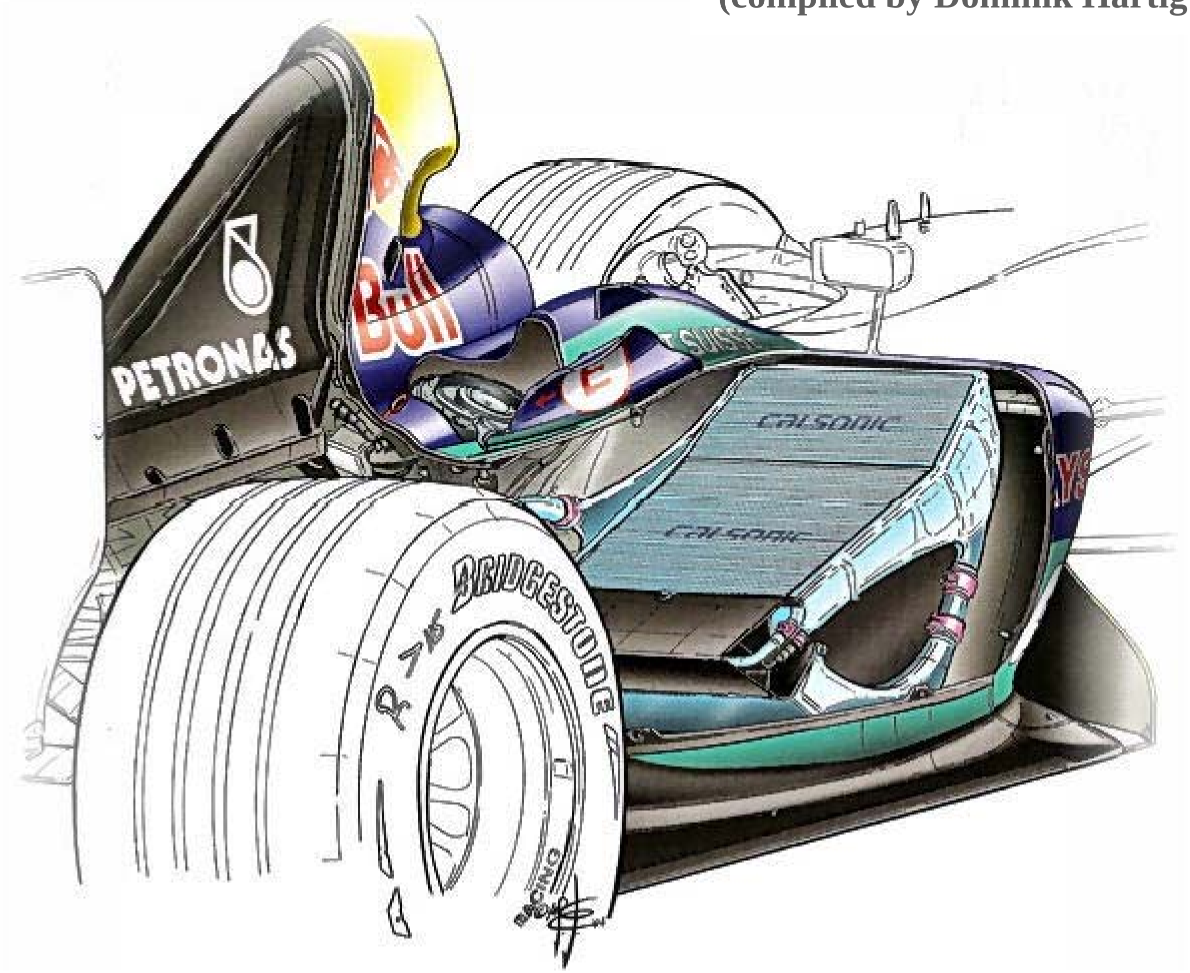
rFactor
Garage Setup Guide

(compiled by Dominik Hartig)



When I came across rFactor the game fascinated me completely, but unlike earlier Racing Sims I have played (Racing Simulation 3, GP3, GP4 and F1 Challenge), the rFactor manual had very little information on the garage settings and their correct use. By searching on the Internet, personal experience, reading posts in related forums and by chatting with fellow race enthusiasts I have been able to put together this manual which should help you understand what the various parameters are and what changes can or should be made in order to achieve desired effects (for Formula 1).

