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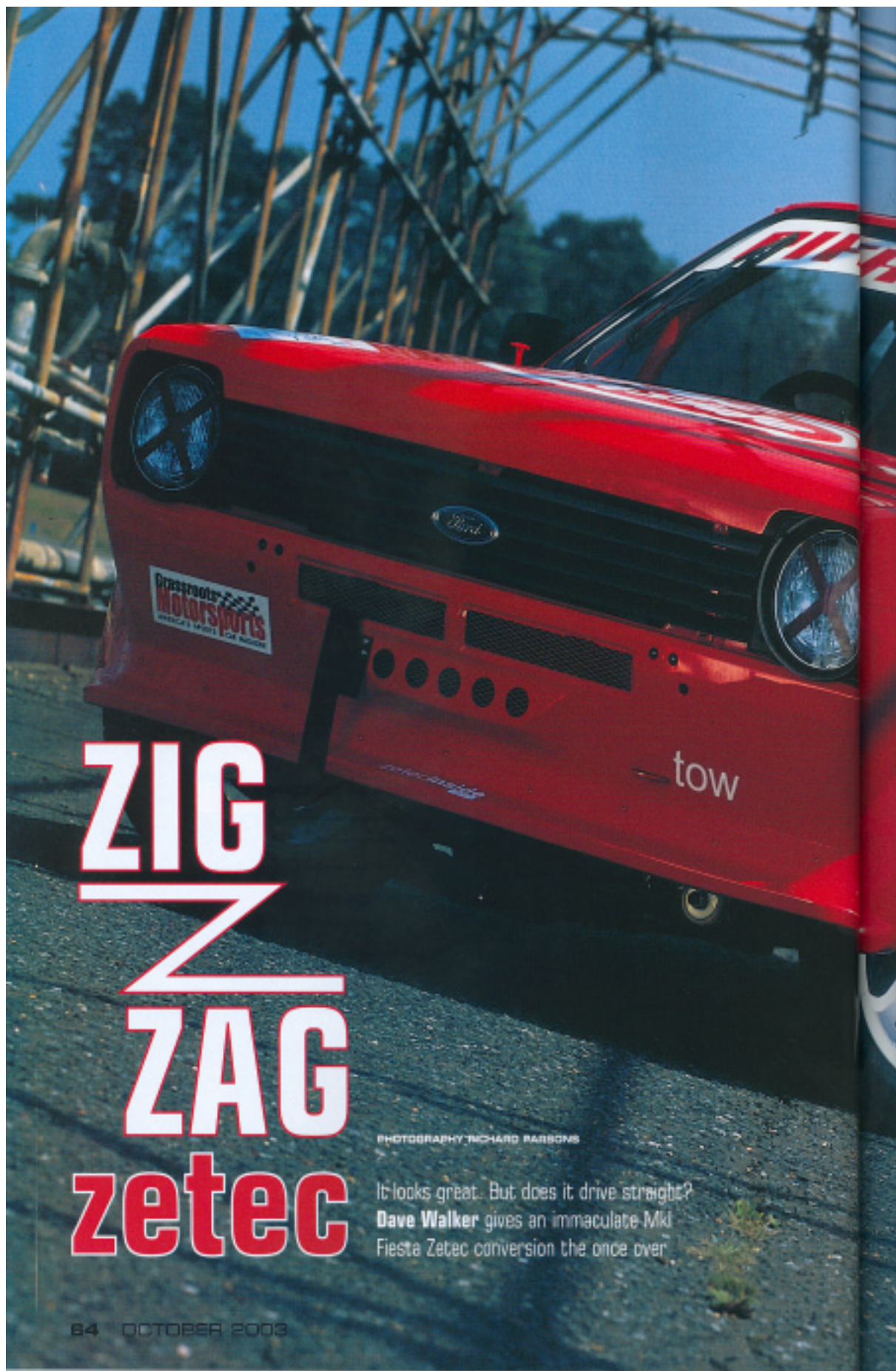


