

# Skip Barber Formula 2000

## Introduction To Set-up And Tuning



***iRacing.com***  
MOTORSPORT SIMULATIONS

## Welcome!

---

This manual is intended to give you a way to become familiar and comfortable with the set-up and tuning options for the Skip Barber Formula 2000.

At the “Rookie” level in iRacing, there are few set-up options. As a result, the Skip Barber Formula 2000 (“Skippy”) may be your first experience at car set-up and tuning. This can be frustrating for some people if they are not familiar with the different set-up or tuning options or the likely results of making certain changes or if the set-up options are not approached in a methodical way.

The fact that new drivers tend to ask the same questions on the iRacing forum was a key indication that a manual such as this could fill a real need.

Since the Skippy has just six basic vehicle tuning variables, it is an excellent way to begin learning about how set-up changes will affect the drivability of a road racing car. Once you understand how to approach these six variables, you will be better prepared to focus on your driving and better prepared to deal with set-up options on other cars as well. This knowledge and experience will serve you well as you continue up the Division ladder in the Skip Barber Race Series (SBRS) or as you drive other cars.

Many of the best drivers in iRacing have raced in the SBRS and many of them continue to race in the series due its level of competition and sense of camaraderie. If you ever want to learn more about the Skippy, just ask on the iRacing Forum and many well-informed people will be able to help you.

**This Manual is maintained by SBRS drivers for the benefit of all iRacers.**

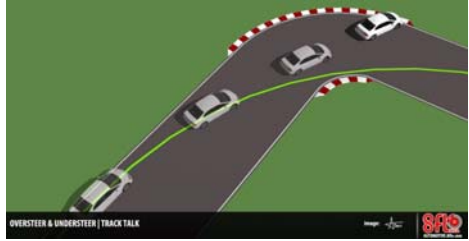
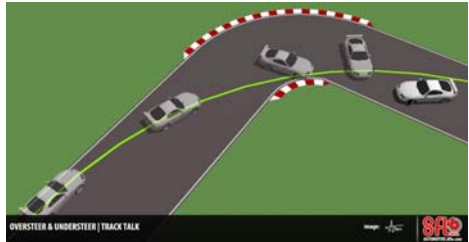


Graphics from [http://upload.wikimedia.org/wikipedia/commons/6/65/Welcome\\_differentlangs.png](http://upload.wikimedia.org/wikipedia/commons/6/65/Welcome_differentlangs.png)

## Background

Car set-up and tuning has a language all its own.

While you may already be familiar with the terminology, a key concept to understand is how to describe car behavior when cornering. Understanding and being able to communicate this will allow you to more easily diagnose and solve issues which may arise.

<b>Understeer</b>	A car is said to “understeer” when the front end of the car does not react as much as the driver input would indicate it should. This is also called “push” or “tight”. This can be caused by how the vehicle was set up or can be caused by driver inputs.	
<b>Neutral</b>	A neutral car is one that does not exhibit understeer or oversteer.	
<b>Oversteer</b>	A car is said to “oversteer” when the rear of the car reacts more than the driver input would seem to indicate it should. This is also called “loose”. This can be caused by how the vehicle was set up or can be caused by driver inputs.	

Graphics from <http://automotive.8flo.com/2010/06/17/oversteer-and-understeer/>

## Important Things

There are a couple of things you should think about.

First, if you are serious about Skippy racing (including time trials), there is no more important thing for you to remember than practice, practice, practice, and practice some more. It is not clear that “practice makes perfect” but practice certainly will make you better. Whether you are off on a track by yourself, in an official practice session (with other cars on the track) or participating as a “ghost racer” in a Spectator session, being out on the track will help you lower your lap times and be more comfortable with set-up choices you have made.

Second, you should think about getting a notebook or file folder or computer folder or some other way to keep track of the setup choices and other things you will learn along the way. You can save set-up choices in the iRacing garage but it can also be just as easy to write down the six settings so you can see how they can change for different tracks and change over time as your driving style progresses.

Third, don’t overlook the value of the Centripetal Circuit for getting a handle on car behavior in response to set-up changes. Knowing how “stable” a set-up is and what happens when it reaches its limits will serve you well on the race course.

Last, have fun! Races can be intense and the emotions can run high. Remember that this is recreation and an opportunity to have some fun with other like-minded people.

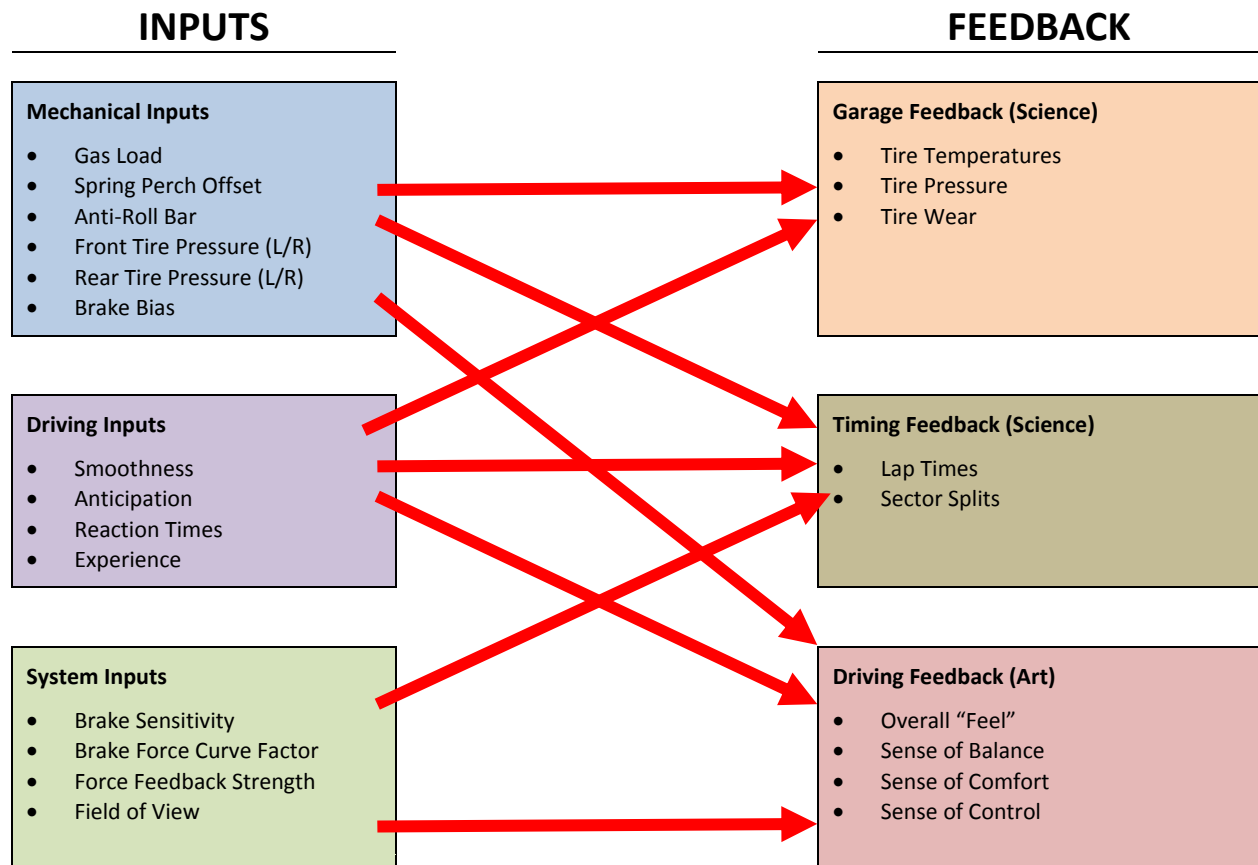
## Set-up And Tuning Philosophy

As part of set-up and tuning, it is important to realize there are only a few ways that your car can communicate with you.

