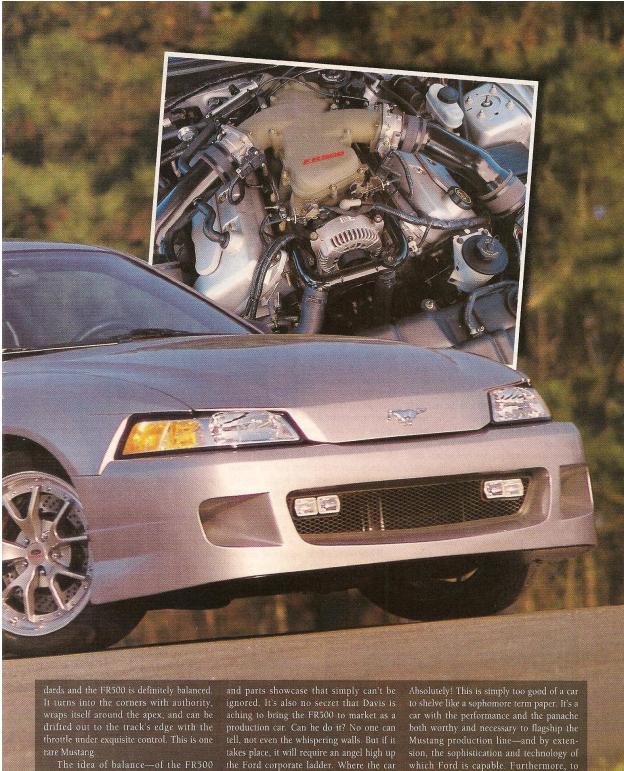


Prime Time in Ford Racing's Incredible Prototype by Tom Wilson•photography by Dale Amy



And yet balance is the key word of some around a perpetual three-way balance of power, the GT40 sports racer of the overent balance, and now Ford has produced one of the greatest Mustangs ever. And guess what? It's a balanced car.

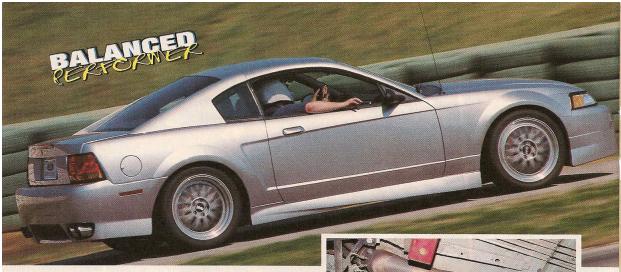
power—and the braking to go with it. The FR500 easily accelerates to huge speeds and as though it had been bred there (and it was), yet it also carries the comforts and refinements of a great GT car designed to make street driving a joy. Get down to the hard currency of enthusiast driving stan-



The idea of balance—of the FR500 itself—is the work of Dan Davis, head of

the Ford corporate ladder. Where the car will fit into Ford's lineup is open to

FR500 is designed to develop, the economies of scale yielded by a production



program are almost mandatory. Yes, Ford, by all means build this car!

To help explain the FR500's greatness, let's examine the hardware. Even though it is not necessarily the most technically dazzling accomplishment, to us the most distinguishing FR500 characteristics are its 50-50 weight distribution and overall chassis competence. This was gained by using the IRS system from the Special Vehicle Team (SVT) Mustang Cobra in the rear and a new A-arm front suspension in the front. That suspension uses Lincoln LS aluminum rear upper control arms as the front upper control arms, unique lower A-arms, and Cobra spindles-all mounted to a fabricated K-member that extends the wheelbase 5 inches and the track by 1.1 inches. It's putting the front tires 5 inches farther toward the nose that does the big job of shifting weight to the FR500's rear haunches. Oh, and the battery is in the trunk as well.

