NC CHASSIS CO.

Chassis Manual

1900 Thru Kong Chassis

All information in this manual is based on the latest product design and specifications available at time of printing. NC Chassis Co. reserves the right to make product changes and improvements that may affect illustrations and/or explanations.

WELCOME

Thank you for purchasing an NC Chassis Quarter Midget. For over 20 years NC Chassis Co. has strived to provide the best service in the industry. We understand that great service to a customer means not only receiving great product but also being able to understand how to use that product to its fullest potential.

As the development of product changes so does the characteristics of that product. Through communication with our dealers, customers, and trackside representatives we learn every week how to stay ahead of the competition.

RACERS EDGE

Races are won at the shop not just at the track and many details are explained in this manual. The specifications and suggested adjustments are what we have found to be best for most drivers and most tracks. Understand that every driver has their own style; and you need to try some of your own combinations. Just never lose sight of the basics.

MANUAL FORMAT

For every car assembled at NC Chassis Co. there is a set-up procedure that we go through upon completion of that car using our Axle Alignment Kit. We suggest you utilize that kit and manual before going to the racetrack. Throughout this manual, we will discuss the purpose and function of the chassis adjustments that can be made for the performance of your racecar. Once you understand the purpose of these adjustments; we will discuss how to implement that knowledge for optimal performance with a bullet point list.

MAINTENENCE

After and during every racing event, inspection and maintenance is a necessity. Clean, silicone, and replace parts as necessary. When inspection reveals the need for replacement of a component, use genuine NC Chassis parts available from your NC Chassis dealer or contact our Customer Service at (330) 798-7744. Inspection is required more often for dirt and/or sandy conditions.

Always silicone all bearings immediately after a thorough cleaning, to prevent any rust. Check all shocks for bad leaks and depressurization. Most shocks will have minimal oil left around the shaft. If a shock has a large amount of oil within the lower cone, a seal may need replaced.

Part 1

Ride Height

Ride height is the primary and most common adjustment to be made throughout the day. When measuring ride height make sure the driver is in the car and take the measurement directly under the car just behind the lower nerf bar spuds in the rear and forward of the spuds in the front. A very common starting ride height is 1" on the left side and 1-1/4" on the right side. From this point ride height can be fine-tuned based on a few important guidelines. First, lower the car the looser the car and higher the car the tighter the car. Second, lower the nose the looser the car and the lower the left side the looser the car. Many times these changes can be made in increments of only a 1/8" to achieve the ideal performance. Those changes can also be made on one corner of the car versus multiple corners of the car depending on the handling of the car.

Part 2

Front and Rear Panhard Bars

The **rear Panhard bar** is the radius rod bolted to the back of the left rear-bearing carrier and to right side of the frame. The **front Panhard bar** is the radius rod that bolts directly to the front axle and to the right side of the frame.

The front and rear Panhard bars greatly affect the handling of the car. Minimal movement up or down can drastically raise or lower the right front and right rear tire temperature. Always remember that the front and rear Panhard bars work the opposite of one another. Lowering the rear Panhard bar on the right side of the frame will put more temperature in the right rear tire and tighten the car. Lowering the front Panhard bar on the right side of the frame will also put more temperature in the right front tire, however this will loosen the car. This works this way because by putting temperature in the right front tire, it will have better grip; this will tend to loosen the rear.

The same applies for when these bars are raised. When the rear Panhard bar is raised on the right side of the frame, the temperature in the right rear tire will decrease, which will loosen the car. If the front Panhard bar is raised on the right side of the frame you will decrease the right front tire temperature, taking grip away from the right front. This tends to tighten the rear.

The rear Panhard bar is also adjustable on the left rear-bearing carrier. When changing the location point on the right side of the frame it is not necessary to change the location point on the left rear-bearing carrier. This is adjustable on the left rear-bearing carrier because, the less angle or the more level the Panhard bar is with the rear axle the less grip the rear will have. This adjustment is rarely changed. Its affect on the chassis is minimal. The factory setting will usually work for any racetrack. If you lower the rear Panhard bar on the right side frame rail, to where the left rear location point is higher then the right rear location point; you should lower the Panhard bar on the left rear bearing-carrier.

The Panhard bar should be used as a last resort when making a chassis adjustment. It can drastically change the handling of the car. If this adjustment is made at the wrong time you may find yourself making more adjustments then needed to compensate.

Points To Remember

- Lowering the rear Panhard bar will tighten the car.
- Raising the rear Panhard bar will loosen the car.
- Lowering the front Panhard bar will loosen the car.
- Raising the front Panhard bar will tighten the car.

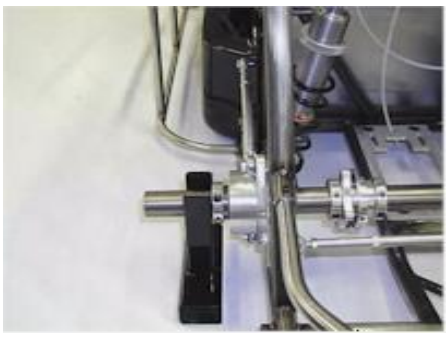
Refer to the measurement sheets for the recommended Panhard bar locations for your car.

