



FACTOR
TM
CUSTOMIZE. CONTROL. CONNECT.

User Manual

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Table of Contents

Minimum Specifications	4
Features of rFactor	5
Getting Started	6
Cockpit Overview	11
rFactor Introduction—rFactor Motorworks	18
On Assignment—rFactor Motorworks	19
Vayline	20
H6	21
Kodi	23
On Assignment with Devon Mack—At The Facility	24
Customize	29
Difficulty	29
Rules	33
Controls	34
Display	36
Audio	37
The Shop –Vehicle Upgrades	39
Venue Assessment	42
Multiplayer	47
Control Commands List	53
Appendix A: Tuning For Speed—The Garage	56
Appendix B: Extra Features	65
Appendix C: Firewall Guide	71
Legal and Warranty	79

rFactor

The world of rFactor is a unique place where Motorsports fans can come together to share their passion for the sport. It is a place where we can challenge competitors and challenge ourselves. It is a place where new friends are made and old friends are reunited, a place that combines the technical world of vehicle design with the creation of race competition. Add to this the creative flair of custom paint jobs, circuit creation, and race organization, and what you have is but a small taste of the world that rFactor has become.

This is truly an exciting time in Motorsports simulation. What we do today is helping to shape the future of this sport. Each person brings something unique to this exciting and ever changing landscape. We are all a major factor in our future.

**Happy Racing,
The rFactor Team**

Minimum Specifications

In order to get the most out of the rFactor experience, make sure your system meets, or exceeds, the following hardware requirements:

System Requirements

1.0 GHz processor

Windows 98 SE, ME, 2000, XP, XP 64-bit (Note: will not run in Windows 95 or Windows 98 First Edition)

256 MB RAM

GeForce 3 or Radeon 8500

64 MB video RAM

DirectX 9.0c

2.0 GB of hard drive space for installation

After downloading, double click on the downloaded file to begin the installation. Before the game starts, an option to update your DirectX version to 9.0c is offered—it is important to go ahead with the DirectX update at this point even if you have 9.0c installed to ensure you have the most current version and any updated DirectX 9.0c files that rFactor requires in order to function properly.

Features of rFactor

- Rules to simulate different types of racing: Standing starts, formation laps, rolling starts, racing by time or laps or both, local or full-course yellows depending on the severity of the accident, and many more fully-customizable options.
- Dynamically changing Time of Day (TOD), with headlights and beautiful transitions from day to dusk to night to dawn. Time scaling allows a full 24-hour transition in as little as 24-minutes.
- Brand new DX9 graphics engine featuring advanced pixel shaders and bump mapping effects. Solid DX8 and DX7 support for older cards and/or for achieving higher frame rates.
- Head movement physics, cockpit vibrations, detailed track surface bump modeling and seat adjustments all give the user a better sense of speed and control. Field of View (FOV) adjustable from the in-game Display menu.
- Includes expanded sound system with incredible and unique sounds for most vehicles and engine upgrades.
- Completely updated multiplayer AI featuring a dedicated server with advanced functionality, matchmaking, and the RaceCast plug-in interface (featuring live timing, results, and rankings). Future support for more league functionality, driver swaps, downloadable vehicles/skins/tracks, and voice chat.
- Replay Fridge replay system allows AVI-format creation with effects defined through plug-ins.
- Camera system include mouse-free look and allows you to move anywhere. Each vehicle features custom cameras.
- New vehicle upgrade system allows users to buy parts for performance, looks, and/or sound.
- Improved tire physics and new tire contact calculation, engine boost, support for various types of suspension including four-link rear suspensions, as well as other advances in vehicle dynamics.
- Extensive support for modders.

Getting Started

No doubt you are eager to hit the track right away, and this is just the section for you. The career paths in the game are a lot of fun to work through, and it is a great feeling when a car you have crafted over a period of time becomes the dominant force on the track. But for now, we want to get you up and running quickly, and allow you to familiarize yourself with the many options and racing configurations available to you. rFactor is rich in detail, and this ‘virtual playground’ is a serious business—the more you put into it, the more you will get out of it. Much like the racers at the 24 Hours of Toban, dedication is needed to get the most enjoyment.

Player Creation

Following the install and activation of rFactor, the user is presented with a blank name entry box—this will be your first player creation. Of course, you can always create another persona later; perhaps you will have one for online play and another for offline, or one for testing one of the numerous mods and tracks that the rFactor Motorworks community is providing. The New Player button is found by selecting the Customize icon, then the Player icon, and finally the Create player button. As a new player you will be asked to select a series to play. Series can be freely switched from play session to play session; for now it is recommended that you try either the “OW Challenge 2006” (for open wheel racing) or the “SR Grand Prix” (a Sports Car series). After selecting a series, you are also able to customize the Team, Vehicle, Helmet, Nationality, Date of Birth, and Location. Date of Birth and Location are optional, but help to make the experience a little more personal. Don’t fret the choices; you are always free to change them later. Just give your player a name, and then proceed to the Settings button, also found under the main Control button.

Before you take a car out for a spin you should configure your input device. Found under the Settings button, along with several option categories, you will find the Controls option page. For now, just make sure the most critical inputs are mapped to your preference. Be sure to check steering, braking, throttle, and clutch in the small input map to the left of the action/key map table. Other tabs lead to pages for fine-tuning your input device; all of these pages will be accessible from the real-time monitor should you need to bounce back quickly and tweak input parameters.



Once you are satisfied with your controller mappings, it's time to pick a car and head to a track. From the "Vehicle" tab you can see all the cars available to you through this particular series. Both the "OW Challenge" and the "SR Grand Prix" only allow you to drive cars you currently own, but both start you off with multiple cars to choose from. Select the "Show Owned" button to view what these cars are. Pick one and head to the Control tab to select a track.

Once you have selected an owned vehicle, it's time to select a track. Open up the Control button to access rFactor's offline game options. "Testing" will allow you unlimited time on the track, so pick that to familiarize yourself with the rFactor driving model.

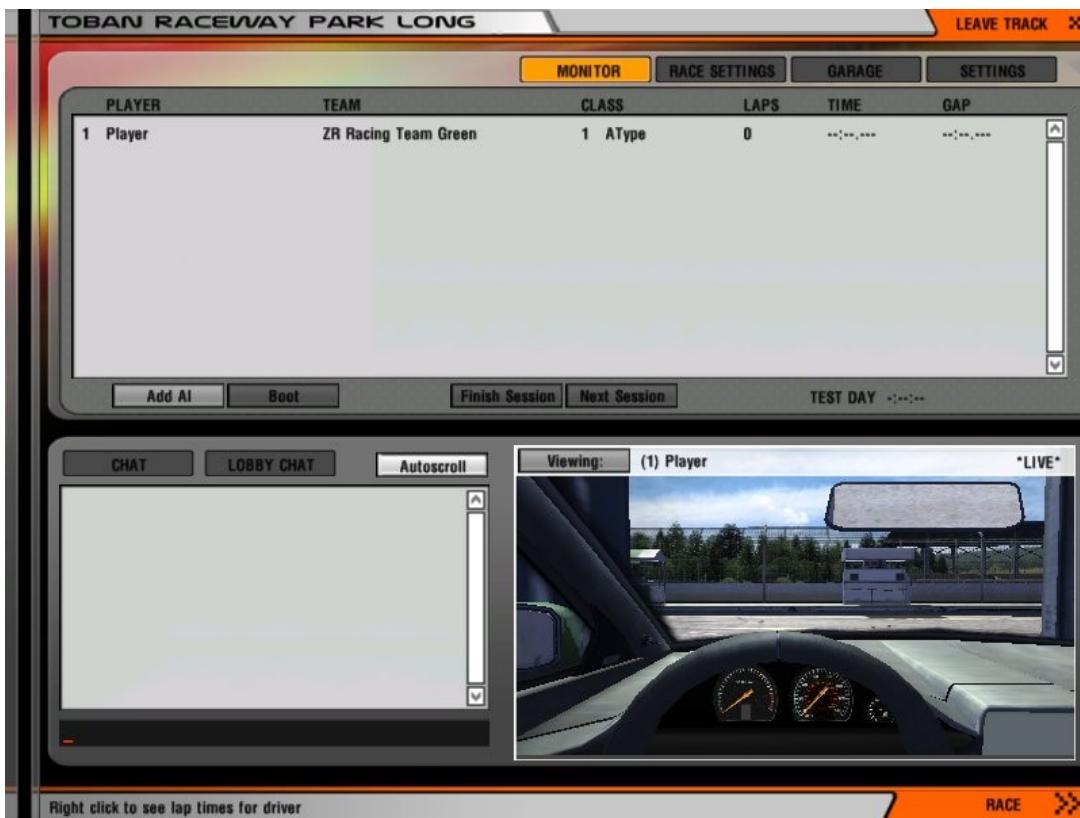
Toban Raceway Park is a good place to start. Click on the circuit name to open up the different track layouts available. Highlight a track layout and hit "Load Circuit" and you will begin to load the track. When finished, you will find yourself in the main driving interface. From here, you can adjust a vast amount of setup options for the car (see *The Garage* for extensive setup information and comprehensive track orientation example), and for the system running the simulator.



At the top of the screen, you will notice the various adjustment tabs. Even while actively within the game, rFactor allows you to adjust many settings and those all can be found here. Some of the graphical related settings are not changeable and those will be grayed out.

To the lower left is the chat and voting window, where you communicate through a text based system with other drivers at the track. The Vote Yes and Vote No buttons are used when a ‘vote’ is put up—such as the addition of another driver (AI), or the advancement of the session to the next—useful when everyone is ready to qualify for example, but the warm-up time has not been met. The middle button reveals a smaller GUI where even more options can be selected—you can bookmark the server you are on, and place your vote for more or less AI drivers, for example.

At the bottom right, a small screen is seen and this is the Monitor screen. By manipulation of various trackside and car mounted cameras, a careful eye can be kept on competitors, or you can take a look at how the advancing day is changing the shadows in a particularly difficult corner. Clicking on the middle of this screen will expand the driver’s monitor for an even closer look. By using the END key camera (see Extra Features for more detailed information), you can elevate the viewpoint to very high above the track, and get a feel for the nature of the layout.



For the purposes of this section, we will be using the default car setup.

Drive Time!

Ok then, let's get on the track! At the lower right of the screen is the RACE button, go ahead and select that. You now find yourself in the cockpit, with your pit man pointing the way to the proper pit lane exit—make sure to heed his direction in a race, as a hefty fine, or disqualification, may result.

At this point, you can go ahead and pull the car out but, for now, we will be using the new AI drive feature of rFactor. Tapping the 'I' key will initiate the AI driver to take over your car. Let's do that now. Next, hit the PAGE DOWN key to enable the TV-tracking cam and watch the AI driver turn a few laps: this will allow you to get a glimpse and feel of the track layout and driving line used by the AI driver. By cycling through some of the other camera views, you can get a much closer look at the car, noticing how it responds to the roadway—suspension deflection, wheel and driver arms turning, leaning of the head into the corner, the bit of dust that comes up as the side of the road is clipped ... the rFactor world is richly detailed, and it is all accurately represented and the feel is just as meticulous as the look.

After a few laps, hit the ESCAPE key to return to the Testing Session main interface. Hit the RACE button again, but this time, you will be taking the car out. As soon as you leave the pits, make sure to toggle off the rev limiter (Default 'L' key), and begin

your run. Start out slow, to get a feel of the track layout and car handling behavior. After a few laps, you will begin to gain confidence, and will soon be ready to dive into the setup features to fine tune the on-track experience. After a few more laps, your fuel will get low and you will have to make a pit stop. The quickest way to get a pit stop done is to make sure you ‘notify’ your crew before you come in, and when you get the ‘Pit Crew Ready’ message, you can come into the pits, confident your crew is ready to do the job. Make sure you have checked the mapping of the Request Pit control so that you can do this while on the track. Pit stops are often overlooked in race preparation, but they are a critical part of any on track success. Get an advantage over your opponents by practicing the pit lane entry—time it carefully so you can enter as fast as possible, but still remain at the pit lane speed limit.

You have now had your first rFactor experience, and it is only the tip of the iceberg. A full career path of many different car types awaits you, and most of the cars found in rFactor can be extensively upgraded with the after market parts provided by rFactor Motorworks. See *The Shop-Vehicle Upgrades* for a listing of all available upgrade options.

Cockpit Overview

The DAS 2500 is a powerful system enabling real time display of on-track driver performance, tire wear and temperature, engine and brake system temperature as well as numerous other functions. Through the careful alteration of the default DAS *.PLR file entry, the output display can be changed.

Hit the INSERT key to toggle through the three 'cockpit views'. The following is an overview of the actual driver's cockpit view:

Digital RPM Displays

Digital Gear Display

Digital Speed Display

Digital Position Display

Digital Laps Display

Digital Flag Warning Display

7 Mode LCD: press ENTER to toggle through modes



The layout of each team's cockpit LCD unit varies, but the following features are present in all:

Digital Displays



RPM

The sequence of lights illuminates as your revs increase. If you are shifting manually, ensure that you shift-up a gear as the red light appears. Note that these lights cycle when the launch control system is active and pulsate when the RPM limiter is active.

Note: Launch control is restricted for some classes/events; consult the relevant sanctioning to determine whether this feature can be enabled.

Gear

The selected gear is indicated as 1-7 (Forward Gears), N (Neutral) or R (Reverse).

Speed

This number indicates the current speed of the car. It can be set up to display in MPH or KMH.



Position

The number on the left indicates your current position, whilst the number on the right indicates how many other drivers started the session.

Laps

The number on the left indicates the number of the lap you are on, whilst the number on the right indicates the total number of laps for the current session.



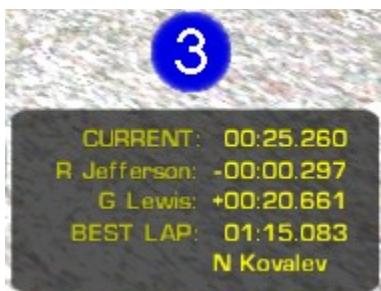
Flag Warning:

The Yellow LEDs light up when a yellow flag is active in the sector that you are in.
The Blue LEDs flash when you are about to be lapped and are expected to give way to the lapping car(s) behind.
The Red LEDs light up when you have been 'black flagged' and are expected to take a stop/go penalty.
The Red LEDs flash on and off if you have been disqualified.

LCD Displays

With seven unique screen modes displaying everything from tire temperature to time of day, the DAS 2500 leads the way in information display. You can cycle through the various LCD displays with the 'Enter' key.

Timing



During Race sessions the following information is displayed:

Driver Ahead

The gap to the driver ahead of you.

Driver Behind

The gap to the driver behind you.

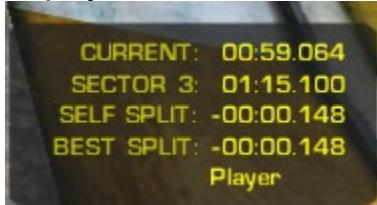
Best

The fastest lap time and the name of the driver who has set it.

Leader

Current leader of the race.

During Practice, Warm Up and Qualifying sessions the following information is displayed:



Current

Your current lap time.

Sector {X}

Your best time for the current sector, where {X} is the number of the sector you are in.

Self Split

The difference between your current lap time and your best lap time, as at the last timing sector.