The information I gathered was too much to quote all the authors, so I'm afraid I have not been able to do this. Still, many thanks to all those people who have contributed to this collection of information, especially Carey Barnett ("Setup Matrix"), Robert Pivec ("F1 Setup Guide") and the producers of the "Car Setup + Troubleshooting Guide".

~DOMINIK~

Please bear in mind that the information in this document may be incomplete or erroneous. Should you have any additional knowledge or would like to contribute to the improvement of this guide please mail me at "dh_vetmed@hotmail.com"

GENERAL

1 GEAR RATIO

1.1 1st to 5th Gear

Lengthening the gears will increase potential maximum speed, but decrease the car's acceleration abilities. Shorter gears, on the other hand, decrease maximum speed while creating an increase in acceleration power.
(smaller numbers are called a taller gear ratio, larger numbers depict a shorter one)

1.2 6th + 7th Gears

Additional gears that can be set when longer gear settings are being used. Please remember that not all vehicles have 6th and 7th gears.

1.3 Final

This may be a kind of overdrive gear for extremely long gear settings.

1.4 Reverse

Use a low setting, you need lots of power when trying to get out of gravel after a spin.

2 ENGINE

2.1 Rev Limit

Increasing the rev limit increases the engine's horsepower but also results in higher engine temperature and thus lower reliability. Lowering the Rev Limit reduces the horsepower, creating lower engine temperature and a higher reliability. The longer you're racing (in respect to time and the number of laps), the more the emphasis should be placed on reliability.

2.2 Radiator Setting

This setting adjusts the air flow to the radiator, which helps cool the engine. The larger the opening, the cooler the engine will run, making it safer to run at a higher RPM. A larger radiator opening creates more drag, though, which will reduce top speed.
(see section 2.3 "Boost Mapping" for more information on how to use this setting)

2.3 Boost Mapping

Basically, setting the boost map to 10 gives your engine the most power, but also the most wear. Setting it to 1 gives your engine the least amount of power, but your engine will most likely last the entire race unless you have your radiator too far closed.

The boost map should be set in conjunction with the radiator size:

Radiator:	setting	6	=	best reliability
	setting	1	=	least drag / higher top speed
Boost Map:	setting	10	=	max. horsepower
	setting	1	=	max. reliability

The idea is to set both of them to the 'fastest' settings for whatever distance you plan to cover. For a complete 100% race distance, safe settings are generally regarded to be Radiator 5, Boost 5. Should you be planning to hotlap (for instance in qualifying), go with the most aggressive settings: Radiator 1, Boost 10.
You can change the boost while driving by configuring increment and decrement boost on your keyboard or wheel, which allows you to temporarily increase the boost setting in-game for overtaking.

2.4 Engine Brake Map

Enables – or increases/decreases – the engine braking effect, so that the engine helps the slow the car down ("5" is usually the best setting).

3 AERODYNAMICS

3.1 Front + Rear Downforce

Front and rear downforce parameters determine the setting of the wings and define the downforce (i.e. grip) on the wheels. Always remember that the rear wing should have a higher setting than the front wing, otherwise you risk losing control totally at high(er) speed(s). These are the basic rules when setting the aerodynamics:

Increase Front Setting	Increases oversteer in corners and · increases front grip in corners + front tire wear · decreases straight line speed
Increase Rear Setting	Increases understeer in corners and · increases rear grip in corners + rear tire wear · decreases straight line speed
Increase Front + Rear Setting	· increases grip in corners · decreases straight line speed.
Decrease Front Setting	Increases understeer in corners and · decreases front grip in corners + front tire wear · increases straight line speed
Decrease Rear Setting	Increases oversteer in corners and · decreases rear grip in corners + rear tire wear · increases straight line speed
Decrease Front + Rear Setting	· decreases grip in corners · increases straight line speed

Remember: Cars with high downforce create 'dirty air' behind them – cars following and trying to pass, lose downforce and traction, often having to drop back again.

4 WEIGHT

4.1 Distribution

This is a pretty complex issue in real vehicles, but in the game you can go by this:
- adjusting the weight distribution to the front = increases oversteer
- adjusting the weight distribution to the rear = increases understeer

4.2 Lateral

Certain tracks may have a preponderance of right or left hand corners. Moving the weight to one side can improve performance on those corners and improve tire temperatures. The lap times may still remain about the same, but the car is more controllable in the critical corners and tire temps are lower.

