

dune buggies

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and hot VWs

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BY ALEX DEARBORN

AUTOCROSSING your BUGGY

Set-Up Tips from an Old Hand at Mini Road Races — Alex Dearborn's Buggy has Shown the Way Home to Many Exotic Sports Cars

AS THE SECOND-GENERATION dune buggies currently being produced look more and more like sports cars, more and more sports car people are getting into buggies. The best way to convert a Triumph owner to buggies is to run circles around him in a stock, 40-bhp dune buggy at the local autocross.

An autocross is a miniature road-racing circuit laid out on a paved parking lot or on a legitimate sports car

course. Timed runs are made to determine fastest car/driver combination. Usually, the courses are tight enough that small, nimble cars are nearly as fast as big, powerful cars.

Everyone knows that a stock buggy accelerates pretty fast in 1st, 2nd, and 3rd gears. If the machine is set up so that it will outcorner *any* production sports car on the track, you've got a competitive car. Here's how:

SELECTING THE RIGHT PARTS: As with any building project, much money is to be saved by selecting the right parts the first time. **THE BODY:** Any major, brand-name buggy body should be of good enough quality to use

on your autocross car. It should be thick enough in the sidewall area and in the bolt flange area to lend rigidity to the shortened VW chassis. Bodies with molded-in battery boxes are slightly preferable for the extra rigidity provided in the rear seat area by that shaping. Avoid metalflake finishes, as they are hard to resurface in the event you wish to modify the body.

It is important that the body have a strong fiberglass dash/cowl section, as this serves as a bridge across the "bath-

tub" of the body, giving a third bracing dimension to the structure. If your body isn't rigid in this area, you can fabricate a steel bridge in the dash area instead. A careful look at the inner fender wells of the buggy body is in order. They should be high and well inset, in order to accommodate fat racing tires when a lot of negative camber is used.

My own Autodynamics' Deserter G.T. body incorporates all of these features, as well as one other: a longer wheelbase. The 84-in. wheelbase (shorten the chassis 10-3/4 in.) is preferable, as it puts more weight over the front wheels than does an 80-in. wheelbase. On the other hand, a stock (94-in.) wheelbase isn't very good for racing, as it can never be as rigid, and does not provide the fantastic steering response for which buggies are so famous. It is also unnecessarily heavy.

THE CHASSIS: Beetle chassis from 1961 through '68 are the best. For purposes of this article, I won't comment on the '69 and later chassis. Although they have inherently better suspension, they are not as likely to find their way into buggies this soon. I prefer the 1967-'68 chassis, as it has a marginally stronger transmission, wider track rear axles, and the ball-joint front end. These years also had the larger 1500cc engines. It would be well to consult Crown Mfg., Gene Berg Enterprises, Deano Dyno-Soars, EMPI, or Autodynamics on availability of close-ratio gears for the different year gearboxes.

ENGINE: The more recent, the better. The recent Squareback (Type 3) engines have dual-port heads, as do the '71 Beetles. I won't dwell on engine mods here, as you will find scores of tips on this subject elsewhere in this magazine, or in any of several available books, such as Bill Fisher's comprehen-

sive new book, "How To Hotrod VW Engines." One comment on engines should be made, however; don't build up a VW engine with high compression, hot cam, big carbs, etc., unless you know it'll be strong at low rpm. In an autocross situation, you might be "lugging" in 3rd gear or overrevving in 2nd. A 140-bhp VW 1600 won't run below 3500 rpm., and you may never get to use 7000 rpm, especially with stock ratios in the gearbox. I ran my Deserter road car with a stock 1600cc VW Bus engine all last year in various events, and was always competitive with 911 Porsches, Corvettes, etc.

FRONT SUSPENSION MODIFICATIONS: If you have a severely limited budget, spend it on the chassis/suspension. Here, a minimum of dollars will buy a maximum increase in lap times. Handling improvements will also work on the street, whereas a highly modified engine may not.

