be as efficient as possible in aerodynamic terms. Once he had come up with what he thought was the ideal combination a quarter-scale model was produced, so that everybody involved with the project could walk around it. In a major car company the renderings would have been sketched straight into a Cray super computer from which a three-dimensional view would have been easy to check out, but when you are in a tiny company

Interior of car is in classic English style.

The car has changed little from original styling sketches first drawn three years ago.

M1 GTD

The subject of our video this month is the first running prototype R42 to be built, and is to be considered as very much a development car; the finished product (and the first production models started to make their way through the factory in early August 1995) will not differ a great deal in terms of appearance or performance, but will have a number of vital changes engineered in. The most significant change will be the adoption of electronically-controlled, variable-ratio power assisted steering; the manual rack under the nose of the test car has a wonderfully direct feel when the car is on the move, but is unacceptably heavy when parking. Similarly, the interior noise levels of the car will be reduced, to make progress a more sophisticated affair. Finally, there will be minor detail changes to the suspension geometry to aid cornering stability.



Engine is high-tech 350 b.h.p. 32v unit.

"If you start with a clean sheet of paper then you can redefine the way that you meet your targets and objectives. Ray Christopher did this when he started to formalise his ideas for R42."

with only a handful of employees the only way to find out if a styling exercise will work is to build an accurate model and look at it from every angle, and in a variety of different colours.

Satisfied that he was on the right track, Ray Christopher went back to the drawing board and painstakingly took each and every line, each curve and each swage of his car and drew full-size versions on paper; resources ran to an endless supply of drafting sheets, but not to the computer systems that are used by most manufacturers as an expedient for such tasks. From this wooden templates were made, and these in turn were built upon to create a full-size body finished in aluminium. The shut lines and apertures were recreated (although none of the panels actually opened) and the overall effect was exactly as the car would look. Well, almost. The original design had fewer vents and slots than would be the case with the finished car and there were other minor changes to be made, but the lines of that first full-size mock-up were surprisingly close to those of the finished car. One of the first things that happened to that body was for it to be despatched for wind tunnel testing, so that the effect of various gusts of wind from different directions could be assessed, and so that the intended "ground effect" behaviour of the car could be confirmed as working. Not only were there no particular problem areas (and those that were discovered were soon overcome by some strategic tweaking of the front spoiler design), but the subsequent report also elicited the information that the overall coefficient of drag was a hugely impressive 0.28. Not bad work from a stylist who has never had any formal aerodynamic training, but was simply working from his instincts …

No sooner was the bodyshell back at Poole than it was shipped off again, this time to the lamination shop so that working moulds could be made from it, thus allowing the creation of laminated duplicate bodies.

Problem was, all of this work was starting to consume a huge amount of money, and even before a rolling prototype was completed the investment had run uncomfortably into seven figures. To a major manufacturer such as Fiat, Ford or General Motors such an investment is little more than small change, but to a small, albeit perfectly formed, company such as GTD the costs were crippling. Which is about where Spectre Supersports Corporation enter the picture. This long-established American concern came to hear about the R42 project through the flurry of publicity which had resulted from what is now seen as a premature press preview of the first full-sized bodyshell and an equally premature showing of a rolling, trimmed prototype at the British Motor Show, and were immediately interested. They had, they felt, the necessary contacts to be able to sell the car in North America and a few other markets, and what was more they had the financial resources to ensure that the car would make it from where it was to where it ought to be, on the roads of Europe and America. A new company was incorporated to allow Ray Christopher to finish off his design work and to see it into production, but freeing him of the usual hassles of running a small car manufacturing company; Spectre's own people took over the onerous side of things.