4.3 Wedge

Changing the weight distribution affects the way the car will behave when cornering, as the weight on each wheel determines grip and tire wear. The main figures are inside weight (total % on inside wheels), rear weight (total % on rear wheels) and the crossweight, the *combined percentage* of the outside front wheel and the inner rear wheel. Each click on Wedge is equal to a change of 0.1% crossweight of the car.

5 STEERING

5.1 Steering Lock

What the steering lock does is set a position where the wheel stops turning limiting your radius. This is used for tracks, which are generally straight to help drivers avoid turning the wheel to far and spinning. Some drivers prefer to leave it at the maximum so as to have a good turning rate if accidentally having run wide. If you have a tendency to jerk the wheel around I would still recommend learning to use it correctly rather than changing the lock since the drawbacks offset the benefits.

8 BRAKES

8.1 Brake Bias

This setting allows you to adjust how much force you want to have acting on the rear and front brakes. You usually want to have most of the brake balance near the front since that is where the cars weight is going. The tricky part is avoiding locking-up the front while still having enough stopping power without risking locking the back brakes. A lock-up on the rear results in a spin, so avoid this at all costs.
Moving the Brake Balance to the front increases the effect of understeer when in the process of braking, adjusting it towards the rear will increase oversteer (both changes will probably cause a longer breaking distance). Too much brake balance set to the front wheels causes understeer when jumping off the throttle and/or braking and too much brake balance set to the rear makes the car hard to control under braking (directional stability is lost by having the brake balance shifted too much to the rear wheels. Instead, use the differential lock to increase oversteer, but this time on the coast side. This will force the car to oversteer more in off-throttle situations)

In short: - more Brake Balance toward the Rear → increases understeer
- more Brake Balance toward the Front → increases oversteer

8.2 Brake Duct Size

The brake duct size determines the diameter of the cooling duct of the brakes. Air-flow cools the car’s brakes, especially on straights. A larger duct will ensure cooler brakes (making them last longer) but decrease your possible top-speed on a straight.

8.3 Brake Pressure

Higher brake pressure allows you to brake later as you have more brake power, but as a consequence more temperature will go into your brake discs and there is a higher risk of blowing your brakes.

8.4 Handbrake Press

No information available (this setting is not applicable to Formula 1 cars)

7 DIFFERENTIAL LOCK

7.1 Differential Pump (note: + 50% = oversteer, – 50% = understeer in acceleration)

This is the setting you all are most familiar with, in most other mods it is referred to simply as the Differential Lock.
If you set Differential Pump to 100%, you're closer to a Welded Differential, if you set it to 0%, you're closer to an Open Differential. You'll see in telemetry that setting this to 100% does not mean that your rear wheels are firmly locked together, but it does offer a nice stabilizing force in yaw and generally better traction while accelerating. The downside of a higher setting can be understeer and you may not like how the chassis loses some of its responsiveness.

This setting alone can be used to determine your differential. It may be advisable to use Differential Pump in conjunction with Differential Power and Differential Coast as there are some shortcomings of those two settings. Setting the Differential Pump at 0% will allow the inside tire to lose traction under power, i.e. on corner exits it allows power oversteer. Setting it to 100% will lock the axle, giving a more stable, but also more difficult exit, because of the resulting understeer. In short: the higher the value the more "stable entry + less stable exit" you get and vice-versa.

7.2 Differential Power (note: decrease results in more oversteer under acceleration)

This setting, together with Coast, works somewhat like the ramp angles of a typical clutch plate differential. The simplest way to describe how it works is that if a different amount of torque is being applied to the drive wheels, the differential will transmit a certain percentage of that difference through the axles in attempt to equalize the driving/braking torque on either side of the car.
Cause and effect: Setting the Differential Power to 100% means that (when you are on the gas) the rear wheels lock together. A setting of 0% means that power will follow the path of least resistance and you'll get a one-wheel burnout, much like with an open differential. Anything in between will give you... well, something in between.

7.3 Differential Coast (note: increase results in more oversteer when braking, keep below 40)

This works just like Differential Power, only under braking torques rather than when accelerating. Most effective at controlling how the car behaves during turn-in, as you are usually still braking somewhat while doing that. Higher settings will feel more stable but also cause understeer. Too low settings can allow the car to violently snap away from you during braking.

7.4 Differential Preload (note: a value of 2 – 5 is often the best setting for a race)

Differential Preload is something like a clutch that must be disengaged before wheel-spin can occur. Higher settings mean that a larger difference in wheel torques must be present before any wheel-spin – and thus differential action – happen.