Part 3

How to Square the Rear Axle

It is important that the rear axle is square in relation to the frame. On the 2002 model chassis the left rear radius rods have **two** available mounting points on the left side of the frame to which they can be bolted. The left rear radius rods should be in the lower of the two mounting points at this time. The next important step is the location of the rear axle from left to right. This is adjusted by the rear Panhard bar. On all model cars move rear axle to the right so the left rear radius rods are parallel to the left side of the frame, from front to back without hitting the left rear spring (Refer to picture 3). This allows the left rear tire and wheel to be tucked in as close to the frame possible. We then square the rear axle by adjusting the radius rods on the left and right rear of the car. You want the back of the rear axle and the centerline of the rear frame crosstube to the measurements shown below (Refer to picture 4).

1900 Chassis:	**4 ¾”**	**2002 Chassis 33”-35”:**	**5”**
2000 Chassis:	**4 ¾”**	**2002 Chassis 37”-39”:**	**4 ¾”**
2001 Chassis:	**4 ¾”**	**Kong Chassis:**	**5”**



Picture 3

Picture 4

Part 4

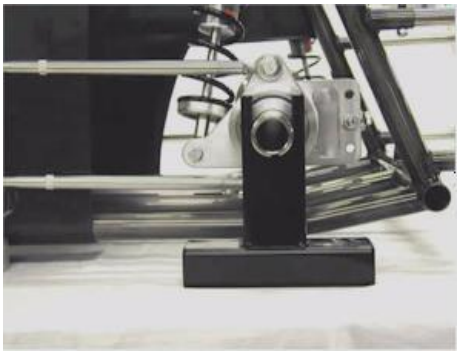
Timing the Bearing Carriers

When timing the bearing carriers you want the top dead center of the carrier to be as close to the centerline of the rear axle as possible. After the carrier is at top dead center rotate the top radius rod one more turn to a turn in a half bringing the top of the carrier forward. This prevents the carrier from rotating back past top dead center under load. This could cause the bearing carriers to have a slight bind through the corner.

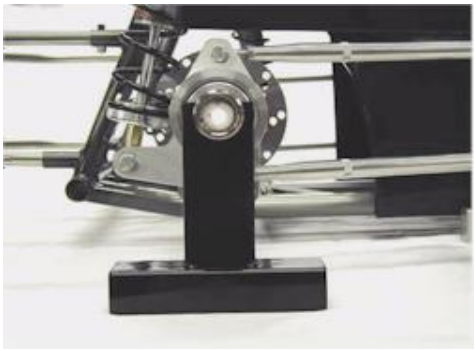
Procedure: The left and right rear radius rods are used to rotate the bearing carriers, and always recheck the rear axle to make certain it is still square with the rear frame crosstube. If you have a **1900**, **2000**, **2001** model chassis this procedure will be fairly simple to find the top dead center. Rotate the carrier so that the flat surface on the rear of the bearing carrier plate is perpendicular to the ground. Any 90-degree ruler works well. If you have a **2002** model chassis do the same for the left rear bearing carrier plate (Refer to picture 5). However for the right rear bearing carrier use the bottom of the brake plate and make sure it runs evenly with the bottom frame rail (Refer to picture 6). Keep in mind, with a **2002** model car the radius rods

locate at the center of the carrier on top and bottom. Positioning the bolt of the top radius rod directly over the center of the rear axle can be a good reference point.

If you use a small level to time the carriers make sure the car is level or the bubble on the gauge will not be accurate.



Picture 5



Picture 6

Part 5

Front Axle Wheelbase and Lead

The front axle location is very critical to the performance of the car. If it is not properly positioned in the car you could create a bind that would alter the handling of the car. **Always make sure the front axle is not bent after any contact on the racetrack.** This procedure will be discussed later in the manual under Spindle and Steering Alignment.

The front axle is not square in the chassis. The front geometry of our cars have a ½" to 1 ¼" of lead built in, depending on the model car. Lead is how much further forward the Right Front tire is then the Left Front tire. The reason for lead is to allow the car to roll to the apex of the corner, with minimal steering impute. This allows the car to roll with little resistance. **Momentum is everything on a 1/20 of a mile track.** The driver must be smooth and the car must be completely free of any bind. **The less the drivers hands move the faster the car will be.**

Wheelbase is the distance between the front tires and the rear tires. It's measured with the front and rear axles. Imagine a square. The smaller the square, the shorter the distance is between each corner of that square. Now think of an arial view of a racecar. Notice it is nothing more than a square. The shorter the wheelbase, the faster the weight will transfer to each tire and/or corner of the racecar. So in theory a smaller car will tighten up quicker than a larger car. **The same applies from left to right.** The narrower the car, the faster the weight will transfer from left to right. This is critical to understand when dealing with a biking situation. The wider and longer the base of the car, the slower the weight will transfer. This will be explained further under Douglas Wheels and Spacing.

Procedure: The left to right position of the front axle needs to be adjusted. First re-bolt the top of the left front shock. Then use the front Panhard bar to position the left front spring collar on the left front shock is roughly a 1/16" from the frame or bodywork (Refer to picture 7). Then bring the left side of the front axle back until it is almost touching the vertical frame tube on the left side of the car (Refer to picture 8).