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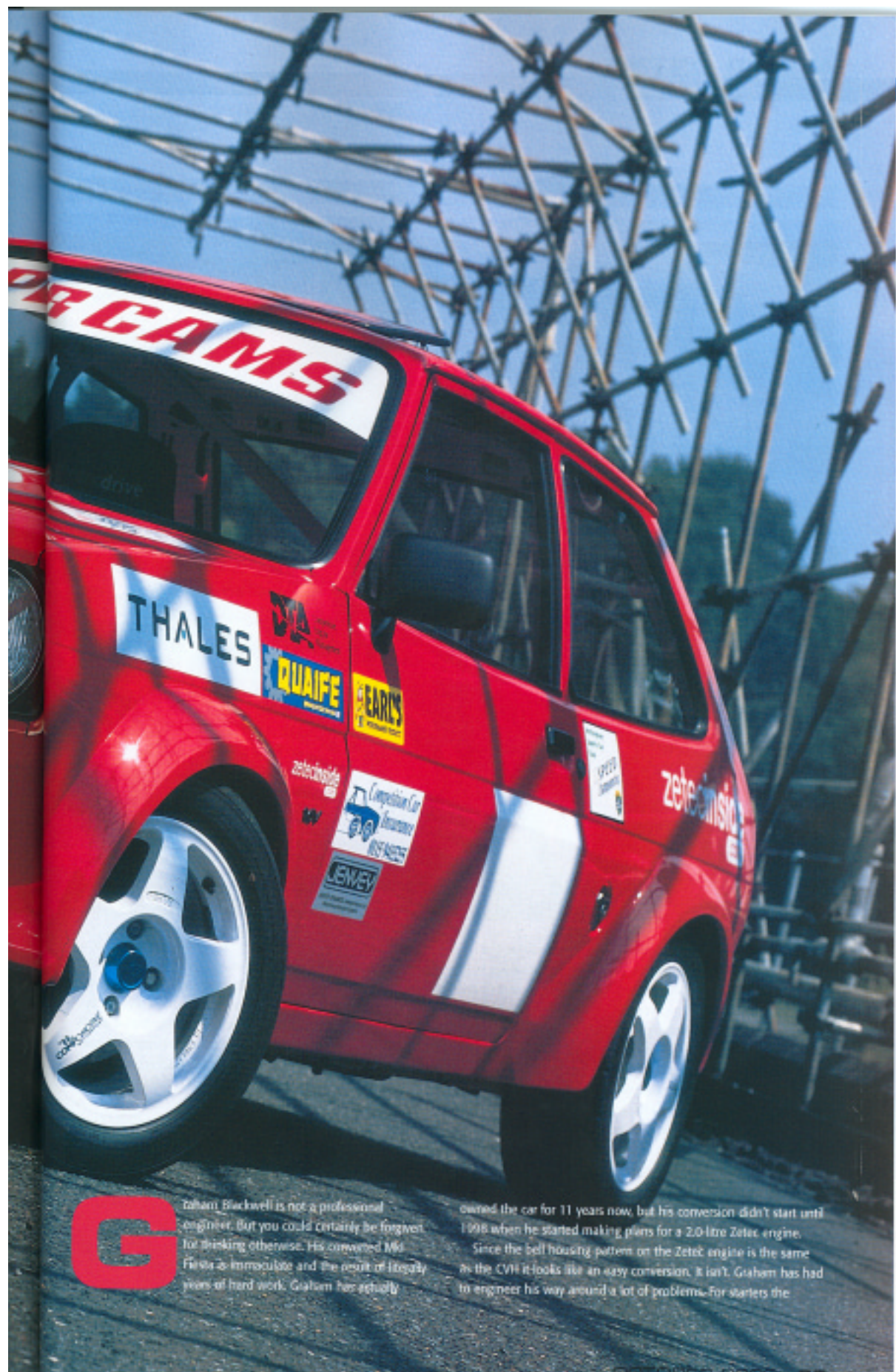


ZIG ZAG zetec

PHOTOGRAPHY RICHARD PARSONS

It looks great. But does it drive straight?

Dave Walker gives an immaculate Mk1 Fiesta Zetec conversion the once over.



G

raham Blackwell is not a professional engineer. But you could certainly be forgiven for thinking otherwise. His converted MK1 Fiesta is immaculate and the result of literally years of hard work. Graham has actually

owned the car for 11 years now, but his conversion didn't start until 1998 when he started making plans for a 2.0-litre Zetec engine.

Since the bell housing pattern on the Zetec engine is the same as the CVT it looks like an easy conversion. It isn't. Graham has had to engineer his way around a lot of problems. For starters the

TESTING



2.0-litre sump has to be replaced with the 1.8-litre sump and pick-up pipe. Then the 2.0-litre water pump runs backwards so the 1.8-litre pump has to be fitted and then a new location found for the alternator.

The Zetec engine is longer than the CVH so Graham had to cut away the chassis at one end to gain clearance. He fabricated his own engine mount from bits robbed from the Ford parts bin; and it goes on and on... But rather than repeat everything here, interested readers could do a lot worse than go to Graham's website: www.zetecinside.com. Here you will find all the details and pictures to get your Fiesta powered up like Graham's. As Graham points out himself, this isn't the only way to go about it, but it's his way, and it works.

This is Graham's first year in motorsport and while he is doing well in a couple of championships he wanted take part in a Clinic feature to try to improve the car. He was already aware of a few problem areas, like the brakes and the steering, but he wasn't

sure how to go about making improvements to them.