Sometimes only two settings are available:
0 - locking caused by friction of parts, relatively small and wheel-spin will easily begin
1 - spool diff.: No way you can reach the preload value and the rear wheels will be solidly locked together. Can give stability at the cost of understeer and very likely will completely change the driving characteristics of the car.

SUSPENSION

8 SYMMETRY

In most cases, the set-up should stay symmetrical, as non-symmetrical settings can cause vicious side effects that are hard to handle. In long races on tracks that are very one-sided in concern of the turns (like oval tracks) the possibility of using an unsymmetrical set-up may come in handy. I would not suggest using it.

9 ANTI-ROLL BAR (note: front increase can create more oversteer, at rear use 30 or 40)

Anti-Roll Bars prevent the car body from rolling and stiffening the anti-roll bars will restrict car movement in the lateral direction. There will be less grip in corners but rock-solid handling. Softening the anti-roll bars will result in more traction in the corners, but your car will be swinging from side to side more.

The general rule is:
Stiffer anti-roll bars (a higher value) reduce oversteer tendency but also increase tire wear.

10 TIRE PRESSURE (note: on straights 100°, in and out of turns not more than 110°)

Each tire has an optimal pressure at which it provides the best grip. Decreasing or increasing the pressure from this point lessens the grip. Tire pressure is at its optimum when the centre tire temp is the average of the inner + outer tire temps once the tire gets up to operating temperature.
Additionally, the higher the pressure, the stiffer the car will be as the tire will act like a spring. This affects car control and handling as well as tire wear.

11 SPRING RATE

The harder you set the springs the quicker the car will respond to driver input. The downside is that stiffer springs will also reduce traction, whereas a softer setting will produce higher traction but a more sluggish handling response.
The more bumpy the track is and the more you need to go over curbs in tight chicanes, the softer your spring rate settings should be. Also bear in mind that a softer setting will increase the risk of bottoming out in corners and high speed straights (because the downforce will push the car’s belly onto the track.
(see section 15 “Packers” for counter-active measures)

12 BUMP + REBOUND (note: a good setting is often between 0 and 10)

12.1 Slow Bump

Slow Bump controls the *mild upward movement* of this suspension corner caused by driver input like steering, braking, throttle and is called slow because the damper is moving up (compressing) in a slow motion.
It is used to affect chassis balance while we are transitioning into and out of the corners. Decreasing this number will speed up how quickly this corner accepts weight transfer while we are transitioning. Increasing will slow it down.

12.2 Slow Rebound

This controls the *mild downward movement* of this suspension corner caused by driver input. Like the Slow Bump it is called slow because the damper is moving down (extending) in a slow motion and is used to affect chassis balance while going into and out of corners and turns.
Decreasing the Slow Rebound will speed up how quickly this corner gives up weight transfer while transitioning. Increasing the setting will slow it down.

12.3 Fast Bump

Controls the *rapid upward movement* of this suspension corner following bumps and curbs. It is referred to as fast because the damper is moving up (compressing) in a rapid motion. This adjustment controls how a tire conforms to the road as it negotiates the leading edge-to-peak of a bump or road undulation.
If you find the car is pushing to the outside of the track in a skating fashion over bumps, then soften (= lower) this setting. If you feel the car floating and changing direction erratically, then stiffen (= increase) this setting. When in doubt, it is usually wiser to go for a softer setting.

12.4 Fast Rebound

The Fast Rebound controls the *rapid downward movement* of this suspension corner following bumps and curbs. Like the Fast Bump, this adjustment controls how a tire conforms to the road as it's negotiating the peak-to-trailing edge of a bump or road undulation.
Note: If you have changed the bump setting, it is usually a good idea to change the corresponding rebound in a similar manner.

13 RIDE HEIGHT + PACKERS

13.1 Ride Height

The Ride Height determines how high the chassis runs above the ground. The rear always needs to be higher than the front, otherwise you will lose nearly all traction. The air passing underneath the car is speeded up due to the increased space at the rear and literally sucks the car to the ground causing traction.
The thing to look out for is bottoming out. This effect occurs if the ride height is set too low and the car's underside comes in contact with the track surface. This needs to be avoided as it slows the car down, can cause damage and in real life can result in disqualification if happening too much.
(remember that spring settings and packers also affect ride height and bottoming out)