Moving to the right front shock, notice the bottom of the shock is bolted between to plates, which are welded to the top of the axle. Make sure these mounting plates are straight up and down, by rotating the

front axle using the right front radius rods. Then take a tape measure and attach it to the shock mounting plate closest to the right front radius rods and pull the tape back to the center of the rear axle (Refer to picture 9). Adjust the right side of the front axle to the recommended wheelbase using the right front radius rods (Refer to picture 10). **Refer to the measurement sheets for the recommended wheelbase of your car.**

Point To Remember:

- When adjusting the right side of the front axle, make sure that on the left side of the front axle you do not hit the frame. More clearance may be needed between the axle and the frame or bodywork once you have the proper wheelbase.

Picture 7

Picture 8

Picture 9

Picture 10

Part 6

Caster/Camber Front Axle

Caster is the rotation of the front axle or spindle forward and backward. Forward is **negative caster.** Backward is **positive caster.** Rotating the top of the front axle forward will make the car easier to steer. Rotating the top of the front axle back will make the car harder to steer. When the front axle has too much negative caster it will be difficult for the driver to keep the car straight. However the more negative caster your driver can run the faster the car will be. It tends to allow the car to roll better.

We do not build any caster into our front axles. Caster has a remarkable effect on the performance of the car. To have a fixed caster setting could be a disadvantage at a lot of tracks. Making the 2002 adjustable left and right caster/camber front axle, one of are best developments. To understand the full advantages of this front axle you need to understand caster split. Caster split is the degree of difference between the left and right spindles of the front axle. A common caster split is 3 degrees; 0 degrees on the left front and 3 degrees back on the right front. The greater the caster split, the more the car will turn left. The more negative caster in the left front, the more **right front weight** the car will have through the car. The more positive caster in the left front, the more **right rear weight** the car will have through the corner.

Camber is the degree of tip from left to right in either one of the front tires. On the right front when leaning the top of the tire towards the car this is **negative camber**. Leaning the tire and wheel away from the car is

positive camber. The left front tire and wheel is the same. Leaning the top of the left front tire towards the car is **negative camber**. When you lean the tire away from the car this is **positive camber**. The purposes for adjusting camber to the racetrack are equalizing temperature and wear across the surface of the front tires.

When you change the caster you change the angle of the spindle which in turn changes the camber. With the right front, the more positive caster the more negative camber is needed. With the left front, the more negative caster the more positive camber is needed.

Procedure 1900 / 2000 Front Axle: Standing at the right or left side of the car. By rotating the axle using the right front radius rods, position the spindle barrel 90 degrees with the bottom of the frame. This will position the front axle virtually straight up and down. To set the camber, place the car on the ground with tires and wheels. Using a 90-degree straight edge, slide the straight edge directly up against the outside of the right front tire and wheel. The bottom of the tire or wheel should be touching the straight edge and there should be a gap of relatively **3/16"** between the top of the wheel and the straight edge.

Procedure Caster/Camber Front Axle: This front axle has a black caster block on both the left and right side of the front axle, which rotate forward and back by loosening three bolts. The camber block is the aluminum block that fits within the serations directly on top of the black caster block.

There are seventeen lines on the caster block. The centerline has a dot above it. When this dot is inline with the groove on the front axle the caster block is at zero. Each line represents about 2 degrees of movement. One degree of movement would be between the lines. With both left and right caster blocks at zero position the front axle straight up and down. Looking at the right front spindle barrel rotate the axle until the barrel is 90 degrees with the bottom of the frame using the right front radius rods. Then rotate the top of the right front caster block **back 4 degrees** (2 lines). Rotate the top of the left front caster block **to the center dot keeping it at 0 degrees** (center line).

The camber block is numbered on each side 1-4. The location dots are 7/8 of a degree change from dot to dot. The rotation of camber block from number to number is roughly a ¼ of a degree change. The arrow locates the center dot. So, if the camber block is positioned with the number 1 over the center dot and you rotate the camber block to the number 2, the camber block will offset slightly too either side of the center dot and change the camber by a ¼ of a degree. The factory setting for the right front camber block is the number 3 offset away from the car on the center dot. The factory setting for the left front camber block is the number 1 on the second dot away from the car. This is a good starting point.

Always keep in mind that the easiest and probably most efficient way to check camber is to simply place the car on the ground and visually see how much it has changed from one adjustment to the next.

Points To Remember:

- The more caster split the more the car will want to turn left.
- Caster split is usually based on the drivers' preference. Keep them comfortable.
- For larger tracks set the left front caster block at zero. The car will drive straight easier.
- The greater the degree of banking in the track, the more negative right front camber is needed.
- The more positive left front camber, the more the car will tend to turn left.
- **Always** have enough right front negative camber, so that the sidewall of the tire is never rolling under.

