by
Papyrus Racing Games

Using This Manual

To navigate through this manual using Acrobat Reader, use the toolbars along the top and bottom of the Acrobat window. The functions of the more important icons in the toolbars are listed below:
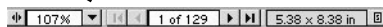
Hand Tool
(Grab and move page)

Zoom Tool
(Click and hold to select
Zoom In or Zoom Out)

Fit in Window
(Click to make entire page
visible)

Click to resize page by percentage

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Introduction

They said it couldn't be done. They said NASCAR fans weren't computer people. Others had tried and failed by making sparse scenery, flat corners and only a handful of cars to race against. But in 1994, the Papyrus Racing Team was on a mission. They knew that real NASCAR fans were hungry for a simulation that captured the true essence of the sport. And they knew they could deliver.

In the fall of 1994, just after Dale Earnhardt had won his record-tying seventh NASCAR Championship, NASCAR Racing debuted on the shelves of software retailers everywhere. The software featured a realistic physics model and accurate banking on the nine tracks that were included (a track pack with other circuits was released a few months later). Almost instantly, sales of the simulation began eclipsing company projections. The Papyrus Racing Team had done it!
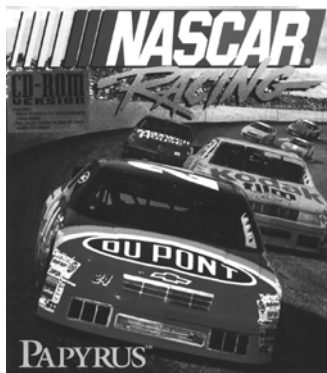
In early 1995, Papyrus began testing the waters of online racing. Using a dial-up system code-named "Hawaii," players were able to trade paint with one another on the hodge-podge system. Despite the exhorbitant long distance bills many players rang up while racing

on the Papyrus-built "Hawaii" system, it was evident that there was a real demand for multiplayer stock car racing.

NASCAR Racing 2 was released prior to Christmas in 1996. Featuring a robust slate of authentic tracks and drivers, Papyrus also souped up the graphics and added new features like real-time Crew Chief/Spotter audio. More importantly network support was built-in, and by the Summer of 1997 the Hawaii system was unplugged in favor of an Internet-based method. No longer would players be required to pay long distance fees to race. Thousands

purchased monthly memberships and flocked to the Internet in search of a racing fix, including many notable sports stars and real NASCAR drivers.
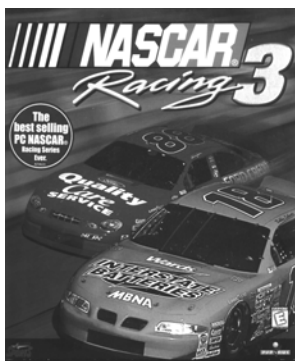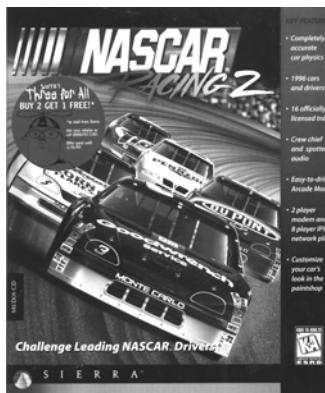
The Papyrus Racing Team rolled out NASCAR Racing 3 in the Fall of 1999; the multiplayer support added ping servers and other features that brought the racing truly onto the Internet. It was now possible for anyone to host a race for free, anytime, at any track. NASCAR Racing 3 also brought some new garage enhancements, 3D positional sounds and spectrum lighting effects to the cyber track.

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Now the Papyrus Racing Team has created the finest auto racing simulation to date, with NASCAR Racing 4. Designed to immerse the player as realistically as possible into a real-world racing experience, NASCAR Racing 4 features a detailed physics model. Make all of the adjustments to your car that real NASCAR teams do, right down to the Track Bar. If you're a real stock car driver, we invite you to bring your best chassis setup to our physics model and compare the results.

Learn the art of high speed driving, using deft footwork and subtle steering movements. Use the Paint Shop to customize the look of your car with any sponsor you choose. And best of all, take your skills online against real human fellow drivers, competing at real world venues like Daytona International Speedway and Watkins Glen. You might actually rub fenders with a live NASCAR star or two, brushing up for their next race. That's because it's all here, the only thing we couldn't put in was the smell of burning oil (but we *are* working on that).

So strap yourself in and turn the page, for the most realistic, intense NASCAR action ever found on a PC- NASCAR Racing 4, the evolution of a racing revolution!

Installation

Close all other programs before you begin installing NASCAR Racing 4. Place the CD ROM disk in your drive. The installation process should begin immediately. If it doesn't, click on the START button and choose RUN. Type D:\Setup (substitute "D:" with the correct drive letter of your CD ROM drive if it's different) and choose OK. The installation wizard will now begin.

Enter the CD KEY located on the jewelbox case your NASCAR Racing 4 CD was packaged in. After a brief system test is performed by the installation program, choose the drive and directory (folder) that you would like NASCAR Racing 4 to reside in on your system. Use the default path provided, or click on the BROWSE button and create your own.

Next, choose the type of installation you'd prefer. The Full installation requires about 315 megabytes of hard drive space, while the Minimal installation consumes only around 70 megabytes of drive space.

When the basic installation process is complete, NASCAR Racing 4 will test your computer's video card. Choose a 3D acceleration format (if your machine supports OPENGL you may experience more favorable results with it, as opposed to D3D). You can reconfigure NASCAR Racing 4's video settings at any time by choosing Configure 3D Graphics from the Main Menu, or by launching the "N4Config.exe" file located in your root N4 folder.
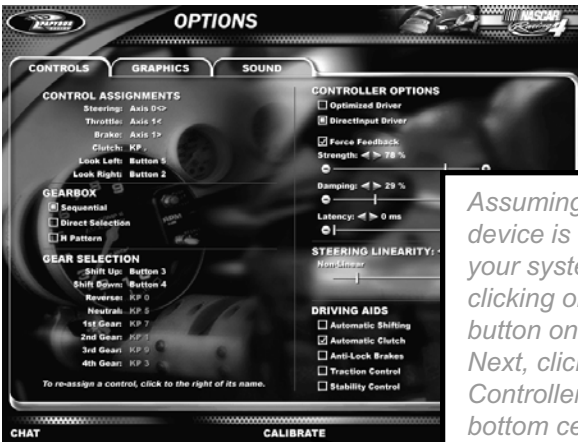
Configuration

If you have a joystick, gamepad or steering wheel device you'd like to control your car with, you can set it up by clicking Options on the Main Menu (the first time you run NASCAR Racing 4 you should automatically see this screen). There are three main steps to getting your controller to work with NASCAR Racing 4:

1. Install. Plug in and install your control device (joystick, wheel, pedals or gamepad) in Windows if you haven't already. Follow the manufacturer's instructions.

2. Calibrate. Click on the Options button at the Main Menu of NASCAR Racing 4. Click on the Calibrate Controller button at the bottom of the screen and follow the prompts.

3. Assign. Tell NASCAR Racing 4 how you want your controller to work by assigning its movements to specific tasks.

Once your wheel/controller is calibrated and working in NASCAR Racing 4, there are several ways to adjust the sensitivity and feel of it by working with items found on the Options Menu. Experiment with different settings until the controller has the responsiveness that you want.

OPTIONS

CONTROLS   GRAPHICS   SOUND

CONTROL ASSIGNMENTS
Steering: Axis 0<>
Throttle: Axis 1<
Brake: Axis 1>
Clutch: KP .
Look Left: Button 5
Look Right: Button 2

GEARBOX
☒ Sequential
☐ Direct Selection
☐ H Pattern

GEAR SELECTION
Shift Up: Button 3
Shift Down: Button 4
Reverse: KP 0
Neutral: KP 5
1st Gear: KP 7
2nd Gear: KP 1
3rd Gear: KP 9
4th Gear: KP 3

To re-assign a control, click to the right of its name.

CONTROLLER OPTIONS
☐ Optimized Driver
☒ DirectInput Driver
☒ Force Feedback
Strength: ◄ ► 78 %
Damping: ◄ ► 29 %
Latency: ◄ ► 0 ms

STEERING LINEARITY:
Non-Linear

DRIVING AIDS
☐ Automatic Shifting
☒ Automatic Clutch
☐ Anti-Lock Brakes
☐ Traction Control
☐ Stability Control
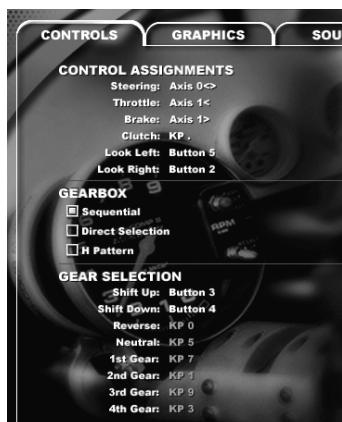
CHAT   CALIBRATE

Assuming your controller device is already installed on your system, begin by clicking on the Options button on the Main Menu. Next, click the Calibrate Controller button at the very bottom center of your screen...

OPTIONS

Now, calibrate your controller device by moving it in each direction. If you're using a wheel/pedals combo, steer the wheel left and right, and depress all pedals. You should see the calibration meters on the screen react to your movements. If you don't, your controller may not be installed correctly on your system. When you finish calibrating, all axis meters should be settled dead center. If they're jumping around, it might be time to change the potentiometers in your device. Click the OK button when you're satisfied with your calibration.

CONTROLLER OPTIONS
☐ Optimized Driver

Calib: 0.002
-512   510
Raw: 1

Calib: 0.000
0   62
Raw: 31

Calib:
30   32
Raw: 31

Calib:
Raw:

OK

☐ Traction Control
☐ Stability Control

ALIBRATE   BACK DONE

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CONTROLS **GRAPHICS** **SOU**

CONTROL ASSIGNMENTS
Steering: Axis 0<>
Throttle: Axis 1<
Brake: Axis 1>
Clutch: KP ,
Look Left: Button 5
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GEARBOX
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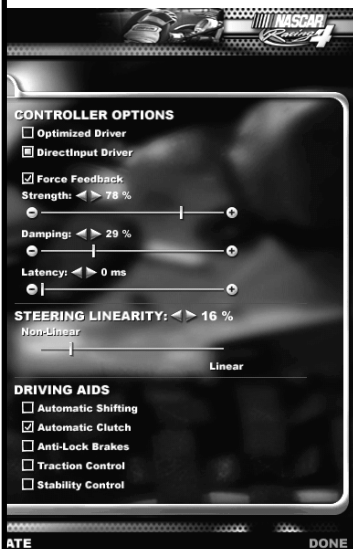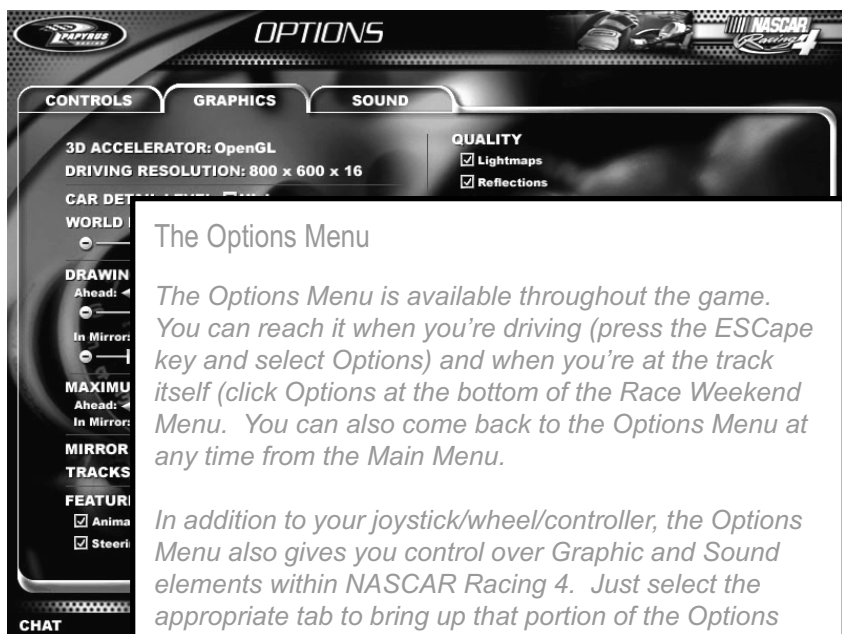2nd Gear: KP 1
3rd Gear: KP 9
4th Gear: KP 3

Now, assign controls the way you want them to work. Start at the top of the list with Steering, and work your way down. Click on Steering, move your wheel or joystick to the left; next click on Throttle and step on whichever pedal you want assigned as your accelerator. You can also assign vacant keyboard keys to these tasks if you don't have a controller device. You cannot have two actions assigned to the same key or device movement.

On the right-side of the Options/ Controls screen, pick a joystick driver and adjust Steering Linearity. If you're using a wheel, lean more towards Linear steering. If you're using a joystick, plan on going more toward the Non-Linear setting.

Driving Aids

In the lower-right panel, you'll see a series of checkboxes that turn various driving aids on/off. These aids are designed to help you control the car better while you get used to NASCAR Racing 4's physics. You should learn to drive without these aids on as soon as you can if you really want to go fast.

NASCAR Racing 4

CONTROLLER OPTIONS
☐ Optimized Driver
☑ DirectInput Driver

☑ Force Feedback
Strength: ◄ ► 78 %
⊖━━━━━━●━━⊕

Damping: ◄ ► 29 %
⊖━━━●━━━━━⊕

Latency: ◄ ► 0 ms
⊖●━━━━━━━━⊕

STEERING LINEARITY: ◄ ► 16 %
Non-Linear
━●━━━━━━━━━
                    Linear

DRIVING AIDS
☐ Automatic Shifting
☑ Automatic Clutch
☐ Anti-Lock Brakes
☐ Traction Control
☐ Stability Control

ATE   DONE

OPTIONS

CONTROLS | **GRAPHICS** | **SOUND**

3D ACCELERATOR: OpenGL
DRIVING RESOLUTION: 800 x 600 x 16
CAR DETAIL LEVEL:
WORLD
DRAWING
Ahead:
In Mirror:
MAXIMU
Ahead:
In Mirror:
MIRROR
TRACKS
FEATURE
☑ Anima
☑ Steeri

QUALITY
☑ Lightmaps
☑ Reflections

CHAT

The Options Menu

The Options Menu is available throughout the game. You can reach it when you're driving (press the ESCape key and select Options) and when you're at the track itself (click Options at the bottom of the Race Weekend Menu. You can also come back to the Options Menu at any time from the Main Menu.

In addition to your joystick/wheel/controller, the Options Menu also gives you control over Graphic and Sound elements within NASCAR Racing 4. Just select the appropriate tab to bring up that portion of the Options Menu. In the picture above, we've clicked on the Graphics tab to pull up the Graphics Menu. Turn on as many graphic and sound elements as you want, just make sure your computer system can handle it. If the animation speeds look choppy, you might try reducing some of the graphics and/or sound details. You can also adjust personal preferences, such as turning on/off the steering wheel shown in the cockpit or the pit crew animations. You can also decide whether the pit board info displayed by the "F1" key shows times or speeds.

Right-click your mouse on any menu item within NASCAR Racing 4 to see "pop-up" help. Want to find more information on Force Feedback? Right-click it! Which gearbox choice is right for you? Right-click it to find out!