Some ways are immediately apparent (such as squealing tires, sliding, or spinning). Others require the use of measuring instruments (such as tire thermometers or timing devices). Others are much more subjective and involve your level of comfort as a driver and how the car “feels” in relation to your skill level and driving inputs.

The key elements of tuning a Skippy are all based on understanding the feedback you get as changes are made. Some feedback (tires and lap times) are scientific in nature and can be measured and recorded. Often, these provide a framework of information to work from and learning to understand the data feedback is an important part of tuning. Others (such as “feel”) are more artistic in nature but are no less important in their contributions to lower lap times and higher finishing positions.

The overall philosophy of this manual is to help you approach the basic setup in a rational and logical manner so that you can get the best feedback and find comfort and speed quickly. Each driver can focus in on issues that are important to them and then advance at their own pace.



## Set-Up Options

The basic set-up screen of the Skippy is shown below. The location of each setting is highlighted. The arrow buttons are used to adjust the settings.

The screenshot shows the 'GARAGE' interface for vehicle setup. The title bar is red with 'GARAGE' in white. Below it, 'Identical To: 101023' is displayed. The main area is divided into sections for 'FRONT:', 'LEFT FRONT:', 'RIGHT FRONT:', 'LEFT REAR:', 'RIGHT REAR:', and 'REAR:'. Each section contains various suspension and tire settings. Red arrows from labels on the left point to specific settings: 'Front Brake Bias' points to 'Front brake bias: 56%'; 'Cold Tire Pressure (Front)' points to 'Cold pressure: 23.0 psi' in the 'LEFT FRONT:' section; 'Spring Perch Offset' points to 'Spring perch offset: -6 x 1/16 in.' in the 'LEFT FRONT:' section; 'Cold Tire Pressure (Rear)' points to 'Cold pressure: 24.0 psi' in the 'LEFT REAR:' section; 'Fuel Fill' points to 'Fuel Fill To: 4.5 gal' in the 'REAR:' section; and 'Rear Anti-Roll Bar' points to 'Rear anti-roll bar: 4 (1=soft 8=stiff)'. On the right side, there is a vertical menu with buttons: 'iRacing Setups', 'Shared Setups', 'My Setups', 'Save As', 'Share', 'Export', and 'Delete'. At the bottom right, there are three buttons: 'Cancel', 'Apply', and 'Done'. The bottom of the screen has a red bar with 'SUSPENSION' and a small upward arrow.

**FRONT:**  
Front brake bias: 56%

**LEFT FRONT:**  
Cold pressure: 23.0 psi  
Last hot pressure: 23.9 psi  
Last temps O M I: 104F 104F 104F  
Tread remaining: 100%  
Spring perch offset: -6 x 1/16 in.  
Ride height: 3.32 in  
Corner weight: 300 lbs  
Camber: -1.9 deg  
Caster: +5.3 deg

**RIGHT FRONT:**  
Cold pressure: 23.0 psi  
Last hot pressure: 23.9 psi  
Last temps I M O: 104F 104F 104F  
Tread remaining: 100%  
Spring perch offset: -6 x 1/16 in.  
Ride height: 3.32 in  
Corner weight: 300 lbs  
Camber: -1.9 deg  
Caster: +5.3 deg

**LEFT REAR:**  
Cold pressure: 24.0 psi  
Last hot pressure: 24.9 psi  
Last temps O M I: 104F 104F 104F  
Tread remaining: 100%  
Ride height: 2.85 in  
Corner weight: 440 lbs  
Camber: -2.7 deg

**RIGHT REAR:**  
Cold pressure: 24.0 psi  
Last hot pressure: 24.9 psi  
Last temps I M O: 104F 104F 104F  
Tread remaining: 100%  
Ride height: 2.85 in  
Corner weight: 440 lbs  
Camber: -2.7 deg

**REAR:**  
Fuel Fill To: 4.5 gal  
Rear anti-roll bar: 4 (1=soft 8=stiff)

**Buttons:** iRacing Setups, Shared Setups, My Setups, Save As, Share, Export, Delete, Cancel, Apply, Done

**SUSPENSION**

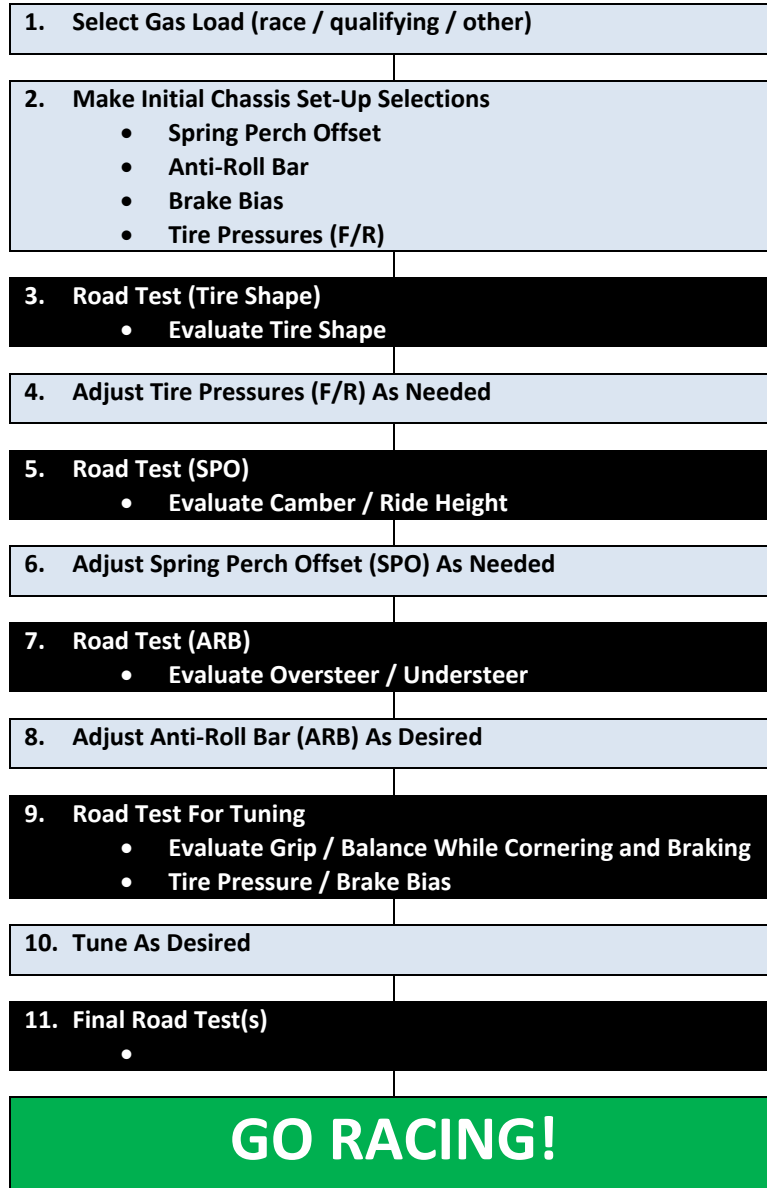
You can either:

- Use the default iRacing setup (may be found in "iRacing Setups"),
- A setup which was shared by someone else (if you saved it in "Shared Setups"), or
- A setup developed by you based on your driving style (if you saved it in "My Setups").

## An 11-Step Program

---

The following flow chart and the form on the facing page illustrate a program which may help you set up the Skippy to reflect the track and your driving style and go racing!



The set-up form on the facing page is a way for you to start thinking about how set-up changes affect some of the garage feedback (science), timing feedback (science), and driving feedback (art).