The way that suspension works is dazzling. Penned by Jay O'Connell, late of Lincoln LS suspension fame, the FR500 has a supple gait backed by firm suspension muscle. Braking also is extraordinary, what with 14-inch, four-piston Brembos up front and

13-inch Brembo rotors and Lincoln LS single-piston calipers in back

Furthermore, weight has been held in check by substituting money cleverly disguised as carbon fiber. The black weave is found in the metal matrix composite dri-

veshaft, front fascia, hood (23 pounds saved right there), fenders, rocker panels, rear fascia, and decklid. The intake manifold upper section is cast magnesium, and the tubular suspension members save weight over the more typical factory stampings. So even with a multi-amp, multi-speaker JBL sound system and at least a try at sound insulation, the FR500 still comes in at just 3,450 pounds.

While we're on the subject of creature comforts, the FR500 does a great job of selling itself with a bright, inviting interior, featuring Ford Racing Performance Parts' leather front bucket seats and leather seat coverings in the rear. The slightly

thicker FR500 steering wheel is fitted, and the rest is quite close to Cobra fare, albeit with some trim color changes. The tach reads to 9,000 rpm and the speedo to 200 mph. Due to their extensive track duty as development vehicles, the three FR500s extant all sport rollbars and five-point racing harnesses.

Of course, it's under the hood where the FR500 is due to build the most aftermarket parts heat, as it has given FRPP's modular engine man, Andy Schwartz, an expansive power-building playground. Unlike the SVT, which went for the displacement gold via the 5.4L modular's long stroke, scarily fast piston speeds, and 100-pound-heavier castiron block, the Cobra's 4.6 engine was Schwartz's starting point, retaining its shorter, piston-friendly stroke. The displacement is bumped to 5.0 liters using spray-bore technology—a Ford-patented technique that eliminates the need for iron cylinder liners in aluminum blocks by spraying an iron solution directly on the cylinder walls. The result is reduced weight, faster installation at the factory, better heat transfer to the cooling system, and the most telling of all-reduced cost. Word is the spray-bore machinery was being installed in Ford's Cleveland engine plant at press time, so expect to see it in a Ford near you soon.

Huge airflow is a big part of getting the FR500's unique 5.0 engine to work. Special six-brick catalysts were carefully pack-

aged to do the job with low restriction.

And no, you can't overbore a spray-bore block 100,000 miles from now, but you could sleeve it-ironically enough.

The stock Cobra crankshaft and rods are retained, but the 9.85:1 pistons are custom-the better to fit the FRPP Four-Valve cylinder head combustion chambers. These heads sport the expected larger valves,





Who says an X-pipe has to be near the transmission? The FR500 X-pipe crosses under the Cobra-based IRS differential. It's a nifty idea that quiets the exhaust and packages the tailpipes around the fuel cell in one action.

lightly revised porting, and funny cams. Schwartz says he thinks he could emissionscertify the engine using these cams, but it wouldn't be easy.

Helping give the 5.0 modular its desired crisp throttle response-even airflow and plenty of it-is the aforementioned magnesium intake manifold, twin 70mm throttle bodies borrowed from the 5.4 Triton truck engine, twin 80mm mass air meters, and twin stock air filters. Custom headers help at the other end, and there is a passel of special supporting parts. These include a uniquely trimmed EEC V computer, a 36mm-thick radiator core, unique six-brick

catalytic converters, a stainless steel exhaust, a 170lph in-tank fuel pump, and a unique oil pan to clear the relocated K-member.

In the driveline, a highcapacity, 8.5-inch, dualdisc Valeo clutch with a vented floating member is mounted to a billet steel flywheel and unique eightbolt flexplate combination, entirely controlled by FRPP's garden-variety B302 adjustable clutch cable. The transmission is the expected

Tremec T56 six-speed manual equipped with a Pro-5.0 shifter. Actually, various shifters

seem to be in use, as the two FR500s we drove had different shifters. The IRS has hollow axles and special bushings, along with unique springs that lower the ride height 1 inch. The same is worked into the front suspension geometry.

Put it all together, take it to the track, and what do you have? That's the question FRPP helped us answer by inviting us along on a developmental track day at the Road Atlanta circuit. A challenging road course owned by Don Panoz, Road Atlanta is an excellent testing venue, and in a show of both confidence and openness, FRPP also brought along a Z51 suspended Corvette and a Viper coupe for comparisons.