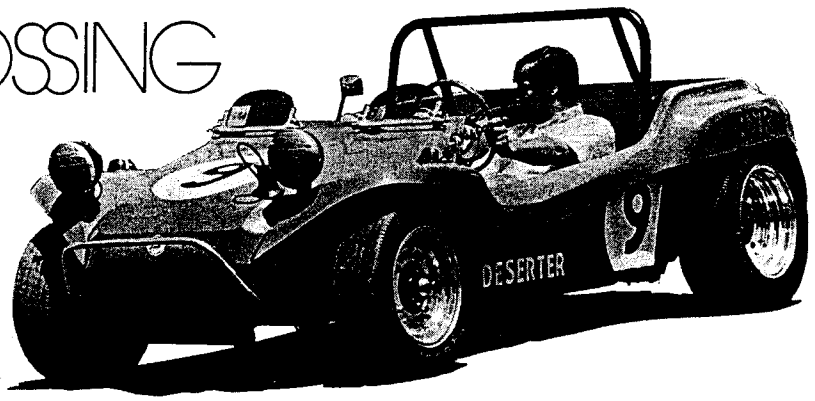
The VW front suspension is strong, and has very little *unsprung* weight. I've found that, for autocrossing, the drum brakes are adequate (and light), although '67 or later Karmann Ghia discs will bolt on. One major design flaw exists in the VW front end. If you fix it, the car will stick better. The front suspension geometry won't change camber to compensate for body roll or lean. A well setup autocross buggy will generate enough cornering force to tilt the car about 5 degrees. At a 5-degree angle, the flat tread face of a racing tire will not be all on the ground. Only the outside edge of the outside tire will be in contact with the pavement. To compensate for this, more negative camber should be built into the front suspension. I use about 3 degrees. This much negative camber can't be adjusted into a VW front end; but, if you're careful to keep the upper and lower torsion arms

parallel, you can heat and bend them to get negative camber. The front spring rate is about right for a VW-powered buggy, so I wouldn't recommend any add-on springs in front. VW shock absorbers, having been made for a heavier sedan, also are fine for pavement racing. The ride height must be lowered. I use Crown Mfg. Co.'s Select-A-Drop lowering device. This unit moves the upper torsion bar anchoring screw through a wide arc of adjustment. Adjust it so that the torsion arms are slightly higher than parallel to the ground, or exactly the same as on a stock VW sedan. Use about three caster shims (VW part) under the lower torsion bar tube. This will increase the car's directional stability at high speeds, and create even more negative camber at positions of full steering lock. About 1/8th-in. total toe-in will do, or stock VW spec. The toe-in adjustment must be made *after* the other parts are installed, including a quick-steering adapter, if used. Fat racing tires will scrub off a lot of a car's potential top speed if they are toed-in (or out) too much.

REAR SUSPENSION MODIFICATIONS: The VW swing-axle rear suspension needs quite a bit of attention to make it suitable for hard cornering. The spring rate should be increased, especially if a preloaded camber compensator is used. This can be accomplished by obtaining a set of coil spring Koni shocks. The extra springs will stiffen the spring rate of the car, thus giving better roll resistance and, more importantly, bump resistance. When using a negative camber setting, the total suspension travel is minimal. Certain "coil-over" shocks are also made for Baja use, but I would guess that the springs are too stiff.

A Z-F limited-slip differential is sometimes available from EMPI, and is a

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great asset in an autocrossing situation. I include the limited-slip in remarks about rear suspension because the unit will aid in keeping the rear end from jacking. (Jacking occurs on a swing-axle car when the car leans, and the inside rear wheel becomes airborne or at least unweighted, and tucks under. When this happens, the center of gravity becomes higher and the outside wheel tucks under, too.) The limited-slip tends to make the rear end slide instead of jack, since power is being supplied to—and can break traction at—both rear wheels. Conclusion—a limited-slip unit will act as a camber compensator. However, some kind of additional camber-limiting device is absolutely necessary, whether or not the stiff springs or limited-slip is used.