For those who want to keep a digital record, a blank spreadsheet is available as a “Google document” at:  
[https://spreadsheets.google.com/ccc?key=0Ar59ydfVUf9cdHBaX1R6QXVfD1A0QWRDQ3Y1cGcwZ2c&hl=en&authkey=CIWN7\\_IO#gid=0](https://spreadsheets.google.com/ccc?key=0Ar59ydfVUf9cdHBaX1R6QXVfD1A0QWRDQ3Y1cGcwZ2c&hl=en&authkey=CIWN7_IO#gid=0)

A sample of one driver’s experiences and setting changes can be viewed here:  
<https://spreadsheets.google.com/ccc?key=0Ar59ydfVUf9cdE1kWGw3LTk3SEt1QWhBX1RSUHFBZkE&hl=en&authkey=COCm7a4M#gid=0>

# Skippy Set-up Worksheet

Track

Fuel Load

1.7 – 5.2 Gallons  
Verify with  
F4 Button

Date

For good data, need 3-5 laps, 5-8 miles, 30-40 corners, 4-6 minutes

## Step 1.1 – Initial Tire Pressure

Front		Rear	
17.1 – 40.4 psi		17.1 – 40.4 psi	

## Step 1.2 – Initial Chassis Set-up

Ride Height / Front Stiffness / Camber (Spring Perch Offset)	
-9 = (high / soft)    0 = neutral rake    +10 = (low / stiff)	

Rear Stiffness (Anti-Roll Bar)	
1 = (soft)    8 (stiff)	

## Step 1.3 – Initial Brake Settings

Brake Bias		Pedal Sensitivity	
45% - 65%		0.00 – 5.00	

## Data

Number of Laps		Fastest Lap	
----------------	--	-------------	--

O	M	I	I	M	O
LF		RF			
LR		RR			
O	M	I	I	M	O

Pressures

LF		RF	
LR		RR	

## Feedback

## Step 1.1 – Revised Tire Pressure

Front		Rear	
17.1 – 40.4 psi		17.1 – 40.4 psi	

## Step 1.2 – Revised Chassis Set-up

Ride Height / Front Stiffness / Camber (Spring Perch Offset)	
-9 = (high / soft)    0 = neutral rake    +10 = (low / stiff)	

Rear Stiffness (Anti-Roll Bar)	
1 = (soft)    8 (stiff)	

## Step 1.3 – Revised Brake Settings

Brake Bias		Pedal Sensitivity	
45% - 65%		0.00 – 5.00	

## Data

Number of Laps		Fastest Lap	
----------------	--	-------------	--

O	M	I	I	M	O
LF		RF			
LR		RR			
O	M	I	I	M	O

Pressures

LF		RF	
LR		RR	

## Feedback

## Step 1.1 – Refined Tire Pressure

Front		Rear	
17.1 – 40.4 psi		17.1 – 40.4 psi	

## Step 1.2 – Refined Chassis Set-up

Ride Height / Front Stiffness / Camber (Spring Perch Offset)	
-9 = (high / soft)    0 = neutral rake    +10 = (low / stiff)	

Rear Stiffness (Anti-Roll Bar)	
1 = (soft)    8 (stiff)	

## Step 1.3 – Refined Brake Settings

Brake Bias		Pedal Sensitivity	
45% - 65%		0.00 – 5.00	

## Data

Number of Laps		Fastest Lap	
----------------	--	-------------	--

O	M	I	I	M	O
LF		RF			
LR		RR			
O	M	I	I	M	O

Pressures

LF		RF	
LR		RR	

## Feedback

## Step 1.1 – Final Tire Pressure

Front		Rear	
17.1 – 40.4 psi		17.1 – 40.4 psi	

## Step 1.2 – Final Chassis Set-up

Ride Height / Front Stiffness / Camber (Spring Perch Offset)	
-9 = (high / soft)    0 = neutral rake    +10 = (low / stiff)	

Rear Stiffness (Anti-Roll Bar)	
1 = (soft)    8 (stiff)	

## Step 1.3 – Final Brake Settings

Brake Bias		Pedal Sensitivity	
45% - 65%		0.00 – 5.00	

## Data

Number of Laps		Fastest Lap	
----------------	--	-------------	--

O	M	I	I	M	O
LF		RF			
LR		RR			
O	M	I	I	M	O

Pressures

LF		RF	
LR		RR	

## Feedback



## Step 1 = Select Gas Load

The easiest set-up choice to make is gas load. The set-up options allow you to pick one of six settings. The default setting is a full tank of 5.2 gallons or 19.7 liters.

### Qualifying / Time Trial

If you are qualifying or doing a time trial, you could pick the lowest setting (1.7 gallons or 6.4 liters) and go. However, it is advisable to take 2.4 gallons (9.1 liters) if you plan on a full qualifying session and 3.1 gallons (11.7 liters) for a full time trial session.

### Race

If you are going to race (or do some practice laps in race trim), you need to know how much gas to take. You want to have enough to finish the race but not carry around more than you need to. Since each additional increment of gas adds about four pounds (1.8 kilograms) of weight to the vehicle, it may not seem like a lot of weight but it can make a difference.

The amount of gas you need is a function of the race distance, the type of track and your driving style. Since the fuel load is re-set at the start of a race, the number of warm-up laps is not a factor in the gas load decision.

While you need to become familiar with how your driving style affects gas usage at each track, you can use the following [as a general guide](#). Note that the F4 button will give you an estimated number of laps at the track based on the selected fuel load. Be sure to check these for yourself!

Gas Load			General Guide	Races
1.7 Gallons	6.4 liters		Never Enough	<ul style="list-style-type: none"> <li>None</li> </ul>
2.4 Gallons	9.1 liters		May Be Enough	<ul style="list-style-type: none"> <li>Laguna Seca (16 laps)</li> <li>Zandvoort National (18 laps)</li> </ul>
3.1 Gallons	11.7 liters		Usually Enough	<ul style="list-style-type: none"> <li>Summit Point Raceway (20 laps)</li> <li>Mid-Ohio Full (20 laps)</li> <li>Road Atlanta Short (23 laps)</li> <li>Silverstone International (18 laps)</li> <li>Watkins Glen Classic Boot (14 laps)</li> <li>Lime Rock Park Full (25 laps)</li> <li>Road Atlanta Full (18 laps)</li> </ul>
3.8 Gallons	14.4 liters		Always Enough	<ul style="list-style-type: none"> <li>Spa Francorchamps (13 laps)</li> <li>Zandvoort GP (15 laps)</li> <li>Road America (12 laps)</li> </ul>
4.5 Gallons	17.1 liters		Too Much	<ul style="list-style-type: none"> <li>None</li> </ul>
5.2 Gallons	19.7 liters		Too Much	<ul style="list-style-type: none"> <li>None</li> </ul>

**Set initial gas load to 3.1 gallons (11.7 liters). *Adjust later as needed.***



## Step 2 = Make Initial Chassis Set-Up Selections

Chassis set-up is the next part of tuning the Skippy. By chassis set-up, we are referring to:

- Spring perch offset (SPO), and
- Anti-roll bar (ARB).

### Spring Perch Offset (SPO)

Spring perch offset is the basic chassis setting for the front end of the Skippy. A spring perch is a collar on the shock/spring assembly which seats the bottom of the spring. The spring perch offset is the distance from the spring perch to a known reference point. On the Skippy, when the SPO is set to zero, the ride heights at the front and rear are the same and the car has no “rake”.

A negative SPO value means that the spring/shock assembly is extended and this has the effect of raising the ride height at the front of the car. A positive SPO value means that the spring/shock assembly is compressed and this lowers the ride height at the front of the car.

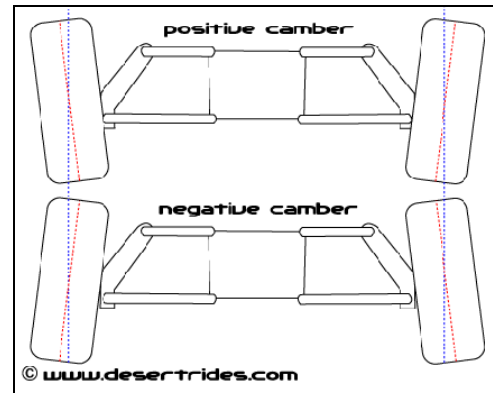
At the default SPO setting of -9, the shock/spring assembly is extended to its limit and the front ride height of the car is as high as it can be.