Best Split

The pole-sitter's best time for the current sector and their name.



Clock

Displays the current time in game.

LDR laps

Number of laps led by current leader.

Time Left

If the race is determined on an elapsed time basis, this line will indicate the time left in the race. If the race is based on time, then *Laps Left* will be seen instead.

Strategy Mode



When in Strategy mode, the LCD displays details of any outstanding penalties and a summary of any changes that have been requested for the next pit stop.

Stop/Go

Indicates the number of laps before you have to serve an outstanding stop/go penalty.

Fuel

Indicates the total amount of fuel that the car will be filled with and how many laps that amount of fuel is expected to enable you to complete.

Tires

Indicates whether the tires should be changed at the next pit stop and, if so, which compound should be used.

Wing

Indicates the angle to which the front wing should be adjusted.

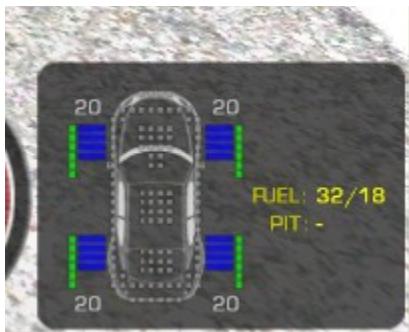
Damage

Indicates whether damage is to be left as is or whether repairs will be attempted.

Use the LCD Up/Down/Increase/Decrease controls (see p. 52) to adjust your strategy.

Note: Some options may read N/A, depending upon the options you have selected.

Vehicle Status



Tire wear is indicated by the color bars located next to each wheel. *Green* indicates that the tire has little or no wear; *yellow* indicates that the tire is worn and *red* indicates that the tire is severely worn.

Tire Temperature is indicated by the color displayed on the relevant tire display. *Blue* indicates that the tires are cold while *red* indicates that the tires are at race temperature. Each of the tire temperature displays consists of three bands representing the inside, center and outside edge of each tire.

Damage is also indicated through color-coding. *Green* indicates the component is fully functional, *yellow* indicates that a component is damaged, whilst *red* indicates that a component has been completely destroyed.

Fuel

Indicates the amount of fuel presently on board and the number of laps it is expected to last for.

Pit

Indicates the lap number on which you are next scheduled to make a pit stop.



Miscellaneous temperatures and other information.

Driver Aids



Should any of the driving aids be enabled, this page will display an illuminated icon corresponding to the particular aid. If there is more than one setting for an aid value, then the intensity of the light indicates the level of aid employment—the brighter the icon, the higher the degree of aid being used.

rFactor Introduction—rFactor Motorworks

The rFactor dynasty is comprised of rFactor Motorworks which currently manufactures such popular sports cars as the H6 Howston and the Kodi ZRz. It is also the organizing body of two small but dynamic race series, the OpenWheel Challenge and the SR Grand Prix.

The rFactor organization has been built from the ground up to encourage and assist the club-racing community. Through the Motorworks empire's relationships with interested teams, access is granted to the rFactor Motorworks' coveted rFm's (with these, any group can create a sanctioned event) using any car they choose, including those custom-built using the state-of-the-art manufacturing provided by rFactor Motorworks.

A radical departure from the mainstream world of Motorsports and sanctioning bodies, rFactor Motorworks' fiercely aggressive and creative take has seen the sport grow exponentially over the last four years and it is now watched by an estimated worldwide audience of 100–150 million viewers at some of its larger sanctioned events.

Formed in 1991 by a handful of dedicated dreamers, rFactor Motorworks has grown from a grass roots Sunday club-racing group to an internationally acclaimed multi-chassis manufacturing and sanctioning body. From the very basic to the very advanced, there is a car and event for just about any level of racer. Depending on your skill level, you may feel right at home in the top-of-the-class FIS chassis, with 650 mind-bending horsepower, or the fully loaded H6 Howston that, with its 450 horses under the hood and too many innovations and upgrades to mention, is the class of the field in the Late Model Sports Car Series.

rFactor Motorworks' dedication to providing a strong and competitive starting point for the serious racer has helped make them world famous. In fact, in 1997, Hank 'Pork Chop' McLoskey took his H6 Howston from showroom stock to World Champion in the Open Class Late Model Sports Car Championship and showed a very shocked and surprised world that racing was no longer for the elite and well-to-do—anyone with enough heart and desire could now reach the pinnacle of their class.

For this service to the racing community, rFactor Motorworks has received numerous awards and praises as a provider whose desire is simply to extend to all the chance of having their dream of becoming a world class racing car driver become a reality.

On Assignment—rFactor Motorworks

Recently, Motor Chronicle Magazine was given the rare opportunity of a totally unrestricted look behind the scenes of the four main players in the rFactor Motorworks world. In addition to once in a lifetime exclusive interviews, we were given access to some of the hottest cars around, from the ‘not so docile’ Rhei, to the monstrous FIS—and lived to tell the tale.

Consisting of Vayline Motors, H6, Kodi, and RaceWorks Motorsport, this dynasty of auto manufacturers did not fully come together until quite some time after Kodi and H6 fell under the protective ownership of rF Motors. With those two strategic acquisitions, rF Motors next had visions of a unification of the top manufacturers in the world, with eventual hopes of extending the automotive experience quite a bit beyond ‘conventional’. Soon, Vayline and RaceWorks followed suit, and the world’s largest auto manufacturing and support dynasty was formed.

Choosing the name rFactor Motorworks, this corporate partnership began the slow process of revolutionizing auto manufacturing as the world had previously understood it. Not only does rFactor Motorworks manufacture some of the most popular automobiles in the world, it is their assistance to the end user in a racing environment that has truly established their reputation as a manufacturer that is more than willing to not only make a profit, but further the interests of their customers in ways other companies can only dream about. Through the use of their ‘virtual assembly lines’, anyone can manufacture just about any car they can imagine. Through the use of VEH, HDV, MAS, SFX, and GEN blueprints—all provided at a small cost to the user—the sky is the limit on just how radical or conventional the client’s car can be. In fact, Dale ‘Moonshine’ McCoy and Dennis ‘Shotgun’ Hatfield recently settled many of their legendary off-track battles in a one-off car co-created by them both at the Mills Grand Prix track.

I recently had the good fortune to be invited to a weeklong manufacturer’s conference, where rFmotorworks, among other things, let the world in on some of their plans for the future. It was an amazing opportunity, and I was afforded the luxury of meeting many of the principals in this recently formed collaboration. It was nothing short of astounding. As an added bonus, Kramden MotoGear Inc. was also there—and they were more than happy to give me a very in-depth and detailed look at their DAS 2500 Data Acquisition and Mapping System, an aftermarket add-on that can be used for everyday tasks such as GPS location displays, or as a full blown racing data acquisition and display unit with nearly unlimited programmability.

As an introduction, a familiarization with each principle is presented—all of which can be found on the respective manufacturer’s web page.



Vayline

Vayline Motor Company was founded in 1965 by Richard M. Stanton. Originally an engine building firm, Vayline produced some of the most competitive stock car engines to come out of Southern England during the 1960s and 1970s. From New Cross to Reading to Brands Hatch, Vayline engines could be heard in all their glory ... glory that often wound up celebrated on many podiums after long, hard days of racing.

Engine building continued, as well as victories. In 1984, Richard stepped down from Vayline and turned over control to Tommy, his eldest son. Tommy's plan was to expand Vayline to more than an engine building concern: He wanted to build cars. From his experience as an oval racer as well as dabbling in road racing, Tommy knew that Vayline could produce much more than a winning engine.

On a cold winter day in December of 1984, Tommy officially took the reigns of Vayline. He moved the company north to Newcastle and set out on a mission ... to make affordable racers for the masses. At first, his idea was met with hesitation. Tommy knew it would take development time. "Give me four years and you'll see a Vayline car in the Winner's Circle!" It took Tommy three years and eight months. On July, 28th 1987, a Vayline R crossed the finish line first in its class at the Goodwood Festival of Speed in Sussex.

The rest is history. Tommy was able to acquire additional funding to expand the Vayline plant and began production of the Vayline R. Since 1987, Vayline cars have won numerous road racing and oval track championships. The tradition continues with the all-new Vayline Rhei. Speed has never been so affordable.



H6

The story of H6 is the story of Amedeo Grimaldi. It all begins in Turin, Italy, circa 1927. Marco Grimaldi, heir to the 500 year old Grimaldi agriculture fortune, made the decision to walk away from the successful family business to pursue his newly found passion of cinema and motion pictures. In May of 1927 Marco, along with his wife and children, made the journey to the States ... to Hollywood, California.

Amedeo, who was only two years old at the time of the move, soon became accustomed to the role of a 'new world' Grimaldi. With the success of his fathers' cinematography came a lifestyle filled with culture, creativity and modern luxuries. As the years passed, Amedeo began to make a name for himself as well ... as Hollywood's newest Party Boy. Amedeo's high profile relationships with female cinema stars, his exorbitant spending sprees as well as his eccentricities made him a favorite of Hollywood gossip columnists.

In 1952, the gossip hit an all-time high when Amedeo claimed he was going to pursue his dream of entering the Indianapolis 500. The Hollywood playboy wanted to become a race car driver. Many thought this to be a publicity stunt for the Grimaldi, whose auto racing experience had been limited to racing from nightclub to nightclub in a limousine. Amedeo, however, did indeed enter the race, only to crash on the 26th lap and proving to the world that it was just another ill-fated publicity stunt ... or was it?

That experience sparked a passion within Amedeo Grimaldi which eventually would make him a World Champion only four years later. During those four long years, Amedeo spent much of his time back in Italy, honing his racing skills and winning auto races. In 1956, Amedeo captured the World Championship in an Alfieri 8CV. The following three years were also successful for Grimaldi, finishing 2nd in 1957 and 1959 as well as capturing the number one spot again in 1958. After his 2nd place points finish in 1959, Amadeo made a bid to purchase the Automobili Sportive Alfieri SpA. Based in Modena, the fledgling auto manufacturer gave him the opportunity to succeed at auto racing; Grimaldi in turn wanted to share his good fortune. In 1964, at age 39, Grimaldi officially retired from motor sport as a driver to devote his time cultivating Automobili Sportive Alfieri.

Through the years, Amedeo Grimaldi learned that running an automotive company presented many challenges: high production costs and the limited market for his automobiles landed Alfieri in serious financial troubles during the late 1970s. The turning point came in 1981 when, under the pressure of his two sons, Alessandro and Dante, Amedeo decided to re-direct Alfieri's marketing efforts towards the States.

Grimaldi also made an unprecedented decision to give the company a new name, H6. These drastic changes confirmed to skeptics that Amedeo was still the eccentric he was in his youth. Once again he proved them wrong. Grimaldi positioned H6 as the ultimate affordable Italian sportscar. This market strategy, as well as H6's commitment to motor sport, made a perfect combination. H6 increased their sales by over 400% over the next eight years while still maintaining the original Alfieri quality standards.

In 1999, Amedeo realized that in order for H6 to meet the challenges of the new millennium, the company needed to form an alliance with a partner who could effectively carry on the H6 name and maintain its dedication to quality and workmanship. rF Motors purchased 51% of the Grimaldi H6 stock in November of 1999. Alessandro and Dante Grimaldi continue to play an integral role in the success of H6 to this day.

The fusion again proved to be a winning idea. In tribute to the great Amedeo Grimaldi, H6 presents the 2006 Howston GP, a car destined to lengthen the long wake of Grimaldi family successes.

Here the original letter written by Amedeo (who returned to live in Italy), to his sons and grandchildren (from the H6 archive):

Cari figli e nipoti, il progresso incalza ed è giunto il tempo di fondere la nostra impresa con compagnie in grado di vincere le sfide che il futuro riserverà, ma non dimenticate mai le radici da cui provenite. Siate sempre orgogliosi dei tanti successi sportivi che io e gli altri piloti della squadra abbiamo ottenuto con le Howston, spingendole ogni volta al limite. Conservate integro il carattere delle nostre auto, la cui origine è nel grande cuore della tradizione motoristica Italiana. Ora che sono vecchio e stanco, e ora che voi rappresentate il futuro, promettetemi di mantenere alto il prestigio sportivo del nostro marchio.

***Con affetto,
Amedeo Grimaldi***



Kodi

Kodi Manufacturing was founded in Hungary in 1927 by Kodi Attila and Kodi Balázs. The 'Kodis' invented one of the first all-steel cars in Eastern Europe. Bicycles were the first vehicles produced by the Kodis. In 1928, they opened a machine shop in the town of Székesfehérvár, making stove parts and, later, auto-parts. The Kodi Brothers, in 1931, established a large auto-parts plant in Budapest, Hungary. There the brothers made engines and other auto-parts and, in 1933, began producing their own automobiles. Production was abruptly halted and the plant was closed during the dark years of World War 2.

After the fall of Nazi Germany, the Kodi Brothers decided to re-open operations in rapidly growing post-war Germany. In 1946, Kodi Manufacturing was re-born. Kodi Attila and Kodi Balázs were responsible for a number of manufacturing innovations, including an oven that could bake enamel onto steel auto-bodies. By 1952, the year in which both brothers died, Kodi was one of the industry's largest companies.

Kodi Manufacturing continued to prosper throughout the 1960s and 1970s. However, the 1980s saw the company begin to face the challenge of dwindling sales. Cost of production and ever-increasing competition forced Kodi to close many of their European manufacturing plants. By 1994, Kodi Manufacturing was on the verge of bankruptcy and the future seemed bleak—at best.

The Kodi concern was purchased by rF Motors in 1995. Realizing that a complete overhaul of the company was in order, rF Motors re-located Kodi headquarters to the Motor City. The next eight years proved prosperous for the newly-invigorated Kodi name. State-of-the-art manufacturing was implemented, world class German engineers were contracted, and an aggressive marketing campaign focusing on Kodi Motorsport was launched world-wide.

rF Motors made a bold decision in 2004 to re-capture the history of Kodi by constructing a brand-new European manufacturing facility in Munich Germany ... just three kilometers from the old Kodi Manufacturing building. The Kodi Brothers would be proud.

On Assignment with Devon Mack—At The Facility

As I approached what many are calling the ‘Holy Grail’ of the racing industry, I asked myself again—Devon Mack— how did you get so lucky to land this assignment...?

Approaching the main facility, it immediately becomes apparent that rFactor Motorworks is a surprising departure from what we are used to seeing in the automotive industry. For one thing, the grounds look more like a resort than an industrial facility, and there are not over-abundances of admonishing signs that warn the passerby they are not welcome in some area or other. Quite the opposite, the rFactor Motorworks’ main headquarters’ grounds are masterpieces of design, layout, and beauty. The landscaping features some of the most diverse flora and fauna to be found anywhere in the world, and the atmosphere of the place is comforting. As I made my way inside, it struck me that success is rooted in even the smallest details of the larger plan.

Steeped in tradition dating back to World War II, this new alliance of auto manufacturers and racing support infrastructure is promising to revolutionize the way we approach racing—and so far, the impact has been appreciable. Already deals are being signed for the transfer of the blueprints and files needed to create tracks and cars outside of the main production facility—with full support of those creations from the auto makers. A level of support rarely seen, I wonder what other amazements await as I begin the discussion with five of the main principle figures involved in this unique project—Tommy Stanton, of Vayline Motors; Alessandro and Dante Grimaldi of H6; and two representatives from rF Motors.

