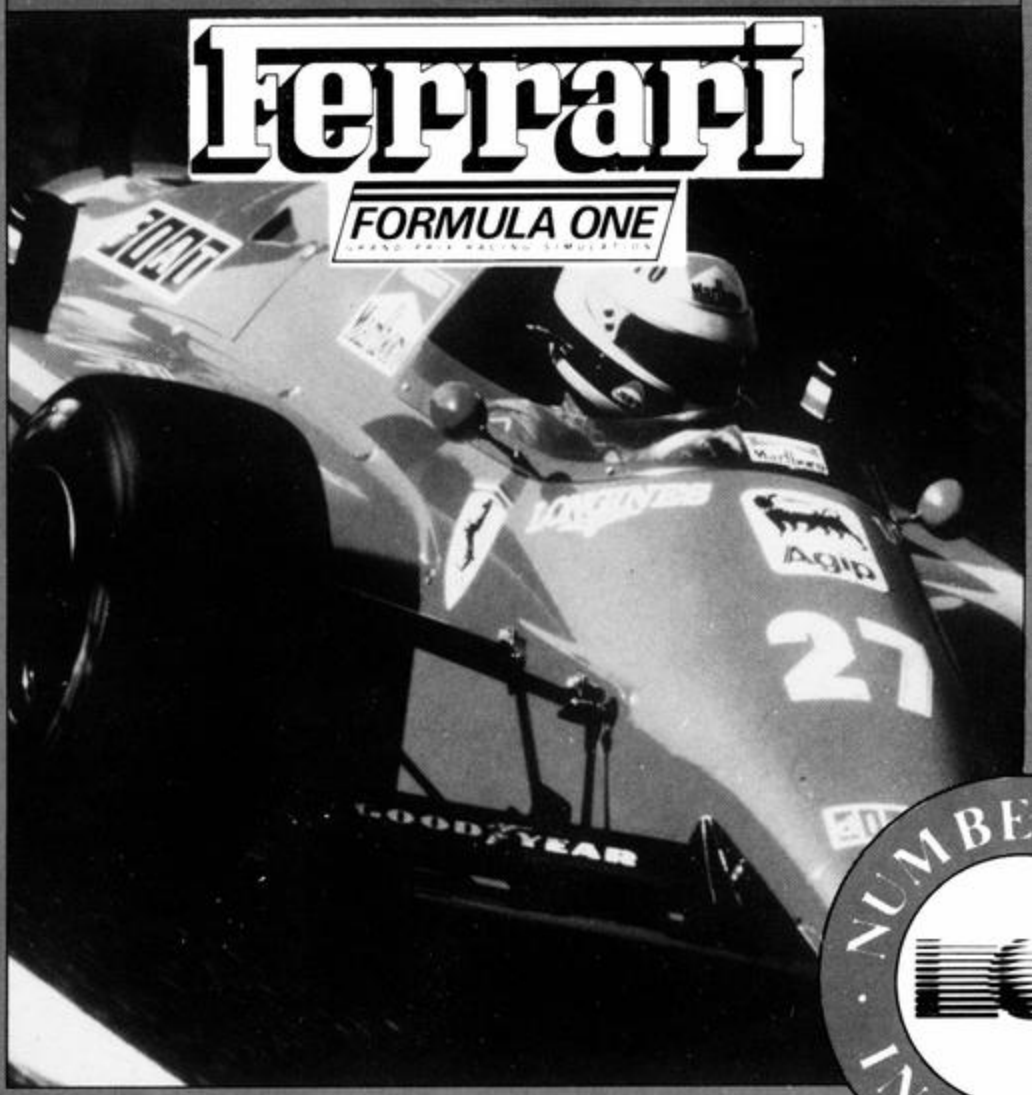
MANUAL

Ferrari

FORMULA ONE



NUMBER ONE IN THE USA

ELECTRONIC ARTS™

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START YOUR ENGINES!

Grand Prix/Formula One racing is one of the most exciting sports in the world. To be a Grand Prix driver, you must not only have a mind like a computer and reflexes like a mongoose, but you must also be an expert on racing technology and an excellent business manager.

Ferrari Formula One brings all of the depth and excitement of the Grand Prix race circuit to your computer. You'll have plenty of races to run, but you'll also have a pit crew to manage, a Ferrari Formula One 1986 (F186) race car to modify and test, deadlines to meet, and schedules to keep. But all of this is only for those who want to run the full simulation. If you just want to get behind the wheel of a Ferrari (the most successful Grand Prix racing team in the world), then you can do that as well.