Camber-compensating transverse leaf springs now on the market for Volkswagens are nearly useless in an autocross or any other competition. They are useful for keeping inexperienced Beetle owners from turning their cars over on the freeways, but not for racing. There are, however, two excellent camber-compensating devices on the market which do a good job of keeping those fat racing tires perpendicular to the road. The Autodynamics double-leaf competition camber-limiter has enough built-in preload that, when you put your VW or buggy on a grease rack, the wheels don't fall down! The other device, a brand-new product now in its initial production run, is Callaway-Grays' Competition Z-Bar. This is a unit much like the one on the production mid-engined Deserter G.S., but has mounts and hardware for attachment to a VW or conventional buggy. Under-the-car Z-bars have been offered before, but are usually too anemic for the job. This one has completely adjustable preload and stiffness. Even better, it

mounts over the transmission, thereby using up no ground clearance. The unit is about \$50, from Callaway-Gray, Dept. DB, Route 5, Deerfield, MA 01373. Use about 3 degrees negative camber without the camber-limiter, or 2 degrees negative with it. Be sure to check toe-in at the rear, too. About 1/6-in. is the best all-around setting.

WHEELS AND TIRES: Wider is not necessarily better. For a VW-powered car, I would use 8-15 wheels rear and 6-13 or 6-15 front. The swing-axle suspension of a VW does not allow the full tread face of a tire to remain in contact with the ground anyway, so wider wheels and tires are useless, especially on a VW-powered car. The best wheels to use are the lightest: Chassis Engineering's spun aluminum racing wheels. Do not use any type of VW-to-Chevrolet wheel adapter. There are many inexpensive steel wheels also available which bolt directly to a 4- or 5-bolt VW drum.

Racing tires are, of course, preferable to street tires, and are better if designed for a light car. Rather than recommend size designations here (they vary too much), I will give overall dimensions of what I consider to be the optimum tire. The front can't use much more than about 6 in. of tread width. Height should be as low as possible, so try for a 23-in. or lower overall diameter. *It is vital to run dissimilar sizes of tires front and rear.* The static weight distribution of a buggy is so heavy to the rear, even if using the 84-in. wheelbase, that it helps to weight-jack the car by putting a substantial rake in the chassis (looks better, too). So—the rear tires should be 26 in. to 29 in. in diameter, with 8 to 9 in. of tread width. This tall tire will make an already bad (too long) gearing situation even worse, so I'd recommend the addition of close-ratio gears.

DRIVER COMFORT AND SAFETY: A quick-steering adapter is an inexpensive must. It allows full steering corrections without moving the hands on the steering wheel. The wheel I use is an inexpensive 13-in. diameter, foam rubber unit—readily available anywhere. The driver should sit as low as possible in the car, just looking over the top of the dashboard. If the windshield is removed, the loss of frontal area will increase top speed, too.

Don't use a buggy seat in the car! An extremely high-sided seat is necessary to support the driver's body—not only at the hips, but also at the rib cage. My autocross buggy generated more Gs of cornering force than Sam Posey's Trans-Am Challenger, but you wouldn't catch Sam sitting in anything less than a totally-stiff, bucket-like bucket. If the driver has to support his body in the turns by putting a death-grip on the steering wheel, he can't make minute steering corrections.

Sitting far back in the chassis as I do, one may need to move the shifter back about 6 in., and shorten the shift rod another 6 in. on top of the 10-3/4 in. already needed in chassis-shortening. I wouldn't bend the VW lever—it makes it easier to miss shifts if bent.

The car I have just described can be an overall winner at very short autocrosses, and a class contender at long ones, using just a stock 1500. The buggy autocrosser will find himself placing ahead of such exotic machines as Porsche 911s, Jaguars, Lotus', etc. Now, should he get beaten—just put in some horsepower. It's pretty easy to raise the 53 bhp we're talking about here to 85 bhp or so. Still not enough? Bolt on a Corvair mill via a Crown adapter, or put all of the above in a Deserter G.S. mid-engined chassis, and run with the big sports-racing cars!