The Basics
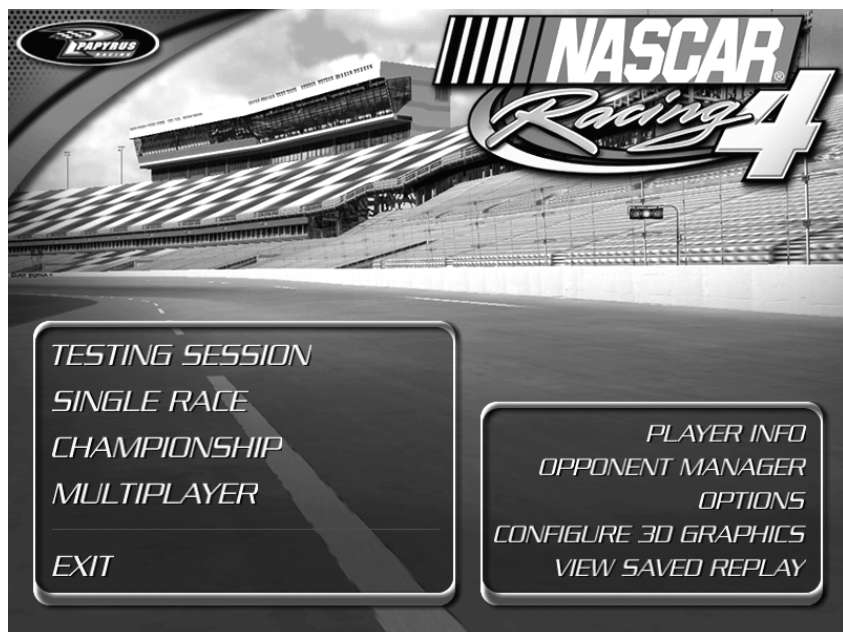
NASCAR Racing 4's Main Menu serves as the launch point of the simulation. From here you have control over the entire racing experience, including personal settings, hardware adjustments, opponents, and of course, racing events.

Notice that the Main Menu is broken up into two specific categories: Configuration Items, and Racing Items.

PLAYER INFO
OPPONENT MANAGER
OPTIONS
CONFIGURE 3D GRAPHICS
VIEW SAVED REPLAY

Configuration Items

Configuration Items give you total control over the simulation environment. Here's a quick rundown of what these items do:

Player Info: Click here to change personal settings such as your name and the car you drive. Specify a car to drive offline, and one to race in online. Personalize Autochat messages that you can display in online events.

Opponent Manager: Take control of the entire field- adjust ratings for drivers/cars, use the Paint Shop to recreate your favorite team, build lists of drivers to race against.

Options: Adjust controller calibration, graphic detail levels, sound quality and more. The Options Menu is also available from various locations throughout the simulation.

View Saved Replay: Relive all of your moments of glory by viewing replays of footage from any track.

Configure 3D Graphics: Lets you change your 3D video accelerator settings.

Exit: Park the car and return to the desktop.

TESTING SESSION
SINGLE RACE
CHAMPIONSHIP
MULTIPLAYER

EXIT

Racing Items

The various Racing Items found on the left side of the Main Menu allow you to select what type of driving you'd like to do:

Testing Session: Just you and the track, testing sessions give you the unlimited opportunity to learn in private on any track you choose, without any other cars to contend with.

Single Race: Pick a track and set up a race. Start with the Practice Session and work your way through the "Race Weekend" or jump straight into the main event and try to win from the back of the grid. Single races do not award any points to finishers.

Championship Season: Every race becomes critical as you accrue championship points after every race, based on your finishing position. Stay out of trouble and keep your car running each week, you just might find the Winston Cup Championship trophy sitting in your team's garage at the end of the season.

Multiplayer: Think you're good? Prove it! A Papyrus exclusive, NASCAR Racing 4's Multiplayer capabilities allow you to compete online against an entire field of real live human opponents. Just bring your Internet connection, the racing's free.

Take 'er For A Quick Spin!

Glad to see you've arrived at this page, the morning testing session is about to begin! From the Main Menu, click Testing Session and select California Speedway- a wide, comfortable, 2-mile "D" shaped track. Grab your helmet and head for the car- see you on pit road in a couple of minutes.

Now you're at what we like to call the Race Weekend Menu. From here you can view replays, check stats and control the entire slate of racing sessions. There are several tabs and buttons you can click on here to affect the action. Notice the various buttons across the bottom of your screen. These buttons allow you to visit the Garage to adjust your race car, Pause the live action, and most importantly, Drive the race car. For now, click the green Drive button in the lower right corner of the Race Weekend Menu.

Now that you're in the car, let's do some driving. We'll go over cockpit features and controls later- right now we just want to see you get some laps under your belt.

Press the "S" key on the keyboard to toggle on the speed/gear display (located just to the left of the steering wheel).

Before leaving the pit stall, press the "S" key on your keyboard to toggle the speed/gear display on or off. Make sure it's on for now, you can always turn it off later. Shift to first gear and gently begin accelerating. Try to shift into second gear and keep the RPM's below 6,000 until you reach the backstretch. Steer the car on the apron of the track, staying along the bottom of the pavement through Turns One and Two. When you reach the back straightaway, merge onto the track, shift to third and increase the throttle. Work your way up the gearbox quickly until you reach fourth gear, about the same time your car nears Turn Three.

As the pavement darkens, release the accelerator and try to aim for the middle of the turn. At this point you should be off the gas entirely. Let the car glide into the corner as the RPM's fall off-gradually add about 50% braking and keep turning the car in the proper direction, which at this point, should still be left!

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Re-apply the throttle in a smooth, gradual manner as your car exits Turn Four. The front straightaway at California is a long, sweeping left bend that requires concentration.

You'll have to concentrate to keep the car from drifting down the front straightaway.

Try to keep the car in the darkened "groove" as you cross the start/finish line; when you approach Turn One keep the car high on the track, lift off the gas early and let it drift down near the bottom on its own. Stay off the gas until you feel like the car is about halfway through the turn. Gradually reapply throttle and power up off the bottom of the track as you exit Turn Two. Avoid the urge to stomp on the gas- even at high speeds this could cause the rear wheels to spin out.

Down the back straightaway, keep the car near the outside wall; you'll probably have to steer toward the right somewhat in order to achieve this.

Approaching Turn Three, stay high and lift off the accelerator early, again letting the car drift down toward the bottom of the track. Coast around the bottom of Turns Three and Four until

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you reach the halfway point, then ease back onto the throttle and drive back toward the flagstand. Now take some more laps and get acquainted with your race car. Press the "ESCape" key when you're done. We'll see you back in the garage in a little while!

An Important Word About Chassis Setups

Chances are, the car you just drove used the "default chassis setup." The default car setup for each track is a "symmetrical" one - meaning the shock, spring, caster, and camber settings have all been set to neutral values in order to make the car's handling more predictable and act more like what you would expect from the family station wagon. However, station wagons don't win stock car championships, and symmetrical setups will not give you the fastest lap times on oval tracks. On an oval, you'll be turning in only one direction – left, and because of that you'll want an "asymmetrical setup" along the lines of the "Fast" setups included with NASCAR Racing 4, in which the suspension is tuned differently on the right side vs. the left. Asymmetrical setups will help the car turn left in order to get it through the corners as quickly as possible, but they have the side effect of pulling the car to the left on the straights. As a result, you may find that you need to "countersteer" to the right on the straights in order to keep the car tracking straight ahead. This is perfectly normal, and is something that real NASCAR Winston Cup drivers have to deal with every time they climb into the car. In the Garage, try experimenting with different Caster settings to find a comfortable balance between turning ability and straightline control.

Basic Driving Tips

Now that you've run some laps and gotten more comfortable with the feel of your stock car, let's cover some of the basics to help you become a competitive NASCAR driver.

First of all, a word about chassis setups. Any NASCAR driver will tell you that in order to win a championship, you've got to have good setups for every track. But while setups can help you drive faster, they don't necessarily make you drive better. Here are some ways to improve your driving skills quickly:

Concentrate on one track at a time. Don't jump around from track to track each time you launch NASCAR Racing 4. Learn your way around one track comfortably; try to turn competitive laps in the preferred groove, but also practice running alternate lines- both high and low. Successful drivers know how their car will behave on every part of a specific track. Beginning drivers may want to start out on the superspeedways that require minimal braking, such as Daytona or Talladega.

Follow the leader. Skip qualifying and take a provisional (start in last place). Try to pick your way carefully through traffic, patiently working your way toward the front of the field. This will improve your traffic management skills and passing ability, as well as increase your patience.

Study the tape. Save and review replays of your escapades on the track, using various camera angles. The helicopter view is

particularly useful for finding the fastest way around a speedway, or spotting a problem with a particular chassis setup.

Listen to your car. Squealing those tires through every corner? Practice to learn how fast you can drive through each corner at a particular track without squealing the tires. Some tire screeching is to be expected, but if you're laying enough rubber down to resurface the entire City of Daytona, you need to learn the fine art of driving with finesse. Braking a little harder and earlier going into a corner will often allow you to power out of that turn with much more authority.

Get the right equipment. Trying to cut silky-smooth laps around Martinsville using your keyboard? Give it up! Sure, you can drive with the keyboard, NASCAR Racing 4 gives you that capability. But let's face it- you wouldn't climb into a real stock car and try to turn 190 mph laps at Daytona International Speedway while steering with cursor keys, now would you? Get yourself a nice steering wheel/pedal combination that plugs into your computer's gameport. Prices generally start in the same ballpark as a gamepad or joystick, and escalate from there depending upon how bullet-proof you want your driving controls to be. There are several companies out there that make them- Microsoft, Thrustmaster, Logitech, TSW to name a few. Some wheels, such as the Microsoft Sidewinder allow you to experience "Force Feedback," a fancy tech-term that basically means many of the things you might feel in a race car. Slap the wall in your car and the wheel will allow you to feel a sudden jolt. Squeal the tires as you slide sideways down the track, and the wheel will vibrate rudely to simulate the effect. NASCAR Racing 4 offers full support for many popular Force Feedback devices.

The Drivers Meeting

In this section we'll give you all the info you'll need to get around in the NASCAR Racing 4 world, including how to create various types of races, and how to paint your car.

Setting Up Races

At the Main Menu, choose the type of event you'd like to drive in. Select Testing if you want to have the track to yourself while you hone your chassis setup. Click on Single Race if you want to pick a track and show 'em what you've got. If you're experienced enough to battle the NASCAR Winston Cup pros on a variety of tracks, go for the Championship Season. Thankfully, seasons can be saved to disk- you don't have to finish thirty-some-odd races in one tiring marathon! Finally, there's the ultimate challenge. Take your game online against an entire field of human drivers, using NASCAR Racing 4's robust Multiplayer feature. Log on, locate opponents and races, then go to work on becoming a cyber-racing legend. You might want to check out our Online Racing Guide later in this book for valuable tips on how to manage Internet competition.

How to Customize Your Races

Using the Testing, Single Race, or Championship Season Menus, you can customize and control every aspect of the racing action, such as the race distance, weather and opponent's skill levels. You'll see these options each time you select Testing Session, Single Race or Championship Season from the Main Menu.

For Testing Sessions and Single Races you can pick a track to drive on from this menu. For Championship Seasons, tracks are raced in order, according to the schedule used for the season you create.

Check the Display All Options box to reveal the entire list of Racing options that you can adjust. When this box is unchecked, you are shown an abbreviated version of the options. Items that are not shown in the abbreviated view are still active, you just can't see them. If you want to change these items you'll need to check the Display All Options box.

☑ Display All Options

DRIVING MODE
☐ Arcade ☐ Simulation

RACE WEEKEND
☐ Quick Race
Practice Length: ◄ ► 20 Minutes
Warmup Length: ◄ ► 10 Minutes
Race Length: ◄ ► 10 % 20 Laps

COMPUTER OPPONENTS
Roster: ▼ Myroster
Number: ◄ ► 13
Strength: ◄ ► 95 %

DAMAGE
Level: ▼ Realistic
☐ Mechanical Failures

RULES
☑ Full Pace Lap
☐ Yellow Flags
☐ Double File Restarts

WEATHER
☐ Realistic
Conditions: ▼ Clear
Temperature: ◄ ► 70 °F
Wind Direction: ▼ North
Wind Speed: ◄ ► 0 mph

The Racing Options list is divided up into seven distinct areas: the Track Selector (on the right side of the screen), Driving Mode, Race Weekend parameters, Computer Opponent settings, Damage, Race Rules, and Weather.

Track Selector: Pick any of the authentic NASCAR tracks available, from the shortest (Martinsville) to the most famous (Daytona).

Driving Mode: Arcade gives you a car that's easier to drive, with more traction and maneuverability than real race cars have.

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Simulation mode removes the training wheels- tame a real NASCAR 750-hp beast. Showtime, baby!

Race Weekend: Specify the length of your Practice, Warmup and Race sessions. Practice and Warmup sessions are set in minutes, while the race length is set as a percentage of the real distance. 100% represents the actual, complete NASCAR race length, whereas 50% reduces the race length to half of the actual distance, and so on. To skip the practice and warmup sessions, check the Quick Race box. This allows you to jump right into qualifying and then straight to the race itself.

Computer Opponents: This section of the Racing Options list allows you to adjust the competition to your skill level. Specify a roster of computer opponents to race against; these rosters can be built and edited using the Opponent Manager section of the Main Menu. Decide how many cars to race against (fewer cars can improve framerate) and dial the strength of your opponents up or down to match your ability. Make the computer opponents too slow and you'll be smashing into the rear ends of cars in front of you. Make them too quick and they'll leave you in the dust! 100% represents actual real world skill level.

Damage: Select from three different damage settings with either driving mode- none, arcade or realistic. With damage to None, your car becomes impervious to collisions. Using the Moderate damage level your car will sustain minimal damage during hard collisions. Select the Realistic damage setting if you're capable of driving like the pros. Check the Mechanical Failures box to allow your car to suffer random breakdowns. This doesn't guarantee

problems, it only enables your car to occasionally get bitten by fate- the same way Mark Martin, Dale Earnhardt, and other NASCAR drivers do from time to time.

Rules: Toggle the prerace pace lap, yellow flags and double-file restarts off/on. Without yellow flags the race will remain under green flag conditions even when there's a horrific accident. With Double-File Restarts enabled, you get the real world NASCAR rule that mandates slower cars who are no longer on the lead lap to line up on the inside of the race leaders during cautions. All cars that are still on the lead lap must line up in the outside line under yellow (this rule is waived during the final ten laps of a race). Double-File Restarts are not used at all during road course races.

Weather: Often overlooked, weather conditions have a profound effect on your car's handling. Check it out:
Cooler air is less dense than warmer air; when the mercury drops you can expect your car's engine to "breathe" more efficiently. Drag is also reduced in the cooler, thinner air. Hotter weather tends to stress your car's systems and increase the amount of drag. Also, remember that tires grip better when they're warmer, just below peak operating temperature (225° Fahrenheit). Gusty weather can also affect the car- pushing it down straights with a tailwind, or producing a lot of turbulence at the front in a stiff headwind.

Enough with "Meteorology 101" already, here's the scoop: Use the weather controls to allow for realistic, random conditions (based on average local conditions for each track) or play God and set weather conditions exactly how you'd like them. Been praying for dry, cool weather to qualify in? Heck, a couple of mouse clicks and you've got it!

The Race Weekend Menu

A familiar staple of previous Papyrus Racing simulations, the Race Weekend Menu allows you to navigate amongst the various tasks at the track itself, such as taking the car into the team garage for tweaking, moving to the next session of racing, or viewing replays, stats and numbers.

Click on the various tabs on the Race Weekend Menu to view information like general race information, a chronology of lap times, the current standings (as shown above), and the race entry list. Use the replay controls (as described later) to view highlights; visit the garage, jump to the next race session, change game options or drive the car- all by clicking on the buttons found along the bottom of the Race Weekend Menu.

NASCAR Racing 4 Rulebook

Every driver needs to know the basic rules of stock car racing before the flag drops. Break a rule, and the officials in NASCAR Racing 4 will be all over you, so listen up!

No passing under yellow, including the pace car. When the yellow laundry comes out, the leader is instructed to race back to the start/finish line. Once the leader has crossed the start/finish line, all traffic behind the leader must also slow and line up according to the rules. However, if a car is going too slowly, this rule is tossed out. Your spotter will tell you what to do.

No speeding in the pits. The penalty is 15 seconds (no black flag) for speeding on entry to pit stall, but a stop and go (black flag) if you speed while leaving the pits.