How to Use This Manual

This manual is designed so that you can use just as much of it as you want. It covers everything about the *Ferrari Formula One* simulation, from Formula One World Driving Championship rules, to travelling to and competing in your first race. However, if you want to simply drive without worrying about schedules and your season standing, then you probably don't need to read this manual.

Just take a moment to carefully read the Driver's Reference Guide. It provides everything you need to get started quickly including how to control your Ferrari, the specific features and keyboard shortcuts for your computer, and other information you'll probably want to keep handy as you race. And because *Ferrari Formula One* is available on a number of different computers with differing capabilities, some of the features and functions described in this manual may be different on your computer. The Driver's Reference Guide will help you deal with those differences as well.

We'll use this type of note to call your attention to important information throughout this manual.

ABOUT THE GRAND PRIX AND THIS SIMULATION

There are a lot of rules in Formula One World Driving Championship racing. The majority of Formula One rules apply to car design and specifications. You won't need to worry about these rules too much because *Ferrari Formula One* won't let you modify your car beyond the parameters laid down by Formula One rules. In other words, *Ferrari Formula One* lets you make adjustments to your F186 (like changing the attack of the wings), but you won't be able to alter the car's structure (like making the wings larger), because this is against Formula One rules.

A Grand Prix race season consists of a series of races, each at a different track. Each race consists of:

- **Practice One (P1)**, in the morning, two days before the race. This is where you get acquainted with the track and your opponents.
- **Qualifying One (Q1)**, in the afternoon, after P1. This is the first real competition of the race. In qualifying you're competing with the other drivers for the best grid position for the start of the race. Your starting position is based upon your best lap time during qualifying. You'll want to adjust your car radically and push it to its limits.
- **Practice Two (P2)**, in the morning of the day before the race. Continue to familiarize yourself with the track and prepare to improve your time for the second qualifying session.
- **Qualifying Two (Q2)**, in the afternoon, after P2. Once again, adjust and push your car to its limits to try and make the best qualifying time.
- **Warmup**, on the morning of the race. This is a 30 minute session in which you'll make a final inspection of the track, and your opponents' strengths and weaknesses. Take it easy on your car during the warmup race — don't take the risk of destroying your engine before the race even starts because you probably won't have time to replace the engine before the race begins.

The Brazilian Grand Prix
Circuit Name: Jacarepagua, Rio de Janero
Circuit Length: 5.010 km/3.113 miles

Track testing time is probably your most limited resource during a Grand Prix. In a little over four hours you must:

- Learn the track and its layout.
- Find the fastest setting for the Qualifying sessions.
- Secure a good grid position.
- Find the best combination of speed and endurance for the race.
- Find the fuel economy that will let you complete the race.

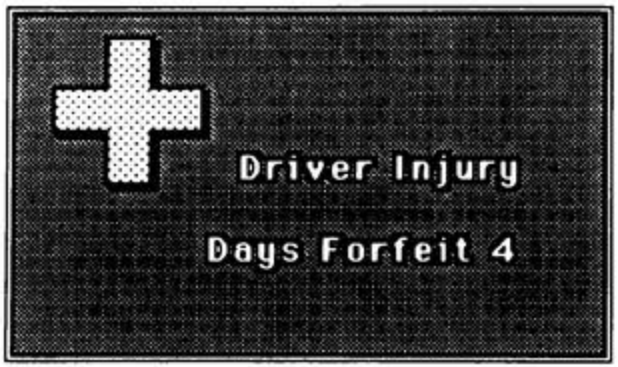
Make sure that you spend time driving your car in race trim. The wrong time to find the right settings is after the green flag drops.

- **Race**, with your car tuned to the best balance of speed and endurance, this is where you'll engage in competition for the race trophy. A Grand Prix race normally lasts two-hours or about 315 kilometers, whichever comes first, but you can use the race control (described later) to select races as short as 2-5 laps (about 18 kilometers). If the race doesn't run the full distance within two hours (or the time limit for a shorter race), then the lead car is the winner. Unlike the practice, qualifying, and warmup sessions, you can't refuel your car during the actual race.

Ferrari Formula One, the simulation, operates just like the Grand Prix race circuit in the real world. The moment you boot the program the clock starts ticking. You must get yourself and your car into shape in time to transport yourself, your equipment, and your crew to the first race of the season. Car repair and travel time is accelerated, but all other aspects of *Ferrari Formula One* are in real-time. Furthermore, if you damage your car before, during, or after the race, you'll receive a time penalty in the amount it would really take to put your car back in working condition, or your body back in shape if you were injured in the crash (see Figure 1). A really bad crash may put you out for the rest of the season.