Part 7

Spindle and Steering Shaft Alignment

This procedure is to make sure you have the correct amount of steer from left to right. The **front alignment gauge** is an absolute must for checking your front alignment (Refer to picture 11). If you change the front axle or have any altercation on the track, you should always recheck the front alignment. This will help you to detect a bent spindle or axle. Numerous times I am asked to look at a car that some how has lost 2-3 tenths of a second, 97% of the time they have a bent front axle. At any point that you feel your car has lost corner speed check the alignment of the front end. **Never under estimate contact on the racetrack.**

Timing the steering shaft is very critical. When you read the procedure below you will notice that we will add a 1/16" – 1/8" of toe out to the Left Front spindle, **after** we time the steering shaft and the front axle can be lifted in and out of the alignment gauge without any bind. This adjustment is made so that at corner entry the Left Front turns sooner than the Right Front. This helps the car roll to the apex of the corner with minimal steering impute. If this alignment is incorrect and the Left Front turns to much faster than the Right Front, the Right Front will tend to drive straight causing a great deal of bind and resistance in the front end. This is not something that can be checked very quickly in the pits so please make sure this is checked at your shop regularly and after an altercation.

If the front axle was bent it is almost always bent on the right side. With the front axle bent it is possible to re-align the spindles with each other so that they slip in and out of the alignment gauge. If this happens all that you would have to do is stand on the right side of the car and look down directly over top the right front. The spindle will be pointing towards you and the end of the axle will be pointing towards the nerf bar. **Replacement of the front axle would be the only solution at that time.** Otherwise if you were to use the bent front axle, your alignment would never be correct. The Right Front spindle could never turn far enough to the left, because it is already turned to the left when the wheels are pointed straight.
Procedure: Lift the front of the car and position the alignment gauge under the front spindles (Refer to picture below). Standing at the front of the car you will notice to ears welded on the steering shaft. Bolted to those ears are the left and right steering rods. Rotate the steering rods until the ears appear evenly split and the steering shaft appears to run directly through the center of the two ears. We refer to this point as 11 and 1 O'clock (Refer to picture below). Now that the steering shaft is timed properly make sure the rods are not in a bind, they should swivel on the ball of the hiem without any effort. The front axle at this time should drop in and out of the alignment gauge without any resistance.

Part 8

Douglas Wheels and Spacing

The proper spacing for all model cars is the same. The left front and right front should always be as close to the front springs as possible without touching the spring. **Do not base this on the steering turned all the way to the left**. Very little steering impute is required to turn the car. If you are using the adjustable caster/camber front axle you will need to reverse the bolts in the left front hub. Otherwise the bolts will hit the caster block and the tire will be spaced too far out.

The left rear should always be spaced as close to the left rear radius rods as possible. The right rear should be the only wheel that is adjusted. We suggest you stay between 33 ½"-34" from the center of the left rear tire to the center of the right rear tire. Spacing the right rear in toward the bearing carrier will tighten the car. Spacing the right rear out will loosen the car.

Rim or wheel offsets are also very important. Picture a triangle that has a 4" base and a triangle that has a 14" base. Which one do you think would be easier to blow over? The one with the 14" base is not going to move very easily. A racecar is based on the same philosophy. The wider the base of the car the more stable the car will be. The narrower the wheel is, the narrower the tire will be. The narrower the tire is, the hotter the tire will be. The wider the wheel, the wider the tire. The wider the tire, the cooler the tire.

The suggested offsets are as listed. To properly measure a rim halve refer to picture 13 (This wheel has a 2 ½" outer rim half).

1900 Wheel Set-Up *(Outer / Inner)*		**2000 - Kong Wheel Set-Up** *(Outer / Inner)*	
LF. 2x5 / 3x5	**RF.** 2.5x6 / 4x6	**LF.** 2x5 / 3x5	**RF.** 2x6 / 4x6
LR. 2.5x5 / 3x5	**RR.** 4.5x6 / 4x6	**LR.** 2.5x5 / 3x5	**RR.** 4x6 / 4x6

Picture 13

Part 9

Tire Compounds

Were not going to discuss what tire you should run on your car, because tire compounds change almost every year. Instead we are going to discuss how to find the right tire for track conditions and driver. I base my tire selection on three elements: Track, weather, and driver.

If a track has an abrasive surface then a harder compound would probably hold up better. This is seldom a factor but must be considered if the tire seems to be coming apart. If the weather has been very hot and sunny a harder compound would be better. If your driver is very smooth and maintains a consistent lap time then a harder compound may be better. If the driver does not mind driving a loose car than a harder compound may be better. For most racing conditions the harder compound will be faster. Because the **harder the tire the cooler it will stay**. The softer the tire the quicker it will grip. **However the faster it comes in, the faster it will go away**.

Sometimes I will base my tire choice on the format of the show and the performance of the drivers. How many laps are the races? Have there been a lot of caution flags? What is the qualifying procedure? These are all-important factors, however always remember minor chassis adjustments will determine weather the tires come in sooner or later. We will discuss these adjustments in a later section.

Part 10

Air Pressure and Tire Stagger

The air pressure for the right front and right rear is normally between **9-11 psi.** The left front is normally **10 psi.** The left rear is normally between **5-7 psi.** The less air pressure in the tire, the more the tire will grip. The more air pressure in the tire, the less the tire will grip.