You must merge properly when exiting the pits. The rule is to stay on the apron (or as far away from the racing line as possible) until the spotter says, "O.K., merge when you can." That doesn't necessarily mean that it's SAFE to merge, it just means that you have now crossed the "blend line" and may legally merge at any time. It's worth noting that at Indianapolis you'll need to use the exit road all the way out to the backstraight. The penalty is a black flag stop and go under green, or a simple "go to the end of the longer line" with no black flag under yellow.

You need to enter the pits properly as well. Cutting across the grass is a no-no. It's worth noting that Homestead requires the use of the access road when pitting. Indianapolis does not. Cutting across the Innerloop at Watkins Glen without stopping is a violation. This is a stop and go penalty.

Thou shalt not pass the leader before the start/finish line on a start or restart. There is a "fudge factor" built in to keep you (when leading) from intentionally being able to cause a violation for someone else. If a car is going too slowly, this rule is tossed out. The spotter will let you know.

You can't pass a car in the same pacing line on the inside before the start/finish line. If a car is going too slowly, this rule is tossed out. The spotter will let you know.

You can only pit on the appropriate lap(s). NASCAR Racing 4 follows the official rule which allows only the cars on the lead lap to pit the first lap the pits open. All other drivers must wait until the next lap. Entering a closed pit will get you escorted to the end of the longest line faster than you can say "Bill France."

Dropping fluids or debris/smoking engine. If your car is damaged to the point that the engine is smoking heavily or dropping debris or fluids, you'll be black-flagged. To clear the black flag, you must pit and get the car repaired at least to the point that NASCAR feels it's safe (if the car is too heavily damaged it's possible that the crew won't be able to fix it well enough for you to continue).

Reckless driving (driving in the wrong direction, either forwards or backwards) results in a Disqualification.

Pitting on the short pit lane at Sears Point will result in your car being held in the stall an additional 12 seconds. This is to negate the advantage of having to adhere to the pit road speed limit for a shorter time than the cars in the main pit lane.

You can't serve a black flag on a restart. You can clear the black flag (for non-damage related issues) under green conditions only. However, if you happen to be on pit road when the yellow comes out, you may proceed to stop in your stall and legally serve the penalty and clear the black flag. Lucky dog!

Passing the stop/go official at the end of pit road (only in effect for races with yellows). If you pass the official when he's showing the stop sign, you'll have to go to the end of the longest line.

Serving multiple penalties. For the sake of convenience, if you have multiple penalties, you only need to come into the pits once. For each penalty beyond the first one, an additional 40 seconds is tacked onto the time normally associated with the infraction. This is done to simulate the time it would have taken for you to decelerate, stop in the stall, and accelerate back to speed.

Post-race penalties. When the checkers fall, you'll receive a 1-lap penalty per outstanding infraction not served during the race.

Something definitely worth noting is that penalties are disabled in Practice and Warmup (except for reckless driving). Your spotter will still let you know that you've done something wrong, but there won't be any consequences. *However, it needs to be made clear that this leniency will not be seen in the Race session.* So, the wiser players will use the pre-Race sessions to learn the optimal pit entry/exit speeds and procedures.

A few final items of note: In Qualifying, you may be disqualified (your qual time is tossed and you're given a provisional) if you either cut the Innerloop at Watkins Glen, break the pit speed limit, or drive in the wrong direction for a certain amount of time. When yellow flags are turned on, it is possible for the start or restart to be "waved off" in the event of a catastrophe. If this happens, the start/restart will be delayed by one lap. In Arcade Mode, the rules are relaxed. Speeding on pit road, passing under yellow, passing the pace car, reckless driving, and cutting the Inner Loop at Watkins Glen are the only rules Arcade Mode enforces.

In Car Controls

Now that you've driven the car and you know how to create and customize race events, let's go over all of the items you have access to whenever you're in the driver's seat. These in-car controls include the instrumentation of your stock car, as well as the keyboard keys that allow you to communicate with your pit crew. We'll start with the dashboard:
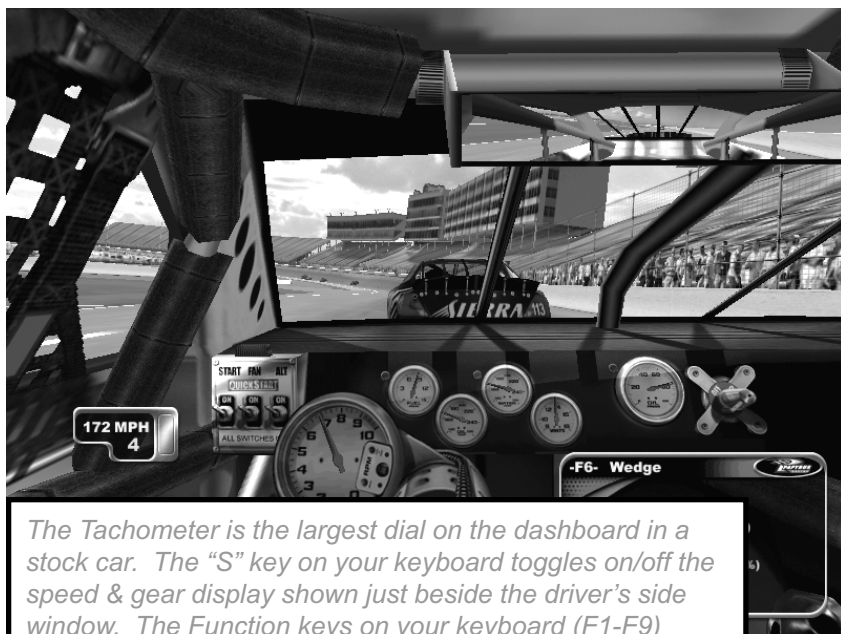
The Tachometer is the largest dial on the dashboard in a stock car. The "S" key on your keyboard toggles on/off the speed & gear display shown just beside the driver's side window. The Function keys on your keyboard (F1-F9) toggle on/off the various pit radio displays, superimposed over the lower-right corner of the cockpit. The rearview mirror keeps you abreast of what (or who) is behind you. By the looks of the rearview mirror above, it seems somebody is getting taken to the woodshed.

Tachometer: The biggest dial on the dash, so you can keep an eye on those rpms. Real stock cars don't have speedometers, so the driver relies on the tachometer to calculate speeds. If the engine revs higher than 8,500 rpms, it's time to shift.

Secondary Dials: These instruments provide information about your car's current health. Think of them as an EKG reading (that's medical talk) for your car. Fuel Pressure should hold steady at around 9 PSI, until you start to run low on gas. Water Temp should hover at around 220° degrees Fahrenheit. If the water temperature is too hot, you've probably got too much tape over the grille. Oil Pressure and Oil Temperature are reflective of your engine's stress. If the pressure drops or the temperature rises, either you already have an engine problem, or you're about to have one. This could be from improper car setup (gears) or as a result of damage. The critical gauges each have an "idiot light" adjacent to them. These lights will start to blink when something's wrong.

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Mirror Adjustments

Press the "M" key on your keyboard to toggle through the various levels of mirror detail. If the action seems too "choppy" you might be able to make things run a little smoother by reducing the mirror detail. In addition, you can press the "N" key on your keyboard to remove the cockpit reflections, such as the back of your roll cage. Betcha every real NASCAR Winston Cup driver wishes they could do that!

Driving Views

Change driving views by pressing the Page Up/Page Down keys on your keyboard. There are several live angles to drive from- pick the one that keeps you on the track!

F1 Pitboard

While driving, press the "F1" key on your keyboard to display the pitboard. The pitboard provides you with useful, lap-by-lap information about your speeds. It displays your current position in the event, the current lap number and the time remaining in the current session if applicable. Obviously the races themselves are not limited by time, so the time remaining is not shown during actual races.
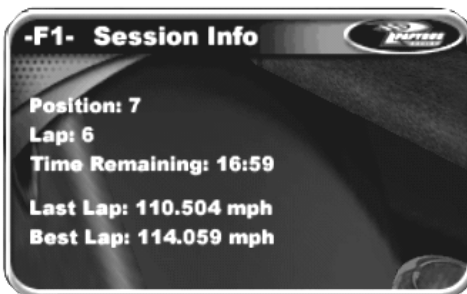
The bottom of the pitboard displays the most crucial information- the speed of your last (most recent) lap, and the speed of your best lap overall during the current session. This gives you a "measuring stick" of your speeds.

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From the Options Menu, you can decide whether these laps on the pitboard are displayed as speed (mph) or time (min.sec.thousandths).

The practice session pitboards shown on these pages illustrate the difference between the two methods.

You'll notice that during pre-race sessions the pitboard displays the time remaining in the current session and basic data regarding your lap speeds. During races however, the pitboard shows much more detail such as the time interval and number of the car directly ahead, and the car directly behind you, the current lap number, and the number of laps remaining. This information automatically updates each time you cross the start/finish line- there's no need to "refresh" the pitboard.

F2 Standings

While driving, you can get standings information by pressing the "F2" key on your keyboard. Each time you invoke the standings display, your car's position will appear in the center of the window; to scroll through the complete list of drivers, use the up/down cursor arrow keys on your keyboard. You can always reset the standings display by simply toggling the window off and then on again with the F2 key. The standings display will always reappear with your car's position shown in the center.

Use your Spacebar to toggle the Standings view to display either the actual race order or the current track position of each car. When you are viewing the current track position (real time), cars listed in white are on the same lap you are. Cars listed in red are one or more laps ahead of you, while those listed in green are one or more laps behind you.

-F3- Fuel

Est. Fuel Remaining: 20
Projected Laps: 38
Laps To Go: 13
Recommend: None
Add: 1 1/2 Cans

F3 Fuel Management

Press the "F3" key on your keyboard to bring up the Fuel management window. This window gives you all of the pertinent information concerning your car's fuel status, including current amount of fuel remaining and estimated number of laps you can complete with your current fuel supply.

At the bottom of the fuel management window you can tell your Crew Chief how many cans of fuel to put into the car during your next pit stop. Each can weighs about eighty pounds; fuel is fed by gravity into the car's gas tank. Your gas man is capable of putting

both cans of fuel into your car in about the same time it takes the rest of the crew to change all four tires!

The choices here are 2 cans (22 U.S. gallons, complete fill-up), 1˚ cans, 1 can, ˚ can, or just a *Splash*. A splash of fuel will give you approximately an eighth of a tank of gas, good for the closing laps of a race when you can't afford a lengthy pit stop. You can also choose *None* if you'd like; the crew will not add any fuel, they'll just perform other specified services to the race car. Use the left/right cursor arrow keys on your keyboard to request the desired amount of fuel. Since the default here is 2 cans, your tank will always be topped off by the crew unless otherwise specified.

An Important Word About Refueling

Fuel calculations performed by your crew in the late stages of a race are ESTIMATES ONLY. That is to say, they may specify too much, they may plan to put in too little. Ditto for the "F3" estimated laps remaining info- it's exactly that, an estimate only. NASCAR Winston Cup cars don't have fuel gauges in them, so don't rely solely on the information you're given. If you don't feel confident with the estimates, pit earlier and take more fuel.

-F4-	Tire Temperature				
	LF			RF	
O	M	I	I	M	O
207	206	208	238	239	233
	LR			RR	
O	M	I	I	M	O
229	227	227	242	240	240

F4 Tire Temps

Perhaps the most important data available in NASCAR Racing 4, the current tire temperatures can be displayed by pressing the "F4" key while driving. The Tire Temperatures window gives you the Inner (I), Middle (M) and Outer (O) temperatures of each tire as you drive (displayed in Fahrenheit).

Every NASCAR driver will tell you that the fastest car on the track is not necessarily the one with the most horsepower, but the car with the most grip. That's where the tire temperatures display becomes vital. As you drive your car, each tire undergoes a certain

amount of stress. The greater a tire is stressed, the higher the temperature rises in that tire. Your goal should be to aim for evenly distributed tire temperatures, all across each tire. If the tire temps are identical all across a specific tire, that means that particular tire is providing you with maximum grip, because the entire tire surface is touching the pavement.

Use the F4 tire temps display during testing and practice sessions to hone your chassis setup. Adjust tire pressures and/or suspension components in order to achieve balanced temperatures in your setup. Use the F4 tire temps display during races to spot handling problems that can be corrected during pit stops.

F5 Tire Changes

Press the "F5" key to display the Tire Change window while you drive. Using the Tire Change window you can specify which tires you'd like changed during the ensuing pit stop, and you can view the current remaining life of each tire; you can also dictate any adjustments to the pressures of each tire with this window.

Use the Spacebar on your keyboard to toggle which tires you'd like changed. Your choices are to have all 4 tires changed, right-sides only, left-sides only, or no tires changed. Each tire shown in the Tire Change window has a box next to it. A check mark fills

the box of each tire that will be changed. Empty boxes indicate the crew will not change those tires during the upcoming pit stop.

To have your crew perform tire pressure adjustments, use the up/down cursor arrow keys on your keyboard to select a specific tire. The current tire will appear highlighted in yellow. Use the left/right cursor arrow keys to raise/lower the cold pressure of each tire. The hot pressure (the operating pressure, indicated by "H") of each tire is indicated just below the cold pressure values. Once you've specified the new pressure value, your crew will make the necessary pressure adjustments during your next pit stop. Pressure adjustments are often the first thing tried by a race team to correct handling problems, because it is the least drastic remedy. Reducing the pressure in a tire may help it grip better during corners, but may also create more "rolling drag," thus robbing the car of some straightaway speed.

Beneath each tire shown in the window is a status bar that shows you the current wear (usage) of each tire. Each tire's status bar will gradually become shorter with wear. Fresh tires have a full green status bar; as a tire wears below 50% of its life the status bar will appear yellow. Tires that are nearly worn out will have a red status bar that will obviously be very short. Unless the race is on the line you should make every effort to pit for fresh rubber anytime you see a red tire status bar.

F6 Wedge

Press the "F6" key on your keyboard to display the Wedge adjustment window. Use the left/right cursor arrow keys to make wedge adjustments in five pound increments. Each five pound increment is equivalent to your crew member turning the screwjack one complete rotation (called a "round" in NASCAR terminology). Thus, ten pounds of adjustment would equal 2 "rounds"- also coincidentally, two strokes on your keyboard. The changes you specify will be implemented during your next pit stop.

Positive wedge values increase the amount of chassis weight applied to the right front corner of the car; conversely, negative values shift more weight toward the left rear of the car. Adding wedge may help a car that's tight turn better. The trade-off however is that the amount of punishment endured by the right front wheel (already the most heavily stressed tire) will also increase.

F7 Track Bar

Press the "F7" keyboard key to call up the Track Bar adjustment window. In the garage you can you can raise or lower either side of the track bar, but during races the crew will only raise or lower the right side of the track bar. Raising the right side of the track bar will loosen the rear suspension; lowering the right side of the track bar will tighten the rear end up.

Use the left/right cursor arrow keys on your keyboard to specify the amount of track bar adjustment you'd like performed during your next pit stop.

F8 Grille Tape

By pressing the "F8" key on your keyboard you can have the pit crew add or remove tape at the front grille of your car. The tape is used to cover portions of the front grille, thereby restricting the amount of air that can flow into the engine compartment. This causes the air to be funneled around the nose of the car instead, which reduces drag and improves downforce. NASCAR teams will generally use as much tape as they can get away with- too much tape can cause the engine to overheat.

Use the left/right cursor arrow keys on your keyboard to instruct the crew to add or remove tape during the next pit stop. The percentage of tape used represents how much of the front grille is covered; thus, a 20% tape setting would mean 80% of the grille is still open.

F9 Pit Summary

Press the "F9" keyboard key to view a summary of all of the changes that will be made to the car during your next pit stop. If you specified changes to the tire pressures, for example, you'll see those changes listed here. You'll also see the customary tires/fuel to be added/changed by the crew during the upcoming stop.

If your car is damaged, use the Spacebar on your keyboard to (while viewing the F9 Pit Summary) to instruct the crew to repair the car, or stop repairs. Need to get back out onto the track so you don't lose a lap? Press the Spacebar- assuming the crew is finished changing tires, they'll cease repair work and drop the jack to let you go.