We have followed the history of this company for quite some time, and when the merger took place, it was quite surprising—what was the main driving force for this decision?

Tommy Stanton: I cannot speak for all, of course, but one of the reasons for our actions was the realization that racing had changed dramatically, and no longer resembled the sport and art as our fathers and grandfathers knew it. It almost seemed to become a matter of the haves, and the have a lot more, and while it is not a foolish thing to spend half a billion dollars running a team for a single season when you will receive (well, a winning team, anyway ...) four-to-six times that back in endorsements, broadcast, publication, and other royalties, it is also something not even a fraction of the many smaller companies and racing teams are able to do. And, in my opinion, the racing began to suffer for it—and it appeared that the days of proving oneself on the track had given way to the days of press agents and wind tunnel fees in the millions per year. We wanted to change that—we wanted to give racing back to the racer and, just as importantly, back to the fans. We wanted anyone, no matter the skill level, to enjoy the highest technology available but with the emphasis strongly on racing. Of course, this type of revolution does not happen overnight, but the changes can already be seen. For example, women with the talent have a much better chance of success as the gender bias that pervades

racing is being effectively controlled with our new venture and it was a goal from the very beginning.

Alessandro Grimaldi: In our case, much of our decision was based on what Tony has said but, in other regards, it was also a matter of our own survival. As the spending in the upper classes escalated over the years, we found it difficult to keep up with the latest demands of the teams, and maintain the quality that has been our trademark. And we simply were not prepared to sacrifice quality, even if it meant our own demise. In the end, we were very fortunate, and are extremely proud to be a part of this exciting, and daring, new venture.

What is your most popular car?

RaceWorks Representative: Well, I think the others would have to agree—the rTrainer is by far the largest selling car produced by the new corporation. Our main goals were affordability and safety and we feel we have struck that balance to near perfection. Providing the perfect launching point for a wide variety of entry-level talent, the rTrainer series has launched the careers of many champions. We continue to refine the car, and now that the merger is fully in place, we can also offer the buyer the rare opportunity to assist in the actual design of the vehicle. This allows a level of customization never before seen in the industry.

What types of upgrades do you offer, and how does one go about obtaining them?

Dante Grimaldi: Basically, everything you see on the car is upgradeable. From a race-ready motor to the tiniest decal, upgrades to our cars at any stage are as simple as buying the parts and either having the dealer install them, or installing them yourself—the most popular route by far. The H6, for example, can be turned into a fully race-prepped vehicle and back to a more sedate one again in a matter of a few hours. This is just one of the benefits of the merger—the vast opening of previously guarded technology has led to an exponential growth in our ability to provide cars that are the perfect fit for our customers.

Why the decision to offer compatibility with the Kramden MotoGear DAS?

Tommy Stanton: Kramden MotoGear has been a long time player in the field of automotive data acquisition and display, and has proven their dedication to quality and service over the years, so the choice was an easy one.

On the surface, it is plainly clear that all of the companies seem to have a common goal—make racing affordable, and offering the customer the right car for the right job—that is, get them in a racing class that matches their talents—what are some of the ‘behind the scenes’ work being done to enhance the first time racer experience?

rF Motors Representative: The first thing we wanted to do was to immediately open the technology floodgates, so to speak. By providing free and open access to all relevant blueprints, files, and the latest in computer machining techniques, we are

now able to distribute relevant technology in a fraction of the time we were used to. The customer benefits from this are tremendous—race-tested technology is now reaching them in a fraction of the time, and with a noticeable increase in quality. We have a long way to go to be sure, but the framework is in place for a robust and dynamically changing provision for the racing community. At the same time, our passenger car models are benefiting as well—new improvements in computer modeling have allowed us to create one of the safest cars in the history of automotive manufacturing.

Kramden MotoGear DAS 2500 Description/Interview—LCD System

I was able to meet with Ron Turner, CEO and Lead Designer at Kramden MotoGear, and of the many questions on my mind, it was Kramden's revolutionary data acquisition and display system that had my interest at an all time high. Proving to be one of the most popular aftermarket add-ons shortly after it was released, the DAS 2500 has nearly unlimited functionality and it was only logical that rFactor Motorworks would approach them for their expertise in the field of digital data acquisition and display. It is capable of common everyday use, such as GPS navigation, and excels in dealing with full blown racing data and feedback—with this functionality and an industry standard ease of use, the DAS 2500 has firmly placed itself at the center of any serious driving or racing concern.

What was the main factor for the production of the DAS 2500?

*RT: We had been producing special, 'one off' units for a select few racing groups and it was during the development phase when we decided to design and build the unit in such a way as to give it broad appeal to the serious racer, or the weekend traveler who just wants a good way to get where they are going without getting lost. By going this route, we have future proofed the unit as it is fully customizable, and upgradeable—using either Flash EPROM firmware upgrades, or *.PLR code changes, both of which take mere moments to complete.*

How easy is the programming of the LCD? What functionality does it offer?

RT: From the very start, we wanted to keep the programming simple, but with great functionality. While it would have been easier to just design a dedicated racing unit, we felt that with the recent developments at rFactor Motorworks, we could better serve the aftermarket community by offering as many features as possible, and at the same time, provide an easy-to-use system. As far as functionality goes, the DAS 2500 has it all—a very complete and feature rich GPS system for the casual traveler and, for the racing interest, there is quite a bit more. When connected to sensors on the car, we can display tire temperatures, engine and oil temperatures as well as a host of timing options that provide the racer with relevant scoring information in terms of lap and split times. Some of the events do not have a telemetry chopper at them, so the DAS 2500 can be used in these cases to get the driver the information s/he needs, given that pit communications are not available.

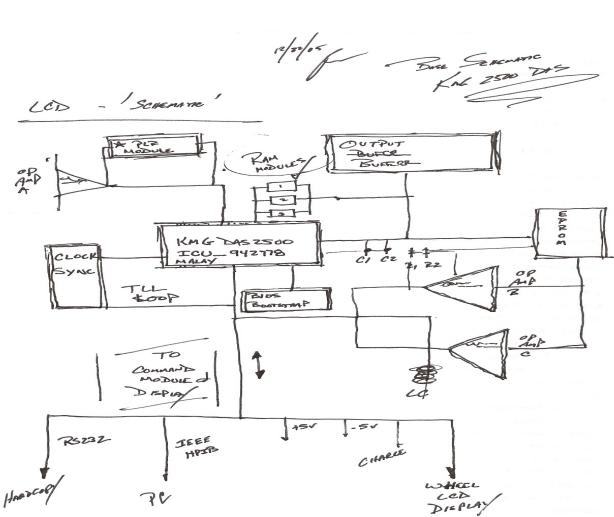
What types of equipment is needed to download and display the LCD data?

RT: With the DAS 2500, all you need is a PC and an RS232 interface to download the data. Using our custom designed software, it is only a matter of a few mouse clicks to get the full picture. At this time, however, we are in negotiations with a custom software designer to make this entire process a bit easier. We hope to eventually have a full blown telemetry display system—the data is there, but at this time we have to resolve a few minor issues in order to increase the ease-of-use in this regard.

We have heard rumors in the motor industry that the KMG 2005 DAS will be offered as an option on some of the manufacturer's cars—which manufacturers can we expect to participate in this program? Which cars will be outfitted at the initial launch of the program?

RT: At this time, due to NDA papers, we cannot say which manufacturers will be offering the DAS 2500 as 'stock', but the groundwork is being laid as we speak. However, the model is currently available to any who would like to give it a try.

What kind of a procedure is involved in retrofitting a unit on an older model? Are there various packages offered depending on the customers needs? What about custom programming and functionality, is this offered 'out of the box'?



An early sketch of the DAS 2500, as imagined by Ron Turner.

RT: While the base unit does not come pre-programmed beyond GPS navigation duties, all of the circuitry is in place, and it is not a difficult matter to reprogram the unit to the user's wishes. Programmability out of the box is limited, but we hope to

*change that in the very near future as our new software begins the testing phase. As far as retrofitting goes, it is a simple matter of a flash update of the EPROM, and a few code changes to the *.PLR command script—we wanted to keep it easy, and we also felt that forcing current owners of the older model to upgrade was not fair. The retrofitted units will offer the same functionality as one rolling off the assembly line today. We also produce ‘one off’ units on a per request basis.*

Where is the unit manufactured?

RT: Currently, we are using our facility in Springfield, Illinois for the DAS 2500 unit construction, and software programming duties are being handled by an outfit located in Ann Arbor, Michigan. I can't say much now, but in the future all of the DAS 2500 manufacturing, programming, research and development will take place at a dedicated facility.

After the interview, Ron gave me a very in-depth look at how the DAS 2500 works in a race environment. It took a few moments to get acquainted with the button layout and command control system, but once familiar with that task, it becomes difficult to imagine driving without this unit installed. At a glance, the driver is presented with a lot of critical information, but the flow of that information is controlled entirely by the driver so they see only what they need to see. Although the unit I tried did not have the computer output circuitry installed, the core functionality of the unit was identical to the more advanced ‘telemetry dump’ model.

Customize



There are a plethora of options and tweaks in rFactor that allow the end user a highly customized play experience. In this section we will identify the organization of these options and explain a little about what they do.

Underneath the “Customize” tab on the main menu there are three sub-tabs: “Player”, “Settings”, and “Vehicle”. The “Player” sub-tab allows you to change all details concerning the identity of your game persona. These are covered in more depth in the “getting started” section of this manual. The vehicle tab displays all the cars allowed for the current mod. The purchase, selling, and upgrading of your car collection is accomplished here. Both of these pages are straightforward and fairly self-explanatory. The “Settings” sub-tab however, contains a huge assortment of game play tweaking options, and it is here that we focus our current discussion.

Difficulty

This screen allows you to change the various difficulty settings.

Invulnerability

Select this option when you want a pristine ride no matter what. This is perfect for learning that new track, or dealing with an unruly car setup.

Steering Help

Once the Kramden Moto Gear DAS circuitry is activated, the unit will send control inputs through the wheel enabling the driver to ‘feel’ the best line through a corner. This incredible learning tool is made possible at the time of track creation by the application of a special magnetic strip along the center of the ‘best line’ through a corner. Of course, this will be a different path for differing autos, hence the application of several of these strips, all encoded to the particular cars’ DAS programming.

This aid will guide you through the corners. There are three levels of effect.

Braking Help

The perfect line through a corner is not very useful if you are coming out the other side off the track somewhere. Again, by employing the DAS system, impulses are fed into the programmable brakes and the driver will actually feel the brake pedal moving—when he no longer feels that, he can be assured that his braking is approaching ‘theoretical optimum’ as his motions are mimicking the ideal. This technology is rarely, if ever, used once the driver is comfortable with braking.

Opposite Lock

Coupled to slip angle sensors on the front and rear wheels, this aid will guide the driver through an out-of-control steering situation. While it cannot overcorrect for extreme inputs, it allows the driver to quickly learn the appearance and feel of the control inputs that occur in an opposite lock situation.

Spin Recovery

Possibly the most complex system Kramden provides, the Spin Recovery aid does just what it says and accomplishes this with a complex array of wheel sensors, slip angle sensors, steering wheel position sensors, engine RPM sensors, and various other items that are trade secrets at this time. Used mainly in the trainers, and rFactor Motorworks Basic Race Schools, this one can get you out of a jam with minimal drama.

Auto Pit Lane

One of the most difficult tasks to master is pitting. Overshooting the pits, speeding, and, in the worst case, hitting people not in cars, the technique of pitting is not as easy as it looks. With this option programmed into the car, the computer takes over once the pit lane is entered and automatically guides the driver to his pit stall.

Stability Control

Identical in principle to the system found on most rFactor Motorworks passenger car models, this system is designed to eliminate spins due to weight transfer and tire grip overloads by an ingenious on-the-fly adjustment of roll bar settings, hydraulically controlled torsion bars, and suspension ride height adjustments.

Anti-Lock Brakes

Another system identical in principle to those found in passenger cars, this system is made possible by using wheel speed and grip load sensors, pulsing the brakes to prevent a lockup under hard pedal application. This aid is a common feature in many sanctioned events, and an invaluable tool to the driver for learning how intermittent brake application at the limit of grip is achieved. While a human cannot pulse the brake pedal as fast as an electronic system can (approximately 10-15 times per second), by learning how to avoid such a situation in the first place, laptimes will begin to improve.

Traction Control

This aid employs traction sensors for the rear tires and feeds this data back to a programmable unit connected to the engine's ignition system. If a traction loss condition is sensed at the rear of the car, the ignition spark is shut off to the engine's cylinders in such a way as to eliminate the traction lost due to the application of too much throttle. Some of the more experienced drivers have been known to purposely activate the traction control system when finding themselves in an oversteer condition—a hard bang on the throttle, and the rotating rear end suddenly becomes a tenable situation.

Auto-Shifting

As the name implies, the car can be setup for several types of shifting maps. Most common is the full automatic that allows for the up-shifts and downshifts to be made by the system with no driver intervention. Other options are *up-shift only*, *downshift only*, and *off*. Depending on the sanctioning for an event, Auto-Shifting is still in fairly widespread use but the fastest drivers, when questioned, indicate that they feel a driver can be faster with manual shifting. But before you have years of experience, this option will give you a good idea of the proper gear to be in for a particular corner.

Auto-Clutch

Hydraulically controlled, this system allows the driver to shift at any RPM without lifting from the throttle. By controlling the driveline synchronization of the car, an Auto-Clutch shift takes approximately thirty milliseconds, much faster than a

human can duplicate. The expense of the system makes it difficult to find in a training environment, but there are companies that offer this with their training packages.

Auto-Reverse

With this option on, depressing and holding down the brake pedal will put the car into reverse automatically.

Damage Multiplier

Using the latest advances in composites and other strength enhancing techniques, some pretty amazing damage resistance can be obtained. Used strictly in the training environment, this setting controls the amount of strength used in chassis tubing, and how many layers of composites are added to the body panels and components. The cars can be difficult to control with the added mass, but driver confidence is boosted immensely, making this the perfect tool for building confidence at a new track, or when more than a few new drivers are on the track together. Another costly item, it is found at select training facilities within the rFactor Motorworks.

AI—Strength

One of the unforeseen benefits of the magnetic track strips was the further development of the so-called ‘car of the future’—a car that can run without any driver intervention whatsoever. Using various control systems, the car is able to follow multiple lines around any given track, at any given speed: from docile to racing speed, the AI cars have provided to be invaluable learning tools. In fact, in his preparation for the now infamous Feud Race, Dennis ‘Shotgun’ Hatfield used this very technology to program his opponent’s behavior, statistically, into the AI controls and was thereby able to accurately duplicate, on the track, many of his longtime rival’s signature moves and racing tactics. Adjustable to levels that would put all but the very best racers to shame in terms of lap times, this is yet another in a long line of amazing features rFactor Motorworks offers to the budding—or serious—racer.

AI—Aggression

Much like AI strength, this controls the ‘attitudes’ of the AI drivers and is adjustable to some very challenging levels. For a baseline, set this at the level which will allow you to best the AI by approximately one second per lap on a consistent basis. By steadily increasing the speed of the synthetic opponents, you will find your lap times become lower, and your comfort level while driving in traffic will increase dramatically. Driving in traffic is an essential talent to master if you ever hope to be the class of the field—and no amount of money will get you there.