Front tire stagger is the difference in circumference between the right front tire and the left front tire. Rear tire stagger is the difference in circumference between the right rear tire and the left rear tire. The circumference must be measured around the center of the tire. If the right rear tire measured 34 ¾" and the left rear tire measures 31". The rear stagger on the car would be 3 ¾". **Stagger must always be measured with the air pressure you are going to run.** Air pressure, wheel offsets, and the tire specification numbers determine the circumference of the tire when it's mounted. More air pressure will expand the tire. The wider the wheel the more the tire is spread out, therefor the smaller the circumference will be.

Rear stagger depends on the degree of banking in the track and whether the left rear is **locked** or **unlocked**. Locked is when you drive off the left and right rear tires. Unlocked is when the left rear spins separately from the right rear. Locked will tighten the car and unlocked will loosen the car. Refer to the chart for our recommended set-ups. Typical starting rear stagger is 3".

Points To Remember:

- The more rear stagger the looser the car.
- The less rear stagger the tighter the car.
- The larger and higher banked the track, the less stagger is needed.
- The smaller and flatter the track, the more stagger is needed.
- The more stagger you can run the better the car will roll in and through the corner.

Part 11

Springs and Shocks

Spring set-up is based on the class, size of the car, weight of the driver, and the type of track. For this reason the spring and shock recommendations listed can only be used as a guide. A different combination may be required for you to achieve optimal performance. Give us a call if you cannot find the combination best for you.

Jr. Divisions		Sr. / Lt. Divisions	
LF. #3 shock / 105 spring	RF. #3 / 95	LF. #3 / 105	RF. #3-5 comp. / 115
LR. #3 / 105	RR. #3 / 95	LR. #3 / 115	RR. #3-4 comp. / 105

Hvy. Divisions

LF. #3 / 115	RF. #3-5 comp. / 125
LR. #4 / 125	RR. #3-4 comp. / 115

Part 12

Weight Distribution and Track-side Adjustments

Fine tuning weight distribution to equalize tire temperature, is the goal when making adjustments to the chassis. Through my experience any time one tire has more temperature than another does, it is because there is more weight on the tire with a greater temperature. To lower the temperature in that tire you need to take weight off that corner of the car. However this is where things get tricky and I'll explain in a second.

How do we adjust weight? With a coil over suspension there is a shock, a spring, and a shock collar. Turn the collar **clockwise** (put turns in) it will put tension on the spring, raise that corner of the car, and therefore put weight on that corner of the car. If you turn the shock collar **counter clockwise** (take turns out) you will lower that corner of the car, and take weight off that corner of the car. When you add weight to one corner of the car, you add weight to the diagonal corner of the car. The same thing happens when you take weight off one corner of the car.

Starting cross weight for our cars is between 52-54% of cross weight. To get your cross weight add the weight on the right front with the weight on the left rear and divide that total by the total weight of the car. **Always set the ride height first before putting the car and driver on the scales**. Because when adjusting the cross weight, you are effecting the ride height. Therefore you must have a starting point. When adjusting cross try to make equal changes from one corner of the car to the next, so that you affect the ride height and balance of the car as little as possible. **Increasing cross** is adding left rear weight. **Reducing cross** is taking left rear weight out.

To **increase cross percentage** put turns in the right front and left rear. Take turns out of the right rear and left front. To **reduce cross percentage** take turns out of the right front and left rear. Put turns in the right rear and left front. Lower cross weight will tend to loosen the car. Higher cross will tend to tighten the car.

Now remember when I said, "The more weight on a tire the greater the temperature will be in that tire." Here's the tricky part and will use the right front as an example. When the car is setting on the scales and you put turns in the right front, you will increase the weight on the right front and left rear tires. However when the car is entering the corner on the track there is weight transfer. Weight transfer from the left rear to the right front. By putting turns in the right front you are raising the ride height of the right front corner which holds weight on the left rear. **This delays the weight from going to the right front tire on corner entry. Which tends to cool the tire because it took weight off the right front tire.**

Keep one thing in mind. **Weight transfers in a triangle**. From the left rear, to the right front, and then to the right rear. The right rear reacts differently. This has to do with cross weight. Taking turns out of the right rear, takes weight off the right rear and puts it on the left rear. This increases cross. Which intern cools the right rear tire and puts heat in the left rear tire on the track.

If your following me you may be asking yourself if I increase cross, I tighten up the car. If I tighten up the car, how does it cool the right rear tire? It tightens up the car because you drive more off the left rear, which puts heat in the left rear tire. So if you need to cool the right rear but keep the car loose. Take half to the same amount of turns **out** of the right front. This remember, will reduce the cross you added.

Here's the key point. When you run a low cross percentage, **the weight you take off the left rear must be balanced between the right front and right rear**. What it takes to balance these two corners will depend on the track, driver, and class.

These are fine-tuning tips to achieve equal tire temperature, good tire wear, and overall better performance. Put the car on the scales; turn the shock collars every direction imaginable. Until you understand how much one adjustment affects another. You will find with are cars it does not take much adjustment to get a reaction on the track.

Points To Remember

- Lower cross weight will tend to loosen the car.
- Higher cross weight will tend to tighten the car.
- The limit for adjustment on one spring should be 3-4 turns. If more is required than a softer or stiffer spring is probably necessary for that corner of the car.