"How Do I Get Out of My Car?"

When you want to stop driving, or take a breath and watch a cool replay, just hit the ESCape key. You'll be presented with some options as you exit the race car. These options vary slightly depending upon which driving session you are in.

Use the up/down cursor arrow keys to select the item you want, then press the Enter key. Want to see a replay? Cursor arrow down until you reach the View Replay selection, then press the Enter key on your keyboard. When you're finished watching highlights, you'll be right back here where you left off.

The items on the pause menu include Retire (exit the track), Call Tow Truck (in case you're disabled on the track), View Replay and Options (another way to get to the Options Menu that lets you adjust graphics/sound, controller devices, etc.). Items on this screen will be disabled whenever appropriate.

Unpausing the Action

Ready to quit looking at replays and jump back into the saddle? Press the Pause key on your keyboard (usually labeled "Pause" of all things!) to unfreeze the action and resume driving. You can also use the Pause button to temporarily freeze the action while driving, instead of the ESCape key. Obviously, the Pause key does not work during Multiplayer races.

Instant Replays

Relive all of your moments of glory with NASCAR Racing 4's elaborate instant replay system. Replays are viewable using a variety of camera angles; in addition, replay footage may be viewed from the perspective of any car on the track. This gives you unprecedented power to view every pass, crash or daring maneuver on the entire track, at any time.

There are some minor differences in the way replays work, depending upon whether you're racing offline (against computer opponents) or online (against human opposition via the Internet).

Offline Replay Viewing

At any time while driving, press the "ESC" key to temporarily pause the racing action. Choose View Replay to begin watching instant replay highlights. Keep in mind that the on-track action will be paused indefinitely while you review footage. When you've finished watching replays and want to resume racing action, press the ESC key twice, then press the Pause key on your keyboard. The action will pick up right where you left off.

Online Replay Viewing

When racing online, replay viewing differs in one significant manner- there's no way for you to pause the action. This means you'll have to confine your replay viewing to situations when you're not driving the car (for instance, when the race is over or when your car is not on the track for one reason or another). Also, due to bandwidth constraints, all cars may not appear visible to all players when watching a Multiplayer replay.

Driver: ◄ ► ☑ J. Tyme
Camera: ◄ ► ☑ Spectator
Press spacebar to hide controls.

Position: 11

Last Lap: 164.229 mph
Best Lap: 166.380 mph
Speed: 145 mph

LAP INFO

1	158.590
2	162.781
3	165.468
4	166.380
5	159.953
6	164.229

Session: ◄ ► Race
Lap: ◄ ► 7 of 16

08:02

Rate: 0x

CHAT

DONE

Replay Controls

Once you've chosen to view a replay, you'll see the replay viewing window. If you know how to work a VCR you'll find the replay controls to be relatively simple. Use the controls found at the bottom of the screen to rewind the footage to the beginning, start and pause the replay, and fast-forward to the end. Use the edit button to create small highlight reels of your exploits. Click on the timeline or drag its slider bar to queue the footage to a specific point.

Replay Controls

Rewind to Beginning: One click does it!

Rewind: Click once to rewind at normal (1x) speed. Each subsequent click causes the footage to rewind faster and faster.

Step Backward: Each click of this button steps backward, one frame at a time. Click and hold the mouse button to produce a low-speed rewind.

Play/Pause: Click once to unpause action that's frozen (roll tape!). Click again to freeze the footage.

Step Forward: Each click of this button advances the footage forward, one frame at a time. Click and hold the mouse button down to roll the footage at a low speed.

Slo-Mo Control: Click this button to view the action in slow motion; each subsequent click of this button slows the footage down another notch.

Fast Forward: Click once to fast forward at normal (1x) speed. Each subsequent mouse click increases the speed of the fast forward action.

Forward to End: Click once to jump to the end of the footage.

Edit Replay: Use this button to make and save shorter highlights. Queue the footage to a specific point and click the Edit Replay button once to select a starting point for the highlight; now go to the point in the current footage where you'd like the highlight to end and click the Edit Replay button a second time. You will be prompted to save the new abbreviated version in your replays folder.

Save Current Replay: Click this button to save the current replay in its entirety in your replays folder.

Replay Window: When viewing replays from the Race Weekend Menu, each click of this button toggles between Full Screen and Inset Window views. When viewing replays from the cockpit of your car, clicking this button exits the replay viewer and returns you to the driver's seat.

Find Incidents: Click the left button to automatically jump to the previous incident (if applicable). Click the right button to automatically jump to the next crash or spin (if applicable).

Changing Camera Views

NASCAR Racing 4 gives you a bazillion camera angles to view replays from (okay, that number may be a little high but there are a lot). Sure, you can watch replays from any of the provided camera views, but in addition, you can also check out these camera angles from the perspective of any other car on the track too.
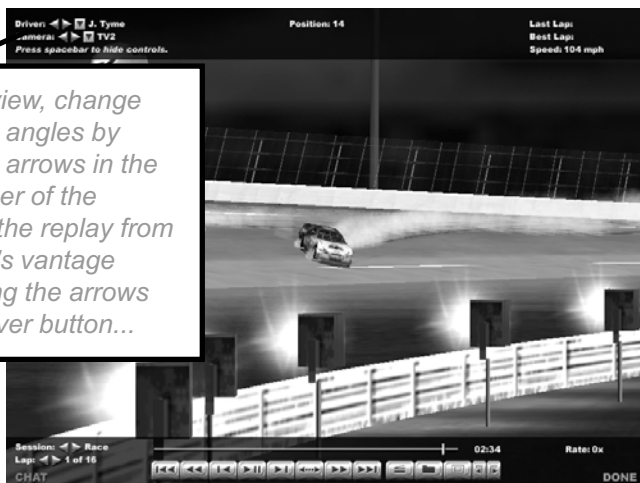
In full screen view, change replay camera angles by clicking on the arrows in the upper left corner of the screen. View the replay from another driver's vantage point by clicking the arrows next to the Driver button...

| INFO | LAPS | STANDINGS | ENTRIES |

Event Info ▶
DAYTONA INTERNATIONAL SPEEDWAY

DAYTONA
INTERNATIONAL SPEEDWAY

Driving Mode: Simulation

Race Length: 16 Laps

Computer Opponents: 13
Opponent Strength: 95

Damage Level: Realistic

RACE
Status: In Progress - Green
Time: 03:28
2 of 16
70 °F, North 0 mph

◄ ► J. Tyme   ◄ ► TV2

...From the Race Weekend Menu view, select replay camera angles with the drop-down button or the arrows. Select another driver's perspective to view from the same way, using the drop-down button or arrows.

CHAT   SESSION   BACK DRIVE

Replay
Standings

Driver: ◄ ► J. Tyme   Position: 16   Last Lap: 109.383 mph
Camera: ◄ ► Spectator   Best Lap: 164.813 mph
Press spacebar to hide controls   Speed: 92 mph

PRACTICE
13:15 Remaining

10	#26	166.571
11	#2	165.993
12	#12	165.883
13	#20	165.852
14	#31	165.788
15	#26	165.264
16	#113	164.813
17	#77	164.770
18	#83	163.459
19	#1	162.817

Session: ◄ ► Practice
Lap: ◄ ► 6

CHAT
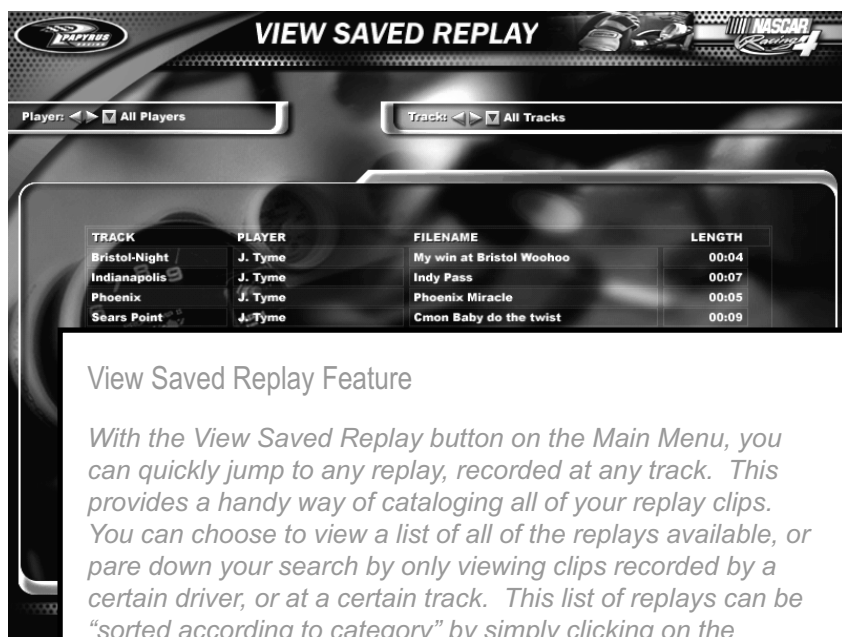
Pressing the "S" key on the keyboard brings up a standings box during replays. These standings run concurrently with the footage that you're watching. The Replay Standings Box will have up to three different modes of display, depending upon which race session you are in. Use the left/right cursor arrow keys to toggle between these display modes.

Your Own Highlight Library

NASCAR Racing 4 makes it easy for you to amass an incredible collection of replays. From the Main Menu choose View Saved Replay. This button reveals a list that contains all of the replay clips that are stored on your computer system, organized by track.

VIEW SAVED REPLAY

Player: ◄ ► ▽ All Players   Track: ◄ ► ▽ All Tracks

TRACK	PLAYER	FILENAME	LENGTH
Bristol-Night	J. Tyme	My win at Bristol Woohoo	00:04
Indianapolis	J. Tyme	Indy Pass	00:07
Phoenix	J. Tyme	Phoenix Miracle	00:05
Sears Point	J. Tyme	Cmon Baby do the twist	00:09

View Saved Replay Feature

With the View Saved Replay button on the Main Menu, you can quickly jump to any replay, recorded at any track. This provides a handy way of cataloging all of your replay clips. You can choose to view a list of all of the replays available, or pare down your search by only viewing clips recorded by a certain driver, or at a certain track. This list of replays can be "sorted according to category" by simply clicking on the appropriate column heading. Use the Delete button at the bottom of the View Saved Replay screen to trash your old clips you no longer want. Be sure to use descriptive names for your replays so they'll be easier to find.

Going For it All

Getting pretty comfy with all of the tracks? Want to see if you can bag consistent finishes throughout an entire season? Click on Championship Season on the Main Menu to see if you've got the magic to finish an entire NASCAR Winston Cup season on top.

Start by setting all of the parameters that will control your season. Race length, opponent strength, realism options and rules can all be set up the way you want. Keep in mind that these settings cannot be changed once your season is underway. Start a season running 25% race distances, and they'll all be that length. Events are raced in the order they appear on whatever schedule file you use. For example, if you select the NASCAR 2000 season schedule, you'll start in Daytona and end in Atlanta, just like the big boys do. The Standings button at the bottom of the screen allows you to view individual race results, as well as the season totals.

The Championship is decided using a points system. You earn points according to how well you finish in each race. Win the race, and you'll receive at least 180 points (175 points for finishing first, and a 5 point 'bonus' for leading at least one lap). Here's a chart of how the points break down:

NASCAR Winston Cup Points

1st...........................175	16th........................ 115	31st..........................70
2nd........................ 170	17th........................ 112	32nd...................... 67
3rd........................... 165	18th......................... 109	33rd......................... 64
4th........................... 160	19th......................... 106	34th........................ 61
5th........................... 155	20th......................... 103	35th........................ 58
6th........................... 150	21st.........................100	36th........................ 55
7th........................... 146	22nd...................... 97	37th........................ 52
8th........................... 142	23rd....................... 94	38th........................ 49
9th........................... 138	24th......................... 91	39th........................ 46
10th......................... 134	25th......................... 88	40th........................ 40
11th..........................130	26th......................... 85	41st..........................37
12th......................... 127	27th......................... 82	42nd...................... 34
13th......................... 124	28th......................... 79	43rd......................... 31
14th......................... 121	29th......................... 76	Ld One Lap............ 5
15th......................... 118	30th......................... 73	Ld Most Lps...........5

If you want to sit at the head table at the annual NASCAR banquet in New York City and wear the champion's crown, you'll have to put together a season filled with consistent top ten finishes. Win ten or twelve races but crash out and finish last in ten or twelve, and you'll find yourself out of the running. Consistency is the key-you don't have to always win, just put together a lot of good finishes. Save and create as many seasons as you'd like- just don't try to finish them all at once!

Player Info

Click the Player Info button on the Main Menu. Now you're at the
Player Info screen where you can personalize NASCAR Racing 4:
add your name, select which car(s) you'll drive, and pick a
manufacturer. You can also edit your own Autochat messages,
which are used for online Multiplayer racing.

*Enter your name and select a car to drive offline (against the
computer) and a car to drive in Multiplayer events (against
real people over the Internet). If you have your picture
saved as a 24-bit Bitmap file (.bmp extension) you can add it
to this screen by clicking on the Load Photo button (place
the picture file in your N4/Exports folder first). Edit and save
up to ten Autochat messages for use in online races. Just
click on a message and type what you want. To display the
Autochat messages in races, just press the corresponding
numeric key on your keyboard and hit the Enter key. Place a
dollar sign "$" at the end of each Autochat message if you'd
rather have your message displayed immediately- this
avoids having to press the Enter key to send. Wonder if
"Little E" knows this Kaemmer fella is driving his car...*

Opponent Manager

OPPONENT MANAGER

Roster: Cup 2001
Total Drivers: 72
Active: 72
☐ **Display Active Drivers Only**

	#	NAME
[X]	8	Earnhardt, Dale
[X]	10	Benson, Johnny
[X]	12	Mayfield, Jeremy
[X]	14	Hornaday, Ron
[X]	15	Waltrip, Michael
[X]	17	Kenseth, Matt
[X]	18	Labonte, Bobby
[X]	20	Stewart, Tony
[X]	21	Sadler, Elliott
[X]	22	Burton, Ward
[X]	26	Spencer, Jimmy
[X]	28	Rudd, Ricky
[X]	31	Skinner, Mike
[X]	33	Nemechek, Joe
[X]	43	Andretti, John

First Name: Dale
Last Name: Earnhardt Jr.
#: 8
Sponsor:
Team:

MONTE CARLO

* You will be driving this vehicle in offline races.
# You will be driving this vehicle in online races.

ENTER PAINT SHOP

ROSTER: NEW SAVE SAVE AS DELETE   DRIVER: RATINGS NEW SAVE DELETE   DONE

Use the Opponent Manager Menu to build and maintain lists of drivers for your races. Just create a new Roster and select each driver you want added to it by clicking on the brackets next to their names. Keep a Drivers Roster with all of the current NASCAR Winston Cup stars in it. Make another list of ficticious drivers and cars- build as many rosters as you want.

Create new drivers and access the Paint Shop to design their cars. Activate and deactivate drivers from the current roster. Drivers must be Active in order to be able to race.

Finally, edit the driver ratings of any car that exists on your system. These ratings affect the performance of each car (except your own, you'll have to drive it yourself!) and can be adjusted to reflect the most current statistics.

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Painting Your Car...And Repainting Your Car...And...

Do you like to switch sponsors more often than the "hat man's" face gets shown on TV? Want to keep your collection of cars up to date with the latest and/or commemorative paint schemes of the series? NASCAR Racing 4 gives you the brush and design tools to paint or repaint any race car in the game, whenever you wish!