Rules

The options found here allow the user to configure the race conditions and parameters to nearly limitless combinations.

Flag Rules

Allows the user to configure the type of race flags that will be seen during a race.

Fuel Usage

If you are not running a 100% race (time or laps), and wish to ensure a pit stop for fuel, select the desired fuel rate consumption multiplier here.

Tire Wear

Similar to fuel usage, this will ensure a pit stop is required in shorter length races.

Mechanical Failures

By changing the type of mechanical failures, the damage behavior for the cars can be customized.

Private Testing

By toggling this option on, there will be no AI cars while in a testing session.

AI Drivers

This controls the amount of AI drivers in the session. If more AI drivers are selected than are in a given class, duplicate names will be seen in the session. Try this with the trainers, selecting more than ten.

Race Grid Position

If the Qualifying session is toggled off (select Race Weekend, then the Race Details tab) this setting will determine your placement on the grid when the race begins.

Race Start Time

Choose the time of day for the race start. With the dynamically changing lighting of rFactor, this can have a dramatic impact on how you approach the track as the sessions advance. Be careful not to select too late of a time for the Open Wheel class, as visibility will become difficult at best.

Race Time Scale

This allows you to speed up the time-of-day lighting effects. With a setting maximum of 60x, a full day can be raced in about a half hour.

Type of Start

Each track has its own type of starting rules (rolling or standing) and those can be overridden with this setting.

Race Length Type

By altering this setting, you can control if the race is gauged by laps run, or time elapsed.

Race Laps

If the race is determined by a lap amount, set the desired value with this toggle.

Race Time

If the race is determined by a fixed amount of time, set the desired value with this toggle.

Controls

Controller Assignment and Function Mapping

See the Complete Controls section of this manual for the entire list of control and map-able functions that can be used and/or assigned to the keyboard or the primary driving controller. rFactor includes many new features, so make sure to take a good look—the new trackside cameras are unmapped by default, but are a great enhancement to the simulation and allow for some breathtaking replay views.

Rates Buttons

Digital Steering/ Throttle/Brake/Clutch Rate

If using a digital control device for a specific input, this set the rate of control. Digital control devices are devices that have only two states: on and off. In order to smooth the responsiveness of these inputs, we ramp up the effect over time. These sliders allow you to control the speed with which the full effect takes place.

Speed Sensitivity

This setting controls the sensitivity of the steering. If you find the steering too hard to control at high speed due to the motion of the wheel, adjust this setting to find a good balance between control and stability.

Look Ahead

This slider controls the amount the driver field of view (FOV) turns into the corner. For example, if you are turning the car to the left, the entire viewpoint will move to the left as well, giving a more lifelike appearance to the driving.

Head Movement

This setting controls the movement of the FOV within the confines of the car's cockpit. rFactor includes the representation of bumps on the track as well as the simulation of in-car disturbances such as extreme vibration at high speed—too fast, and you might find yourself bumping around hard enough to lose the line on the track!

Exaggerate Yaw

Moves the camera in the direction of car angle when in a corner.

Force Feedback Button (FFB Button)

FFB Type

Choose the type of force feedback depending on the controller being used.

FFB Effects

With options between from None to Full, this controls the amount of force feedback effects mapped through the control system.

FFB Strength

This setting controls how strong the force feedback values are. Adjust to desired strength. If you are using a Logitech wheel, make sure this setting is of negative value, if not already set to negative by default.

Controller 1 and Controller 2 Buttons

These control the various sensitivities and dead zones associated with the car's control.

Display

The visual aspect of the rFactor world is controlled here. Experiment with these settings in order to strike a balance between graphical splendor and CPU performance.

Circuit Detail

Controls the amount of details displayed for a given track.

Player Detail

Controls the detail and appearance of the user's on-track car.

Opponent Detail

Controls the detail and appearance of the AI opponents' cars.

Texture Detail

Controls the detail of the rFactor world textures.

Texture Filter

Bilinear, Trilinear, and Anisotropic texture filtering options are selected here. Full Screen Anti-Aliasing (FSAA) must be set-up by using the rFactor Config.exe program found in your rFactor directory.

Shadows

This controls the amount of shadows. At the highest levels, the shadows are cast over and into the cockpit, giving an amazing sense of immersion. If you are having performance problems, try to reduce this setting first. Lowering the setting to High will still give the dynamically changing effect, but the casting of the shadow into the driver cockpit will not be seen.

Shadow Blur

Selecting this option will give the shadows cast a much smoother appearance, but at the cost of performance. If you are having performance difficulties, turn this option to OFF.

Auto Detail FPS

This option, when toggled on, will adjust the level of detail in rFactor in order to maintain a minimum frame rate value. The number that is displayed when this option is selected is the minimum desired frame rate.

Special Effects

Adjust this to control the amount and detail of special effects (smoke, skid marks, sparks, etc.) and the duration they last.

Visible Vehicles

Select the amount of vehicles that are rendered at the same time on the track.

Message Center

If this is on, chat, pit crew, and game status messages are displayed in a window located at the lower left of the drivers view.

KPH MPH

Choose KPH or MPH as the primary display of speed.

Heads-Up Display (HUD)

Toggles the HUD display of information projected over the driving screen on or off.

Default View

Change the default view here, from the driving perspective.

Mirrors

This setting toggles the display of the mirrors on or off. The mirrors, like many of the other settings here, can also be changed in-game.

Vehicle FOV

Controls the field of view (FOV) of the driving perspective. Experiment with this setting to get the desired balance between cockpit view, for example, and sensation of speed preference.

Audio

To control the sound experience in the rFactor world, change these settings to your tastes.

Music Volume

This slider controls the rFactor music volume.

Sound Effects Volume

rFactor sound effects volume is adjusted with this slider.

Engine Volume

Controls the player's engine volume.

Player Volume Ratio

How loud your car is relative to everything else.

Opponent Volume Ratio

How loud your opponents will be in relation to everything else.

Number of Effects

Controls the number of simultaneous sound effects that are processed.

The Shop –Vehicle Upgrades

rFactor Motorworks not only manufactures some of the best cars in the world, they are also actively and extensively involved in the aftermarket support of those cars. Whether your preference is for a better sounding exhaust or a full-blown racecar, rFactor Motorworks provides for everything you will need. In fact, in order to advance your career standing, upgrading is an absolute must. But care must be taken—make sure to research the track well, as a power upgrade might not be as desirable as a brake system upgrade, depending on the nature of the track. And at a track that is very narrow, such as the friendly confines of Sardian, proper handling and gearing setup is a must. Weight reduction upgrades are unique in that they must be purchased and installed in sequence. At this time, the F/S cars are not upgradeable. The full description of each upgrade can be found in the Upgrades Information Window to the right of the Upgrades Select Window.

Trainer Upgrades

DAS 2500 LCD Unit
Advanced School Package

National Stock Car Upgrades

The Stock car series offers complete upgrade packages based on the track type and are complete chassis and aero packages. Make sure to select the proper package or you may find your car overheating or worse—underperforming!

Short Track

F/S Upgrades

None at this time.

SR Class Car Upgrades Available

Spoiler

Provides for better rear end stability.

Cockpit

Removes some of the stock car interior and replaces the items with rFactor Motorworks approved racing pieces.

Side Skirt

Not just for styling, this upgrade can help with handling as well.

Front End

Allows for adjustable down force at the front of the car, a must have for those technical venues.

Rear End

See Front End.

Hood

Reducing weight and providing for better airflow into the engine compartment, this is a good upgrade to get early on.

Exhaust

Besides sounding better, an upgraded exhaust system is a sure and easy way to gain a few more horsepower.

Tires

You will want to keep the tire upgrades in line with any driveline upgrades as you will need to get the power to the road.

Brakes

From better performance overall, to a full blown race setup, the brake upgrade is one of the most critical changes to your car—another good item to pick up as soon as possible. Upgrade in stages if you cannot afford to make the jump to the race setup right away.

Weight Reduction (Must upgrade in stages)

Drastically reduces the weight of the car by removing unnecessary items and replacing (not just a simple removal) a select few by much lighter, and stronger, components. This upgrade path must be done in stages, as the later upgrades share construction areas with the lower end reduction packages.

Suspension

With this upgrade, the suspension can be fine-tuned and dialed in to give that perfect setup.

Computer Chip

A simple upgrade that can yield serious results, this is yet another good upgrade to get early on, as the Engine upgrades can be quite expensive.

Engine Tuning

Here is the good stuff—you can get some very substantial gains in performance, but be warned—raw horsepower is useless if you are using it to turn rubber into glue. Match the engine performance to the chassis capabilities, and you will be well on your way to a great handling and fast racecar.

Clutch

Upgrading the driveline requires a stronger clutch. Make sure to match the clutch performance level with your current engine spec.

Flywheel

Much like the clutch upgrade, this is another necessary driveline upgrade.

Transmissions

From a simple automatic to a full-blown and adjustable race transmission, find your preference here.

Differential

Have more control over the behavior of the rear of the car by upgrading the differential to the fully adjustable model.

Fuel Tank

Lighter, and safer, the upgraded fuel tank is a requirement for many rFactor Motorworks sanctioned race events.

Horn

Last but not least—give the opponents a shout with this custom horn. Upgrade available for SR cars only.

Venue Assessment

Through the use of currently available technologies, rFactor Motorworks has laid the foundation for what can only be called 'Team and Racer Track Creation'. Once a suitable location has been found, the basic track layout uses ideas borrowed from the world's military and engineering road and bridge building corps. The actual track layout can be constructed in about a week, and this is the first step—the laying of the road grid used to make the track. It is a composite material stronger than steel, and is the backbone of the track, and can be anywhere from 15 to 37.5 feet in width, with no real limits on the length, or shape. Next, a special resin is poured into the honeycomb structure of the track grid, giving it rigidity but at the same time maintaining the flexibility that is required due to temperature changes and loading stresses. When the resin has dried, the final coat is applied—similar to the surface of an aircraft carrier flight deck; this material has an estimated lifetime of 15-25 years, and is repairable, much like its asphalt cousins. Finally, the landscapers are brought in to finish the look and feel of the track creator's vision. rFactor Motorworks currently owns 1.2 million acres of land around the world, and strongly encourages the creation of tracks by interested parties. But this is not cheap—to gain access to the MAS and INI blueprints required for accurate track creation or replication will run you around 10-15 million, USD, but compare this to the 150-200 million to build a conventional track, and the advantages become crystal clear. In other words, for the price that many teams are paying to simply race a full season, an entirely new venue can be created. And it can just as easily be taken down, and the land returned to a condition that does not indicate that anything was ever there. A truly remarkable feat, and another in a long line of wonders rFactor Motorworks has put forth in its efforts to make auto racing a household phrase.

Toban Raceway Park

Location—Toban Indiana, USA

Length—Special Event, Reverse—2.603 KM/1.6 Miles

Special Event, Normal—2.603 KM/1.6 Miles

Special Event, Long—4.012 KM/2.5 Miles

Grand Prix Event—4.012 KM/2.6 Miles

Type—Road course

Number of Configurations—Four layouts supporting all classes.

Sardian Heights

Location—Sardian Heights, Georgia, USA

Length—Temporary Street Circuit, Short Event—1.35 KM/0.84 Miles

Temporary Street Circuit, Long Event—2.53 KM/1.58 Miles

Type—Temporary Street Course, Road Course layout.

Number of Configurations—Two layouts supporting all SR events, OW Trainers and rF Advanced models.

Mills Metro Park

Location—Mills City, Virginia, USA

Length—Mills Short—1.846 KM/1.2 Miles

Mills Special Event, Reverse Layout, Long—3.149 KM/1.95 Miles

Mills Grand Prix, Long—3.149 KM/1.95 Miles

Type—Road Course

Number of Configurations—Three layouts supporting all classes,

Orchard Lake Raceway

Location—Washington Pennsylvania, USA

Length—Speedway Infield Road Course—3.713 KM/2.31 Miles

Speedway Oval Course—2.91 KM/1.81 Miles

Type—Road and Oval Course

Number of Configurations—Two, all classes allowed.

Joesville Speedway

Location—Joesville Montana, USA

Length—Short Oval Course—0.656 KM/0.41 Miles

Type—Fixed Oval.

Number of Configurations—One, fixed oval, SR classes, rF Trainer and rF Advanced classes, FIS Championship Series.

Essington Long

Location

Length

Type

Number of Configurations

Lienz Festival Der Geschwindigkeit

Location—Lienz, Austria

Length—Week 1—Altstadt—1.53 Km/0.95 miles

Week 2—GP Short—2.68 Km/1.66 miles

Week 3—GP—6.26 Km/3.89 miles

Week 4—GP Long—7.23 Km/4.49 miles

Week 5—24 Hour GP—8.16 Km/5.07 miles

Week 6—Rally Hill Climb—6.78 Km/4.21 miles

Type—Temporary road course

Number of Configurations—six, including one rally hill climb stage

Jacksonville Super Speedway

Location—Jacksonville Florida, USA

Length—Jacksonville 500—4.02 Km/2.50 miles

Type—Super speedway

Number of Configurations—One fixed layout super speedway

Barcelona

Location—Barcelona, Spain

Length—4.62 Km

Type—Road Course

Number of Configurations—One road course layout

Northamptonshire

Location—Northamptonshire, UK

Length—British Grand Prix course 5.141 Km

RF3 Championship course

Sports Car Championship course

Type—Road course

Number of Configurations—Three road course layouts

Nuerburg

Location—Nurburg, Germany

Length—European Grand Prix course 5.149 Km

Nuerburg Sprint course

Type—Road course

Number of Configurations—Two road course layouts

Essington Park

Location—Bolsover, Derbyshire, UK

Length—Essington Grand Prix—4.012 Km/2.5 miles

Type—Road course

Number of configurations—One permanent road course layout

Sanctioned Class Season Schedules	
Event Series	Race Locations
Rhez Amateur GP-GT3	Mills Short
	Joesville Speedway
	Toban Short
Rhez Unlimited-GT2, GT1	Mills Short
	Orchard Lake Road Course
	Toban Short
	Sardian Heights, Short Course
	Mills Long
ZR Challenge—ZR	Toban Long
	Mills Short
	Orchard Lake Road Course
	Toban Short
	Sardian Heights, Short Course
	Mills Long
ZR-Z Invitational	Toban Long
	Orchard Lake Road Course
	Mills Long, Reverse Layout
	Sardian Heights, Short Course
	Mills Long
	Toban Long, Reverse Layout
rFactor Basic Trainer	Mills Short
	Joesville Speedway
	Toban Short
rFactor Academy Racer	Toban Long, Reverse Layout
And Trainer	Orchard Lake Oval
	Mills Long, Reverse Layout
	Toban Short
FIS Championship	Mills Long
	Joesville Speedway
	Toban Long
	Orchard Lake Oval
	Mills Short
	Orchard Lake Road Course
	Toban Long, Reverse Layout

Kodi Rayzor	Altstadt
Takamaya Venom	GP Layout
	GP Layout Long
	24 Hours Course
Scoring, SR Series	
Place	Point Award
First	10
Second	8
Third	6
Fourth	5
Fifth	4
Sixth	3
Seventh	2
Eighth	1
No Further Point Awards	–
Scoring, OW Series	
First	8
Second	5
Third	3
Fourth	2
Fifth	1
No Further Point Awards	–

Multiplayer

There are two types of servers—dedicated and non-dedicated. The dedicated server does not have any graphics or sound and can run on a fairly low-end machine (because of low CPU and memory usage). It can respond to and transmit networking messages much quicker than a non-dedicated server. To use this special server, double click on 'Dedicated.exe' and use the options tables to configure the server to your tastes. Non-dedicated servers are set up through the normal game, by clicking on the 'Create' button under the Connect icon in the main options. On non-dedicated servers, the host can race with the clients. The host of a non-dedicated server is also in complete control of the game flow—the clients cannot vote to change sessions or add AI.

