

**RC Crew Chief 2012**  
**Steps to a Baseline car setup**  
**Version 2- 9 January, 2012**

**Step 1 – Balancing**

- Before doing anything check the weight balance of the car with everything installed,(motor, batteries, electronics)
- I check mine using two furniture levelling feet and grind the end to a point. Most cars will have a small hole at the front and rear of the chassis to locate the centre of the chassis. Position the levelling feet in the holes and now you have a balance point to work from.
- Add ¼ oz weights to the light side until you get the car as close as possible to balancing. If you can't afford to add weight you can try moving your electronics and battery around.
- You can repeat this procedure for the front to rear balance as well but it is harder to find the centre point so I don't bother.
- Now you have a statically balanced chassis.
- For Steps 2, 3, 4, and 5 you need to remove the wheels, shocks and disconnect Anti-Roll Bars (ARB's).

**Step 2 – Shocks**

- Remove the springs and shock collars.
- Measure the length of shock pairs in the fully extended position to make sure they are the same length. If they are not adjust the bottom end of the shock until they are the same.
- If you want to change the shock oil now is the time.
  - Remove the cap and empty out all the oil.
  - Fill the shock about 90% full and slowly pump the piston up and down several times to help get any air out. Let the shock sit for several minutes until the oil is clear. Repeat this process until there are no more air bubbles.
  - Fully extend the shock, top off the oil and install the bladder and/or cap squeezing out excess oil..
- The shock response must be matched in both directions.
  - **Compression** –You should be able to fully compress the shock until it bottoms out. Resistance should be the same throughout the travel. If the resistance increases as you compress it or if you cannot fully bottom out the shock then you have too much oil.

Bleed out some oil until the resistance is constant throughout the travel.

- **Rebound** - Check the rebound by fully compressing the shock and then releasing the shaft. The shock should slowly extend out on it's own. Shock pairs should rebound the same amount and the same speed.
- Install springs and shock collars. Make sure the spring is free to move and is not compressed (preloaded). If it is back off the spring collar or remove spacer clips if you do not have threaded shocks. Set the spring collars on all shocks to approximately the same position.

### Step 3 – Chassis

- Remove all tires and place chassis on a “**FLAT**” surface.
- Check the chassis tweak by pressing down on shock tower at each of the four corners. If there is any rocking in the chassis it is tweaked. Or you may have a screw protruding below the chassis. If it is a screw fix it.
- To fix tweak in a carbon fibre chassis loosen the screws in the upper deck. Have someone press down on the front/rear shock shocks and then tighten the screws on the upper deck. Check your tweak again and it should be gone.
- If you find a plastic tub chassis or metal chassis is tweaked there is not much you can do as it is either bent, warped or twisted. If it is really bad it should be replaced.

### Step 4 – Suspension Travel

- Check all suspension arms to make sure there is no binding. They should move freely up and down with no resistance.
- If there is any binding determine the cause and correct it.
- Check suspension and steering components for excessive slop. Do whatever you can to minimize it without causing binding. If there is a choice between slop and free suspension travel always choose free suspension travel. You can live with a little slop!

### Step 5 – Anti-Roll Bars (ARB)

- If you are using ARB's now is the time to check and make sure they are not tweaked or binding.
- Install the bar in its mount but do not connect it to the suspension arm yet. Make sure the bar is free to rotate and does not have excessive side-side or in-out movement.
- Connect the ARB to the suspension arms. The shocks and wheels are still not on the car. Now lift up the right axle and

watch to see at what point the axle on the opposite side starts to move. Repeat this test by lifting the left side. Your axles should lift at the same point on both sides. If they don't then adjust the link between the bar and the arm until they do.

## Step 5 - Putting it back together

- Install shocks and wheels on car.
- Set the car on a flat surface and measure the ride height at all four corners.
- Adjust the shock collars (or add/remove spacer clips if you don't have threaded shocks) to set the ride height. I use 5mm front, 5.5mm rear. **Do not use the droop screws to set the ride height.** If you cannot get the right height adjusted using the shocks make sure that the droop screws are not bottoming out. If they are back both sides off 1 turn and try again. Repeat if necessary.
- Set your camber to 1.5 to 2 degrees on all four corners using a camber gauge or setup station.
- Turn on your radio and check your steering throw to make sure it's the same in both directions. A setup station is the best way to do this. If you don't have one then it can be set on track. See Step 6
- Set your front toe to between zero and -1 deg. Negative toe (toe-in) will make the car easier to drive. Positive toe (toe-out) will make the car more responsive on turn in but more difficult to drive.
- Lastly set your droop (or uptravel as I prefer to call it). Firstly make sure your droop is set the same side to side. You can do this by balancing the chassis on the edge of a table and pivoting it down until the tires touch the table. The left and right tires must touch at the same time. If they do not then adjust one of the droop screws until they do. Repeat this for the other end of the car.
- The total droop is measured by lightly holding the wheels down on one end of the car and then pushing up on the chassis. Slide a ride height gauge in and measure the clearance. Normally you want around 2mm difference between the normal ride height and the value measured. So if your ride height is set at 5mm and when you push up the car the ride height measures 7mm ( $7-5 = 2\text{mm}$ ) you are in the zone. If the chassis doesn't move up when you push then you have zero droop and your car will be impossible to drive. If an adjustment is needed adjust the left and right

screws by the same amount until you achieve at least 2mm of droop to start.

- Last but not least put your car on a tweak bar and adjust the weight balance. If you have done your job right you shouldn't have to make significant adjustments to the shocks to get the balance right. If you find you have to make major changes to the shock settings then something may have gone wrong.

## **Step 6 – Radio adjustments**

- You can help or hurt your car handling significantly with your radio settings. The most important setting of all is steering.
- Set your steering total throw and dual rate to 100% and steering trim to zero.
- Put your car on the ground and drive straight slowly. Adjust the steering trim on the radio until the car goes straight with no steering input. If your trim point is more than 10% from zero then you should adjust set the zero point with radio sub trims. Read your radio manual to see how to set this.
- Turn the steering full left and return to centre. Drive the car slowly it should still go straight. Repeat for the other direction. If the car wanders left or right then your steering servo is not centering properly. If it is really bad it may be time for a better servo.
- Next you want to make sure that you have an equal amount of steering left and right. For this apply full left steering and run the car slowly in a full circle. Repeat in the right direction. The diameter of the circle in the left and right directions should be the same. If it is not adjust the left/right steering throw until it is.
- Lastly you need to adjust the total steering. This needs to be done on the track. Since we set the steering Throw and Dual rate to 100% it is very likely that you will have too much steering on track. Reduce the dual rate until you have enough steering to negotiate all the turns at speed.

## **Step 7 - Tuning the setup**

- Now you should have good baseline from which you can build the setup of the car.
- Now you can use RC Crew Chief to tune the setup to suit your driving style.
- Some common mistakes:

- When a good setup goes bad for no apparent reason check you tires to make sure they are not coming unglued.
- Spring rates front to rear should be fairly similar. For example if you use really soft front springs and hard rear springs then handling can be erratic.
- Do Not adjust ride height with droop screws.
- Do Not preload your springs.
- Check your diffs, one ways, and drive train to make sure everything is smooth, not slipping or binding.

**Happy Racing!!!!!!**