To enter the NASCAR Racing 4 Paint Shop, click on the Opponent Manager button at the Main Menu. Select the car you want to paint, whether it be yours or any other driver's car. Want to paint Tony's car blue? Go ahead, he won't mind. Give Mark a purple and orange car? Why not, it's your Paint Shop! To begin painting a car, just select it from the driver's list on the left, then click on the Enter Paint Shop button beneath it.
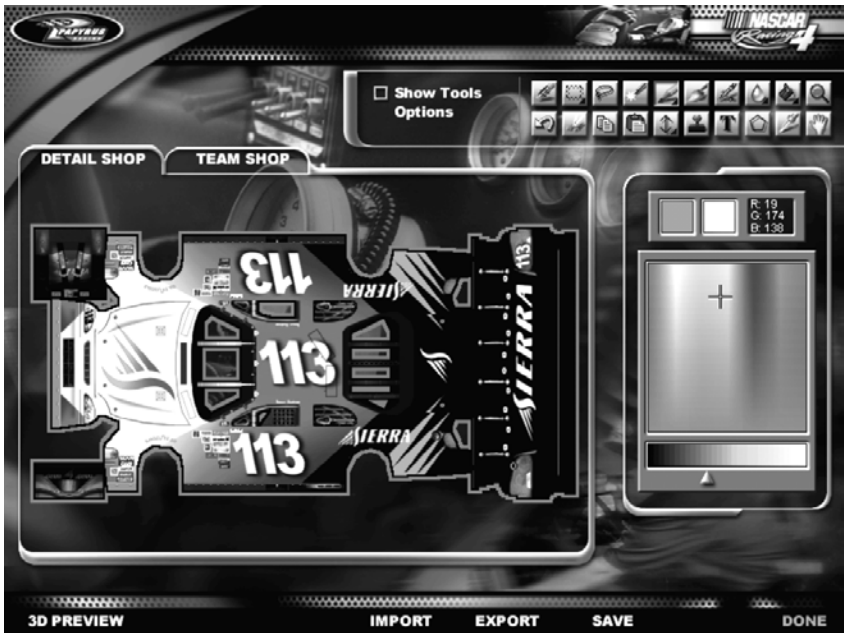
The NASCAR Racing 4 Paint Shop

Many of the controls found in the Paint Shop will seem familiar to those that have previously used any other artistic software packages. The Detail Shop allows you to paint the car itself, while the Team Shop offers you the ability to customize the look of your crew's uniforms and accessories.

To move back and forth between the Detail Shop and the Team Shop, simply click on the tabs, as shown at right.
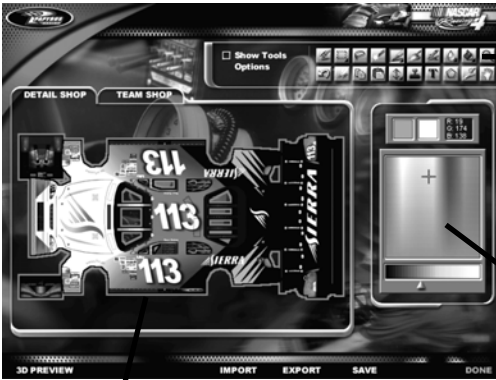
Use the various Paint Shop tools to design your car and accessories

Mix and load two colors using the paint palette. Apply the primary color (shown in the left swatch box) using the left mouse button; apply the secondary color (shown in the right swatch box) using the right mouse button.

Apply paint and decals directly onto items shown in this window- in this example, the #113 car. Just grab a brush tool and start swiping!

☐ **Show Tools Options**

Basic Painting

The basic process of painting a car or object consists of clicking on a tool in the toolbox (shown above) and applying it to whatever you want to paint. For example, click on the Freehand Brush tool to select it, then choose a primary color with the left mouse button. Choose a secondary color with the right mouse button. Next, click and hold the left mouse button as you drag it across the car or crew

object to apply the primary color. Click and hold the right mouse button as you drag it to apply the secondary color.
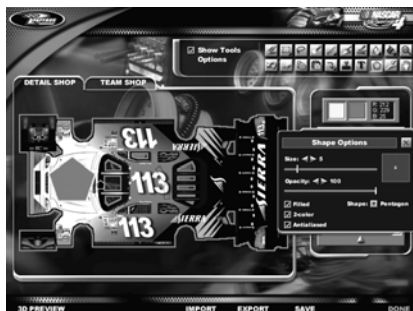
Show Tools Options

By checking the box labeled "Show Tools Options" you can see all of the pop-up windows each time you select a tool. Change the values in these windows to affect the tool you want to use. In the picture above left, we've just selected the Shape tool. In the shot at the right, we've picked two colors we like and set some other options for our shape, such as Anti-aliasing. Heck, we even picked the shape itself, a pentagon. Next we simply put the cursor over the hood of the car, clicked and held down the mouse button to draw our shape.

Like so many other buttons and elements of NASCAR Racing 4, each tool in the painting toolbox has on-screen descriptions- just right-click on any button, or hover the cursor over the tool for a few seconds, and the description will appear.

Starting With a Clean Slate

There are two ways to start painting with a nice clean car in the NASCAR Racing 4 Paint Shop: create a new driver from scratch, or choose the car you wish to paint and select the Eraser tool. Click the left mouse button on the car or object to clear the textures and start with a solid primary color. Use the right mouse button in conjunction with the Eraser tool to clear the car and fill it with the secondary color.

Paint your crew uniforms and accessories the same way. Simply click on the Team Shop tab and do your stuff.

3D Preview Window

AUTO ROTATE   RESET   DONE

3D PREVIEW   IMPORT   EXPORT   SAVE   DONE

Preview the Results

Click on the 3D Preview button at the bottom of the screen to open
a window that lets you see what you've accomplished. Click the
Auto Rotate checkbox to let the car spin 360° repeatedly. Or,
uncheck the Auto Rotate box to stop the rotation and reveal a hand
tool (as shown below) that you can use to turn the car in any direction
you wish. Simply click and hold the left mouse button while you
rotate the car with the hand tool. Click and hold the right mouse
button to zoom in and out. Click the Auto Rotate checkbox once
again to let the car spin on its own, using the new viewing angle
you selected.

Color and Tool Tips

When mixing colors, you can left-click your mouse on the primary or secondary color swatch boxes to reveal additional color controls that allow you to create the exact color you're looking for.

You'll notice that many of the tool buttons within the Paint Shop can be expanded to reveal multiple functions. These tools are denoted by a small triangle in the lower right corner of the tool button.

3D PREVIEW   IMPORT   EXPORT   SAVE   DONE

The NASCAR Racing 4 Paint Shop also gives you the ability to Import and Export artwork to and from your car. Got a nice logo graphic you want to bring in? No problem, save it as a Targa file (.TGA extension) and import it using the Import button at the bottom of the Paint Shop screen. Likewise, use the Export button to send the entire car or team shop window to a Targa file. Open the Targa file in your favorite third-party painting application and touch it up the way you want. When your finished, save your work and bring it back in using the Import feature.

Proving it to the World

Sure, beating the computer controlled drivers in NASCAR Racing 4 is tough- but wouldn't you like to share some of your driving exploits with real humans? Wouldn't you like to see how you stack up against other NASCAR Racing 4 drivers around the world? In that case, bring it! A licensed copy of NASCAR Racing 4 and a connection to the Internet are all you need. You don't even have to endure the agony of trying to round up 30-40 of your closest friends/ coworkers in order to fill up the field. NASCAR Racing 4 does all of that for you, free of charge. If you got the CD ROM, and you've got an Internet connection, you're all set!

Configure Your Internet Connection

Click the Multiplayer button on the Main Menu, then click on the Configure button at the bottom of the screen. Whether you've got DSL, a cable modem or a standard dialup modem, choose to Find Network Addresses a Different Way if NASCAR Racing 4 isn't automatically detecting your dialup connection or network IP. Use the Detect Modems option for direct, modem-to-modem competition. Use the Detect Serial Ports option for direct, null-modem cable races.

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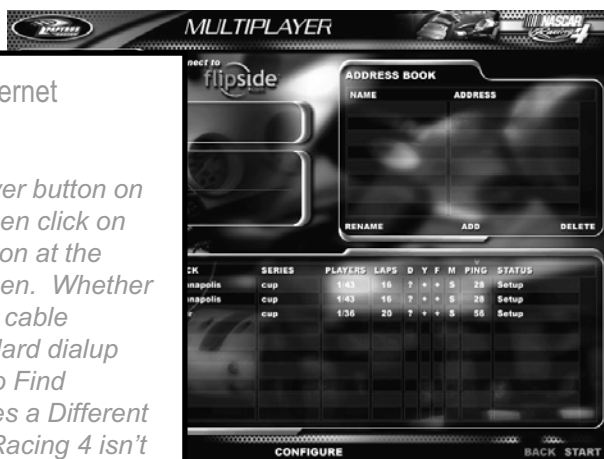
Flipside.com

Online racing requires a free membership with Flipside.com (did we mention that it's free?) in order to participate. Just visit Flipside.com when you're browsing the Web, or click on the Flipside.com button on the Multiplayer screen- it'll take you straight there to sign up!

Join or Host Races

Most online drivers will Join races- that is, they'll participate in races that are created by someone else. To join a race, check the Join box and scope out all of the races available. To enter a race, just click on the one you want, then hit the Start button. Some races may be protected by a password (which you'll need to know if you want to get on the track with those folks). Passworded races are usually league events open only to drivers who belong to that league.

Use the Address Book to store connection information that you plan to use regularly. This is really handy if you belong to a racing league that utilizes a private server.

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If you're the generous type who like to have friends over often, you might want to Host some races. All it takes is a good connection. You'll be able to host a few buddies reliably using a 56K dial-up, but if you want to host races with larger field sizes, your best bet is to use a high-speed broadband connection like a cable modem or DSL. Using a dedicated server to host (a separate computer that is set aside to do nothing more than host the race- without anyone actually driving a stock car, playing a hand of solitaire or crunching spreadsheet numbers on it) is the best bet if you want solid, steady results. To host a race, check the Host box and set limits on what types of connections you'll allow.

As the race host, you can use the Max Latency selectors to keep out racers who have poor Internet connections. This keeps what you see on the screen (positions of cars) nice and stable.

In addition to picking the track, rules, and race weekend parameters, you can also decide how many drivers you'll allow in your race. Click on the drop-down arrows and select the number of drivers you'll allow. If you've got a monster connection and server, cram all 42 cars on the track. If you're hosting with a minimal connection, you may want to limit your race to a smaller number of opponents instead.

Online Racing Caveats

Once you have joined or launched an online race, the sequence of events is similar to that of offline racing, with a few exceptions. The Host has control over all of the race setup options, and the game cannot be paused.

Talk While You Drive

Online, you'll want to sometimes "chat" with other drivers. Notice there are several Chat buttons sprinkled throughout NASCAR Racing 4, most notably at the bottom of the Race Weekend Menu. When you're racing online, you can click a Chat button and open up a pad for typing messages to your competitors.

While driving the car, press any numeric key across the top of your keyboard (1-9 and zero) to display the appropriate Autochat message stored on your system. Remember, these Autochat messages can be pre-edited the way you want. To have the message go straight to the screen, use the dollar sign symbol "$" at the end of each message you store in Autochats. Without the dollar sign symbol, messages will be queued on-screen, but not sent until you press the Enter key. It's a good idea to reserve Autochat messages for necessary comments such as passing instructions, alerts to other drivers that you're going to pit, etc.

You can also type messages from scratch (not a good idea at 180 mph) by pressing the "T" key on your keyboard, typing the message and hitting the Enter key.

Heroes of the Information Superspeedway

A Guide to Online Competition Using NASCAR Racing 4

Rodney Arndt is a race car driver. O.K., so his picture has never made the cover of any of the NASCAR magazines you buy at the local Dixiemart, and he isn't the benefactor of countless t-shirt and endorsement deals, but he's a race car driver just the same. Oh sure, at age 35 he's got that vending business thing that's been in his family for over forty years, but make no mistake- Rodney Arndt is a race car driver.

You see, Rodney (online nickname: Racinrod) has competed in cyber stock car racing for several years now. "I'll be the first to admit that I'm not the fastest driver out there," Rodney says, "but in all of the series I run in online I find myself towards the front in points because I finish races. I very rarely win, but I FINISH. This should be everyone's first & foremost goal. The other goals I use for racing are what I call the '3 P's.' Patience, Practice & Perseverance."

Paul Dornburg really *is* a race car driver. Now 51, Paul (online nickname: a911sc) is a Maintenance Manager at a chemical plant these days. But twenty years ago the Kentuckian used to mix it up

on the bullrings of the sunbelt region, competing against the likes of Michael Waltrip and Jeff Green in mini-stocks division races. "I was the track mini-stock champion in 1980," Paul begins. "The next year Mike Waltrip started racing and beat me for the championship by the points I didn't get when I didn't start the opening night feature because the flywheel on my VW had come loose." In 1996 Paul bought NASCAR Racing 1 while attending Speed Weeks at the Daytona International Speedway. A few months later he wandered online to race and has been there ever since.

One of the best aspects of the whole online experience is the remarkable friendships you end up making. Run a few races on the Internet, join a league or two, and in no time you've got friends all over the map. Tom Eckels and Mike Langston, a pair of "Michiganders" met this way. Tom's (online nickname: tceckels) job title is too long to print here, but suffice to say he does technical stuff for an automotive-related company.

"Mike had been in the first race that I ever ran online and after that short Talladega race we "chatted online" for awhile about our interests in racing," Tom recalls. "Over the next couple of months Mike and I chatted frequently between races. At some point we traded phone numbers and would spent an hour or more after each race discussing the night's events. One night when I hadn't been racing, my phone started ringing about midnight or so...I was at the computer so I grabbed

Sim Driver Tom Eckels

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the phone and as soon as I said hello this ecstatic voice started yelling into the phone. "I just won the race! I just won the race at Charlotte!" It was Mike calling to tell me about his 'first official league win.' He was stoked and I was happy for him, honored that he'd call me right after the race was over to share his excitement and joy. Not long after that we got to meet in person at Michigan Speedway. It was like seeing an old friend you hadn't seen in a long time. We spent the day at the racetrack shooting the breeze along with fellow sim racers Randy Lange and Larry Holbert."

Believe it or not, there are a lot of folks out there in the 'sim racing community.' And you thought you were the only one! Twenty-four hours a day, seven days a week, drivers in every age group and social class assemble on the Internet to compete using NASCAR Racing 4. Some of the friendships established through this common ground will last a lifetime.

In fact, many of the folks who designed and built your NASCAR Racing 4 software originally met online! Scott Stutsman (Senior Producer), Shawn Wise (QA Manager), Scott Sanford (QA Lead), Brian Motisko (QA) and others began racing online, then parlayed their experience into a career with Papyrus Racing Games, makers of the NASCAR Racing series.

Papyrus Senior Designer Rich Yasi is cut from this same cloth. To hear Rich tell it, "My most traumatic non-Red Sox-related childhood sports memory was watching my racing idol Richard Petty lose the 1976 Daytona 500 in that famous last-lap showdown with David Pearson. I've also been a fan of video and computer games ever since I can remember. Once I played 'Pong' on my cousin's TV,

that was it. Fast-forward to 1994. Three years after graduating from college (with a degree in accounting!) I was the controller of a small software company and bored out of my skull. I was looking through the Boston Globe's 'help wanted' section one day when I saw an ad for a game tester position at Papyrus, and I figured what the heck. I went for it, and got it."

Rich's (online nickname: ryasi) most poignant online memory involves one of the founding fathers of Papyrus Racing Games, David Kaemmer. Rich tells the story this way: "We were racing at North Wilkesboro, and I had battled my way from the back of the field to second, and had been gaining on the leader for several laps. Now, five laps from the finish it was time to make my move. The leader drifted a bit wide halfway through turns 3-4, and I ducked underneath him. We came off of turn 4 side-by-side and were faced with a horrifying sight- Dave Kaemmer's car parked sideways, just before the start/finish line, blocking the entire track! Remember, there was no spotter in the game back then, and we were racing without yellows, so there was no indication of danger. We both slammed into the side of Dave's car and killed our engines- Race over. When I came to work the next day, I went over to Dave's office and asked him what the...um...heck he was thinking, and he replied, 'Well, I was thinking that we really need to take a closer look at the damage model with regard to heavy side impacts.' ARGH!!!"