To run a server, you may first have to make sure it works with your firewall. With a non-dedicated server, there is actually a Firewall Test button that you can use. In fact, in order to announce your non-dedicated server to the Internet, you must pass this Firewall Test first. It is found under the multiplayer Settings page (a submenu of the Connect icon in the main options). For further help with firewall issues and setting up ports, please consult the Firewall Guide in the Support directory where rFactor was installed. If you still do not see your game on the Internet, make sure the 'Matchmaker Announce' option is enabled.



It is very important to set up the bandwidth options for a server. You can find information about Connection Types and Upload/Download Speeds at the top of the Multiplayer Client Setup section. However, the server has more considerations than the clients when setting these options up. For one thing, the upload capacity is more important for a server than the download capacity.

By default, rFactor will use as much bandwidth as allowed to create the highest quality multiplayer experience possible given the connection. The bandwidth allowance is determined by a combination of the server and client's connection options. More to the point, though, even though your connection may support 1000 kbits/sec (1Mbit), it doesn't mean you should configure rFactor to use 1000 kbits/sec. If you plan on running several rFactor servers, or want some extra bandwidth available for other uses (web-browsing and other networking applications), you should reduce the connection type and/or 'share' the upload/download speeds. For example, if you want to run 4 rFactor servers sharing a 5000 kbits/sec (5Mbit) upload connection, then each server should be configured to use no more than $(5000/4) = 1250$ kbits/sec. While we are talking about multiple rFactor servers running on the same machine, it should be noted that each one should use a separate profile (or 'player file'); otherwise options may get mixed up between them.

Another way of limiting the bandwidth is available through editing the multiplayer configuration file (found by default at UserData/<your name>/multiplayer.ini). You can limit bandwidth on a per-client basis by changing the Max Data per Client setting. For example, say you have some clients joining with cable connections (let's say 256kbit connections) and others joining using ISDN (64kbit). You may want everyone to experience the same connection type to your server, so you could change the Max Data per Client to 64, which will limit even the cable clients' connection to be the same as the ISDN clients. Clearly, you can then easily calculate the maximum upload bandwidth you will be using. With 15 clients, you will be using no more than $15 * 64 = 960$ kbits/sec. You might note that if this exceeds the Upload Speed you configured, bandwidth will be limited to the Upload Speed instead.

Servers have many options available to them. One of the first and most important is what Race Series (or 'game database') to use, which will partially dictate what vehicles and tracks can be used. After that, you will want to set up the vehicle filters to allow only the vehicles you want. Vehicle filters were discussed above in the 'Game play Summary' section.

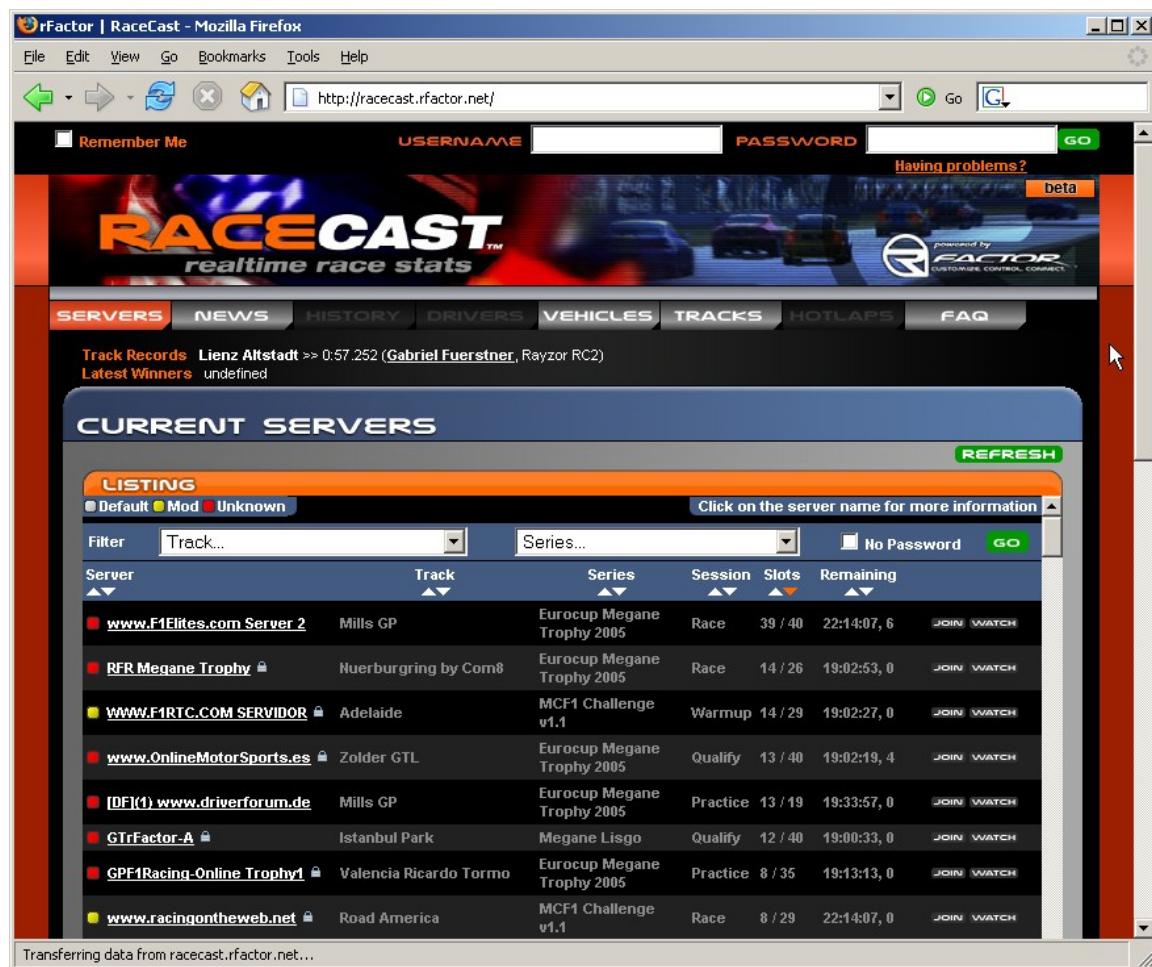
Selecting "RaceCast" (dedicated server) or 'Post On RaceCast' (non-dedicated server) will have the timing and other information sent to RaceCast so others can view the race results on your server. There are many other options, such as which driving aids to allow, various race options and so forth that you will encounter, and most are discussed elsewhere in this document. Also of interest are some more special options in the multiplayer configuration file. For dedicated servers only, you can configure the voting so it is not too easy or too hard to change sessions, add AI,

restart races, etc. For these and other options, please look under the "External Options" section later in this document.

Finally, once the server is set up and clients have joined, you have the option of booting or banning people for poor behavior. Booting people is temporary—the player could simply choose to re-join the server immediately assuming the race session hasn't started. Banning people puts their IP in a list and prevents them from re-joining. The full list of banned IPs is stored by default in UserData/<your name>/bans.xml, so you can share it with friends or edit/delete it at a later time.

RaceCast

RaceCast is a powerful utility that is just one of the new features to be found in rFactor, and one of the most entertaining from a driver's point of view. Once you have your password and login information gathered and properly entered, you can use this powerful utility to track all of your online activities, and display them in numerous ways. Total laps, total miles, cars driven, tracks raced—you name it, and RaceCast has it covered, as well as a very useful *.XML output of the race that can be parsed to display the race results however the user chooses.



The screenshot shows a Mozilla Firefox browser window displaying the RaceCast website. The address bar shows the URL <http://racecast.rfactor.net/>. The page header includes a 'Remember Me' checkbox, 'USERNAME' and 'PASSWORD' fields, a 'GO' button, and a 'Having problems?' link. Below the header is a banner with the text 'RACECAST™ realtime race stats' and the rFactor logo. The main menu bar has links for SERVERS, NEWS, HISTORY, DRIVERS, VEHICLES, TRACKS, HOTLAPS, and FAQ. A sub-menu for SERVERS shows 'Track Records' for Lienz Altstadt and 'Latest Winners'. The main content area is titled 'CURRENT SERVERS' and contains a table listing various servers. The table columns include Server, Track, Series, Session, Slots, Remaining, and two buttons for each row: 'JOIN' and 'WATCH'. The table rows show the following data:

Server	Track	Series	Session	Slots	Remaining	JOIN	WATCH
www.F1Elites.com Server 2	Mills GP	Eurocup Megane Trophy 2005	Race	39 / 40	22:14:07, 6	JOIN	WATCH
RFR Megane Trophy	Nuerburgring by Com8	Eurocup Megane Trophy 2005	Race	14 / 26	19:02:53, 0	JOIN	WATCH
WWW.F1RTC.COM SERVIDOR	Adelaide	MCF1 Challenge v1.1	Warmup	14 / 29	19:02:27, 0	JOIN	WATCH
www.OnlineMotorSports.es	Zolder GTL	Eurocup Megane Trophy 2005	Qualify	13 / 40	19:02:19, 4	JOIN	WATCH
[DFI] www.driverforum.de	Mills GP	Eurocup Megane Trophy 2005	Practice	13 / 19	19:33:57, 0	JOIN	WATCH
GTrFactor-A	Istanbul Park	Megane Lisgo	Qualify	12 / 40	19:00:33, 0	JOIN	WATCH
GPF1Racing_Online Trophy1	Valencia Ricardo Tormo	Eurocup Megane Trophy 2005	Practice	8 / 35	19:13:13, 0	JOIN	WATCH
www.racingontheweb.net	Road America	MCF1 Challenge v1.1	Race	8 / 29	22:14:07, 0	JOIN	WATCH

At the bottom of the page, a status message reads 'Transferring data from racecast.rfactor.net...'. The browser interface includes standard navigation buttons (back, forward, search, etc.) and a toolbar above the address bar.

The RaceCast main window allows the user to login, check the status of any server running that is using RaceCast, and gives an overall statistical picture of all the laps and miles that have been run cumulatively. From this main screen, you can click on a server name, and an informational window will appear below the server list, providing the user with the rules and other relevant information from that particular race. If you chose, you can simply click on the WATCH link, and will be taken to a real-time display of all drivers on that server, what session they are in; times they are running, and total amount of laps. Feel like a race? Then pick one of your buddies servers, or hop on one that has no password protection—but remember your manners here, as pickup races are only as ‘clean’ as the drivers allow them to be. If the server is password protected, you will be prompted for that password before you are allowed to join the server.

RaceCast also provides an immense database of driver statistics, results, and ranking information. By using the powerful search functions, you can obtain, for example, a complete list of every race entered in the course of a driver’s online ‘career’. Also for observation is the rRank, a ranking based on your online performance, the higher the number—the better.

And the best part? Through an exclusive agreement between the principals at rFactor Motorworks and several broadcasting networks...it’s free! No longer will you wonder where you stack up in the grand scheme of your racing class, RaceCast can provide any information you need and it is just a few mouse clicks away.

For more information, visit the RaceCast site at: <http://racecast.rfactor.net>

Multiplayer Client Setup

To join an Internet game for the first time, you need to set up your connection first. Go to Settings under the Connect icon on the main page. Pick the Connection Type that is equal to or less than the real connection you have. For example, if you have a Cable or DSL line with 192kbits upload capacity, we recommend choosing the **Cable/DSL 128K Up** selection.

If you have tested your connection and know that your precise upload and download capacity is not comparable to one of the existing Connection Types, then choose Custom and specify those capacities directly in Upload Rating and Download Rating.

Warning: picking a connection type faster than what you actually have will likely lead to a unsatisfactory multiplayer experience.

After you have set up your connection, click Join under the Connect icon. A list of games should appear showing the Game Name, the Circuit, the number of Players out of the maximum allowed, and finally the Ping. Just to clarify, the Ping is not your ping to the server. Rather, it is the average ping of the players that are currently

connected (and 0 if nobody is connected). Lower pings (under 150 or so) indicate that the server has a good connection to its existing clients.

To get more information about a particular game, simply click on it. At the bottom of the screen, there are three tabs, each of which has information about the game you have clicked on. A lock beside the name of the game indicates there is a password (meaning that the server has probably invited specific people to join). Another important piece of information is which Race Series (rFm) is being run. The two series that ship with the game are SR Grand Prix Season and the Open Wheel Challenge, which were described earlier in this document. If you may want to race a particular type of car, also check under the News/Info tab for the Allowable Vehicles.

Back under the Settings tab, you will see which driving aids are allowed. A green box indicates that you are allowed to use the given driving aid. If you depend on Traction Control to get around the tracks, it is recommended that you not join games that disallow Traction Control.

You should also check the current Session that the game is in. You cannot currently join a game that is already in the Race session. The Laps Remaining and Time Remaining show you how much longer the current session will last (unless the participants or server choose to change sessions before it ends). The Flag Rules are described elsewhere in this document, and the Damage Multiplier tells you how realistic the damage is. 100% is realistic, 50% is pretty forgiving, and 0% causes no damage at all.

Under the Advanced tab, the only current important piece of information is the Data Rate of the server. Higher data rates (1000+ kbps) indicate that the server can handle many cars with good quality. Finally, other miscellaneous information can be found under the News/Info tab.

If you have decided on which game to join, go ahead and click it and then click Load Game at the bottom-right hand corner of your screen. At that point you will need to choose a vehicle that matches the server's Allowed Vehicles. When you are done, click Load Circuit and you will be in the game.

More information about participating in multiplayer games, including voting, is covered above in the Monitor section.

More Multiplayer Features

On the Join page (found under the Connect icon in the main options), you will find three tabs at the top - Server List, Friends List, and Chat. The Server List is where you are taken to by default and lists the games you can join.

Under Friends List, you can specify friends by their profile name and clicking the Plus icon to add them. Later on, you will be able to see which of your friends are

racing right now. In the right pane you will see games you have bookmarked. Once you are in a race, you can bookmark the server by pressing the call-vote button in the bottom-left portion of the monitor and then pressing the "Bookmark" button. From then on, just go to the Friends List, pick the bookmarked server and hit Join Race.

Under Chat, you can participate in rFactor chats using IRC. Simply hit Connect, and assuming your nickname is not already taken (it defaults to your profile name) you will be able to chat with anybody listed in the lower pane.

On the multiplayer Settings Page (found under the Connect icon in the main options), you will see RaceCast settings in the lower part of the screen. RaceCast is an exciting new feature that allows you to watch live timing, find games, and view results and rankings. To enable RaceCast to keep your statistics, you must first register with RaceCast by typing in an e-mail address and password, then clicking the "RC Register" button. If Registration succeeds, you can then press the "Sign on RaceCast" button to sign on. When RaceCast is activated, the RaceCast Status indicator will light up green. From then on, the game will attempt to log in automatically whenever you start up. To view results and so forth, open up your web browser and go to racecast.rfactor.net. You will need to log in using your profile name (not the e-mail address) and password that you registered with.