Spectre started by committing the company to building two running prototypes for serious evaluation. But rather than just make two cars piecemeal they would put them together in the already-suggested manner that had been determined for actual production cars; that way the company could get a far more accurate picture of what would be involved in building cars which will eventually be made for customer consumption. Building a Spectre R42 begins with a lightweight tubular steel frame – in reality these are the front and rear sub-frames which will support the drive train and suspension system – around which the honeycomb and aircraft-alloy central tub is built. There is a full tubular roll cage (which meets FIA competition standards) built in at this stage, too; the essence of R42 is that it is a racing car for the road. The first pair of prototypes were both built in this manner, although there are differences; the first car out of the factory gates is the one you see in our main photographs and is a UK market car with right hand drive, whilst the second is a European mainland-specification model with its controls on the left hand side of the cabin.

The original idea was that the bodyshells would be produced in a choice of materials, it being possible to have either a hand-formed aluminium shell or one made from glassfibre-reinforced composites. However there was a better solution which Spectre have introduced, and which is to be used for all R42 models, this being to use a body moulded from carbon fibre composites. Such a material is lighter than either of the originally-planned options, and is tougher too, although strength is not a prerequisite of the complex series of panels as the body is totally non stress-bearing; the chassis and central tub take all road shocks. There is still the option of a lightweight "throwaway" body for those who want to go and race their Spectre R42s.

Buried halfway under the rear bulkhead of the cockpit is the engine, which sits in-line and which feeds out to a custom-built five speed transaxle. The power unit comes from Ford, but rather than being the ageing push-rod unit used in the GT40, it is a vastly more sophisticated unit with four overhead camshafts and four valves to each of its eight cylinders. Displacing 4.6 litres from perfectly "square" bore and stroke dimensions of 90.10mm, the engine was originally developed for use in the Lincoln Town Car, probably the ugliest car on sale in the USA today, but we won't hold that against it, especially as it proves able to provide more than 350 brake horsepower at a suitably sporty 6,000 r.p.m., and to give out in excess of 400 lb/ft of torque at 3,500 r.p.m. The design of the intake runners, which are dualled to maintain high intake gas velocity at all speeds, is sufficient to ensure that more than eighty percent of peak torque is available at all speeds from tick-over to red-line, and more than ninety percent where it is most needed, between 2,000 and 5,000 r.p.m. Hitching this up to a closely-packed set of gear ratios and out through a final drive ratio of 3.54:1 is sufficient to ensure that the machine will be capable of stunning performance, especially as the all-up weight of the R42 is a mere 1,050 kilograms. Best of all, buying in the complete package of engine with management system and ancillaries not only takes away the problem of trying to make everything work, but also ensures that the exhaust emissions meet the required standards without Spectre having to endure the expense of gaining certification on their own account.

The R42 is the first totally British hand-built mid-engined V8

HOW IT SQUARES UP **Super Car Performance Comparison**

CAR	BHP/TONNE	0-60	MAX SPEED	PRICE
Aston Martin DB7	191	5.8 seconds	158 m.p.h.	£78,500
Ferrari F355	262	4.7 seconds	184 m.p.h.	£79,750
Honda NSX	202	5.3 seconds	158 m.p.h.	£68,245
Lotus Esprit Sport 300	234	4.5 seconds	162 m.p.h.	£64,995
Porsche Turbo 3.6	294	4.6 seconds	175 m.p.h.	£91,950
Spectre R42	333	4.0 seconds	175 m.p.h.	£70,000

series production sports coupé to make it to the market in a very long time. But that alone will not be sufficient to ensure its success, because it is pitched into a sector of the market which is already well-subscribed to, and Spectre are coming up against products from the likes of Aston Martin, Ferrari, Porsche, Lotus and Honda. These rivals have all got existing reputations (mostly of the good variety), the funding to generate national interest in their products via major advertising campaigns, and have existing dealership networks able to offer local promotions of the cars in question. At present Spectre has neither the track record nor the dealership presence, simply a product which is sufficiently good to take on the competition. The company is in the process of establishing a small string of dealers across Europe, and also has plans to enter a factory-based team in the International GT Championships, and possibly even the 24 Heures du Mans. And the circle will then be squared …