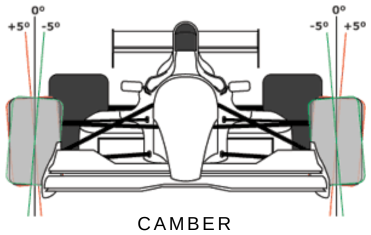
13.2 Packers

Packers are extra spacers inserted to adjust how soon the bump stops come into play so as to limit downward travel of the chassis. The more packers are used, the sooner and more effective the bump stops will be at limiting travel. More packers can cause chassis instability over bumps and heavy vertical G-force corners, though.
On tracks which are flat you can use more packers, but on bumpy tracks or tracks with varied elevation you don't want them too high or they will restrict the suspension and grip in corners will be reduced. Some drivers even go so far as to use packers only as a last resort to avoid chassis scraping.

14 CAMBER

(note: tire inside too hot → more toward positive)

This is the degree to which the tires are tilted. Minus figures (negative camber) have the tires leaning in towards the car; plus figures (positive camber) will have the tires leaning out away from the car. The proper settings are negative, the idea being that as the car leans going into a corner, the outside tire will approach being perpendicular to the track.
There are some downsides to this: In acceleration and braking, the closer the camber is to 0º, the better the grip will be. Also, large amounts of camber will drastically overheat the edges of the tires as well as impeding accelerating and braking.



CAMBER

ADVANCED

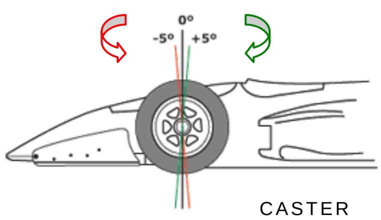
15 FENDER FLARE

No information available (this setting is not applicable to Formula 1 cars).

16 CASTER

(note: increase improves turn-in ability but more oversteer in fast turns)

This setting adjusts the degree the tires lean forward or back at the top of the wheel and increases or decreases directional stability. More positive caster provides more directional stability, yet too much positive caster will make steering more difficult. Negative caster requires less steering effort but can cause the car to wander when going down straights.
Increasing the caster will decrease your turning radius and reduce understeer in general but can cause over-steering in fast turns. A decrease of caster increases general understeer effect but also produces better stability in high speed corners.



CASTER

17 BRAKE DISC

Choosing a slimmer brake disc will improve brake performance which is good. The downside of slim (or small) brake discs is that they don't last as long as thicker ones.

18 TORQUE SPLIT

As far as I could determine, this is applicable to 4-wheel-drive vehicles only.

19 TRACK BAR

No information available (this setting is not applicable to Formula 1 cars)

20 FRONT THIRD SPRING

No information available (this setting is not applicable to Formula 1 cars)

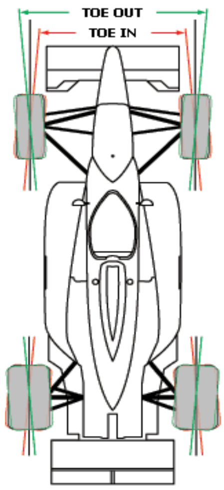
21 TOE IN

21.1 Front Toe In

(note: between – 1 and + 1 is often best)

Toe In or just 'toe' determines if and how much the front of the car's wheels are pointing in- or outward. Negative values are toed in, i.e. the wheels point toward each other, positive values resemble toe out (away from each other). As a general rule, front toe-in yields better turn-ins. Too much toe in any direction will slow the car down due to drag effect. This overview should help:

Increase front (positive value)	improves turn-in ability increases front tire wear decreases straight line speed
Increase rear (positive value)	improves stability increases rear tire wear decreases straight line speed
Decrease front (negative)	decreases turn-in increases front tire wear decreases straight line speed
Decrease rear (negative)	decreases stability increases rear tire wear decreases straight line speed



21.2 Rear Toe In

(note: 0 – 30 is usually quite good)

See section 21.1 "Front Toe In" for information on Rear Toe In settings.

22 COMMENTS

When defining your setup always remember the track layout, possible hairpin turns or chicanes, the planned race distance and your primary aim (a few quick laps in qualifying or a steady and reliable car for a race). This should help you determine how much risk you will want to put into your setup.

For a qualifying session with hardly more than a few laps being run at a time you can be more daring as you can return to the pits more often. Once you're setting your car up for a race, give some thought to reliability and the fact that your setup should be a bit more forgiving in case you miss a braking point here or there or have to leave the ideal line for overtaking. Also, a race usually means more fuel and a heavier car so take this into consideration, too.