Control Commands List

This is the complete control list for rFactor. Note that several commands are unmapped. The free roaming camera control is described in more detail in the 'Extra Features' section.

Default Key Map

ACTION	DEFAULT KEY	DEFAULT CONTROLLER
Accelerate	A	Axis Y (-)
Brake	Z	Axis Y (+)
Steer Left	,	Axis X (-)
Steer Right	.	Axis (+)
Shift Up	Left Alt	B1
Shift Down	Right ALT	B2
Neutral	N/A	
Clutch	Q	
LCD Mode	ENTER	
Request/Cancel Pit Stop	S	
LCD Up	UP arrow	
LCD Down	DOWN arrow	
LCD Increase	RIGHT arrow	
LCD Decrease	LEFT arrow	
TC Override	O	
Launch Control	/	
RPM Limiter	L	
Brake Bias (Forward)	[
Brake Bias (Rear)]	
Look Left	V	
Look Right	N	
Look Behind	B	
Steering Assistance	F1	
Opposite Lock Assistance	F2	
Braking Point Assistance	F3	
Stability Assistance	F4	
Spin Recovery	F5	
Invulnerability	F6	
Auto Shifting	F7	
Traction Control	F8	
Anti-Lock Brakes	F9	
Pit Lane Assistance	F10	
Clutch Assistance	F11	
Take Screenshot	F12	
Cockpit Cameras	INSERT	
Onboard Cameras	HOME	
Swingman Cameras	PAGE UP	
Circuit Cameras	PAGE DOWN	
Bounce to Vehicles Ahead	Keypad +	
Bounce to Vehicles Behind	Keypad -	

Instant Replay	R
Display Driver Details	TAB
Pause	P
Restart Race	Y
End Session/Race	ESC
Pan Up	Keypad 8
Pan Down	Keypad 2
Rotate L	Keypad 4
Rotate R	Keypad 6
Zoom In	Keypad 9
Zoom Out	Keypad 7
Display Vehicle Labels	TAB
Toggle AI control	I
Driver Hot Swap	W
Passenger Select	P
Increment Boost	UNMAPPED
Decrement Boost	UNMAPPED
Temporary Boost	UNMAPPED
Toggle Free Move	UNMAPPED
Zero Free Move	UNMAPPED
Ignition	UNMAPPED
Starter	UNMAPPED
Horn	UNMAPPED
Headlights	H
Handbrake	UNMAPPED
Look Up	UNMAPPED
Look Down	UNMAPPED
Look Roll Left	UNMAPPED
Look Roll Right	UNMAPPED
Adjust Seat Fore	UNMAPPED
Adjust Seat Aft	UNMAPPED
Adjust Seat Up	UNMAPPED
Adjust Seat Down	UNMAPPED
Time Acceleration	UNMAPPED
Toggle Mirrors	NUM_3
Toggle HUD Stats Bar	NUM_4
Toggle HUD Tachometer	NUM_5
Cycle HUD MFD's	NUM_6
Toggle Overlays	NUM_7
Real-time Chat	T
Quick Chat #1	UNMAPPED
Quick Chat #2	UNMAPPED
Quick Chat #3	UNMAPPED
Quick Chat #4	UNMAPPED
Quick Chat #5	UNMAPPED
Quick Chat #6	UNMAPPED
Quick Chat #7	UNMAPPED
Quick Chat #8	UNMAPPED
Quick Chat #9	UNMAPPED
Quick Chat #10	UNMAPPED

Quick Chat #11	UNMAPPED
Quick Chat #12	UNMAPPED
External Signal Up	UNMAPPED
External Signal Down	UNMAPPED
External Signal Left	UNMAPPED
External Signal Right	UNMAPPED
External Signal Select	UNMAPPED
External Signal Cancel	UNMAPPED
Camera Slow Move	
Camera Move Forward	UNMAPPED
Camera Move Backward	UNMAPPED
Camera Move Left	UNMAPPED
Camera Move Right	UNMAPPED
Camera Move Up	UNMAPPED
Camera Move Down	UNMAPPED
Camera Tilt Up	UNMAPPED
Camera Tilt Down	UNMAPPED
Camera Tilt Left	UNMAPPED
Camera Tilt Right	UNMAPPED
Camera Turn Left	UNMAPPED
Camera Turn Right	UNMAPPED
Camera Zoom In	UNMAPPED
Camera Zoom Out	UNMAPPED
Toggle Use of Hardware Plug-in	UNMAPPED
Push to Talk Control for Voice Chat	UNMAPPED
Push to Change Camera View	UNMAPPED
Reset FFB	UNMAPPED
Standard Display	UNMAPPED
Pit Display	UNMAPPED
Driving Aids	UNMAPPED
Vehicle Status	UNMAPPED
Extra Info	UNMAPPED
Race Info	UNMAPPED
Standings Display	UNMAPPED

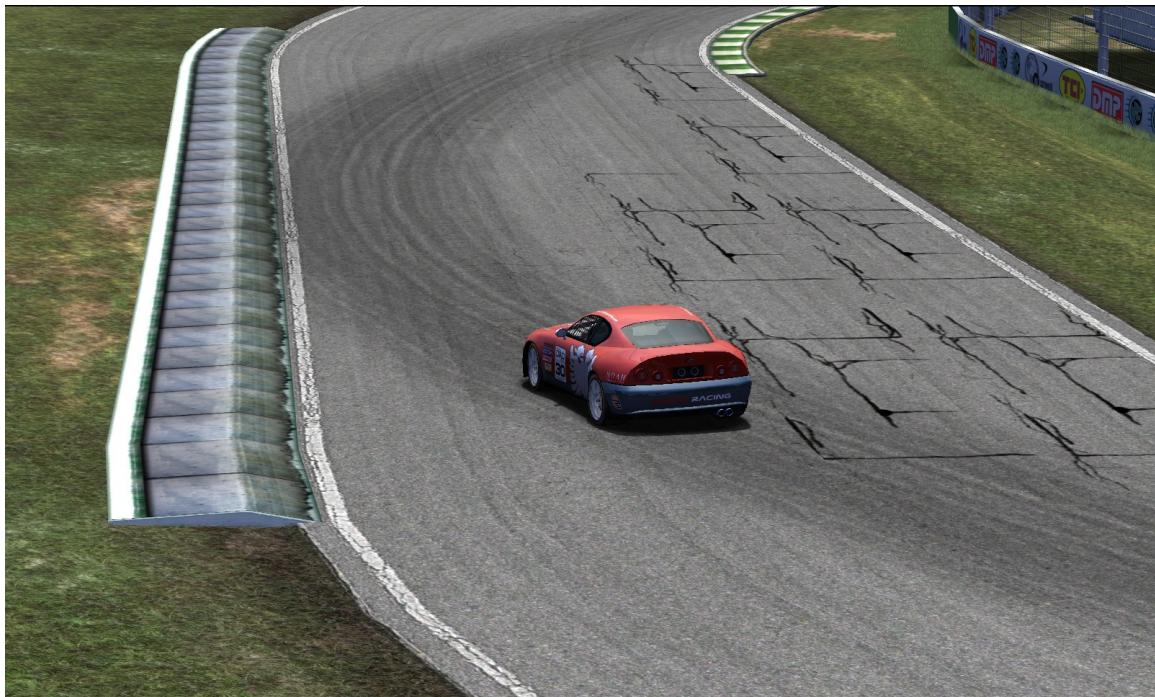
Appendix A: Tuning For Speed—The Garage

In order to be quick, besides having the line down, you need to understand how the car is behaving and how you can change that behavior if it does not feel right to you. Car setup is an art, as well as a science, and this section will provide you with a good idea of just where to start. After a bit of practice and time in the garage, your driving and car setup skills will rapidly improve. You will now be taken through a detailed track run-through with setup-guru **Achim-T** at the challenging Mills track.

Ladies and Gentlemen, strap yourselves in as we examine Mills from both the driver and the engineer's point of view.

The first thing you need to do is become intimately familiar with the track. If you have not yet done so, take the *Howston* out onto the tarmac and drive fifteen-to-twenty laps using the default setup.

On your first five laps, try and follow the racing line as close as you can. The main goal at this stage is to memorize the sequence of corners and to identify landmarks that will trigger the necessary memory-actions later on when you'll be driving too fast to see every detail.



After five laps, speed up a tad and follow the racing line more competitively. Not quite at race speed yet, but fast enough for it to be interesting. Release the throttle considerably earlier than you normally would, and start braking earlier as well, so that you're not hard on the brakes and are slow enough to be able to examine each corner in order to understand how you will need to attack it. These five laps are for

understanding how each corner works, and your attention should be drawn, in particular, to the entry and exit phases for each turn.

By lap ten, you should have determined approximate braking points as well as the correct gear for each turn, and you should also know exactly what follows each turn.

Now it's time to go fast. For another five laps, try to go as fast as you—safely—can. The emphasis is on 'safe'. Still brake earlier than you think you should—it'll be too late quite often anyway—and focus on the racing line, memorizing what the car does in every corner.

Asking the right questions is a crucial part of setting-up the car for speed and here're some things you should be paying attention to: Does the car oversteer or understeer, and, if so, where, and what were you doing at the time with the throttle, steering wheel and brake? Are there bumps before-in-or after the corner that upset the car? Are there any spot that seems particularly slippery? Are the curbs usable or not? Is the perspective deceiving you as to the actual trajectory of the corner and the appropriate racing line? Is the corner followed by a high-speed section (which would mean that exit speed is dramatically more important than entry or mid-corner speed)? Is the apex where it seems to be or is it earlier-later, and what errors are you making—in other words, what are you trying to do naturally and is this optimal for the corner or not, and if not, in which way (for instance, are you trying to jump on the throttle too early, are you taking the wrong line, braking too late-early?) are you inducing either understeer or oversteer?

Is a corner followed by another corner and does using the optimal line or speed through one corner compromise the line or speed for the subsequent corner? Do you reach something just short of the redline on the tachometer at the fastest spot on the track when you entered the section smooth and fast? Do the gears match your cornering speeds, or are you at a very high or very low RPM somewhere through a corner but cannot shift to a better gear because that then would again be too high or low in terms of RPM?

Does the rear end get very loose as you shift down for some corners? (A remedy to this is to shift down later or to move the brake balance further to the front, but the latter has severe tradeoffs, so if you're still on the default settings, you should only choose the first option.) Do the front wheels tend to lock-up excessively? Does the car over or under steer during acceleration out of the corner? Can you point it towards the straight quickly after the apex?

Does the car follow your steering input well, and where does it not do this? Does it do things you do not want it to do? If so, where?

If five laps at speed were not enough to answer these questions, drive another five. After twenty laps, however, you should have enough information to return to the garage and start discussing the driving and setup of the car for this track.

All right, I assume you've driven those twenty laps now and have the answers to the questions that will come up during the following discussion.

Let me now take you on a lap at Mills so that you can reflect upon the differences between my perception and yours, and see the things I watch out for in such situations. I always drive with all driving aids off, so keep that in mind while reading this little guide. However, since there are racing series that feature traction control, anti-lock/ABS systems and other electronic driving aids, feel free to enable them as you wish. But be aware that they *will* change the car's behavior, so some of the things we say here may no longer apply when driving aids are enabled.

Let's assume we've completed a warm-up lap and are now on that short straight preceding the final left-hander leading back onto the main straight.

I try to enter the final left-hander from the right hand curb; since this corner is followed by a long straight, any bit of speed advantage I can take with me out of this corner will remain effective for (in racing terms) a very long time.

Therefore I will, if necessary, sacrifice some speed before entering the corner in order to make sure I am able to accelerate as soon—and as hard—as possible out of the turn. I need to have absolute control of the car around the apex to be able to point it into the right direction for the subsequent acceleration.

I start from the right-hand curb; I steer early and use the lower part of the left-hand curb when I'm in the race (I might use the higher part of the curb in qualifying, but only after I've made sure my setup permits this). Softer suspension settings may allow the car to feel smoother across the high curb, stiffer settings may not.

Basically, I will point the car to a point somewhere at the end of the right-hand curb following the corner by gradually reducing the steering lock. Smooth driving is an absolute must in rFactor, as it is in a real car. Therefore, I will not nail the throttle, but will depress the pedal further in three or four steps while gradually opening the steering lock. The car will probably snake a little, but all that matters is that I can continuously accelerate as hard as my rear wheels' grip allows. If I can do this then for now, everything is optimal. If I cannot, I'll need to change something either in the setup, or in my driving.

Assuming then, that I am comfortable with the car's handling coming out of this turn, I'll accelerate flat-out until I see the right-hand curb preceding T1L (Turn One, a Left-hander).

Again I will aim and drive onto that curb. Then, as I reach the end of that curb, I will remain on the throttle and steer left a tad earlier than my eyes would make me believe since, at this speed, the centrifugal forces will drive the car towards the outside of the corner. So I need to make some provisions for counter-balance to still be able to touch the inside curb at the apex of the corner (or wherever I am aiming for), and have the car pointed into the right direction for optimal exit.

It is fairly easy to get through this corner if you follow this advice. However, do not make the mistake to dwell on the satisfaction of your success. This is one of the major errors a driver can commit—keeping your mind focused on the past instead of on what is ahead of you. No matter whether maneuvers went well or not, store it in memory for later reviewing (when you're back in the garage) and concentrate on what is ahead of you.

Having reached the apex of T1L—provided you have the speed you should have in the *Howston*—you have to start braking for T2R. Most of you will have had problems getting through T2R in one piece—this is simply because, no matter how happy you are about the speed you carried through T1L, you have to immediately sacrifice that speed to prepare yourself in time for T2R.

Obviously the car will not want to slow down; it will wiggle and buck. Concentrate on braking and on smoothly bringing the car over to the left-hand curb before T2R.

Despite the default setup being a fairly stable one, the car will still feel very much on edge under brakes here—but making the car even more stable would simply make it too slow. So we'll have to live with this for now.

I imagine a line through T2R ending on the left-hand curb behind the corner and try to find the right combination of speed and control input to keep the car on that line. T2R is followed by a straight, so exit speed is more important than speed before the apex, and I'll act accordingly by trying to prepare for an optimal exit rather than trying to maintain speed through the corner.

As I pass the apex and try to get on the throttle early, I notice that the car pushes badly towards the outside curb. I have problems getting it to steer to the right while at the same time under acceleration it seems very ‘snakey’.

So here is the first thing we need to address setup-wise: I make a mental note that I will reduce the differential lock on the power side, or the preload, to dial some oversteer into the car. I may choose only to reduce the preload since the problem mainly exists while the throttle is fully depressed. Of course, the preload also affects the coast side, so I'll have to decide whether I want the car to oversteer more on the coast side (off-throttle) as well. If I perhaps only want it a little more loose on the power side with a little less than full throttle applied and would like to regain that extreme stability with the throttle fully depressed, I would reset the preload to, say, three.

Of course, I could change the overall balance of the car by adjusting the weight balance, or the anti-roll bars. Or even by changing the suspension settings—namely, the slow-action side of the shocks to use weight transfer to achieve a change in the car's balance in specific circumstances. But the differential lock is a nice way of achieving the same effect without changing the car's balance, or introducing unwanted side effects. More rear weight will reduce the steering precision; stiffer

anti-roll bars will increase tire wear and also reduce the oversteer tendency in static situations. Increasing weight transfer will only have an effect while the weight is being transferred. The diff' lock is really the best option for me at the moment.