In addition to front ride height and rake, the SPO acts as a camber adjustment for the front wheels. Camber is an important set-up concept because it is used to help maximize the contact patch of the tire during cornering.

Camber refers to the inward or outward tilt of the top of the wheel relative to the ground. Positive camber means that the top of the wheels are tilted outward relative to vertical. Negative camber means the top of the wheels are tilted inward relative to vertical.

For road courses, some negative camber is typically used. This causes the outside tire wall to “straighten up” when cornering and this keeps the “contact patch” of the tire on the ground. In other words, lateral loads when cornering actually push the contact patch onto the pavement surface. If an outside tire had zero camber or positive camber, you can imagine how cornering loads might actually pull the contact patch off the ground.



You may have noted that the rear of the Skippy has built-in camber of -2.7 degrees. The front camber and rear camber of the Skippy are the same (-2.7 degrees) when the SPO is set to +2. How much camber is desirable depends on the track, the types of corners, the surface “grippiness”, cornering speeds, and your driving style.

The SPO setting also affects caster (the backward tilt of the steering pivot points). Increasing the SPO will drop the nose of the car and this will have the effect of making the steering pivot points more upright (reducing the amount of caster). In general, less caster means less steering feel and less willingness to turn and this may result in a slight “understeer” condition.

Overall then, increasing the SPO will result in a lower front ride height, a lower front center of gravity, more positive rake, more negative camber, and better aerodynamics. While it has not been shown to have a significant effect on top speed or acceleration in iRacing, a higher SPO than the default setting of -9 may have some benefits.

Having said that, a lower ride height which is too low will result in the car “bottoming out” under certain conditions – this sounds like static on your headset or speakers – and this can have negative handling effects, especially if it occurs in a braking zone or on corner entry.

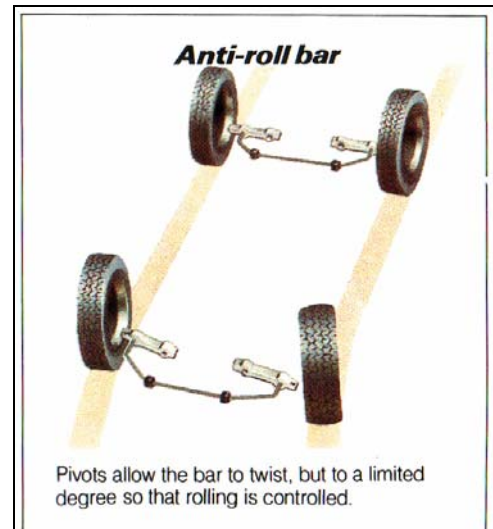
Also keep in mind that more camber will reduce the contact patch of the tires in a straight line and this may result in the need to brake differently or change brake settings. More about this later.

### **Anti-Roll Bar (ARB)**

An anti-roll bar is a device used to stiffen a chassis laterally so that a car does not lean (or roll) as much when cornering. The rear ARB is adjustable on the Skippy.

A higher value means that the rear ARB is stiffer and is more resistant to body roll. It also means that both rear wheels will respond similarly (whether good or bad) to inputs or forces. With other things being equal, a stiffer rear ARB will add oversteer tendency to the back end of the car or remove understeer tendency from the front end of the car. While some drivers prefer this, others find this behavior to be “edgy” and less forgiving.

A lower value means that the ARB is softer and is less resistant to body roll. With a soft ARB, each rear wheel acts more independently from the other in terms of response to inputs or forces. A softer rear ARB can be more forgiving of sudden inputs or changes.



By changing the dynamics of the rear of the car relative to the front, the ARB can be used to adjust the behavior of the car when cornering.

### **SPO/ARB Synthesis**

The Skippy comes with some “default” settings (SPO = -9 and ARB = 1).

The graphic on the facing page shows that there are 160 possible combinations of spring perch offset (20 possible settings) and anti-roll bar (8 possible settings). The default setting in the upper left corner (SPO = -9 / ARB = 1) is the most forgiving setting (good for new Skippy drivers). The lower right corner (SPO = +10 / ARB = 8) is the least forgiving setting (more difficult for new drivers). It is up to each driver to find the setting that works best for them.

The annotations on the table are intended to help you understand the general effect of some changes you may want to consider as you gain experience with the Skippy at each track.

**One of the first things new Skippy racers will need to come to terms with is that there is no magic chassis setup. Each driver has different preferences, different experience and different levels of comfort. Experience and experimentation will lead you to a solution which works best for you.**

**To drive this point home, you may find it interesting to know that some of the best Skippy racers have shown they can get close to the record times at tracks with the default set-up. They do not race with those settings but they could. You need to find a set-up that works for you in terms of comfort, stability, and speed.**

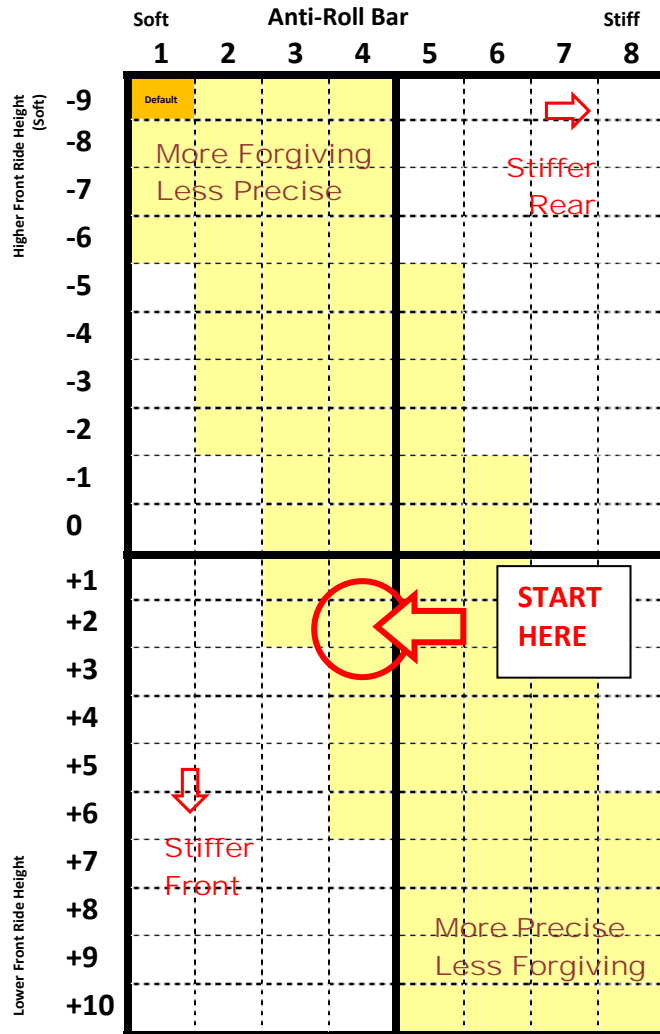
## Skippy - Chassis Set-up Matrix

### Lower SPO:

- Higher front ride height / more negative rake
- Less negative camber on front wheels
- May feel "floaty"
- More weight transfer / body roll under braking / acceleration / cornering
- May have less front grip and more potential for understeer

### Lower ARB:

- More body roll at rear in corners
- More forgiving of sudden inputs or changes
- Easier to keep "on the edge"
- Less tendency to oversteer
- More tolerant of riding curbs



### Higher ARB:

- Less body roll at rear in corners
- Less forgiving of sudden inputs or changes
- May require quicker responses
- More tendency to oversteer
- Less tolerant of riding curbs

### Higher SPO may:

- Lower front ride height / more positive rake
- More negative camber on front wheels
- Steering may feel more precise
- Less weight transfer / body roll under braking / acceleration / cornering
- May have more front grip and more potential for oversteer

### **Brake Bias (BB)**

Brake bias is set-up option which determines how much of the braking effort will be directed to the front or rear wheels. A setting of 50% means that the front and rear wheels are being given the same amount of braking input. A setting of 60% would mean that the front wheels are being given 60% of the braking input. The default setting in iRacing is 59%.