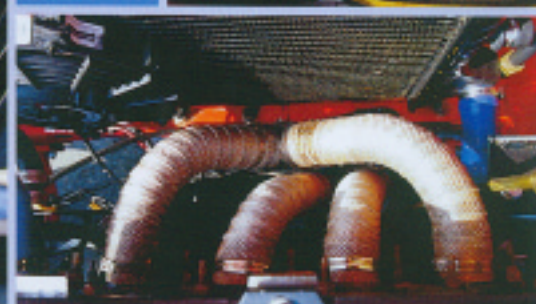
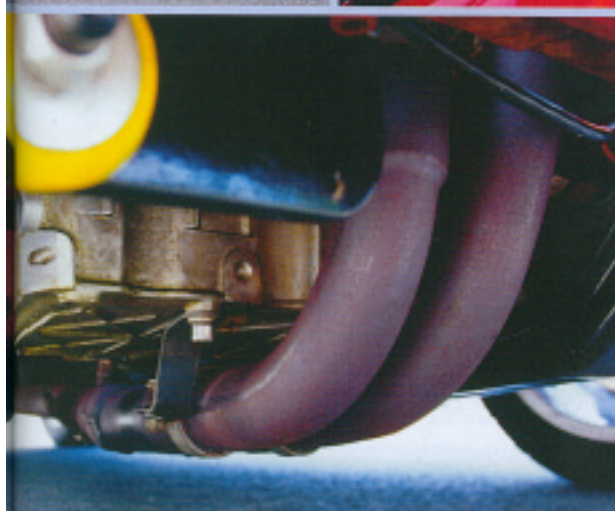
The whole idea of the Clinic series is to point readers in the right direction as regards developing their pride and joy, it's not just an excuse to thrash their car around a track and take pretty pictures. Competition performance can be roughly divided into three areas: going, stopping and steering. In the going department Graham has a standard breaker's yard 2.0-litre Zetec with an Ashley competition exhaust (very quiet at 94 dBA) Jenway throttle bodies and a DTA engine management.

For stopping he has fitted four pot calipers from Jeff Beddings at Hi-Spec but the master cylinder arrangement needs some attention. Graham had to re-engineer the stock set-up to remove the standard brake servo for engine clearance. He says he can't find a master cylinder of the right bore so he is going to fit a proper pedal box with bias adjustment for next season.

In the final – some would say most important – steering department you will find a set of poly bushes on all the



Tidy job: the Blackwell Fiesta is a neat conversion, but it needs work in the handling department if it's to fulfil its potential. Dr Dave suggests fitting 500lb rear springs, straightening the rear axle, correcting front castor and toe, and setting the front wheels to 2.5 degrees with camber nuts



suspension points, plus reinforced track control arms and new forward radius arms, again on poly bushing. The new (standard Ford) rear axle is located on adjustable arms. Springing is 2.25-inch coil springs at the front but standard at the rear. The front turrets have been cut off and new ones welded in to take adjustable camber/caster plates.

Chobham

As usual our test venue was Chobham and Graham pulled the car off the trailer with the help of his number one mechanic, team supporter and fan – his wife Dawn. Switching on the master cylinder the ignition switch is up for on and you press the button to bring in the starter motor. The ignition is a tad advanced but if you crack the throttle the engine goes over TDC and fires up. Graham informs me that he has zero correction in the map for water temperature because the engine doesn't seem to need it.

Straight away we have a mapping issue. The engine has actually

never been mapped properly. Mark at Owen Developments had the car in but due to time shortage was only able to do a quick full throttle mapping job. Graham said that it drives okay and he has run all year without any problems, so it can't be too far out.

After taking all the static pictures it's time for a first drive. Unfortunately someone has the concentric circles booked for the day so we can't get on. I found a quiet corner and tried a few circles in both directions. It does not feel good. The steering "flips over" as you apply lock and straight away I suspect the castor angle. Graham was aware of the feel of the car but did not know what was causing it. He also said that the car oversteers and to try and cure it he has upped the front spring rates from 260lbs/inch to 300lbs/inch while the rear springs are stock.

We make our way up to the usual corner for photographs and I drive the car harder for the first time in a straight line. Hell's bells! It's all over the place. This must be what Graham refers to as oversteer. The steering leaps from side to side but it isn't torque

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WORKSHOP



steer, it's a geometry problem – I'd stake my lunch on it.

At the corner where we do the photography the car really shows what it is all about. Basically you can wind on all the lock you want and the car just goes straight on. Left foot brake, handbrake, snap lift off – nothing makes the car steer. I have driven enough Fiestas – including my own and Roger Ebdon's – to know how they can be made to handle. When I pull off the number one mechanic is waiting: "How is it?" she asks. In the presence of a lady I simply say: "It's dreadful." Actually, it's a lot worse than that...