The camber is already high enough—or even too high. The car feels nicely responsive with more camber, but increasing it does not always increase the overall grip, and it will also increase tire wear on the inside of the tire.

I could, of course, decrease the camber at the rear end to get more grip under acceleration, since under acceleration the rear suspension gets compressed which turn increases the camber and might lead to the effect that, under acceleration, the rear wheels only have contact with the asphalt on the inside instead of on their entire width. I might end up with more rear end grip under acceleration like this—which might actually be a point to note if I feel that I don't have enough rear end grip under acceleration. But right here, the diff' remains the best solution.

As for gearing: you can use either third or second gear. Second feels faster, but third may actually be faster as the car will not become so untidy under acceleration, and also because shifting down to second under braking might upset the car unnecessarily, thereby preventing me from aligning it for the fastest possible exit.

For now, though, I will try and modulate the throttle and steering wheel to get the car pointed in the right direction. Since the car, depending on the setup, responds differently to control input, I'll just have to experiment with which combination of control inputs gets the desired response from the car. The theory is to upset the car moderately and perhaps lose a bit of grip at one end of the car (the rear end in this case) to make it easier to point the car into the right direction.

Again, once the car is pointed in the right direction, it is time to return to 'smoothness'. I accelerate flat-out towards the right-hand curb preceding T3L. This is a very slow left-hander, and you know by now that it is a hairpin-type of corner. I start braking smoothly quite a bit before the tire marks—at least for the *Howston*. (The skid-marks generally start too late to serve as definitive brake-markers and are best used as relative brake markers-only.).

I notice that, as I jump off the throttle and under-braking, the car pushes quite hard—that is, it understeers. Too much brake balance set to the front wheels can cause this. It is now on 69/31, so I'll set this to 60/40 later on. A wheel can only generate so much grip, and this overall available grip is distributed among, and shared by, all the forces applied to the wheel (or rather, the contact patch, the patch of rubber which is actually touching the road). Hence, when the brakes are applied at the front end, the grip remaining available for steering will be reduced—or be completely annihilated should I lock up the front wheels entirely.

I must be careful, though, not to shift the brake balance too far to the rear, because that again will make the car hard to control under braking. Directional stability will be lost by having too much brake balance shifted to the rear wheels. I will instead

again use the differential lock to increase oversteer, but this time I'll use the coast side. I'll reduce the lock on the coast side from fifty to twenty-five to force the car to oversteer more in off-throttle situations.

The reduced preload will help, but I'll reduce the coast lock setting as I want a stronger effect, and I want that effect at every throttle position and speed situation.

Perhaps a short explanation of the preload and lock settings is due.

The higher the preload, the sooner (in terms of throttle position and speed differential between the wheel on the left and the one on the right) the lock will kick in. With no preload and a high lock, you get max lock when the speed differential between the left and right wheel becomes very high. In this case, the lock kicks in late and hard. With a high preload setting, the lock kicks in early and softly—in other words, at low speed differentials between left and right wheel.

With that cleared up, let's get back to Mills, where I am in the process of turning-in following the tire marks closely and once again using the right-hand curb before the corner, and the inside curb at the apex. Be aware that the apex in this corner is very late due to the high degree of directional change of the turn itself. For optimal acceleration out of this corner—and this is, yet again, a corner followed by a long fast section, hence exit speed is more essential than entry or mid-corner speed—I actually try to hit the inside curb at a point somewhere following the actual apex. The criterion is to get the car aligned as early as possible in such a way that you have a fairly straight line ahead of you for early and determined acceleration into that fast section.

I won't describe where that line is since it is clearly apparent.

During exit, I will once again allow the car to drift over to the right-hand curb and even use it. If you get on the grass, don't panic. As long as you don't steer hard, the car will let you get away with getting half a wheel on the green.

The combination of corners we are approaching now is the most fun part of the track: a left-hander over a hill, followed by a kink to the right and another fairly tight left-hander. For reference, we'll refer to them as T4L, T5R and T6L.

Although I hate to lose speed and want to keep the speed up through these corners, the fastest way through this section is to drive the optimal line—and this means having to sacrifice maximum speed.

You have to enter T4L from the right while aiming to be on the left where those two infamous little blue plastic cabins are. This, for practical purposes, is the apex of this corner—and in this case, the apex is not a point, it's a stretch. Do not accelerate at the apex, but wait a tad and only accelerate when you are sure that you will not hit the wall of T6L on the right. From that location after the apex of T4L, you drive a straight line to the left-most point of that wall. Just before you get there, you turn

left and aim to get your left front wheel into the grass to the left of that curb, and way before the apex of that corner.

Cutting across the grass will not be a problem—you're carrying too much speed and the contact with the grass will be too brief to cause any problems—and your speed will carry you nicely over to the right and back onto the tarmac.

As you approach that wall to the right before you turn left into T6L, do not accelerate for too long—and then aim to coast at half or zero throttle through T6L. If you are too fast into T6L, you will get sucked over to the right on the exit from T6L and you won't be able to accelerate properly for the short straight following T6L.

Let the car drift over to the right as far as necessary. Hit the throttle once you've aligned it with a point allowing you to accelerate without danger of getting carried over to the right and off the track.,

Again, like in T2R, you can chose between two gears—this time, between fourth or third. Fourth is probably fastest, as the car will not become so untidy under acceleration. Third may feel faster, but shifting down to third under braking might have upset the car unnecessarily, keeping you from aligning it for the fastest possible exit.

The next corner, T7R, is tricky in that this section is obscured by shade. For several hours of the day you won't be able to see your braking points as your eyes are not able to adapt quickly enough from the light to the shadow.

The secret is to brake a tad early. It's not a great problem, as this corner allows a nice drift across the inside curb at the apex and hence a fairly high cornering speed. If you've braked a little early but not too hard, you will hardly lose any time as you can keep the mid-corner speed up.

So brake a little early but not too much and try to almost hit the grass on the inside curb with your right front wheel before the actual apex. Considering the high speed, this should take you through this corner in a nice four wheel drift. Once out, though, do not over-accelerate. If you start accelerating too hard and then have to make corrections as you get carried over to the left, this will cost you more time than being smooth and accurate and perhaps a little late on the throttle. It is crucial that you make sure that the car is pointed in the right direction before you accelerate.

For T8L, you need to use the right-hand curb before entry. Again, try to almost touch the grass at the inside apex of T8L with your left front wheel, but not as much before the actual apex as in the preceding corner—simply because this is a slower corner.

A clean, early, and uninterrupted acceleration out of this corner is absolutely essential because the following straight is the longest on the track. Hence, sacrifice everything necessary for a clean, smooth exit.

As you brake for T9L (start braking *before* the track darkens from skid-marks), you will notice that your front wheels lock-up even before the crest of that little climb preceding that corner. This is because there's a bump that will briefly reduce the wheel's contact with the road.

Assuming that you hit the bump, braking optimally for T9L will require that you release the brake pedal—*briefly and entirely*. Releasing the brake pedal only a bit won't work as well as simply releasing the brake—which will allow the wheels to start rotating again—and then re-applying the brakes. For those of you who are interested, the theory behind releasing the brake entirely is that without the torque (the momentum of the rotating wheel), there simply is not enough grip at the contact patch to get the wheel turning again. You have to add the wheel's own torque to the equation as quickly as possible to find grip—and grip, obviously, is essential to braking.

T9L holds no secrets—enter from the right, pull over to the apex on the left—again, a tad early—find a straight line to a point *before* the apex of T10R, and turn left into T11L from that point. For T12R, again you need to turn-in early and remain glued to the inside curb for a moment. If you do this, you can accelerate early and hard, but do not wait too long before you brake as, once again, you need to align the car optimally for the final corner.

If you feel courageous, you can try to hook the right front wheel onto the curb to counter the centrifugal forces (using it as a rail-road), but it is easy to upset the car badly this way—try at your own risk!

Setup considerations

We've already addressed the differential lock issue. In general, the default setup is quite stable and easy to drive. However, it emphasizes directional stability over agility, which, in turn, limits the ability to achieve lower lap-times.

I would not touch the suspension for now. The default settings allow pretty fast laps and offer was is essentially a very usable car.

I'd set the brake balance more to the rear because, in the default setup, the front wheels lock up too soon.

I'd set the transmission ratios to match the track's fastest straight. You should find that you are just under the redline at the fastest point on the track.

I've increased the rev limit to the maximum—trusting that the engine will be well manufactured and be able to take the strain. In extreme endurance races, or on very hot days, you might reduce this again—or simply shift earlier.

I've set the weight distribution to 50/50 as I feel it gives me more control over the car. With a front bias, the car will be more stable and precise in terms of directional control, but with a 50/50 weight distribution, you leave its characteristic more open, and can decide for yourself whether you want it to over or understeer. The downside of this is—the car may surprise you as you don't know for sure in advance whether it will over or understeer. In order for the car to offer you no harsh surprises, you will have to introduce that certainty through the setup.

I've reduced the brake pressure because the front wheels lock up too frequently. With reduced brake pressure, this is more easily controllable, but too little pressure would prevent me from getting maximum braking force.

I've changed the differential as described in the text above.

I've softened the front anti-roll bar one notch to get a little more grip at the front end through the turns. This minor modification did not reduce the directional stability, but works towards creating less understeer.

I've reduced the front camber to -2.5 because, at the default setting, only the inside section of the tires ever touch the ground—clearly visible through the temp distribution across the tires. Good temp deltas from inside to outside are below ten degrees.

I've also reduced the camber at the rear. -1.5 may not give me optimal lateral grip in high speed corners, but I get more tire on the asphalt (thus increasing the contact patch) under hard acceleration.

I've changed the tire pressures to get evenly distributed tire temps and the caster from 3.0 to 5.0 for more directional stability. For those who don't know what caster is—it's nicely visible on motorcycles. Race bikes have a low caster. Their front fork is a lot more vertical than that of a custom chopper like in the famous Easy Rider movie. Lower caster values make the steering more nervous and agile. Higher caster settings add directional stability at the cost of agility.

But since my setup is oversteering anyway, I don't need that much directional stability. Sometimes setting the front to a higher negative value can also help you turn-in—but it didn't seem necessary to use this at Mills.

Well there it is: now you have driven a lap around Mills, and I have given you solutions to any problems you may encounter setup-wise. Good luck out there on the track, and don't forget the golden rule of racing—to finish first, first you must finish!

Appendix B: Extra Features

Free Roaming Track Cameras—Spectator Camera

One of the most unique ways to enjoy rFactor is through the use of the trackside stationary camera, accessed by default by pressing the END key. Once this key is pressed and with the proper control mappings entered, the camera can be zoomed in or out, moved freely around a viewpoint with the mouse, and elevated up or down. By moving the camera up high enough, you can keep an eye on every car on the track! And you will also see the incredible detail that makes up the rFactor world—hidden lakes, lush rolling hills, and other gorgeous scenery provide for a beautiful, and rarely seen, backdrop to the action on the track. Coupled with the features of the replay engine, this camera can be used to display some breathtaking race footage.



Replay Fridge

rFactor features a brand new replay system, where you can create your own videos. You will find the Replay Fridge under the Control icon in the main options. On that page, you will find some replay options at the top of the screen, and assuming you

have already run at least one race, you will find a list of replays to choose from in the left pane and the bottom of the screen.

Clicking on a replay will bring up information about it in the right pane. If you have found a replay you want to watch or edit, click the Play Replay. You also have the option of manually deleting or renaming replays. By default, the replay system stores the last 5 replays at each track. If you don't want rFactor to ever delete a specific replay, you must rename it to something without the full track name.

Once you have started up a replay, you can play it using the standard VCR controls. Maximize the screen for a better view. If you want to toggle the onscreen graphics off, hit the Enter key.

To Edit a Replay

Click in the middle of the long bottom window. Then use the Split button.

You now have two clips. You can continue to create more.

Clips can be moved, copied or deleted.

Each clip is like a piece of an editor's film, but much more powerful as the image on it is not fixed.

In each clip you can specify a vehicle to focus on and a camera to switch to (please note, however, that free-look cameras are not currently supported).

Specifying and arranging these clips, you can create dramatic films switching to the right car at the right moment using the right camera.

When complete save your creation to a movie format to share with your friends.

Experiment, it's fun!

If you want to create a video, first check the Output Settings. When you are ready, press the Export button. Note that exporting a video takes a long time - a 30-second clip may take a half-hour or more to create. The quality and amount of time taken depends on the video codec used. You can change the video codec by opening your player file (found by default at UserData/<your name>/<your name>.PLR) and changing the setting for "AVI compressor fourcc". It must be a fourcc video codec - you can find out more information about this standard (and available codecs) at fourcc.org. Note that very few of the codecs seems to be affected much by the Quality setting in the Output Settings.

Career Checklist

The career paths of rFactor are challenging and rewarding—use these tables as baseline templates for tracking your progress.

***.PLR FILE—LINES OF INTEREST**

LCD Display Modes="31" // Add the modes to allow them: 1=status 2=aids
4=engine/brake temps 8=race info 16=standings

AVI compressor fourcc="cvid" // Changes compression algorithm

Command Line Options

Some people may find a need to use one of our command-line options. To use command-line options, create a shortcut to the executable (rFactor.exe for the normal game and rFactor Dedicated.exe for running a dedicated server). Right-click on the shortcut and select Properties. Add one or more of the following command line switches at the end of the Target:

trace=<1-3> // this generates a file whose default location is
UserData/Log/trace.txt that may be helpful in diagnosing problems with running
the game.

config=<file> // run game using a config file different than the default
config.ini

perfhud // testing/debugging graphics

+profile "<name>" // this will run the game with the given player file
name.

+oneclick // this allows a dedicated server to start up and load a track
without user intervention.

+host // auto-host (unsupported?)
+gamename "<name>" // set auto-hosted game name

+password "<pswd>" // set auto-hosted game password

+maxplayers <num> // set auto-hosted maximum number of players

+connect <address:port> // auto-join at given address & port. If port given is 0,
will use multiplayer.ini value "Query Port Start".

+fullproc // use dual processors if available (should only be used with
Microsoft's dual processor fix for Windows XP SP2)

+nosound // completely disable sound to diagnose problems

Modding Notes

While rFactor is very open to modding, there is some basic information that you should know before doing so. First off, it's done completely at your own risk, as is downloading mods from other people.

Second, if you wish to modify existing tracks and vehicles, you should NOT touch any information that can affect physics in any way. Doing so will prevent you from joining multiplayer races. This includes GDB files, RFM files, much of the SCN and MAS files (any geometry that affects physics), HDV files, parts of the VEH (such as the HDVehicle and Upgrades entries), TBC files, PM files, *gears.INI, *engine.INI, and parts of the *upgrades.INI (any HDV= line, for example).

If you absolutely must change one of the above (for participation in a league for example), we would recommend that everybody that you will be racing against save off the original and then get a copy of the changed file. If anybody's version doesn't match the server's version, then that person can't join.

The basic structure of rFactor starts with the RFM files in the RFM directory, which define separate race series. In it you will find filters for which tracks and vehicles to allow. The special * symbol is a wildcard which will allow everything. These filters are used to compare against entries in the track GDB files ("Filter Properties") and vehicle VEH files ("Classes"). When you pick or change the Race Series in game, it will load only the tracks and vehicles appropriate for the new Race Series.