Straight-line braking efficiency can be maximized by distributing the braking forces so that all four tires are generating their maximum deceleration simultaneously. Since a car's weight is thrown to the front tires under braking, it is common to have some front brake bias.

It is typically preferable to avoid a rear brake bias since this may result in locking up the rear brakes (with less load on the rear tires under braking) it is almost certain to result in a spin. On the other hand, if the front brakes lock up first, you tend to slide forward in a straight line (which can often be saved) but not spin.

How much brake bias is used is specific to your driving style. The goal is to find a setting that shares the braking load among the four wheels as efficiently and effectively as possible, suits your driving style and feels comfortable.

### **Tire Pressure (F/R)**

The Skippy set-up menu allows you to select cold tire pressures for each of the four tires on the vehicle. For initial set-up purposes, it is typical to have the same setting within each pair of tires at the front and rear of the car. Since tire pressures are one of the key tuning elements of the Skippy, you should select a basic cold pressure setting and then adjust it as you apply your driving style to the specific conditions at each track.

### **Initial Settings**

OK, let's select some settings to try out.

<b>Set <u>initial</u> spring perch offset to +2.</b>	This will give you the same camber settings at both ends of the car.
<b>Set <u>initial</u> rear anti-roll bar to 4.</b>	This is a mid-point setting for evaluation and should be a fairly neutral setting for initial evaluation.
<b>Set <u>initial</u> brake bias to 56%.</b>	This should result in a stable braking experience to help evaluate the car.
<b>Set <u>initial</u> tire pressures to 24 psi (165 kPa).</b>	This should help you generate a feeling for the handling of the car and evaluate tire performance.

All of these will be changed later once you have had a chance to try the car on the track. The only way to evaluate settings is to take them on the track and try them out.

## Step 3 = Initial Road Test For Tire Shape

---

Since the goal in this first session is to evaluate overall tire shape, **do not** try to set fastest lap right out of the box! The main objective should be to collect as much useful data as possible so that you are making measured changes and making progress in your set-up and tuning program.

Experience has shown it takes a while to get the tires up to operating temperature so you should use the following as a guide:

- 6 – 10 miles
- 6 – 10 minutes
- 3 – 5 laps
- 30 – 40 corners

The key is **do not spin** if you can help it. Be patient. The car may feel tentative compared to other cars you have driven but hang in there. Once you know how it is behaving, you can start to make choices to get the car matched with your driving style. You should be pushing the car towards its limits but should not be on the edge.

After you have gotten these laps under your belt, come to a gradual stop (do not skid to a stop since this will adversely affect the reading of your tire temperatures) and return to the garage.



Graphics from <http://members.iracing.com/membersite/member/CarDetail.do?carid=1>

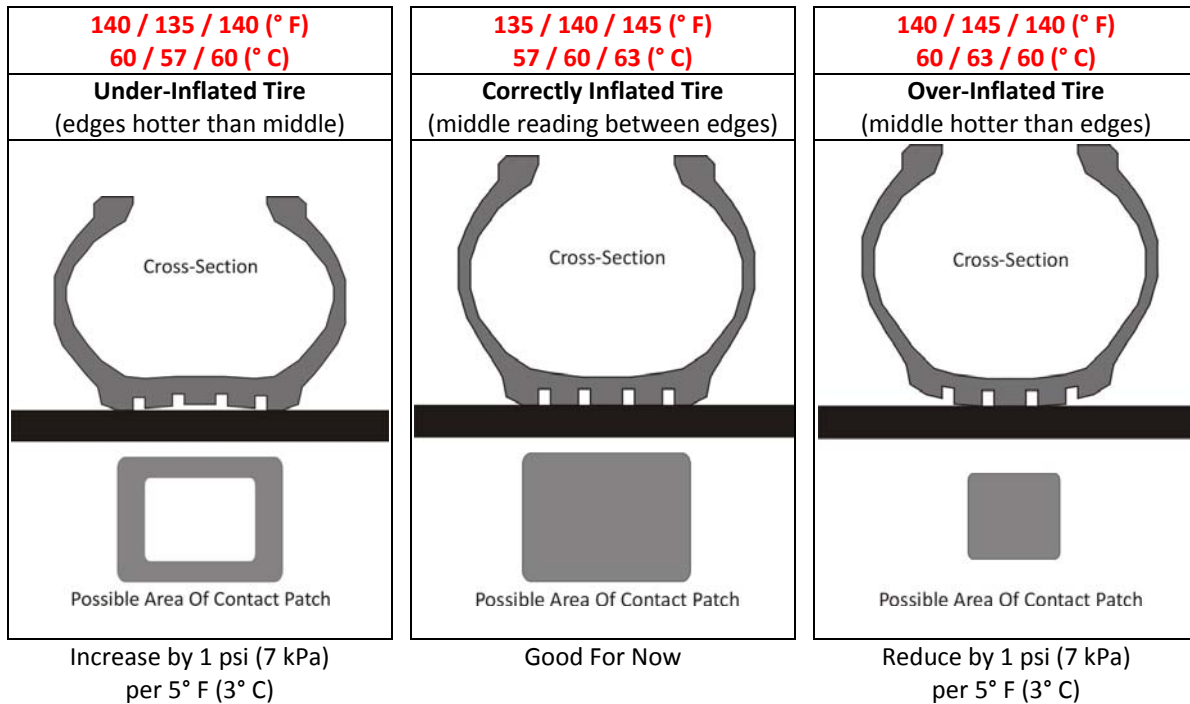
## Step 4 = Adjust Tire Pressures (F/R) As Needed

Tire temperatures and pressures are the main way that the car communicates with you as the driver.

You will get maximum grip and performance by having tires which are:

- not over-inflated (reducing the size of the contact patch and running colder than desired), or
- not under-inflated (changing the tire handling and running hotter than may be desired).

You get this information by looking at the tire temperature distribution on each tire. The diagrams below are examples of possible temperature readings for the left front tire (Outer / Middle / Inner).



## Step 5 = Second Road Test(s) for SPO

Now that the tire shape is within an appropriate range for the track and your driving style, the next setting to evaluate is ride height and camber at the front end of the car. Again, the way to evaluate settings is to take them on the track and try them out.

Try 5 or more laps with the SPO setting and then return to the garage for an evaluation. During the road test, pay particular attention to the behavior and feeling of the front end of the car when cornering.

## Step 6 = Adjust SPO (as needed)

---

There are two parts to evaluating ride height and camber adjustments with the spring perch offset:

- Tire temperature distribution, and
- Feel.

Your front tires steer you around the course and you want them to be operating as effectively as possible. The peak temperature range for actual BF Goodrich radial tires like those on the Skippy is 160 – 230° F (70 – 110° C). It can be hard to get to these temperatures in the Skippy. Most people cannot drive the car that hard.

What is possible though is to get as much of the tire surface working for you as possible. Looking at the tire temperature distribution on each tire, you should shoot for a temperature distribution with all temperatures within about 10° F (6° C) of each other and with the middle reading closer to the inside reading. If the middle temperature reading is closer to the outside temperature, you may have too much camber (and/or tire pressure) because the inside part of the tire is doing most of the work and the tire contact patch may not be flexing onto the track surface with lateral loads.