Chobham used to be real handy for the workshop in Brixton, but now we're located in Norfolk it isn't exactly up the road. Graham has an event on the Sunday so we arrange to fit the car in around a customer on Saturday afternoon. I badly want to check out the geometry, more than the engine power. The engine is, as Graham describes it: "a disposable item" since it is just a stock breaker's yard job.

Workshop

Yet another "hottest day ever" and not a good one for power. All the same we run up the Zetec engine a couple of times and recorded a little over 150bhp with 130ft.lbs of torque. A very quick look at the mapping found a few brake on fuelling but really the engine needs mapping from scratch. The biggest gains though would come from the handling so it was more important to check the geometry.

Who needs £8000's worth of alignment kit? The geometry was exactly as I suspected – only worse! The castor angle was indeed

negative but the front toe! Nobody runs 3-degrees of tow-in on a fwd car. Negative camber wasn't enough at the front and the rear axle was slewed to one side. It couldn't have been much worse...

Fortunately Graham has a lot of adjustment in his car and that included the rear drag links. The best we could do was even out the bend to give the same amount of negative toe either side.

Up front the negative castor was really bothering me. There was no adjustment in the top mounts left so it had to be done from below. But there was no adjustment here either. As a desperate measure I pulled off the front tie bar and machined a slot into it. Fighting the plastic bushing we pulled the bottom of the arm as far forward as we could. The end result was just under a degree of positive castor. That's nothing like enough but at least it might steer in a straight line.

The rear springs are way too soft but there were no others available so I told Graham to just wind up the dampers as hard as they would go. Front toe was set to dead ahead. I normally like about 30 minutes of toe out but with so little castor it was better to work on the stability.

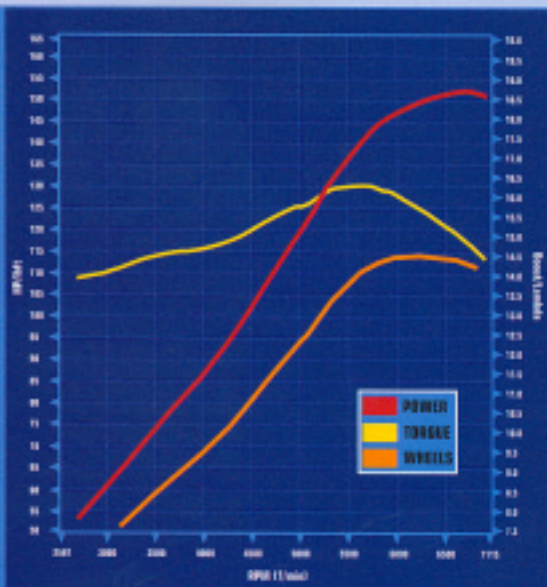
It isn't normally part of the Clinic to get so involved in modifying and setting up but I know how good these cars can be and I wanted Graham to really get something out of this feature – other than just being told that his car didn't handle.

Recommendations

There's still a long way to go to get it right. The rear springs need to be at least 500lbs/inch, not standard. The rear axle needs straightening and then lining up to get both rear wheels parallel.



Zetec story: fitting the 2.0-litre Zetec engine into the Mk4 body was no easy task. On the rollers the car registered 150bhp with 130ft.lb of torque – which isn't great for a Zetec. Dave often sees 165bhp with standard examples – but this is in need of a proper mapping session.



If possible about half a degree of negative on the rear would be nice.

Up front, the 300lb springs want to be brought down a bit. Since Graham has some 260lb springs I would suggest starting there. The inner plastic bushes on the track control arms should be replaced with a spherical bearing or the original rubber. The arm moves through a compound angle so a plastic bush just binds up.

The front tie bars need to be made shorter to get some sensible caster angle. I would suggest 3-degrees as a maximum. Set the front toe to 30-minutes toe-out and slot the uprights for camber nuts. Set the front camber to 2.5-degrees negative as a starting point.

Engine wise, 150bhp isn't a great deal from a 2.0-litre Zetec, I regularly see 165bhp plus on standard engines. The DTA needs a proper mapping session and that might include the warm up maps. Graham has some Piper cams ready to go in so it makes sense to fit those and then have the mapping done.

That isn't a five minute job, but I guarantee it will transform the car into one that goes around corners and doesn't pink on light throttle or kick back on starting. ●

REPORT

- Fit 500lb rear springs
- Straighten rear axle
- Correct front caster angle
- Correct front toe setting
- Set front wheels to 2.5-degrees with camber nuts
- Fit Piper cams and map the engine.