You know we're going to say the FR500 was well-balanced, and it was. Of the three cars, it was the one that most easily moved to wherever was necessary on the racing line thanks to its sophisticated chassis. Stability was excellent, and as we searched in our bag of road-racing driving tricks, the FR500 always responded readily and linearly. There was really no comparison to a stock Mustang, except maybe the Mustang Cobra,





# CHROME vs. ST

When rebuilding an engine or dressing it up you are presented with several options. Do you reuse the stock accessory bolts, purchase

chrome plated aftermarket fasteners, or go with genuine ARP\* polished stainless steel bolts?
You should know that many so-called "high performance" aftermarket fasteners (often obtained from off-shore sources) are comparable to SAE Grade 1 and Grade 2 stuff found in hardware stores. They're made of low carbon steel with a tensile strength of about 70,000 psi. The best (which are also expensive) are only Grade 5 or 8. The plating, as you know, can chip or peel —sometimes during installation. And the chrome flashing corrupts thread integrity. Then there's the matter of rust!

ARP® provides the solution with a complete lineup of premium quality stainless steel lineup of premium quality stainless steel fasteners. They're cold forged from material that's impervious to rust. And nominally rated at 170,000 psi tensile strength (significantly



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stronger than even Grade 8). Generously flanged bolt heads provide better load distribution. The threads are precision rolled to ensure optimum engagement, and the bolts polished to a bright chrome-like luster. All manufacturing operations are proudly done in the U.S.A. at ARP's plants.









What's more, ARP® gives you a choice of reduced wrenching hex or 12-point heads, plus the option of black oxide finished chrome moly They're available individually packaged by application (intake bolts, header bolts, etc.) in 5-packs by size, or in convenient Engine & Accessory Fastener Kits with a dozen key groups —everything from oil pan to carburetor.



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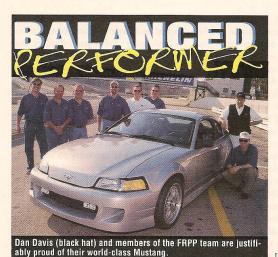
Flaky

Poor

"Brand X"

thread

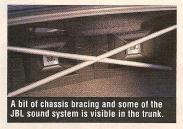
quality



as the live axle Mustangs are simply too schizophrenic at the limit, and have far too much understeer built into the frontend to exploit their great engines.

So where a stock Mustang would have been a what's-it-going-to-do-next whiteknuckler, and the stock Cobra on hand seemed a bit soft and-get this-dull by comparison, the FR500 was all steel and nerve. We could easily pick up the front end with the throttle coming off the corners for beautifully controlled drifts, the midcorner traction was quite high, and the control during corner entry and braking was quite good. Only at the highest speed braking—just touching 140 mph and then onto the binders at the end of the back straightdid the FR500's rear end wiggle a bit at this downhill transition. But this is simple physics working a big weight transfer situation-and without a winged aero packageto be expected from any car. It also wasn't enough to upset either the car or driver to any meaningful degree, so to heck with a wing. That's what race car homologation specials are for.

Stability was also good on the mediumspeed sweepers and corner exits, allowing us to take the car right up and over the beveled curbs and play excitingly close to the grass while the FR500 humped and skittled over the small bumps leading onto the



pit straight. That means there was just enough understeer to give us some steering feel, and balance enough through either throttle or steering to put the power down. Great stuff this!

We could only squawk at two things, really. The seats-while easy to get in and out ofcould have used a bit more lateral support for the 1g follies we were engaged in, and the shifters all proved a bit too long in the

throws. This really shows up when reaching for the Third- or Fifth-gear slots. Both issues can be simply cured, and FRPP was well aware of them.