The Spanish Grand Prix
Circuit Name: Jerez, Spain
Circuit Length: 4.218 km/2.621 miles

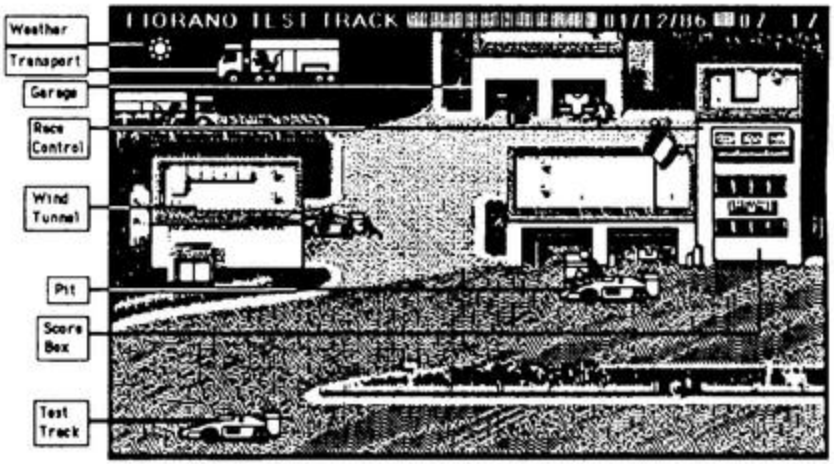
Figure 1:
An Injury
Penalty



FIORANO — LAUNCHING YOUR CAREER

Fiorano (pronounced FEE-OH-RON-OH) is your home base and test track. Fiorano has all the facilities you'll need to coax the best performance out of your Ferrari (see Figure 2 below), and to hone your own driving skills. And your crew chief is always available to help you make the setup decisions that can determine race outcome.

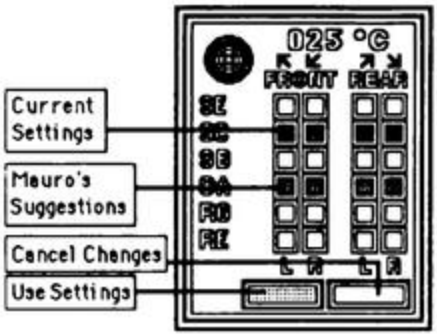
Figure 2: Fiorano Paddock



Who's Mauro?

Mauro is your computerized crew chief who's always available when your car is in the pit or the garage.

Figure 3: A Ferrari Control Panel With Current Settings and Mauro's Suggestions



Select the toolbox to get Mauro's suggestions on car adjustments. When you select the toolbox, all the control panels for your Ferrari will open. Solid squares highlight Mauro's suggested settings just as if you had selected them yourself (see Figure 3).

If Mauro's settings are the same as the current settings, only Mauro's settings will show on the control panel. When you are playing at F3 level, Mauro's settings automatically take effect each time you go to a new track.

After you have driven the car, some of the current setting squares may be partially blacked-out, indicating wear. A solid black square means that component is no longer operational.

Map of Fiorano

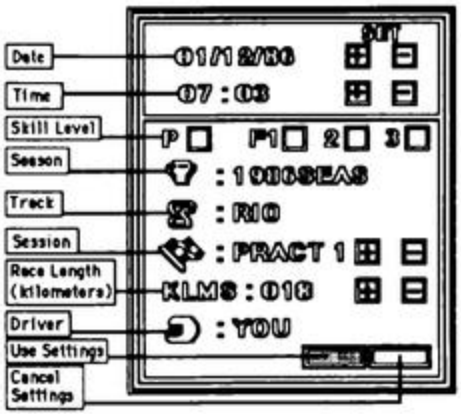
The Fiorano paddock is made up of seven different areas. You can get to the different areas of Fiorano by selecting one from the paddock screen (shown in Figure 2 above). See the Driver's Reference Guide to learn how to select screen areas on your computer. Fiorano paddock is very similar to the paddocks of the competition tracks, except that it has some additional facilities that you won't find at the competition tracks (see "Competition Track Layout" under *Your First Race* for more information on competition tracks). The following sections describe each of Fiorano's areas in detail.

The San Marino Grand Prix
Circuit Name: Imola, Italy
Circuit Length: 5.040 km/3.132 miles

Race Control

This is where you pick the race settings such as track, session, race length, and driver name. The race control panel appears when you select the second floor race control building. Figure 4 below shows the race control panel and each of its controls.