Balance this information with how the car “feels” to you. For some people, a higher SPO setting (lower ride height and more camber) is preferred because it seems more precise to them and less “floaty.” However, even for these people, the ride height should generally not be set so low that the car bottoms under braking or with elevation changes on the track. Other people feel that a lower SPO setting (higher ride height and less camber) is advantageous since it feels more forgiving when cornering or braking.

What is important is how the car feels to you.

On the test drive, how did the front end of the car feel? If the car seems to understeer on corner entry (it did not want to turn into the corner the way you wanted it to), try increasing the SPO. If you did not have enough camber in your tires, this will increase the negative camber which should have the effect of increasing the contact patch of the tire when subject to turning loads. This should result in more front grip and less understeer.

On the other hand, if you had too much camber to begin with, this may increase the understeer effect and you will want to reduce the SPO to maximize the contact patch. Another clue that you may have had too much camber to begin with is that the car feels “twitchy” under braking or locks up easily due to the reduced contact patch. Watch your tire temperatures and rely on the feel of the car to figure out what works best for you.

Try changing the SPO setting by 4 clicks or more so that it makes enough of a difference that you can feel it. If you feel you may have gone too far, back off a few clicks and see how that feels.

Remember, the goal is to find settings that make you comfortable driving the car given your driving style and experience. Once you are comfortable, speed will follow.

## Step 7 = Third Road Test(s) for ARB

---

A stable and balanced race car might also need to have some adjustments to the rear anti-roll bar. Head out on the track again and pay particular attention to the behavior of the rear of the car.

Try 5 or more laps with the ARB setting and then return to the garage for an evaluation. Again, pay particular attention to the behavior and feeling of the rear end of the car when cornering.



## Step 8 = Adjust ARB (as needed)

---

The key part of evaluating the rear anti-roll bar (ARB) is how the car feels to you and performs based on your driving style. Since changing the ARB only changes one end of the car, the key effect can be how the rear of the Skippy is tuned relative to the front.

A softer rear ARB will result in more body roll at the rear when cornering and, for many people, may feel easier to drive at the edge. It is less likely to result in an oversteer condition. It may contribute to the feeling of an understeer condition under power (when exiting a corner) because there will be more relative grip at the rear of the car.

A stiffer rear ARB will reduce the amount of body roll and is more likely to result in an oversteer condition. This can be harder for some people to drive “on the edge” and, if too much power is applied or inputs are sudden, this can result in a “snap spin” due to the lower level of grip at the rear of the car. Some people want a slight oversteer condition because they feel they can control it better with the throttle.

On the test drive, how did the rear end of the car feel? If the car seems to oversteer and you do not feel that you can get power down, try softening the ARB to increase the grip at the rear of the car.

Think about how the car behaved at the key corner (or corners) on the track. If the key corner is the fastest corner or the corner leading onto the longest straight, are you able to get the power down early or have a high exit speed? Is the car behavior in that corner allowing you to maximize your speed on the straight?

The general idea for the rear ARB should be to find a setting that reduces body roll and that does not hurt the independence of each of the rear wheels. A general strategy might be to run as soft an ARB as possible while maintaining control of the car and the proper handling balance. There is no magic setting.

Try changing the ARB setting by 2 clicks or more so that it makes enough of a difference that you can feel it. If you feel you may have gone too far, back off one click and see how that feels.

Remember, the goal is to find settings that make you comfortable driving the car given your driving style and experience. Once you are comfortable, speed will follow.

## Step 9 = Road Test(s) for Tuning

---

At this point, the chassis settings are closer to supporting your driving style and the track conditions. Now you should be thinking about final-tuning. Head out on the track.

Try 5 or more laps and then return to the garage for an evaluation. Again, pay particular attention to the behavior and feeling of the car when cornering.

## Step 10 = Tuning (as needed)

---

Settings on the Skippy tend to affect each other in some way. For example, changing the rear ARB changes how you drive certain corners and this may lead to desired changes in SPO and/or air pressures. Tire temperatures or pressures may vary at different corners of the car and you may want to play with these settings. .

Experience has shown that maximizing the performance of the tires for a given track and your driving style has the greatest impact on lap times and results.

### Chassis Tuning

If you are not fully comfortable with the car's behavior (maybe the car does not feel "stable" to you) or if you just want to try out some options, try some different chassis set-ups. Try 5 or more laps with each of the following set-up options and see which feels best or results in the fastest lap times for you:

	Soft Front (SPO)	Stiff Front (SPO)
Soft Rear (ARB)	-5 / 2	+6 / 2
Stiff Rear (ARB)	-5 / 7	+6 / 7

Remember that chassis settings might vary from track to track vary depending on the types of corners, the surface "grippiness", cornering speeds, and your driving style.

Once you find a general chassis setting range which feels good to you, you can continue to fine tune the chassis set-up from there. This may be a situation where a visit to the Centripetal Circuit may be helpful.

While many people seem to find a basis set-up that works for them and stick to it, do not hesitate to go back and revisit your basic chassis tuning for different tracks or if you feel you may have hit a road block. Others have developed a favorite set-up for each track they visit based on its unique characteristics.

### **Tire Pressures**

Tire pressures are used to effectively tune the Skippy (and every race car) since tire performance is a key part of how the car will perform. Whether to make adjustments to tire pressure or the chassis (SPO or ARB) is often a matter of personal preference after you have developed experience with the car.

Since the Skippy is a lightweight vehicle, lower tire pressures will generally result in more grip – to a point. On the other hand, the softer sidewall of the tire will make the tire less responsive to driver inputs. Higher tire pressures will stiffen the tire and improve its responsiveness – to a point. However, it may also result in less grip.

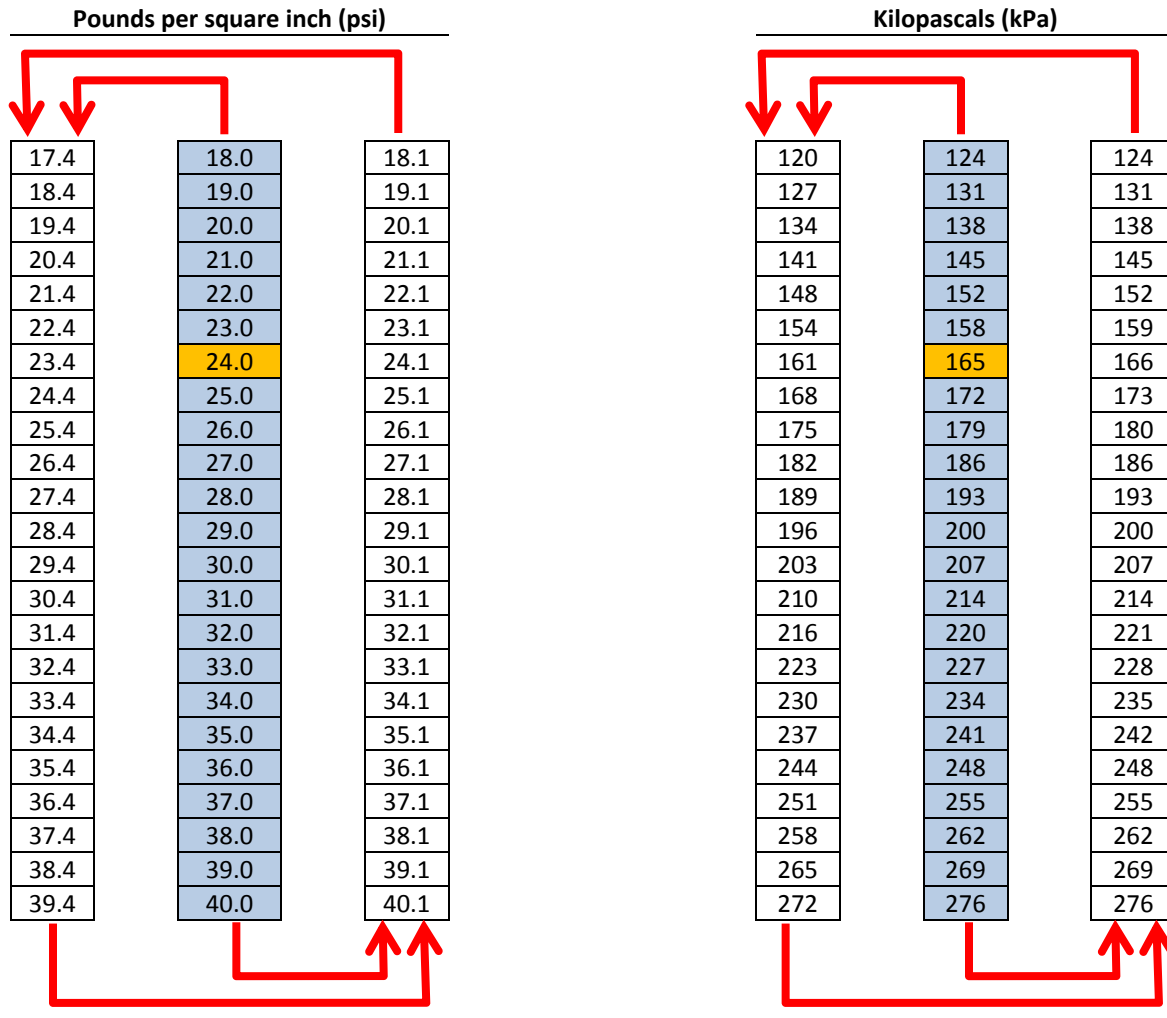
Some people run the same tire pressures on the front and rear. Others run a higher pressure on the rear since this is the heavier part of the car or because they want to tune the balance of the car that way. Still others run a higher pressure on the front since the dynamic weight of the Skippy (the weight transfer under braking and cornering) relies on the front tires. Try each of them out and see what feels best to you.