Lonnie Larkan also has recollections of mixing it up on the track with Dave Kaemmer. At 40, Lonnie (online nickname: L_Larkan) is an Air Traffic Controller in Los Angeles. "I remember when Papyrus was first trying to put together a multiplayer network that

eventually became known as Hawaii, the guys in Boston would host a LAN session and had written a program that would allow one user to dial in from the outside and join the session," remembers Lonnie. "I was lucky enough to be the first tester from the outside to be able to call in and race. Wow, what a thrill! Not only was I racing the greatest simulation, but I was racing the greatest simulation drivers...well, except for Dave Kaemmer. Dave is one heck of a programmer/designer/producer but I remember a few racing sessions where he would get out of control and wipe out half of the field. Of course, he was just testing the crash dynamics, that Dave is a true professional!" Lonnie says with a laugh (editor's note: Dave really is an accomplished driver who has also competed in some real world racing...but somebody's gotta crash test these things, right?).

Sim Driver Lonnie Larkan

If you've raced online before, chances are you've run across the path (literally and figuratively) of Mike Ostrow. Mike and his non-twin brother Tom are both avid sim racers. Mike even noted in his league bio once under marital status that "my wives are Grand Prix Legends and NASCAR Racing...they don't know each other and I'd like to keep it that way!" At 35, Mike is a Senior Draftsman in New Jersey. Always a frontrunner, he has amassed several league championships and even published a Web page with driving tips for other online racers.

If you're getting the notion as you read this that online racing spawns

many friendships, and that the actual racing itself eventually takes a back seat to the comraderie, you're catching on. In short, don't be a jerk during the races. Log on and meet folks- no one will respect you for being a loudmouth who's fast. You'll find pretty quickly that if you can keep your temper in check and befriend those you race with, it really doesn't matter whether you're good at this sim racing thing or not.

But make no mistake about it, everyone takes their driving seriously to some degree. Paul Dornburg was racing online one night at Darlington and had the lead when his phone rang. Paul's wife answered the phone; it was a man from where Paul worked on the other end of the line. Paul's wife tiptoed into the room and notified him of the call. Just as she finished the sentence, Paul crashed into fellow sim racer Mike Lentz and was out of the race instantly. "No sailor ever used as many bad words as I did that night," Paul says, "my poor wife retreated downstairs and apologized to the caller for my actions. After she finished giving me a very well-deserved talking to, I called work and talked to the man there. I explained and apologized for acting like such a jerk. We talked for a few minutes and then he asked me to come to work to see something. 'O.K.' I said, 'just let me get dressed and I'll be right there.' There was an awkward pause from his end before he finally asked, 'You race naked?"

One online driver who can relate is Terry Henne. The 44-year old Californian is an automobile technician by day (online nickname: thenne) and by night Terry can often be found at his computer, participating in an online race. One night as Terry raced into the wee hours of the night, his wife put a load of laundry in their machine

and went to bed. Sometime during the race, the washing machine's hot water hose burst and began spewing water everywhere. With his wife sound asleep, Terry was jolted with periodic warning signs that something was wrong. First, the lights in the house flickered. Next the smoke detector went off. Unfazed by the commotion, Terry lept from his chair during a pit stop and yanked the battery out of the smoke detector, jumped back in his seat and continued driving. After a ninth place finish at Darlington (were these two guys in the same race?) Terry sat pensively in his chair, mentally replaying the race. The sound of spraying water eventually jolted Terry up out of his seat where, upon investigation he discovered the broken hose, along with two rooms of his house completely flooded by all the water. His wife was awakened by the drone of the couple's wet vac as Terry began sopping up 'Lake Henne.' "My wife and I just looked at each other and surveyed this huge mess. We laughed so hard we cried and when she finally caught her breath she asked if the roof had to fall on me to get my attention. I replied, 'well dear, that would depend on what position I held in the race."

Sim Driver Chuck Keller

Yes, the vast majority of online racers take their driving very seriously. Cause an intentional wreck, curse and display poor character traits, and you'll soon discover it hard to find races to enter. Sure, you're allowed to make mistakes, you're allowed to be slow, you're allowed to be human. But above all, be civil. "People need to treat others online as they would face to face,"

says Brian Tate (online nickname: btate80), a veteran sim racer who also happens to be the Communications Officer for the CART Toyota Atlantic Championship series. Fellow sim driver Rhawn Black agrees. "I still have great relationships with several of the people I met many years ago online," states Rhawn (online nickname: Ripp). "Terry Adams and his family go out with mine regularly. Greg Hans and I enjoy Barbeques, racing R/C cars and slot cars regularly also. Bill Dillon and I still talk about everything but racing on the phone and Greg and I even went to Bill's wedding and had a ball. Alec Flory and I still talk daily and plan to take a trip together with our families soon. It just goes to show what a great vehicle online racing can be for having fun and bringing people together that otherwise would have never met."

Racing online also raises the overall level of your abilities, because you can draw from the strengths of so many other people instead of going it alone. Many sim racers are eager to share their special skills with their fellow drivers. There are chassis setup gurus like Bob Stanley, Bill Benedict and Bill Bollinger out there; there are actual real-life NASCAR drivers like Dale Earnhardt Jr. and Kevin Harvick who compete online; and there are guys like Brian Simpson who can paint a car like nobody's business. Brian has created masterful designs that adorn many a sim racer's virtual ride. But even the artistic types drive to win. "My first online race was a Talladega sprint race with 18 cars in it," says Brian (online nickname: bsimpson). "Dodged a few wrecks, passed a few cars, and finished 12th. Didn't win the race, didn't care...from the rush of the adrenaline, to the shaking in my legs and the beating of my heart I knew I had found one of the most challenging, fun things I'd ever done...Momma, I was home."

So where do you start? Here are a couple of things to do:

Join a league. Visit the newsgroups or do a quick Internet search for NASCAR Racing 4...most leagues have monnikers like HAL, HGNS, OSCAR, CARS and FSS-PRO. Many leagues also have their own Web pages. Rodney Arndt runs a league called SASCAR (sascar.com) that consists of several divisions, depending upon your experience. So don't worry about driving like a rookie, just don't behave like one. ***Join a team.*** Many drivers have formed teams in order to trade secret chassis setups and driver notes. "My racing improved markedly after joining a team, because now I was competitive with setups and other information," notes online racer Chuck Keller (online nickname: ckeller).

Grab your steering wheel, fire up your Internet connection and launch your copy of NASCAR Racing 4...there's a whole world waiting out there.

Getting More Information on the Web

Rodney Arndt's NASCAR Racing 4 Setup Guide
http://www.sascar.com
Mike Ostrow's Multiplayer Tips Page
http://userweb.interactive.net/~mostrow/multiplayer.html
Lightspeed Motorsports Online Racing (setups, tips, forums)
http://www.team-lightspeed.com
Race Servers Network
http://www.raceserver.net

How to Find the Garage

To enter the Garage, begin by clicking on the word "Garage" at the bottom of the Race Weekend Menu...
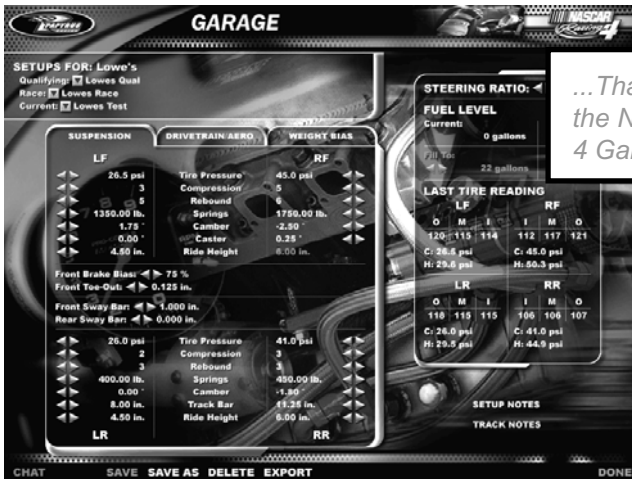
...That brings us to the NASCAR Racing 4 Garage.

GARAGE

SETUPS FOR: Lowe's
Qualifying: Lowes Qual
Race: Lowes Race
Current: Lowes Test

SUSPENSION   DRIVETRAIN AERO   WEIGHT BIAS

FRONT BIAS: ◄ ► 1830 lbs. (50.8%)

990.0 lb.   840.0 lb.

960.0 lb.   810.0 lb.

LEFT BIAS: ◄ ► 1950 lbs. (54.2%)

WEDGE: ◄ ► 0 lbs. (50.0%)

CHAT   SAVE SAVE AS DELETE EXPORT
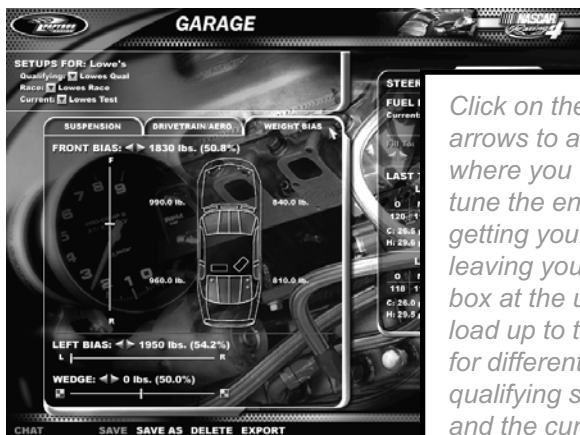
Click on the tabs, sliders and arrows to adjust each item where you want it. You can tune the entire car without getting your hands dirty or leaving your easy chair. In the box at the upper left, you can load up to three different setups for different sessions: a qualifying setup, a race setup, and the current setup you're tinkering with.
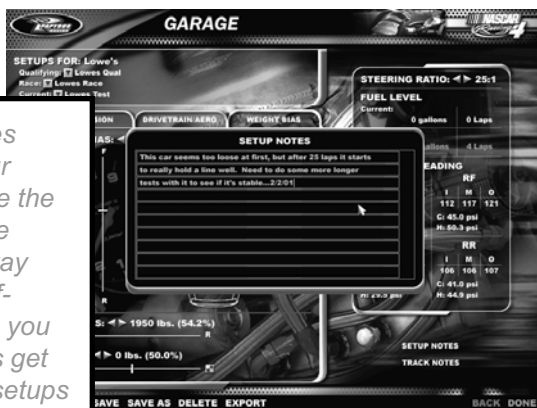
Click on the Setup Notes button to document your changes to the car. Use the Track Notes pad to save information about the way you drive the track itself- such as how many laps you can turn before the tires get too worn. Export your setups to HTML files to share with others.

GARAGE

SETUPS FOR: Lowe's
Qualifying: Lowes Qual
Race: Lowes Race
Current: Lowes Test

STEERING RATIO: ◄ ► 25:1
FUEL LEVEL
Current: 0 gallons   0 Laps

DRIVETRAIN AERO   WEIGHT BIAS

SETUP NOTES

This car seems too loose at first, but after 25 laps it starts
to really hold a line well. Need to do some more longer
tests with it to see if it's stable...2/2/01

READING
RF
I   M   O
112 117 121
C: 45.0 psi
H: 50.3 psi

RR
I   M   O
106 106 107
C: 41.0 psi
H: 44.9 psi

S: ◄ ► 1950 lbs. (54.2%)

◄ ► 0 lbs. (50.0%)

SETUP NOTES
TRACK NOTES

SAVE SAVE AS DELETE EXPORT   BACK DONE

Confused by the choices? Hover the cursor over an item, or right-click on it with your mouse to get a pop-up explanation. And by all means, take a look at the following pages.

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How to Tune Your Car

All of these settings, where do you start? It can seem overwhelming, but it really doesn't have to be. Needless to say, if you want to go fast, you've got to make some adjustments to the car that fit your style- not your buddy Ralph's, but yours. To make this task easier to understand, we enlisted the help of a couple of seasoned veterans: Chief Sim Steward David Kaemmer, and NASCAR Crew Chief Philippe Lopez. We'll start by letting Dave walk you through the basics, and we'll bring Phillipe in for the fine tweaks:

Dave Kaemmer: Each of the setup items can have several different effects, so it is difficult to say, 'if you change this, A will happen, if you change that, B will happen.' It just doesn't work that way. What I'm going to explain here are the general effects that you should see by changing a particular item. This doesn't mean that you will see those specific effects whenever you change that item- you might have something else in your setup that masks your adjustments. The best analogy I've heard about car setup is that it's like solving a Rubik's Cube puzzle- sometimes it appears to be pretty close, but you may have to undo a bunch of stuff in order to get closer.

The most important things to keep in mind are these:

1. You want the tires to be at the correct camber while cornering.
The grip falls off noticeably if the dynamic camber (the camber while cornering) is off. The best grip is obtained with the tire leaning a bit into the turn (i.e. negative camber on the outside wheel, positive

on the inside). Therefore, you will probably want the edge of the tire on the inside of the turn to be a bit hotter than the edge on the outside of the turn.

2. The tires grip best when they are each shouldering their fair share of the download on the car. When one tire is carrying more than its share, it will have a bit less grip at the limit than the others (i.e. two tires carrying 1000 lbs. between them have more grip than one tire carrying all 1000 lbs. by itself). This is why the cars carry a lot of left side weight at ovals tracks. When a car is cornering, the outside tires (right-side on ovals) are carrying more of the load, and so the overall grip is reduced. By starting with more weight on the left side of the chassis less grip will be lost, because the load will be more evenly balanced left-to-right while cornering. If more of the weight shift while cornering is transferred at the front (because the car has stiffer front springs, or a stiffer front sway bar), then the front will lose more grip than the rear. You generally want more weight transferred at the front, so that your car has some grip left over at the rear for putting down the hammer.

3. You want the car to be neutral in handling- neither pushing nor loose. When your car's neutral, you should be able to get to full throttle or very close to full throttle coming off the corner, and with the steering centered, the car will be in a nice drift. You should be able to pull the car into a spin with the steering when at or near full throttle. If at full lock, the car hasn't started a lazy spin, then the car is too tight (don't try this in real life). You can really tell by checking the front-to-back tire temps- if they are nearly equal, then the car is good.

4. Mechanical changes (springs, shocks, track bar, camber, etc.) affect the car at all speeds. Aerodynamic changes (spoiler, grille tape) affect the car mostly at higher speeds (140+ mph).

Tire Pressures

Higher pressures have less rolling drag, and so are faster at high speeds, with less heat build-up. Above the optimal pressure (manufacturer recommended pressure) the center of the tire will tend to heat more, resulting in more wear during cornering. Going below optimal pressure can help put heat into a tire that isn't reaching a good temperature. Lower pressures give slightly sloppier, more forgiving handling, which can help on slower tracks. Lower pressures will grip a bumpy surface a bit better. Higher-pressured tires won't deflect as much under load, so tire pressure can be used to change stagger a bit (going higher on the right or lower on the left increases stagger). In general you'll need to aim for tire temps between 190 and 240 degrees, and they should read evenly front-to-back if the car is neutral (neither loose nor pushing). Across the tread, optimal pressure will give slightly higher (5-10 degrees) middle temperatures. There is no single 'perfect' pressure- it's always a matter of tradeoffs to arrive at whatever makes the car work. You generally don't want temperature extremes on either edge of a tire, or in the middle, simply because it'll wear out too fast. In qualifying, though, maybe that would be ok...hey, whatever works!

Front Tire Pressure

Higher pressure in front increases responsiveness, lower pressure increases stability at high speed.

Getting Started

So many tweaks, where do you start?

Philippe Lopez: "Geez, it took me fifteen years to learn all this stuff! But seriously, at every track you're going to need some sort of baseline. The first changes should always be in the springs and swaybars- leave the shocks alone. You can really, really dial a car OUT with shocks. So if you're not sure, just leave them alone. Shocks are a timing device- how you enter a corner, how you drive off a corner, how fast you go. It's a timing, dampening force, and a spring is not. A spring is just going to hold the car up. So until you get more familiar with how to adjust the shocks, you'd be better off changing the springs and swaybars. If the car body 'rolls' too much then put in bigger swaybars. Corner entry problems are usually right front, exit problems are usually rear springs. Wedge is really more of a driver's preference- you can have 2 team cars with identical settings and the drivers will each want different wedge settings."