Part 13

Dirt Set-Up

For dirt we use a dirt steering shaft and a dirt left front spindle. These components allow more steer to the right for when the car is sideways. Adjustments work the same on dirt as they do for asphalt. Suspension is the only change that is really made. We simply put soft shocks on all four corners and soften the spring weight by 20-30 pounds. Raise the ride height for clearance and weight transfer. Lower the stagger and air pressure for grip. Space the right rear in for side bight and possibly lock the left rear hub.

If the track takes rubber, then simply lean towards the pavement settings to loosen the car. Leave the right rear spaced in for side bight. The key for dirt is knowing what the track conditions are going to be throughout the day.

Part 14

Closing Comments

After all is said and done remember we are only a phone call away. No question is a dumb question. Racing has many variables, theories, and opinions. Trust me you will develop your own. Remember that all racecars require constant attention to details, not just one thing will make your car fast. A consistent competitor is always well prepared when they get to the track. **Have a game plan and stick to it**. Always take thorough notes of track conditions and adjustments done to the car. Never forget your baseline.

Classic 1900 Car Measurements

Rear Panhard Bar:

- The rear Panhard bar is bolted in the bottom hole of the left bearing carrier and in the third hole from the bottom on the right side of the frame.
- Loosen the heim joint nuts and by turning the Panhard bar, position the axle so the left side radius rods that are bolted to the left bearing carrier are parallel to the frame, from front to back.

Front Panhard Bar:

- The front Panhard bar is bolted in front of your front axle and in the third hole up from the bottom on the right side of the frame.
- Loosen the heim joint nuts and by turning the Panhard bar, position the axle so the left front shock is positioned straight up and down.

Square Rear Axle:

- The distance between the back of the rear axle and the centerline of the rear frame crosstube is 4-3/4" on both left and right side of car.

Timing Bearing Carrier:

- This means you want the top dead center of the bearing carrier to be as close to the center of the axle as possible, you should do this at the same time you have squared the rear axle. The same radius rods are used to rotate the bearing carrier and you must recheck the rear axle to make sure it is still square in the car.
- The easiest way to time your bearing carrier is by using the back of the bearing carrier plate; it is flat and vertical. Position this 90 degrees with the ground.

Wheelbase:

- The front axle of the 1900 car is set with a ½" of lead.
- The distance from the back plate on the front axle where the bottom heim of the right front shock locates, to the center of the rear axle on the right side, should measure as listed below according to your car size.
- 76" car 46" Wheelbase
- 78" car 48" Wheelbase
- 80" car 50" Wheelbase
- Position the left side of front axle within a 1 1/6" from the vertical frame tube on the left side of car.

Pro 2000 Car Measurements

Rear Panhard Bar:

- The rear Panhard bar bolts in the second hold up from the bottom of the left bearing carrier.
- On the right side, it is attached to the frame using an aluminum slider. From the top of the rear frame crosstube to the center of the slider the measurement should be 1-3/4". With the car on the ground with the driver in it at the proper ride height, the slider should locate about parallel with the rear axle. A final adjustment may need made at that time.

Front Panhard Bar:

- The front Panhard bar bolts in front of your front axle.
- On the right side, it also is attached to the frame using an aluminum slider. From the bottom of the front frame crosstube to the center of the slider the measurement should be 1-1/2". With the car on the ground with the driver in it at the proper ride height, this slider should also locate about parallel with the front axle. A final adjustment may need made at that time.
- Loosen the heim joint nuts and by turning the Panhard bar, position the axle so the left front shock is positioned straight up and down.

Square Rear Axle:

- The distance between the back of the rear axle and the centerline of the rear frame crosstube is 4-3/4" on both left and right side of car.

Timing Bearing Carriers:

- This means you want the top dead center of the bearing carrier to be as close to the center of the axle as possible, you should do this at the same time you have squared the rear axle. The same radius rods are used to rotate the bearing carrier and you must recheck the rear axle to make sure it is still square in the car.
- The easiest way to time your bearing carrier is by using the back of the bearing carrier plate; it is flat and vertical. Position this 90 degrees with the ground.

Wheelbase:

- The front axle of the 2000 car is set with a ½" of lead.
- The distance from the back plate on the front axle where the bottom heim of the right front shock locates, to the center of the rear axle on the right side, should measure as listed below according to your car size.
- 33" car 49-1/4" Wheelbase
- 37"-41"car 50-1/4" Wheelbase
- Position the left side of front axle within a 1 /16' from the vertical frame tube on the left side of car.

Ultimate 2001 Car Measurements

Rear Panhard Bar:

- Rear Panhard bar bolts in the second hole up from the bottom of the left bearing carrier.
- On the right side, it is attached to the frame using an aluminum slider. From the top of rear frame crosstube to the center of the slider, the measurement should be 1-3/4". With the car on the ground, with the driver in it, and at the proper hide height, the slider should locate about the parallel with the rear axle. A final adjustment may need made at that time.
- Loosen the heim joint nuts and by turning the Panhard bar, position the axle so the left side radius rods that are bolted to the left bearing carrier are parallel to the frame, from front to back.