## Introduction To Set-up And Tuning – 2011 Season 1

Sometimes, balancing relative grip (a little more in the front or a little less in the rear) is the key to finding a setup that works best for you. If you are comfortable with the basic chassis setup but the car seems to understeer, try reducing the tire pressure at the front of the car (or increasing it at the rear) to provide more relative grip at the front. Similarly, if the car seems to oversteer, you could try increasing the tire pressure at the front of the car (or reducing it at the rear) to provide more relative grip at the rear. Sometimes, the absolute pressure settings are not as important to the balance of the car as the relative pressure settings.

Once you have settled on a front/rear pressure balance you feel comfortable with, try increasing or decreasing the pressure settings by the same amount on all four tires to see how that changes the balance of the car. Try changing the pressure setting by 2 clicks or more so that it makes enough of a difference that you can feel it. If you feel you may have gone too far, back off one click and see how that feels.

Don't forget that you can get to intermediate pressure increments by going to the top (or bottom) of the basic tire pressure scale (the blue bands below) and then coming back into the operating range. Once you have done this, however, the only way to get back to a whole number is to reset to the default setup.



### **Brake Bias**

As you gain more experience with the Skippy, you should explore reducing the front brake bias in order to distribute the braking forces evenly given your driving style. The default setting of 59% is very stable for people becoming familiar with the Skippy.

A setting of 56% should also be stable for most people and share more of the braking load with the rear wheels. If you brake with your right-foot, you may find that the setting of 56% is comfortable for you.

If you are learning to be a left-foot braker and want to use some trail braking (braking while turning) and/or dynamic braking (braking while keeping some gas on), you may want to try a lower front brake bias.

The basic rule of thumb (as with other changes) is to try moving it back two or more clicks. If the results are unsatisfactory for your driving style or lap times, add some more front brake bias back in.



Graphics from <http://members.iracing.com/membersite/member/CarDetail.do?carid=1>

## Common Skippy Symptoms / Solutions

Braking	Driving Options	Set-up Options
Lock up front wheels on braking	<ul style="list-style-type: none"> <li>• Brake earlier</li> <li>• Brake softer</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Move brake bias towards rear</b></li> <li>• Lower F/R tire pressure (more grip)</li> <li>• Calibrate brake pedals</li> <li>• Change brake sensitivity</li> </ul>
Lock up rear wheels on braking	<ul style="list-style-type: none"> <li>• Brake earlier</li> <li>• Brake softer</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Move brake bias towards front</b></li> <li>• Lower F/R tire pressure (more grip)</li> <li>• Calibrate brake pedals</li> <li>• Change brake sensitivity</li> </ul>
Long braking zone	<ul style="list-style-type: none"> <li>• Brake later</li> <li>• Brake harder</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Move brake bias towards rear</b></li> <li>• Lower F/R tire pressure (more grip)</li> </ul>
Spin on braking	<ul style="list-style-type: none"> <li>• Keep some gas on while braking</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Move brake bias towards front</b></li> <li>• Increase F/R tire pressure (more stable, less snap)</li> </ul>

Entry	Driving Options	Set-up Options
Wont turn into corner (front end understeer)	<ul style="list-style-type: none"> <li>• Slow down more / slow down sooner</li> <li>• Turn more smoothly / less abruptly</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Increase SPO (more camber and grip)</b></li> <li>• <b>Stiffen rear ARB</b></li> <li>• Reduce F tire pressure (more grip)</li> <li>• Increase R tire pressure</li> </ul>
Spin on turn in / (rear end oversteer)	<ul style="list-style-type: none"> <li>• Finish braking before turning</li> <li>• Do not stab brakes while turning</li> <li>• Do not “toss” the car into the turn</li> <li>• Slow release of the brake, ease onto throttle If dynamic braking, do not lift off throttle abruptly while turning</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Reduce SPO (less camber and grip)</b></li> <li>• <b>Soften rear ARB</b></li> <li>• Increase F tire pressure (more stable)</li> <li>• Lower R tire pressure (more grip)</li> </ul>
Steering feels unsure or car is slow to take a set in the corner		<ul style="list-style-type: none"> <li>• <b>Increase SPO (more frontgrip)</b></li> <li>• <b>Stiffen rear ARB (less rear grip)</b></li> </ul>
Car feels too edgy or responds too quickly		<ul style="list-style-type: none"> <li>• <b>Reduce SPO (less frontgrip)</b></li> <li>• <b>Soften rear ARB (more rear grip)</b></li> <li>• Reduce tire pressures (more grip)</li> </ul>

Middle	Driving Options	Set-up Options
Too Much Understeer	<ul style="list-style-type: none"> <li>• <b>Avoid</b> - Slow down / Use pedals smoothly</li> <li>• <b>Manage</b> - Ease off gas / Tap brakes</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Reduce F tire pressure (more front grip)</b></li> <li>• <b>Stiffen rear ARB roll bar to reduce rear grip</b></li> <li>• Increase R tire pressure</li> </ul>
Too Much Oversteer	<ul style="list-style-type: none"> <li>• <b>Avoid</b> - Slow down / Use pedals smoothly</li> <li>• <b>Manage</b> - Ease off gas <u>or</u> add gas to catch the oversteer</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Reduce R tire pressure (more rear grip)</b></li> <li>• <b>Soften rear ARB to add more grip</b></li> <li>• Increase F pressure</li> </ul>

Exit	Driving Options	Set-up Options
Understeer Under Power	<ul style="list-style-type: none"> <li>• Set up earlier for a later apex</li> <li>• Don't get on the throttle too soon</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce F tire pressure (more front grip)</li> <li>• Stiffen rear ARB to get less rear grip</li> <li>• Increase R pressure</li> </ul>
Oversteer Under Power	<ul style="list-style-type: none"> <li>• Ease onto the throttle rather than punch it</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce R tire pressure (more rear grip)</li> <li>• Soften rear ARB to get more rear grip</li> <li>• Increase F pressure</li> </ul>