The RFM file also contains scoring info and seasons that you can race. While the original release version of rFactor doesn't include any examples, you can create your own seasons without editing the RFM file. You do this by creating a file ending in .AOS (for Add-On Season). Its contents should look something like this:

```
RFM = SR Grand Prix Season // this must match the name of an existing race
series
Season = MySeason // must be 19 character or less
{
    FullSeasonName = Super Multi-Class Racing Challenge // name override
    SceneOrder // order of events in the season
    {
        Mills_Long // name from the top of an existing track GDB
    }
}
```

You can also add other information to the above (new points systems, different credit earnings, etc.) - just look for examples from the existing RFM files to see what can be done.

Track Naming Convention—(ISI Mike D)

Every track should have a unique name that it would be referred to as in the Locations folder. The ONLY exception I can think of here would be Monaco. This is strictly for simplicity's sake, and to provide a basic template. So...for the Aussie tracks out there...

Locations

- >Albert_Park
- >Canberra
- >Eastern_Creek
- >Surfers_Paradise

I think this will cause fewer headaches for everyone, and it's a convention that should be followed in all cases if possible.

More extensive modding (new skins, 3d models, and physics) is beyond the scope of this document.

Known Issues

Some software products may interfere with the normal startup procedure or multiplayer capabilities. In some cases VET anti-virus software will cause the rFactor startup procedure to take an exceptionally long time. If rFactor seems to be stuck on the rFactor logo screen and you have VET anti-virus installed, at this time the only known work around is to uninstall VET.

Setting Force Feedback Effects to anything higher than Low on a Microsoft wheel may result in a loss of forces after going over curbs. There are now two possible workarounds, both of which reset the force feedback effects on the fly. The first is a Controller Mapping "Reset FFB" that you can use to manually reset the force feedback. The second is a controller.ini option which can be used to reset the force feedback automatically every X seconds. To enable it, open the file UserData//controller.ini and change the value of "Reset FFB Time".

Requesting a replay from the server in multiplayer is unimplemented.

Force Cockpit, Upgrade Credits, and Duplicate Vehicle checking are all unimplemented. There is no wet weather driving yet.

There are a few issues associated with the instant replay at the monitor. The time-of-day is not correct, and sometimes brake glows and other special effects flash or work intermittently.

Appendix C: Firewall Guide

Note—this guide is also found under the Support menu in the main rFactor install directory.

Running Multiplayer Races Using rFactor 1.0

<http://www.rfactor.net>



Overview

This document is to help the average computer user setup their firewall and/or router so that they can play and host rFactor races.

Section 1: Hosting a race versus joining a race

To join a race you do not need to change anything to your existing Internet connection. To host a race you will need to allow other drivers to connect to your computer. By hosting the race you can specify the rules, track and allowable cars. In order to have other drivers join your race you will have to open ports in any existing firewall.

Section 2: Port Information

To host games or a dedicator server you will need to open some ports so that other drivers can connect to your game. There are three types of games you can host. You can host a LAN only game, an Internet only game, or a LAN and Internet game. For any game you want to host on a LAN you will need to open up the ports in Table 2.1.

Table 2.1 Ports required for successfully hosting LAN races

Port Number	Transport	Description
34447	TCP	Session, Race and Chat Information
34297	UDP	LAN Query Information
34397	UDP	Race Event Information

If want to host the game only over the Internet you only need to open up the ports in Table 2.2.

Table 2.2 Ports required for successfully hosting Internet only races

Port Number	Transport	Description
34447	TCP	Session, Race and Chat Information
34397	UDP	Race Event Information

Section 3: Port Forwarding and Firewall Exceptions

3.1 Section Overview

In general, some type of firewall protects computers on the Internet. If you are not behind any type of firewall you can ignore this section. Also if you never intend on hosting any races you can skip this section.

3.2 Description of a firewall

A firewall is either a piece of software that runs on your computer or a hardware device that sits between your modem and your computer. A router that performs network address translation is considered to be a firewall. Common software firewalls are Zone Alarm, Black ICE, Norton Internet Security, McAfee Firewall and Windows XP Service Pack 2 firewall. LinkSys, Net gear, Dlink, Belkin and Cisco manufacture common hardware firewalls.

Driver Join Sequence

When a driver attempts to join your race, that driver will get the address of your race from either a matchmaker service or by direct IP. Regardless of which way the driver gets this information, the driver will attempt to connect and be confronted by your firewall. If your firewall does not let him in, he cannot join your race. You firewall must be setup so that when the driver attempts to connect to your race it forwards his connection request to computer hosting the race instead of blocking the request. Once your firewall is setup correctly the driver will be able to join your race.

3.4 Allowing access

In order to host a race you will need to configure your software and/or hardware firewall to allow other drivers to connect to your computer. To do this you will need to enable port forwarding or add exceptions to your firewalls rules. It is beyond the scope of this document to give detailed instructions on how to enable port forwarding or exceptions for every possible software and hardware firewall. Section 4 attempts to give instructions for the most popular firewall solutions. Please consult documentation that came with your firewall product.

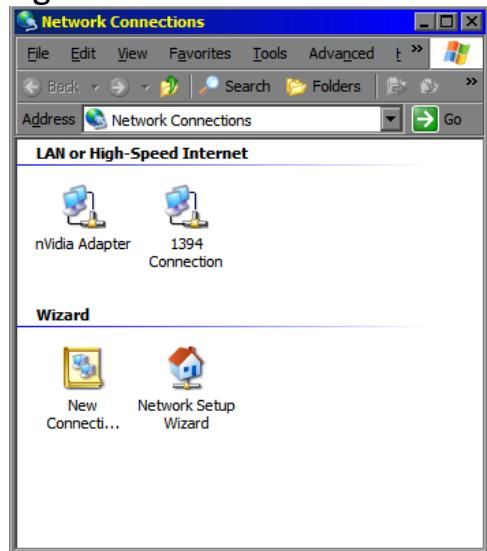
Once you have discovered how to setup port forward and/or setup firewall exceptions you will need to make sure those changes reflect the ports listing in Table 2.1 and 2.2.

Section 4. Setting up port forwarding and firewall exceptions

Section 4.1 Windows Xp Service Pack 2 Software Firewall

Right Click on My Network and Select Properties you should see a window like Figure 4.1.1.

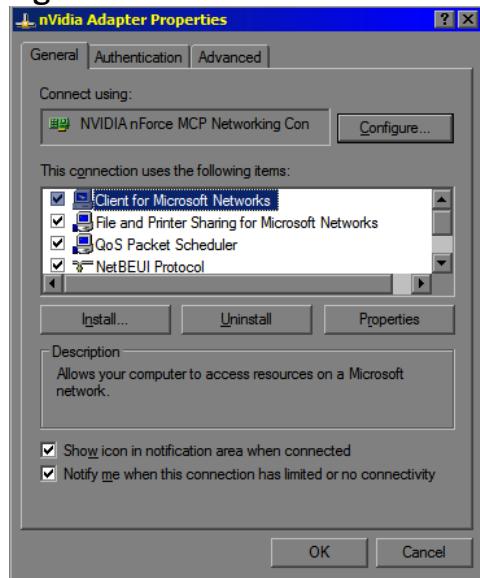
Figure 4.1.1



Right click on your network adapter and select Properties. You should see a screen like Figure 4.1.2.

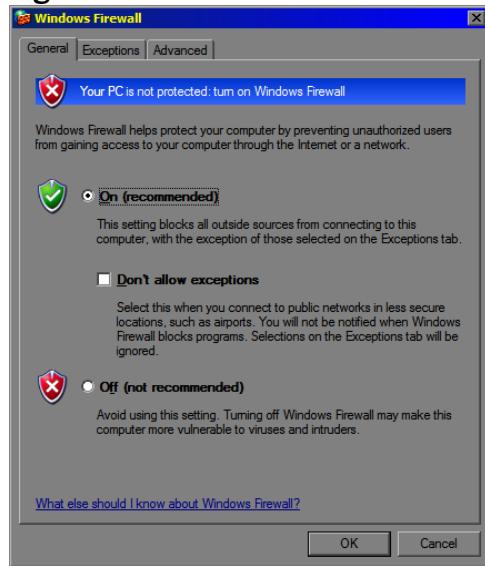
4.1.2.

Figure 4.1.2



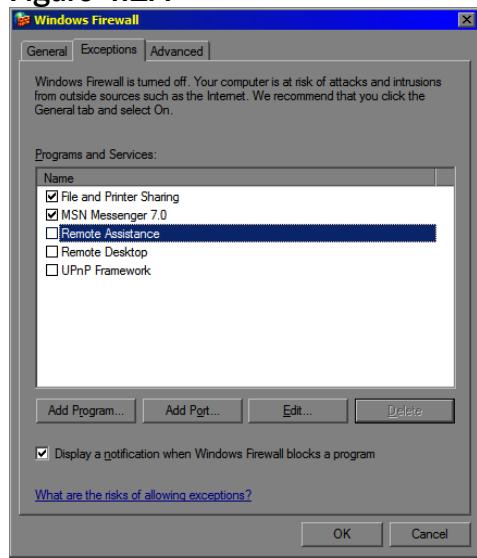
Select the Advanced tab and then click on the settings then you should see a screen like Figure 4.1.3.

Figure 4.1.3



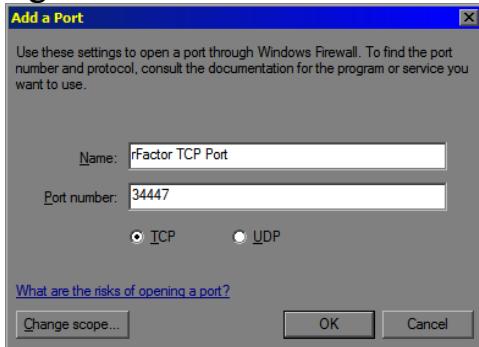
Click on the Exceptions tab. You should see a screen like Figure 4.1.4.

Figure 4.1.4



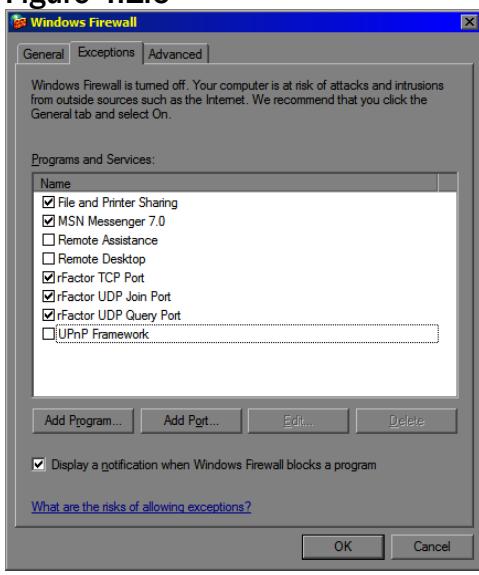
Click on Add Port... You should see a screen like Figure 4.1.5.

Figure 4.1.5



Enter in the information based on Tables 2.1 and 2.2. You will have to add a port for each row of those tables. Once you're done you should see something like Figure 4.1.6.

Figure 4.1.6



At this point you have successfully setup Windows XP Service Pack 2 Firewall to allow hosted races on this computer to be joined. Make sure that any other hardware firewalls are also properly configured.

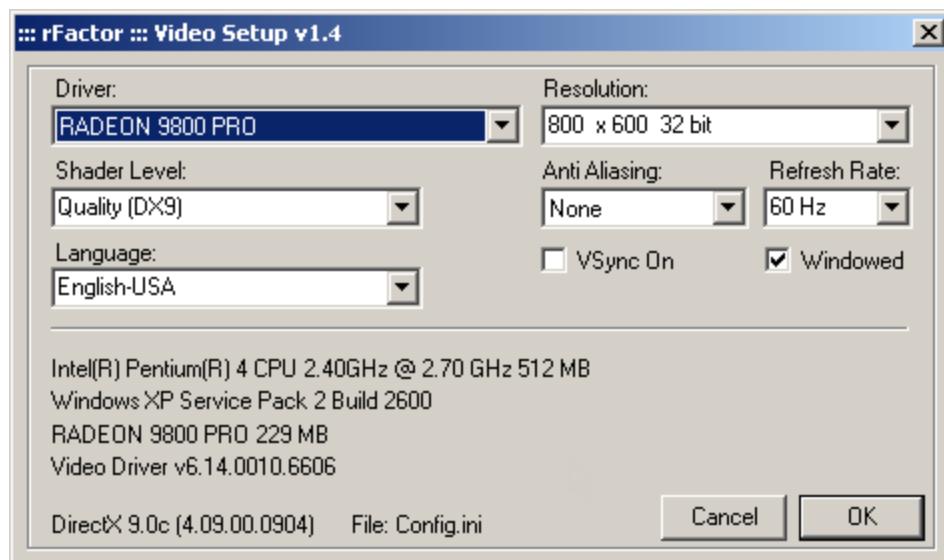
Stat Send.exe

Located in the support directory is a utility, Statsend.exe that examines the system for informational and troubleshooting purposes. Here is an example output:

DX: DirectX 9.0c (4.09.00.0904)
CPU: AMD Athlon(tm) XP 3200+ @ 2.20 GHz
SRAM: 1024 MB
OS: Windows XP Service Pack 2 Build 2600
GPU: RADEON X800 XT Platinum Edition
VRAM: 489 MB
DRIVER: 6.14.0010.6583
GUID: D7B71EE2-0910-11CF-056A-0820A1C2CB35

rF Config.exe

Found in the root directory, this utility runs the first time rFactor is installed and can be manually accessed at any time later by double clicking on the exe file. With this utility, the user can set the screen resolution, refresh rate, FSAA level, and Direct X rendering path version (Supports DX7, DX8, and DX9). If you are having performance difficulties, use this utility to alter the settings until a good balance between playability and graphics is obtained. When used in combination with the in game graphical settings, an attractive balance is easily obtained.



NOTES

User Warnings

Projection TV Owners Warning

Still pictures or images may cause permanent picture-tube damage or mark the phosphor of the cathode ray tube. Avoid repeated or extended use of video games on large-screen projection televisions.

Epilepsy Warning

Please read before using this game or allowing your children to use it.

Some people are susceptible to epileptic seizures or loss of consciousness when exposed to certain flashing lights or light patterns in everyday life.

Such people may have a seizure while watching television images or playing certain video games. This may happen even if the person has no medical history of epilepsy or has never had any epileptic seizures.

If you or anyone in your family has ever had symptoms related to epilepsy (seizures or loss of consciousness) when exposed to flashing lights, consult your doctor prior to playing.

We advise that parents should monitor the use of video games by their children. If you or your child experience any of the following symptoms: dizziness, blurred vision, eye or muscle twitches, loss of consciousness, disorientation, any involuntary movement or convulsion, while playing a video game, discontinue use IMMEDIATELY and consult your doctor.

Precautions to follow during use

- Do not stand too close to the screen. Sit a good distance away from the screen, as far away as the length of the cable allows.
- Preferably play the game on a small screen.
- Avoid playing if you are tired or have not had much sleep.
- Make sure that the room in which you are playing is well lit.
- Rest for at least 10 to 15 minutes per hour while playing a video game.

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