Figure 4: Race Control Panel



You can use the date and time controls, or the track and session controls to quickly advance a race season if you are trying to run a season from start to finish. When you choose the track control, a list of the various race tracks appears for you to choose from. Choosing a track resets the clock, calendar, and session control to the first session of that race.

The session control changes the selected session and resets the clock and calendar for that session. You'll notice that once you pass the last session of a race, the session control also switches the track control to the next race in the season.

Unlike the transport trucks, selecting a new track or session from the race control panel sets the clock and calendar ahead to the day of the current track session. This means that you can use it to skip races. But if you are keeping a record of your season standings, you won't have scores for the races you've skipped. Also, if you use the race control to go back and repeat a session, you'll forfeit your accumulated season standings.

The Monaco Grand Prix
Circuit Name: Monte Carlo, Monaco
Circuit Length: 3.324 km/2.065 miles

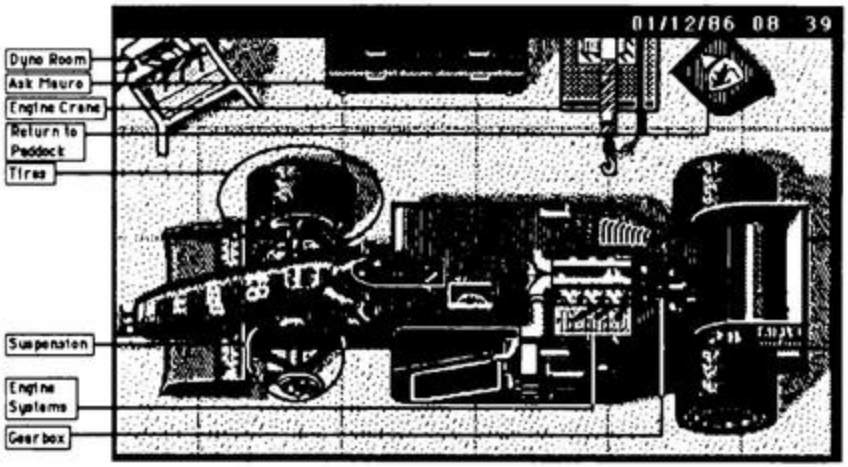
The skill level control lets you set *Ferrari Formula One*'s difficulty from Formula One (F1 — the hardest) to Formula Three (F3 — the easiest). The harder the skill level, the more skillfully your opponents will drive and the more likely that wear and tear will cause a mechanical failure in your car. At the F1 level, you must also shift gears manually (see the Driver's Reference Guide for information on manual shifting). The **P** in the skill level area of the control panel lets you leave the driving to us so you can view the race as a passenger. (But you still call the shots when it comes to car repairs, even though you're only a passenger during the race.)

The driver control lets you enter your own name as a driver for the season. The name you enter here will appear before your score on the season standings screen. The trophy control lets you save your current season to disk, or load another season from disk. You'll need a formatted/initialized, blank disk in order to save your seasons. See the Driver's Reference Guide for more information on saving your season statistics, and see your computer's users' manual for instructions on formatting or initializing blank disks.

Garage

The garage is where you'll adjust your Ferrari's major systems before you take it out to the test track or to a race.

Figure 5: The Garage

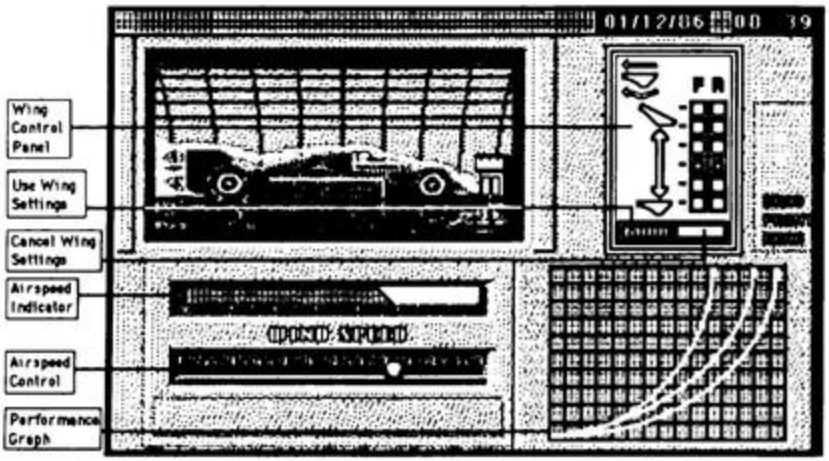


Select the garage building to enter the garage. Figure 5 (above) shows the inside of the garage and the eight screen areas you can select for garage functions. See the *Setting Up Your Ferrari* section below for more detailed information on using the garage. The dyno room is also located in the garage (at Fiorano only). See "Dyno Room" in the *Testing Your Car* section below for a description of, and information on using the dyno room.