Rear Tire Pressure

Higher pressure in the rear increases straight line stability, lower pressure increases turn-in rotation. Higher right rear pressures can give some stagger change, which will loosen the car under power.

Shocks

Think of the shocks as directional springs that act only during transitions. While transitioning to braking, the front compression settings and rear rebound settings affect the balance in the same way as the springs (stiffer means less grip at that end). While transitioning to throttle, the front rebound and rear compression settings come into play. By stiffening or softening these settings, the car's balance can be changed during transitions, but kept the same at mid-corner, or steady state. All of the asymmetrical wizardry that can be applied to the springs (left-right split, wedge, etc.) can be applied during transitions using the shocks.

Front Shocks Compression

Stiffer means tighter handling under braking, softer means looser under braking.

Front Shocks Rebound

Stiffer rebound makes the car tighter under acceleration, softer makes it looser under acceleration.

Rear Shocks Compression

Stiffer means looser handling under acceleration, softer means tighter handling under acceleration

Rear Shocks Rebound

Stiffer settings are looser under braking, softer settings are tighter under braking

Curing A Loose Car

Philippe Lopez: "If the car is loose going into a corner, nine times out of ten people point to the right front spring and try to stiffen it up. A lot of times that works, however the downside is that it will make you tight in the middle of the corner.

"If you're loose going into the corner during a race try putting in some diagonal wedge."

Springs and Sway Bars

When it comes to springs, softer is better. Softer springs will generally do a better job of gripping bumpy pavement than stiff springs, and all pavement is bumpy to some degree. There are some downsides to soft springs though- set the springs too soft and the car will scrape the pavement. This becomes far more likely at a banked track, where the centrifugal loads are higher. Also, soft springs have a hard time keeping the car from leaning all over the place, which jeopardizes the camber angles and loses grip.

To fix the first problem, you can raise the ride height, or stiffen the springs, or both. Raising the ride height is actually a reasonable solution, but at some point you will have raised the center of gravity high enough to cause too much load transfer, and that will hurt you. On an oval, a greater proportion of the cornering load will end up on the right-side tires, so we can simply raise the right side, and/or put stiffer springs on the right. So a good strategy is to run the softest springs that you can get away with, while keeping the car up off the pavement. But that will allow the car to lean too

"My car's just not up to speed overall, it feels slower than everyone else's."

Philippe Lopez: "Chances are, you could be too high- too high, too stiff sprung. Put more rebound in the shocks, this makes the car ride lower and gives you a lot better 'drag number.' The new trend in NASCAR Winston Cup is to go as soft as you can on the front springs, and put a very big front sway bar in. The downforce increases because we're running the cars around now like a dragster- it's really quite amazing."

much in the corners, so the camber angles become incorrect. Here we can do two things as well: crank in more static camber to compensate for the body roll, and/or bolt on some sway bars. Sway bars are usually the solution of choice, and they help a bit with the right side bottoming problem, as well.

Now that the car isn't scraping on the track or rocking like a boat, we get to the second main purpose of the springs: controlling the car's balance by changing the amount of weight that is transferred at the front vs. at the rear. When the car is cornering, weight shifts to the outside tires, and more weight will shift at the end of the car that is stiffer. The percentage that shifts at the front is called the "roll couple," and with a NASCAR stock car it is usually in the 70% to 80% range. The reason most of the weight is transferred at the front is so that grip is left at the rear for acceleration. Unfortunately, the roll couple is difficult to calculate from the information usually used to set up the car, since it depends on the wheel rates, not the spring rates. Because of the way the springs

are mounted, the springs at the front are less effective at a given rate than those at the rear, so they can't be compared directly. Worse yet, the roll couple also depends on the sway bar rate, which is a complex function of bar diameter, length, mounting points, etc. A good rule of thumb is to use rear springs that are about 30% of the front spring rate, with a 1 1/8" front sway bar. Play with it from there to get a good balance, adding a rear sway bar if you'd like.

Front Springs

Stiffer front suspension will make the car tighter, generally. Softer springs will loosen it up. But

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Tricks of the Trade

Philippe Lopez: "The bottom line is, you want the back end up and the front end down- that makes the car fast. The driver who can get away with the least amount of right front spring to go into a corner will be the fastest one. We're running spring settings now that five years ago I would've said, 'You're crazy!' The standard Michigan setup used to be a 1300 lb. left front spring and an 1800 in the right front...and a 350-400 in the rear. But we raced there this year with a 500 lb. spring in the left front and a 600 lb. in the right front, a 500 lb. in the right rear and a 200 lb. in the left rear. If you can get the front end of these cars down as it goes around the race track, you almost double your downforce...and we've done it in the wind tunnel."

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again, depending on what's happening with the cambers, this may not hold true. Running more "split"-having softer left fronts than right fronts—will tighten the car up under braking.

Rear Springs

Stiffer springs in the back will loosen the car, softer ones will tighten it. More split at the back should loosen the car under power.

Front Sway Bar

Using a bigger diameter bar makes the front stiffer, which tightens the car (unless you suddenly are

controlling the camber better, in which case it might turn better).

Rear Sway Bar

Opting for a bigger bar stiffens the rear, which should loosen the car. The front bar diameter is measured in 1/16" increments, but the rear bar is measured in 1/1000ths of an inch.

Camber, Caster, and Toe (Suspension Geometry)

These all affect the precise way that the wheel is rolling along the road. Camber refers to how much the tire is leaning in at the top (negative camber) or out at the top (positive camber). The best grip is achieved with the tire leaning into the turn a bit. Caster is how much the steering axis is leaned back, like the front fork on a bike. The more it's leaned back (positive caster), the more self-steering force there is (if you have force feedback) and the more the tire moves up and down as you steer. Since you can control

> ### Setting Brake Bias
>
> **Philippe Lopez:** "At the bigger tracks, you won't be using much brake. You'll want to set brake bias 60/40%, sixty percent to the front. At the shorter tracks where the braking becomes more important, you'll want to try to use as much rear brake as you can."

To adjust caster, you reposition the ball joints. At left is an example of positive caster, the top ball joint is closer to the nose of the car. At right is negative caster, the top ball joint is closer to the driver.
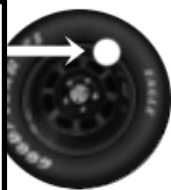
how much the tire moves up and down, you can affect the wedge, or cross-weight in the car, when the steering wheel is turned. The toe is just how much the two wheels are pointed toward each other (toe-in) or away from each other (toe-out). You can adjust the toe to affect how much the car pulls to the left.

Front Camber

On road courses, both left and right will be negative; on ovals, left will be positive, and right negative. How much to use is somewhat a matter of the type of circuit. On slower, flat tracks, softer springs are used, so there is more body roll, and -5 or -6 degrees on the right front wouldn't be unheard of. The left front might be +4 or 5 in that case. On faster, banked tracks with stiffer springs, -3 degrees might be more appropriate. The setting is the static camber, or the camber measured on the garage floor. What affects the grip is the instantaneous camber on the race track, which of course is different, depending on many things. Experimentation is the way to go here-but generally the best grip is with temperatures slightly higher on the edge of the tire toward the inside of a turn.

Rear Camber

Can't really be changed much-you want to pretty much run +1.8, -1.8 at an oval, -1.8, -1.8 at a road course. You might find a better

balance with one or both sides at 0, though.

Front Caster

More positive caster will make the car turn in a bit better, and it should be a bit easier to catch the tail under power. On high speed ovals, though, you probably want the handling not to change as much with steering angle, so less caster is generally used on the speedways. Less caster also means less steering force, which is preferrable at a high-banked track which creates very large steering forces with a lot of caster. Rule of thumb: +4 to 5 degrees of RF caster at a short oval, +2 to 3 at a speedway. The LF caster is usually set about 2 to 2 1/2 degrees less than the RF.

Front Toe

Never really changed. Usually set to 1/8" toe-out, which equates to 0.125" of toe-out on the setup screen.

Track Bar

The track bar, or Panhard bar, keeps the rear axle from moving sideways as the car corners. It is

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How to Fix a Car That Has Too Much Wheelspin

Does your car slip and slide too much when you step on the gas coming out of a turn? Here's the cure:

Philippe Lopez: "Drop the track bar on the right. If the car turns good in the center but you just can't put the throttle down, take air pressure out of both rear tires. If the car's tight in the center and the wheels spin, take air out of only the left rear. But the track bar on a stock car does wonders."

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a long bar which is attached to the rear axle at the left rear, and to the chassis at the right rear. These attachment points can be independently moved up and down to control how cornering forces are transmitted to the chassis. In general, the higher the bar is mounted, the looser the car will be. A good starting point is to set the track bar at 9"/11", or 10"/12". That works pretty well, but of course there is more... By increasing the track bar split (difference between right and left heights) more rear axle steering will come into play. More split (higher right side) should make the car looser under power, tighter under braking. Less split is the opposite. This effect should also happen mid-corner at high-banked tracks, since the rear axle steer is a function of how much compression there is.

Weight Distribution

Front Weight Bias

By moving ballast blocks (little blocks of lead tucked inside the chassis rails), more weight can be moved to the front or back, and to the left and right. Moving more weight to the front will generally help the car turn in a bit on a fast track with little braking. It will also tend to loosen the car up under power, since there is less weight on the rears to put down the gas. So, more front weight is typically run at the high speed circuits since the gearing is taller and the rears aren't as close to spinning anyway. It can actually cause the car to push under braking, and at lower speeds the shorter gear ratios tend to allow the rears to spin too easily. At short tracks, then, less front weight makes sense. Keep it as close to 50% front weight as possible-having more weight on the rear can be a little dicey. 52-53% is probably as high as you would want to go on high speed tracks.

Left Weight Bias

This is really a 'no-brainer'- full allowable left weight on ovals, 50% on a road course. An interesting side note: the reason for the limit is to keep the cars from rolling over if they spin to the right.

Cross Weight

Cross weight isn't set by using the ballast blocks, but by changing the height of the spring perches, like making a wobbly 4-legged table. This is also called wedge, in NASCAR circles. More wedge (> 50%) means that more weight is on the RF/LR diagonal. This will tighten the car-the right front is doing more work, plus the left rear is able to provide more grip at the rear. As the wedge is decreased, the car will loosen up, since the left front is now helping out with the share of cornering at the front, and the right rear is doing more than its fair share.

Gearing

Transmission Ratios

You generally want fourth gear to just barely trip the red warning light on your dashboard at the end of the longest straightaway. Suffice to say that if there is a lot of wheelspin in a given gear, then probably a taller gear could be used. Once the ratios in the transmission seem acceptable, there probably won't need to be further experimentation going on- most of the future adjustments would be performed by changing the differential ratio.

Finding a Baseline for Lowe's

Philippe Lopez: "Try a 1250 lb. spring on the left front, about an 1850 lb. right front, 375 left rear, 425 right rear. Run about 52% nose weight, diagonal weight about even. I would say 5 or 6 on the front, rebound-wise. Tire pressures, 48 and 45 on the right, and 35-35 on the left. We actually usually run about 6 lbs. down from that all the way around, and that's how we'll start. Go with about an inch and three-eighths front bar- I haven't had much luck with the rear bar at Lowe's."

Finding a Baseline for Martinsville

Philippe Lopez: "Run extremely soft, like a pair of 700's (springs) in the front, a 200 in the left rear, 250 in the right rear. Use a one-inch sway bar up front. Front weight would need to be about 50%, and diagonal would be about 48%- you gotta get the car to turn there. Air pressures will be extremely low- we'll only have about ten pounds in the left sides, and about seventeen on the rights. It takes a couple of laps for 'em to come up."

Differential Ratio

Except at road courses, this is probably the only gear that is typically altered. It changes the final drive ratio of all the gears in the same

proportion. To change a single gear ratio without affecting the others, change the transmission ratio.

Aerodynamics

These effects are most noticeable at high speeds, but they can make a slight difference at lower speeds.

Grille Tape

Taping off the front grille increases front downforce and reduces drag. It also chokes off the cooling airflow to the engine. Run as much tape as you can without overheating. For qualifying, use a whole roll of duct tape!

Rear Spoiler Angle

Higher spoiler angles increase downforce and drag, more at the rear of the car. At superspeedways, you'll probably want to run the minimum, at most other tracks the max. At some of the faster speedways you might use 60 - 65 degrees sometimes just to trim the balance.

Atlanta Motor Speedway

Hampton, Georgia   1.54 Miles

**PIT ROAD
SPEED LIMIT
55**
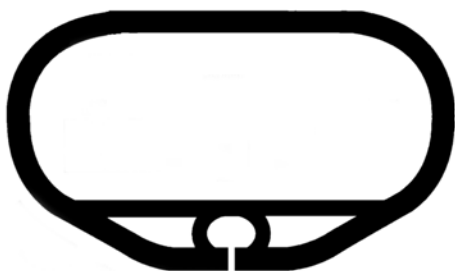
Track Data

Atlanta Motor Speedway is located in Hampton, Georgia. About a twenty minute drive from the downtown Atlanta nightlife, this speedway underwent major renovations in 1997. The old 1.522-mile oval track was stretched into a much faster 1.54-mile Quad-oval configuration. NASCAR stock cars now tend to travel at faster speeds around Atlanta Motor Speedway than they do at restrictor plate counterparts such as Daytona or Talladega.

Pit Notes: You won't need much braking here at all, perhaps a quick stab as you lift off the gas going into each turn…Entering the pits can be tricky because of the fast speeds, combined with the drastic change of banking; you'll need to start preparing for the pit entrance as you brake for Turn Three…Build a car that has a load of top speed and the ability to grip the pavement immediately as you power off the turns…

Atlanta Banking: 24 Degrees

96

Bristol Motor Speedway

Bristol, Tennessee .533 Mile

PIT ROAD SPEED LIMIT
35
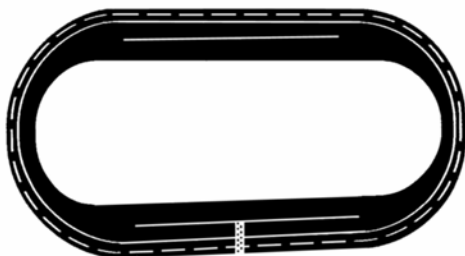
Track Data

Bristol Motor Speedway, located in Bristol, Tennessee owns the distinction of having the steepest banking on the NASCAR circuit, 36 degrees. Bristol's concrete surface plays host to NASCAR racing events both day and night. The undisputed king of Bristol is Darrell Waltrip, who owns 12 career victories there.

Pit Notes: At Bristol, you've got to be gentle during transitions; gentle on the brakes, gentle on the gas…Keep an eye on the weather, and be prepared to adjust your tire pressures to find more grip…Cars entering and exiting the pits on both straight-aways will keep you on your toes…You'll need a car that can handle on any part of the track here…

Bristol Banking: 36 Degrees

California Speedway

Fontana, California 2 Miles

PIT ROAD SPEED LIMIT
55

Track Data

This track was built in 1997 by a group of investors that included Roger Penske. The land was originally the home of a defunct steel plant. It is currently the only permanent speedway in Southern California. California Motor Speedway is a wide, sweeping 2 mile track, cut from the same cloth as Michigan International Speedway.

Pit Notes: The track favors multiple racing lines, get to know them all well…Make sure that the chassis setup allows you to get on/off the brakes quickly without upsetting the car…Plan on spending some of your testing time finding the right amount of grille tape…

California Banking: 14 Degrees

Darlington Raceway

Darlington, South Carolina 1.366 Miles

PIT ROAD SPEED LIMIT
45

Track Data

In some respects, Darlington Raceway could be considered the soil that houses NASCAR's roots. Built on an old cotton field in 1950, it was the first superspeedway to host a NASCAR race. Darlington's unique egg-shape is attributed to the original land owner's demand that his favorite fishing hole be undisturbed by the track construction.

