Alignment: Doug and Matt Seim

Front End Adjustments:

Camber:

This is adjusted primarily through the eccentric on the upper ball joint. You will notice that there are two positions of the eccentric that will result in the same camber. The caster at these two positions will be different. We set our camber at the position with the reduced caster. Otherwise the car gets hard to steer.

If we can't get the camber we want through adjustments of the eccentric we adjust the position of the lower trailing arm. Our lower trailing arm is where the sway bar is located. All cars use hard spacers between the trailing arm and the beam tube. We put in a thinner spacer if we need less camber. If we need more camber we put a shim washer between the spacer and the beam tube.

When measuring and adjusting camber remember that changes in camber result in changes in toe. Since the front suspension has a decent amount of caster the camber will change as the car is steered. As you adjust camber and the toe changes you are steering the car which will impact the measured camber. We get around this by sighting down the outer edge of the front tire towards the tread of the rear tire. We steer the front wheel so that it's pointing at the same point on the rear tire tread each time before the camber is measured.

There are two schools of thought on the proper front camber setting. One school of thought follows Hoosier's recommendation for this Club Ford tire and sets the static camber at -0.5 degrees. The other school of thought believes that an FST has much more chassis roll than a Club Ford and sets the camber at least at -1 degree. Both schools of thought have cars going pretty fast.

Toe:

Our steering rack is higher than the tie rod pickup point out at the wheel so when we the brakes are applied and the front end moves down the front wheels toe in a bit. We set the static toe somewhere around 1/16" out which encourages the car to turn in. It also keeps the car from toeing in a bunch under braking.

Ride Height:

You'll want the front end low enough to limit the amount of air going under the car but high enough that the frame won't bottom out under braking. We run somewhere around 1.75" to 2.00" from the lowest point of the front end of the frame to the ground. It is critically important to verify that the frame will hit the track before the front shocks run out of bump travel. If a shock runs out of travel first the sudden loss of compliance will cause that wheel to lockup and the car will yaw suddenly and violently. Jared Smith had his car set up that way and wound up driving up and over my car at Blackhawk Farms. Nobody got hurt but my wallet needed time to recover after that. Test this by getting a couple big guys to stand on the beam until the frame hits the floor. You should see that the

shocks still have at least a little travel left in them. If the frame bottoms out under braking on the track you transfer the weight off the tires and onto the frame. The front wheels will probably lock up due to the sudden loss of traction. This will typically not cause the car to yaw but can lead to punting the car in front of you and it's sure to shake up the driver. If any of this happens you need to increase the ride height.

Ride height is adjusted with the spring adjuster typically installed in an FST front beam. Using a Sway-a-Way high rate front spring also helps quite a bit.

Droop:

We control how much the front suspension can droop when unloaded by controlling the total travel of the front shocks. Since the car only has roll stiffness on the front end it will transfer a ton of weight between the front wheels when turning. There is very little or no weight on the inside front tire when turning. I've seen plenty of FV's with the inside front wheel off the ground. With our harder tires you don't see that as much in FST but there is just not much weight on that tire. When we control the amount of droop in the front end we control how much toe change we get in the front suspension which reduces drag while the car is in a corner. Set up the shock extended length so that the front end droop travel is no more than the bump travel. If you don't want to build new shocks to get the total travel just right you can use something like wire rope to prevent the shock from extending further than desired. I can give you more detail on that should you decide to try it. We have a couple of cars currently in the series running with wire rope limiters.

Rear Suspension Adjustments:

Camber:

In the zero roll rear suspension the camber only changes with the amount of weight being carried by the rear suspension. There is some change in camber during cornering as chassis roll moves the inner axle pivots up and down but that amount of change can be discounted in this discussion.

The rear suspension is better behaved than the front and can be made to grip much better than the front. That's why our typical strategy is to get the most grip we can out of the front then adjust the rear to balance the car (understeer vs oversteer).

We adjust the static camber of the rear suspension by adjusting the spring perch on the rear shock. That makes the ride height of the rear suspension change which results in camber change since this is a swing axle suspension. This adjustment interacts with the droop adjustment so we do droop first, then static camber.

Typically, the rear camber is set a little higher than the front camber to keep the car a little on the understeer side of the handling balance. Different drivers like different kinds of balance. This is a key adjustment point to get the car handling. Start with the total rear static camber (the sum of the camber

of both sides) about 2 degrees higher than the total front camber. The car should push some. Stand up the rear tires in steps until the driver is happy with the balance.

Droop:

When the car is braking hard there is quite a bit of weight transfer to the front suspension. The rear suspension hikes up to the droop position. This causes the camber of the rear suspension to be reduced. I think about it this way – what rear camber do I want the car to have right when I release the brakes and turn into a corner?

Most cars are set up with the total droop camber (sum of both sides) somewhere between -1 degree and +1 degree. The more positive the droop camber the less grip you will have in the rear during turn in. That will allow the car to turn in more crisply but care needs to be taken that it isn't too abrupt for the driver. My car is usually around a half degree negative in total rear droop camber. Droop camber is measured by jacking the car up by the transmission case in the rear, measuring both rear wheel cambers and adding them up.

Most cars have a droop limiter in the rear suspension. This is a rod of some kind running parallel to the rear shock and includes a rubber bushing to provide a little compliance as it limits the droop travel of the suspension. I adjust droop by first loosening the droop limiter so the droop is limited only by the shock. I adjust the suspension to the desired droop camber settings by adjusting the length of the push rods between the rear spring and the rear axle. I then tighten the droop limiter until it just starts to move the shock. Some rear suspension geometries will not allow you to get to the desired static camber with the droop set up this way. In that case I change the push rods to allow the static camber to be achieved then use the droop limiter to preload the rear spring until the desired droop camber is achieved.

Toe:

Cars with leading or trailing arms in the rear differ a bit on what's going on with toe. Typically, a leading arm rear suspension is set up to prevent toe change as the chassis rolls and the ride height changes. A trailing arm suspension will change toe a little with ride height and chassis roll but may be setup by the designer to be beneficial by slightly steering the rear end to aid in stability during cornering. In both cases the static toe can be set to whatever suits the driver. Since this is a low power car you'll want the toe to be pretty close to straight. Most guys run just a bit of toe in. Start with about 1/16" total.

Making Measurements:

Always measure the car with the driver seated in the cockpit. The cambers and toe settings change with the ride height of the suspension.

After an adjustment has been made the suspension has to get settled into its running position. This is critically important if the car has been jacked up. Do this by rolling the car forwards and backwards while someone bounces the suspension. Then roll it once or twice without the bouncing. After making your measurement roll the car back and forth a few times again and repeat the measurement. If you

get the same reading as before you have a good measurement. If it changes you didn't. Roll it again and measure again. Repeat until you are getting the same reading. This is really important for the rear suspension.