Front Panhard Bar:

- The front Panhard bar bolts in the front of your front axle.
- On the right side, it also is attached to the frame using an aluminum slider. From the bottom of the front frame crosstube to the center of the slider, the measurement should be 1-1/2". With the car on the ground, with the driver in it, and at the proper ride height, this slider would also locate about parallel with the front axle. A final adjustment may need made at that time.
- Loosen the heim joint nuts and by turning the Panhard bar, position the axle so the left front shock is positioned straight up and down.

Square Rear Axle:

- This means you want the top dead center of the bearing carriers to be as close to the center of the axle as possible, you should do this at the same time you have squared the rear axle. The same radius rods are used to rotate the bearing carrier and you must recheck the rear axle to make sure it is still square in the car.
- The easiest way to time your bearing carrier is by using the back of the bearing carrier plate; it is flat and vertical. Position this 90 degrees with the ground.

Wheelbase:

- The front axle of the 2001 car is set with 1-1/4" of lead.
- The distance from the back plate on the front axle where the bottom heim of the right front shock locates, to the center of the rear axle on the right side should measure as listed below according to your car.
- 33"-35" car 48-1/2" Wheelbase
- 37"-41" car 49-1/2" Wheelbase
- Position the left side of the front axle 1" shorter than the right side

Xtreme 2002 Car Measurements

Rear Panhard Bar:

- The rear Panhard bar bolts in the second hole up from the bottom of the left bearing carrier.
- On the right side, the Panhard bar bolts to the frame in the fourth hole up from the bottom. Loosen the heim joint nuts and by turning the Panhard bar, position the axle so the left side radius rods that are bolted to the left bearing carrier are parallel to the frame, from front to back.

Front Panhard Bar:

- The front Panhard bar bolts in front of your front axle.
- On the right side, the Panhard bar bolts to the frame in the second hole up from the bottom. Loosen the heim joint nuts and by turning the Panhard bar, position the axle so the left front shock is positioned straight up and down.

Square Rear Axle:

- The distance between the back of the rear axle and the centerline of the rear frame crosstube in 5" on the 33"-35" cars and 4 3/4" on the 37"-39" cars.

Timing Bearing Carriers:

- This means you want the top dead center of the bearing carrier to be as close to the center of the axle as possible, you should do this at the same time you have squared the rear axle. The same radius rods are used to rotate the bearing carrier and you must recheck the rear axle to make sure it is still square in the car.

- The easiest way to time your left bearing carrier is by using the back edge of the plate; it is flat and vertical. Position this 90 degrees with the ground. On the right it would be easiest to use the bottom of the brake plate and make sure it runs evenly with the bottom frame rail. Keep in mind, the radius rods locate at the center of your bearing carrier and positioning the bolt of the top radius rod to the center of the axle can be a reference point.

Wheelbase:

- The front axle of the 2002 car is set with 1"-1 ¼" of lead.
- The distance from the back plate on the front axle where the bottom heim of the right front shock locates, to the center of the rear axle on the right side, should measure as listed below according to your size car.
- 33"-35" car 48-5/8" Wheelbase
- 37"-39" car 49-5/8" Wheelbase
- Position the left side of front axle 1" shorter than the right side

Kong Car Measurements

Front Pan-hard Bar: The 3rd hole from the bottom is the standard location. The left front shock should be about 90 degrees with the front axle when the front axle is positioned left to right.

Rear Pan-hard Bar: the 3rd hole from the bottom is the standard location. The pan-hard bolt in the left rear birdcage should be fully exposed to the outside of the frame when the rear axle is in the standard left to right position.

Square Rear Axle: Measure from the back of the rear axle to the center of the rear hollow frame cross tube. Set the measurement on both left and right sides of the axle to 5". Remember to view the timing of the birdcage when squaring the rear axle.

Wheelbase: Take this measurement from the right front lower shock bolt to the center of the rear axle. Rotate the lower shock bolt to the flat side of the hex head of the bolt; to hold the tape measure. The measurements are listed below. The standard lead setting on a Kong chassis is a ½". To do this set the left side wheelbase a ½" shorter than the right side measurements that are listed below (ex: 33" / 47").

33": 47-1/2"
35": 48-1/2"
37": 49-1/2"

Ride Height: This should be set with the driver in the car. Take these measurements under the side panels near the nerf bar spuds. Always recheck each corner of the car after the last corner has been set.

LF.	¾"	RF.	1-1/8"
LR.	7/8"	RR.	1-1/4"

Radius Rod Lengths:

	33"	35"	37"
Frt. Pan-hard bar	11"	11"	11"
Lf. Steering	8.5"	8.5"	8.5"
Rt. Steering	14"	14"	14"
Lf. Outer	7.5"	8.5"	7.5"
RF Outer	19.5"	20.5"	21.5"
LR Top	9.5"	9.5"	9.5"
LR Bottom	10.5"	10.5"	10.5"
RR	20.5"	20.5"	20.5"
Rear Pan-hard	14.5"	14.5"	14.5"

Tips to Help Car and Driver Stay Fast

CHASSIS ADJUSTMENT OPTIONS TO CORRECT A "LOOSE" OR OVERSTEER CONDITION (pavement, locked rear axle)