As with all modulars, from the sleepiest Town Car motivator to the hottest factory examples, the FR500's 5.0 is a smooth, smooth unit, but with big rpm on its mind and a broad torque band. Comparisons between the FR500 and Cobra R are inevitable-especially for us-as we drove each car within weeks of each other (it was a good month!), and we have to say the larger 5.4 R-model is easily the stronger of the two engines. Informed sources say the torquier R-engine is really around 425 hp and the smaller, less go-for-broke FR500 comes in at its rated 415 hp, or a tad more. The 5.0 seems a bit cammier, with a voluptuous idle that says performance in a silken way. As a street engine, what a rush it would be. We'd wager a hairless cam would be necessary for emissions-compliance, so we figure the 5.0 modular engine could hit the street at a true 400 hp and with plenty of around-town torque, coupled with excellent manners and sweet throttle response. Kinda makes our right foot itchy just thinking about it.

Because it was a track test, we really didn't get into the stereo, and with a helmet on, the noisy exhaust was merely fun, so we can't give you the entire story on the FR500 as a car. However, we're 99 percent certain this is the Mustang that has taken the ponycar concept to its limit. The FR500 is more pocket-exotic than a workday-commuterand-weekend-fun-car combination. At 60 large, it would make a superb flagship for the Mustang line.

As a parts development showcase, the FR500 is showing us that the modular program has real legs under it. It can be a fabulous street engine-even with fewer horsesif necessary. The chassis bits are equally good, and in the end, the only question remaining to us real-world enthusiasts is how much those parts will cost. FRPP already has many of the engine bits in the system, which are working their way into the catalog, so don't think this is some PR exercise. I only hope the economies of scale work out.



### **MAD MAX**

To show us the way around Road Atlanta, CART pilot Max Papis was on hand, along with FR500 regular Rusty Wallace. Not incidentally, both could demonstrate what the FR500 could really do, which is a lot. I rode and drove with Max, and to speed up, down, and around a great track such as Road Atlanta in an FR500 with Max driving is to ride in God's own chariot. Butter smooth yet blindingly fast, Max had the formula driver's quick shifts, lightning steering response, and totally unflappable composure under death-could-be-next braking. Days later he won the CART season opener at Homestead in his Reynard-Ford. Way to go, Max!-Tom Wilson

### BY COMPARISON

It's not often we get to compare the best Fords against the best of everything else, but at Road Atlanta our hosts gave us the opportunity with a Corvette and a Viper. Pitting all-Ford against Chevy—nonsense aside—the Corvette was a real disappointment. The engine was torquey and reasonably powerful, but not exceptional in this gathering. We rated it easily Third in power.

Worse yet was the chassis-a nervous. autocrossing group of twitches and saves. Chevy relies heavily on its electronic traction control system to save the day, and while we'll bet it's a godsend in snow or ice, on dry pavement it's hopelessly aggressive-killing the fun just as it starts. With the traction control switched off, the car was far too nervous at speed. Low marks to the Vette on seating and sight picture as well. Both are cramped by the





low posture and swept windshield.

More redeeming was the Viper. Here is the story all about power—gobs of big-block torque, and plenty of urge on top to avoid any agricultural feelings. It's really tough to beat displacement, and at 8.0 liters, the Viper has plenty going for it. The chassis was linear enough and definitely calmer than the Vette's, but not sparkling like the FR500's. It was enough, however, to combine with the big power on hand to best the FR500 in lap times

General

Flywheel:

by an estimated second per lap (only casual lap times were being taken, and many variables were at work).

Viper drivers should invest in better brakes, however. With no ducting, the Viper pedal was on the floor in less than three hard laps, so there's a real problem. Much was made of the Viper's offset pedals—they're distinctly off to the left of the steering wheel. But to anyone with big-block Cobra experience they're a nonissue. Overall, the Viper is an exciting, fun, honest car, but it's missing the FR500's polish. We're glad to be with Ford.—Tom Wilson