## General Driving Tips

Overall	<ul style="list-style-type: none"> <li>• Focus on managing and minimizing inputs to the car</li> <li>• Simple is fast</li> </ul>
RPM	<ul style="list-style-type: none"> <li>• Shift above 6000 RPM / No need to wait for rev limiter (6400 RPM or so)</li> <li>• Power range is above 5000 RPM</li> </ul>
Accelerator	<ul style="list-style-type: none"> <li>• Be easy with pedals and pedal transitions / Try not to stab at pedals</li> <li>• Keeping some gas on at all times can help minimize nervousness in corners</li> </ul>
Brake	<ul style="list-style-type: none"> <li>• Be easy with pedals and pedal transitions / Try not to stab at pedals</li> </ul>
Steering	<ul style="list-style-type: none"> <li>• Concentrate on corner exit, not on corner entrance</li> <li>• Try to get car set early and get back on gas early at corner exit</li> <li>• Try using throttle to aid steering (an abrupt lift can help induce rotation)</li> <li>• Follow marks on the pavement since there is a reason they are there</li> </ul>
Practice	<ul style="list-style-type: none"> <li>• There is no better way to get faster than practice, practice, practice</li> <li>• Figure out the most important corner(s) on the track and tune for those first</li> </ul>

## Step 11 = Final Road Test(s)

---

Try out the settings to see how comfortable they are.

Go on an extended run (race length) to see how the car feels over an extended period.

Try participating as a “ghost racer” in a Spectator Session to be on the track with other racers but not be visible to them. Wait until someone drives through your car for the first time!

Develop comfort that you are ready to go racing with the family of Skippy drivers.



Graphics from <http://members.iracing.com/membersite/member/CarDetail.do?carid=1>

**GO RACING!**



# Other Settings

## Pedal Calibration

Pedal calibration is something that should be done on a regular basis to ensure that your brake pedal settings (and degree of pedal throw) are accurately represented in the simulation. It will be easier to drive consistently if your brake settings are accurate and reflect your style.

In the Simulation, go to “options / settings/

**You may want to calibrate pedals regularly.**

## Force Feedback Adjustment

One of the keys to faster lap times is understanding the feedback from the car. Since we have to rely on sight and hearing and feel to get as much information as possible, it makes sense that these sensory options be expressive as possible.

One way to do this can be through the force feedback option on your racing wheel or from the iRacing system. For a less experienced racer, increasing the force feedback can provide information that, when synchronized with the visual and sound information, will give you a better understanding of what the car is doing (or is about to do).

Once you have developed an understanding of the feedback through the wheel (and the corresponding visual or sound information), you can decrease the force feedback if you wish. However, in the meantime, this may provide the missing link for you developing a better feel for the performance of the car – especially the tires.

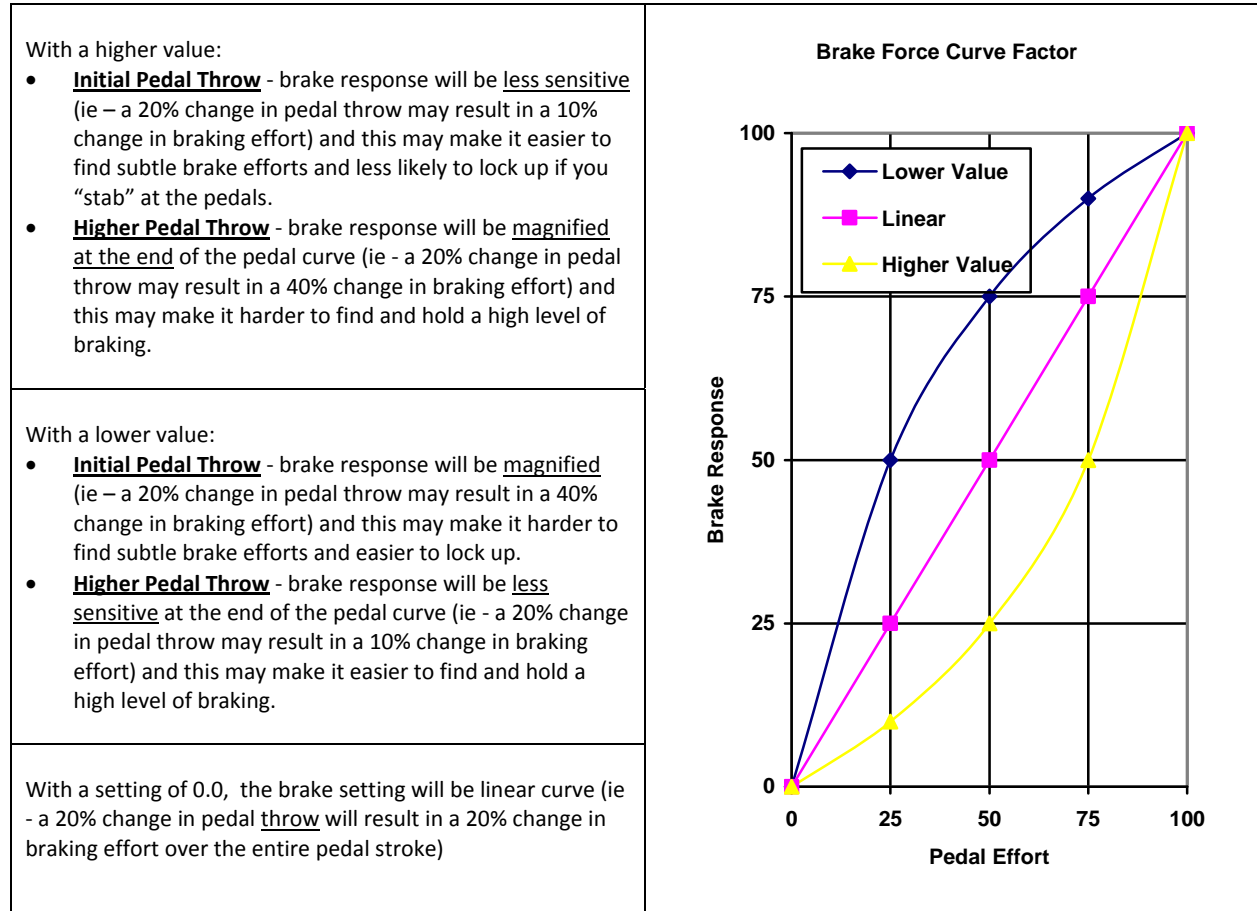
Alternatively, you may want to try turning the force feedback down so you focus in more on the visual and other feedback mechanisms.

In the Simulation, go to “options / settings/

**You may want to try increasing or decreasing the “force feedback” until you develop a feel for the behavior of the car.**

### Brake Curve Force Factor

Everyone has their own driving style and an important adjustment could be the brake force curve factor. This adjustment changes the brake response in the simulation in relation to the pedal throw by the driver. The basic options are explained below:



In the Simulation, go to “options / settings/

**Accept default brake force curve factor or select a personal setting.**

# Acknowledgments

iRacing Staff

Countless iRacers who have contributed ideas and input on the iRacing Forums

The following specific reviewers and contributors (listed alphabetically):

Jay Blass, Glenn Chalder, Duncan Coppedge, Roland Ehnstrom, Dave Grey, Mitchell Hibbs, Simon Hulbert, Marco Linke, Michael Lorensen, Lubomir Moric, Sean Siff, Ryan Terpstra, Samuli Vahonen

Special thanks to Mark A. Carpenter for creating the "Oval Crew Chief 101" which created the inspiration for this manual.

Cover image found at

<http://media.photobucket.com/image/skippy%20iracing/Mokkiwokki/irac33.jpg>

**If you have thoughts or ideas about how to make this manual even better, please let us know at [contact@iracing.com](mailto:contact@iracing.com).**

**The same holds true if you feel that the manual contains information which may not be correct.**

**Thanks for your help!**