Pit Notes: Each end of the track is decidedly different and requires a different approach...Your number one priority here should be to keep the car up on the banking all the way around the track...The exits of each corner are somewhat tricky here, try to develop a smooth rhythm...Coming off the banking into the pits can be 'dicey' if you're not smooth...

Darlington Banking: 25, 23 Degrees

99

Daytona International Speedway

Daytona Beach, Florida 2.5 Miles

PIT ROAD SPEED LIMIT
55

Daytona International Speedway was built by NASCAR founder Bill France in 1959. France's plan called for workers to bank the track "as steep as they could lay asphalt." The inaugural Daytona 500 was won by Lee Petty in a photo finish that took France 3 days to deliberate on. Daytona's fabled 31-degree banks remain hallowed ground to NASCAR drivers and fans alike, playing host to the season-opening Daytona 500 each February, and a 400 mile race under the lights during the 4th of July weekend.

Pit Notes: It's restrictor plate racing, you won't be doing any braking around the track itself...Focus on top speed in the garage- gearing, stiffer suspension, etc...You can't win here if you can't draft; practice drafting in the pack and get used to working your way through the field one-by-one rather than with diving passes...

Daytona Banking: 31 Degrees

100

Dover Downs International Speedway

Dover, Delaware 1 Mile

PIT ROAD SPEED LIMIT

35

Track Data

Known as the "Monster Mile," Dover Downs was originally paved with asphalt.   Prior to the 1995 season, the track was resurfaced with concrete. Dover Downs International Speedway has an equestrian track around the infield.

Pit Notes: Dover is a very fast race track, you'll need to be able to get back into the gas quickly as you exit each turn...Because of the banking, it's very easy to start your exit at the bottom of the corner and wind up at the top; take some time to learn where the wall is...The high speeds at Dover often cause drivers to forget that the pit road speed limit is a lazy 35 mph- don't get caught speeding in the pits...

Dover Banking: 24 Degrees

Homestead-Miami Speedway

Homestead, Florida 1.5 Miles

PIT ROAD SPEED LIMIT 55
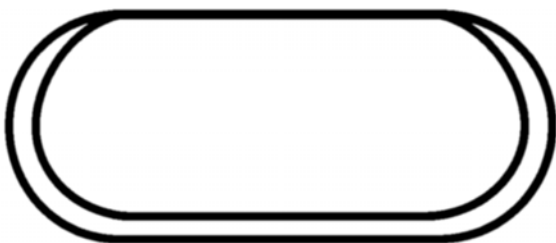
Track Data

Homestead-Miami Speedway was built in 1995. The track originally hosted NASCAR Busch Grand National and Craftsman Truck races before climbing to the NASCAR Winston Cup schedule for the 1999 season and beyond. Homestead hosts one of the final events of the season as the warm south Florida climate provides the perfect venue for teams to migrate to in the chilly fall.

Pit Notes: Homestead's surface is extremely flat, which means you'll spend a great deal of time turning here...Concentrate on getting the right side of your car to grab the pavement in the corners; you'll also need some maneuverability as you ease the car through side-by-side traffic...Locate and get comfortable with the pit lane access road to avoid penalties...

Homestead Banking: 6 Degrees

Indianapolis Motor Speedway

Indianapolis, Indiana 2.5 Miles

PIT ROAD SPEED LIMIT
55

Track Data

Indianapolis Motor Speedway hosts the prestigious "Brickyard 400" each year. The famous track was built in 1909. The original clay marl surface was so battered during the first event that 3.2 million bricks- enough to fill 500 boxcars - were brought in for paving. The track became known as "The Brickyard." Eventually the surface was paved with asphalt; one yard of the original bricks still denotes the start/ finish line.

Pit Notes: Indy has a nice blend of high octane action combined with deft cornering- build a car that's fast on the straights, with moderate handling ability in the corners...Watch your grille tape here, it's one of the subtle adjustments that has a pronounced affect...Keep your car on the pit exit lane all the way around to the back straight in order to avoid a black flag penalty...

Indianapolis Banking: 9 Degrees, 12 Minutes

103

Las Vegas Motor Speedway

Las Vegas, Nevada 1.5 Miles

PIT ROAD SPEED LIMIT
45

Track Data

Situated about fifteen miles from the famous Las Vegas Strip, this modern speedway possesses the complete package- a clay oval, a dragstrip, a motocross track and other assorted racing surfaces. Although the track resembles counterparts such as Lowe's, Texas and Atlanta in size, Las Vegas Motor Speedway is much flatter than those tracks.

Pit Notes: It should be easy to find the top speed you want; focus more on getting the car to handle through the corners if you want to be fast...Try softening up the right front and left rear corners to help transition into and out of each corner...The flatter banks create a nice wide surface all the way around- use it to your advantage...

Las Vegas Banking: 12 Degrees

Lowe's Motor Speedway

Concord, North Carolina 1.5 Miles

PIT ROAD SPEED LIMIT 55
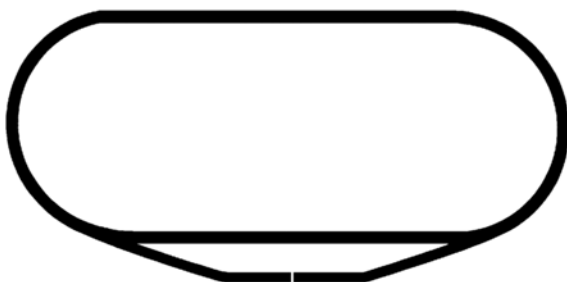
Track Data

Lowe's Motor Speedway first appeared on the NASCAR schedule in 1960. Many teams are headquartered in the area and consider Lowe's to be their home track. NASCAR Winston Cup fans flock to the speedway three weekends per year as the track hosts two points races as well as "The Winston," a famous non-points event featuring select drivers.

Pit Notes: Try bringing your Darlington, Texas or Atlanta setup here as a baseline...Some drivers use a quick stab on the brakes entering each corner, others have mastered a line that requires nothing more than lifting off the gas...Watch the right front tire, if you can preserve it you'll be ahead of the competition...The pit entrance is tricky, with a severe banking change combined with a sharp turn onto pit road...

Lowe's Banking: 24 Degrees

Martinsville Speedway

Martinsville, Virginia .526 Mile

PIT ROAD SPEED LIMIT
35

Track Data

With the distinction of being NASCAR's oldest sanctioned track, Martinsville Speedway opened in 1947 as a dirt track. The speedway was first paved in 1955. Martinsville is a fan-friendly track, offering an incredible close-up view of blistering NASCAR action, combined with such amenities as attended restrooms and free parking.

Pit Notes: Brake, brake, brake!...Soften the right front suspension, keep the front weight bias a little more toward the rear, and throw in a round of wedge or two...Brake, brake, brake!...Make sure your car can grab the pavement as you mash the accelerator off the turns...Brake, brake, brake!...Set your shocks and brake bias settings such that the car behaves as you brake for each corner...One more thing, brake, brake, brake!

Martinsville Banking: 12 Degrees

Michigan International Speedway

Brooklyn, Michigan 2 Miles

PIT ROAD SPEED LIMIT
55

Track Data

Located in the Irish Hills region, Michigan International Speedway has hosted NASCAR Winston Cup action for over thirty years now. The track's ultra-wide surface and gentle banks lay a perfect foundation for three-wide battles.

Pit Notes: Wide and fast, make sure you're getting all you can out of the motor at the ends of the straights...Work with the suspension until your car sticks to the track as you accelerate hard out of the corners...Use the draft here, the speeds are high enough for it, and the track is wide enough to give you plenty of room to maneuver.

Michigan Banking: 18 Degrees

New Hampshire International Speedway

Loudon, New Hampshire 1.058

**PIT ROAD
SPEED LIMIT
35**

Track Data

New England's largest sports facility, New Hampshire International Speedway hosts two NASCAR Winston Cup events each year. In addition, the track hosts NASCAR Busch Grand National cars, open wheel events, and even the Soap Box Derby trials. The track itself is an excellent spectator venue, with the front and back straightaways being relatively close together.

Pit Notes: Work toward achieving quick acceleration off the corners, handling in the turns...The corners are extremely tight and require a very late apex... "Seeing" the entry point of each turn is tricky as you speed down the straights; memorizing braking points such as billboards or other trackside objects will help...Move some extra weight to the rear of the car and throw in a round or two of wedge...

New Hampshire Banking: 12 Degrees

North Carolina Speedway

Rockingham, North Carolina 1.017 Miles

PIT ROAD SPEED LIMIT

45

Track Data

Perhaps better known as "Rockingham" or "The Rock" by drivers and fans alike, North Carolina Speedway has grown up with the NASCAR circuit. The track was originally built through a grass roots effort that included local residents buying shares of the speedway for a dollar apiece. The track hosted its first NASCAR race in October of 1965.

Pit Notes: Turns One and Two are somewhat tighter and therefore slower than Turns Three and Four, keep the car on the banking to be smooth and consistent...The pit entrance is particularly tricky to enter, because of the drastic banking change and faster speeds...Soften the right front and make sure your chassis can hold a steady line around each corner; it'll be a long race if you're slipping and sliding all over the place...

North Carolina Banking: 22, 25 Degrees

Phoenix International Raceway

Phoenix, Arizona 1 Mile

PIT ROAD SPEED LIMIT
45
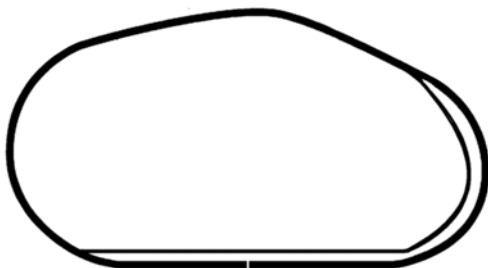
Track Data

Welcome to the desert, hope you remembered to put water in the car! Phoenix International Raceway (known as "P-I-R") is set among warm southwestern hues and spectacular mountain scenery. Each corner of the track varies in banking and radius.

Pit Notes: Strive for a car with impeccable handling in the corners, but don't overlook the top speed you'll have to have on the dragstrip...Drivers generally take various lines through the corners, especially in Turns Three and Four; therefore, your car will need to run smooth and fast whether you're in the high line or on the low side...As tires wear down, it gets tougher to keep the car at the bottom of the kink on the backstraight...

Phoenix Banking: 11, 9 Degrees

110

Pocono Raceway

Pocono, Pennsylvania 2.5 Miles

PIT ROAD SPEED LIMIT
55

Track Data

Pocono Raceway is unique in the fact that each corner of the race track sports a different radius and banking. It is the odd triangular shape of the superspeedway that has earned Pocono the reputation of being a "speedway that drives like a road course." One of the few speedways where drivers regularly downshift, Pocono Raceway creates an exciting blend of raw horsepower and finesse.

Pit Notes: You'll spend a lot of time in third gear here, so make sure the gear spacing provides the power you need...Turn Two, known as the "Tunnel Turn" is perhaps the trickiest corner; you've got to keep your speed up through it as much as possible in order to clock a fast lap...Don't overcook it as you brake for Turn Three; it's more important to stay low and come off the turn hard onto the long dragstrip...If you're looking for a baseline car to start with, try bringing your Indianapolis chassis to Pocono...

Pocono Banking: 14, 8, 6 Degrees

Richmond International Raceway

Richmond, Virginia .750 Mile

**PIT ROAD
SPEED LIMIT
35**

Track Data

The only track on the NASCAR Winston Cup circuit measuring three quarters of a mile, Richmond International Raceway began its life as a half-mile oval. The track was redesigned in 1988 to its current "D" shape. Richmond's NASCAR history extends all the way back to 1953 - now all of the races at Richmond are staged at night under the lights.

Pit Notes: Notoriously brutal on the right front tire, if you can make yours last you'll be faster in the long run...It's vital to have a car that bites the pavement when you step on the gas hard coming off the turns...If you exit Turn Two too low the pavement gets slippery, stay up in the middle of the track if you can...

Richmond Banking: 14 Degrees

Sears Point Raceway

Sonoma, California 1.949 Miles

PIT ROAD SPEED LIMIT
35

Track Data

Once a year, NASCAR Winston Cup drivers pop the cork on some exciting road course racing at Sears Point. Set in the heart of the NAPA wine valley, the circuit was given a significant face lift in 1998 in order to give race fans a better view of all the action. The circuit still retained many of its daunting hairpins and sharp elevation changes that are certain to keep you on your toes!

Pit Notes: Start with a neutral car, remember to move all the weight bias settings back to the center...Gear ratios become more critical at a road course, where you'll be shifting gears all day- make sure that you have them spaced such that you don't blow the motor while downshifting...Take some time to learn the braking and shifting points...If your car leaves the pavement, the best remedy is to gently try to slow the car, and downshift when you can...

Sears Point Layout: 11 Turn Road Course

Talladega Superspeedway

Talladega, Alabama 2.66 Miles

PIT ROAD SPEED LIMIT
55
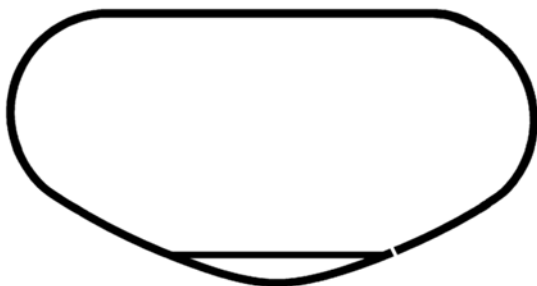
Track Data

Simply put, it's the biggest, fastest track on the NASCAR Winston Cup circuit. When Talladega Superspeedway opened in 1969 some drivers were hesitant at racing there until big Bill France himself borrowed a race car, hopped in and turned a few hot laps to prove the track's worthiness. Since then the track has been the site of the fastest laps turned in NASCAR- Bill Elliott's 212+ mph lap there still stands as a series record.

Pit Notes: Like Daytona, it's a restrictor plate track that will keep your foot off the brakes and on the gas all day...Get comfortable being patient in the draft here or you'll be hung out to dry...Think stiff suspension and higher tire pressures to go faster...

Talladega Banking: 33 Degrees

114

Texas Motor Speedway

Fort Worth, Texas 1.5 Miles

Track Data

Texas Motor Speedway opened its doors to NASCAR competition in 1997. The second largest sports and entertainment facility in America, Texas Motor Speedway can accomodate just about any form of auto racing- day or at night under the lights.

Pit Notes: Charlotte and Atlanta setups will work well here, with some slight changes to gearing and suspension...The approach to the frontstretch dogleg tends to get congested, make sure you drive a consistent line through there so your opponents will know what to expect...Stay on the banking at all costs- dipping down onto the flat aprons could prove catastrophic...

Texas Banking: 24 Degrees

Watkins Glen International

Watkins Glen, New York 2.45 Miles

PIT ROAD SPEED LIMIT
35
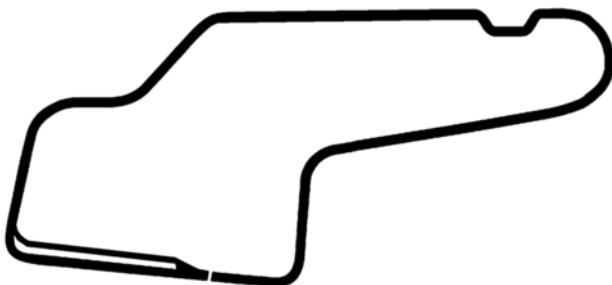
Track Data

History buffs recall Watkins Glen International as the revered site of the United States Grand Prix in days gone by. But after falling into bankruptcy, a Corning executive stepped forward with a plan to revitalize the weed-choked circuit. NASCAR quickly saw the value in the plan and supported the renovation, adding the famous course to its schedule in 1986.

Pit Notes: Start with a neutral car, weight biases to the middle, but keep in mind that Watkins Glen's more important corners are right-handers...The pit lane is slow and downhill, causing the car to gain speed as you exit- don't catch a speeding ticket on the way out...There are a lot of second and third gear turns here, make sure you have proper spacing between gear ratios...

Watkins Glen Layout: 11 Turn Road Course

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B) Technical Support
C) Legal Information

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