		CATIO	

Wheelbase:	
Length:	
	3,450 lbs
g,b.to.t,	0000
Performance	
Ton Speed:	
тор орооц.	Performance numbers from FRPP on street tires
	T CHOIMANCE HAMBERS HOW THE FOUR SUFEEL WES
Engine	
	4.6 4V cast aluminum, spray-bore liners to achieve 5.0 displacement
	94mmx90.0mm
Compression Dati	
	0:
	Fully counterweighted forged steel
	Production Cobra 4.6L 4V
	Forged aluminum, unique design
	FR500 high-flow, cast aluminum, 4V/cyl, two 37mm intake valves
Camshafts:	DOHC, grinds unique to FR500
Followers:	Roller finger followers, hydraulic lash adjustment
	FR500 dual induction system
	Dual air filter assemblies with production air filters
	Dual 80mm mass air sensors
	Dual 70mm throttle bodies
Intake Manifold: .	
Engine Manageme	int:Unique EEC V calibration to operate FR500 dual induction system
	Production Cobra alternator
	Trunk-mount battery system
Fuel Pump:	
Injectors:	Eight 33-lbs/hr fuel injectors
Radiator:	
	Production Cobra electric fan
Exhaust Manifolds	:High-flow stainless steel tubular headers
	2½-in stainless steel exhaust pipes
	2½-3½-in dual-tip tailpipes
	The same of the sa
Drivetrain	

.. Unique eight-bolt flexplate/billet steel flywheel combination

Clutch:	
Clutch Cable:	FRPP adjustable clutch cable (PN M-7553-B302)
Transmission:	Tremec T56 six-speed manual
Shifter:	Pro-5.0, modified production handle
Driveshaft:	Metal matrix composite, 3%-in diameter
U-Joints:	Production Cobra
Ring-and-Pinion:	8.8-in (PN M-4209-G410)
Axle Ratio:	4.10:1
Differential:	31-tooth Torsen T2R, 4.0:1 torque bias limited-slip
Differential Housing:	Aluminum Cobra housing with unique FR500 locating bracket
Differential Cooler:Tilto	on electric pump with unique FR500 tube-style heat exchanger
Half-Shafts:	FR500 51mm OD tubular half-shafts with 31-tooth stub shafts

#### Suspension

Front

FR500 double A-arm front suspension utilizing a bolt-on tubular No. 2 crossmember, Lincoln LS aluminum rear upper control arms as front upper control arms, fabricated steel lower control arms, Cobra spindles, Lincoln LS-derived aluminum coilover shocks, 11/4-inch diameter rearward-mounted tubular stabilizer bar, fabricated bar arms and drop links, ride height lowered 1 inch from stock.

Cobra IRS with revised spring rates and shock valving, ride height lowered 1 inch from stock.

Steering Type:	***************************************	 Power-assist	ted rack-and-pinion
Gear Ratio:			17.25:1
Turns:		24	4 turns lock-to-lock

### Brakes

Front

Rotors: ......14x1.25-in Brembo rotors, vented, cross-drilled Calipers: ...... Four-piston Brembo calipers with FR500 caliper adapters Cooling: Forced air, ducted from front fascia

### Rear

Rotors: ..... ......13x1.1-in Brembo rotors, vented Calipers: .....Lincoln LS single-piston rear calipers with FR500 caliper adapters ABS: Production four-channel ABS system

### Wheels and Tires

Wheels

Front: \_\_\_\_\_\_18.0x9.0-in FR500 prototype wheels Rear: \_\_\_\_\_\_18.0x10.0-in FR500 prototype wheels

Manufacturer: BFGoodrich g-force T/A KD 

Production '99 Mustang with FR500 carbon-fiber front fascia, hood, fenders, rocker panels, rear fascia, and decklid

Head Lamps: ......

......DuPont Special Effect Silver Production Cobra with PIAA bulbs Driving Lamps: ..... Interior: ......Two-tone dark charcoal/medium graphite leather, thick-rim FR500

steering wheel, 200-mph speedo, 9,000 rpm tach Front Seats: ......Production Mustang seats with FR500 Mustang leather seat trim featuring larger, racing-style bolsters in the seat cushion and seat back

Rear Seats: Production Mustang with FR500 leather trim

Audio: A JBL high-performance CD audio/CD-ROM/AM/Dual FM tuner with Becker TrafficPro voice prompt navigation, one JBL GT1041 10-in subwoofer powered by a JBL BP600. One 600-watt, high-efficiency switching amplifier, two JBL 504Gti two-way midrange speakers powered by a JBL P80.4 stereo amplifier, one JBL seven-band parametric equalizer



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