- RAISE THE LEFT REAR RIDE HEIGHT TO INCREASE CROSS WEIGHT IN CHASSIS (THE LEFT REAR THEN DRIVES MORE)
- INCREASE LEFT REAR TIRE PRESSURE (REDUCES STAGGER AND INCREASES CROSS WEIGHT IF RIDE HEIGHT NOT READJUSTED)
- REDUCE THE RIGHT REAR SPRING RATE
- LOWER THE REAR PANHARD BAR ON THE FRAME SIDE
- INCREASE THE LEFT REAR SPRING RATE
- INCREASE THE RIGHT FRONT SPRING RATE
- REDUCE REAR TIRE STAGGER
- REDUCE THE AMOUNT OF FRONT AXLE LEAD IN THE CAR
- REDUCE RIGHT FRONT CASTER (CHANGES CAMBER WHILE FRONT WHEELS ARE TURNED AND DOESN'T UNLOAD THE LEFT REAR AS MUCH)
- MOVE THE RIGHT REAR TIRE IN
- LOWER THE ENTIRE REAR OF CAR AND/OR RAISE THE FRONT OF CAR

Notes: Increased cross weight helps only in the middle and exit of corner, not entry. Increased front spring rate helps on entry and middle but not on exit.

CHASSIS ADJUSTMENT OPTIONS TO CORRECT A "TIGHT" OR UNDERSTEER CONDITION (pavement, locked rear axle)

- LOWER THE LEFT REAR RIDE HEIGHT TO DECREASE CROSS WEIGHT IN CHASSIS (THE LEFT REAR THEN DRIVES LESS)
- DECREASE LEFT REAR TIRE PRESSURE (INCREASE STAGGER AND DECREASES CROSS WEIGHT IF RIDE HEIGHT NOT READJUSTED
- INCREASE THE RIGHT REAR SPRING RATE
- RAISE THE REAR PANHARD BAR ON THE FRAME SIDE
- DECREASE THE LEFT REAR SPRING RATE
- DECREASE THE RIGHT FRONT SPRING RATE
- INCREASE REAR TIRE STAGGER
- INCREASE THE AMOUNT OF FRONT AXLE LEAD IN THE CAR

- INCREASE RIGHT FRONT CASTER-INCREASES CAMBER WITH WHEEL TURNED AND UNLOADS THE LEFT REAR

- MOVE THE RIGHT REAR TIRE OUT

- RAISE THE ENTIRE REAR OF CAR AND/OR LOWER THE FRONT OF CAR

  Notes: Increased cross weight helps only in the middle and exit of corner, not entry. Increased front spring rate helps on entry and middle but not an exit.

CHASSIS ADJUSTMENT OPTIONS TO CORRECT A "LOOSE OR OVERSTEER CONDITION (pavement, unlocked rear axle)

- PUT TURNS IN RIGHT REAR-RAISES RIDE HEIGHT AND INCREASES NORMAL FORCE ON RIGHT REAR TIRES

- TAKE TURNS OUT OF RIGHT FRONT-LOWERS RIDE HEIGHT AND DECREASES NORMAL FORCE ON RIGHT FRONT TIRE

- REDUCE THE RIGHT REAR SPRING RATE

- LOWER THE REAR PANHARD BAR ON THE FRAME SIDE

- INCREASE THE RIGHT FRONT SPRING RATE

- REDUCE THE AMOUNT OF FRONT AXLE LEAD IN THE CAR

- REDUCE RIGHT FRONT CASTER (CHANGES CAMBER WHILE FRONT WHEELS ARE TURNED AND DOESN'T UNLOAD THE LEFT REAR AS MUCH)

- MOVE THE RIGHT REAR TIRE IN

- LOWER THE ENTIRE REAR OF CAR AND/OR RAISE THE FRONT OF CAR

  Notes: Increased front spring rate helps on entry and middle but not on exit

CHASSIS ADJUSTMENT OPTIONS TO CORRECT A "TIGHT" OR UNDERSTEER CONDITION (pavement, unlocked rear axle)

- TAKE TURNS OUT OF RIGHT REAR-LOWERS RIDE HEIGHT AND DECREASES NORMAL FORCE ON RIGHT REAR TIRE

- PUT TURNS IN RIGHT FRONT-RAISES RIDE HEIGHT AND INCREASES NORMAL FORCE ON RIGHT FRONT TIRE

- INCREASE THE RIGHT REAR SPRING RATE

- RAISE THE REAR PANHARD BAR ON THE FRAME SIDE

- LOWER THE FRONT PANHARD BAR

- DECREASE THE RIGHT FRONT SPRING RATE

- INCREASE THE AMOUNT OF FRONT AXLE LEAD IN THE CAR
- INCREASE RIGHT FRONT CASTER (CHANGES CAMBER WHILE FRONT WHEELS ARE TURNED AND DOESN'T UNLOAD THE LEFT REAR AS MUCH)
- MOVE THE RIGHT REAR TIRE OUT
- RAISE THE ENTIRE REAR OF CAR AND/OR LOWER THE FRONT OF CAR

  Notes: Lowering the front panhard bar does not help on corner exit