Wind Tunnel

The Fiorano wind tunnel is where you'll learn to make adjustments to your Ferrari's wings, and then test to make sure your adjustments are aerodynamically sound.

Figure 6: The Wind Tunnel



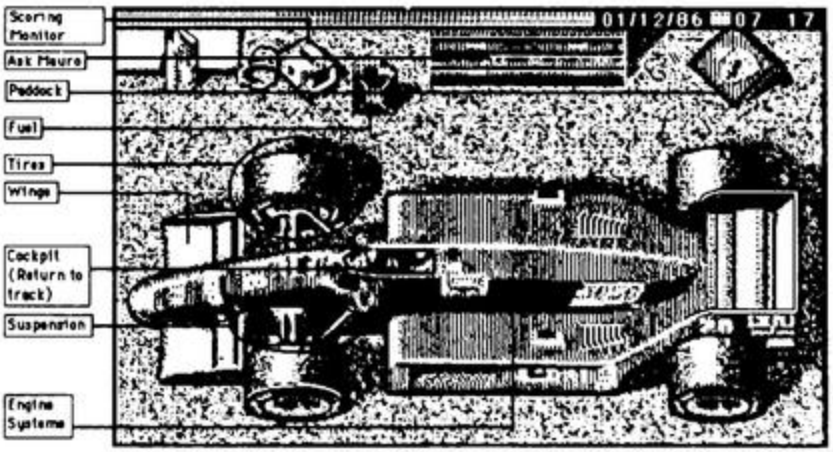
The adjustments you make to your Ferrari's wings affects the way the car handles on the track, so the wind tunnel plays an important part in developing a winning Ferrari. Select the wind tunnel building to put your Ferrari in the wind tunnel. Figure 6 (above) shows the inside of the wind tunnel and the controls you can use. See "Wind Tunnel" in the *Testing Your Car* section below for detailed information on using the wind tunnel.

The Canadian Grand Prix
Circuit Name: Gilles Villeneuve, Montreal, Canada
Circuit Length: 4.410 km/2.74 miles

Pit

The pit is the place where you fine tune the major adjustments you performed on your Ferrari in the garage.

Figure 7:
The Pit



You can select the pit building to put your car directly into the pit from the paddock, or if you have a problem on the track, just pull off the right side of the track after the start/finish line (the area without a curb) into the pit and ask Mauro's advice. The pit has most of the features of the garage except for the dyno room, the engine crane for changing engines, and the ability to change gear ratios. The dyno room is available only at Fiorano.

In the pit, however, you can also adjust your car's wings, refuel (except when Formula One rules prohibit it), and see your current lap times and the weather conditions on the scoring monitor. During competition, you can also use the scoring monitor to see the overall race scoring. When you're done in the pit you can return to the track by selecting the Ferrari's cockpit.

The Belgian Grand Prix

Circuit Name: Spa-Francorchamps, Belgium
Circuit Length: 6.942 km/4.313 miles

Figure 7 shows the inside of the pit and the nine screen areas you can select to use its various functions. See the *Setting Up Your Ferrari* section below for more detailed information on using the pit.

Your pit crew's accuracy and speed will vary depending on whether you're in the garage or the pit, and depending on whether you're practicing, qualifying, or racing.

Test Track

When you have your Ferrari set up in what you think will be a winning configuration, it's time to take to the test track to see how she performs. There are no other cars on the test track except for yours, so this makes it a good place for you to learn to drive at high speeds. Select the car that's lined up on the track at the bottom of the paddock screen, or the cockpit of the Ferrari in the pit to move onto the track. See the *Going for a Lap* section of the Driver's Reference Guide for more information on getting behind the wheel of your car.

Season Standings

Season standings is housed in the building directly below race control and shows your overall season standing.

Figure 8:
Score Box

Figure 8 shows the season standings. You can save your season standings screen to disk and view them again later using this screen (see your Driver's Reference Guide).

Table 1:
Points for Finish Position

Points	Position
9	1st Place
6	2nd Place
4	3rd Place
3	4th Place
2	5th Place
1	6th Place

During the 1986 season, the season score for a driver was calculated by using the 11 best scores out of all 16 races. The driver gets a certain number of points per race, based upon his finishing position. Table 1 shows the correlation between points and finishing position.

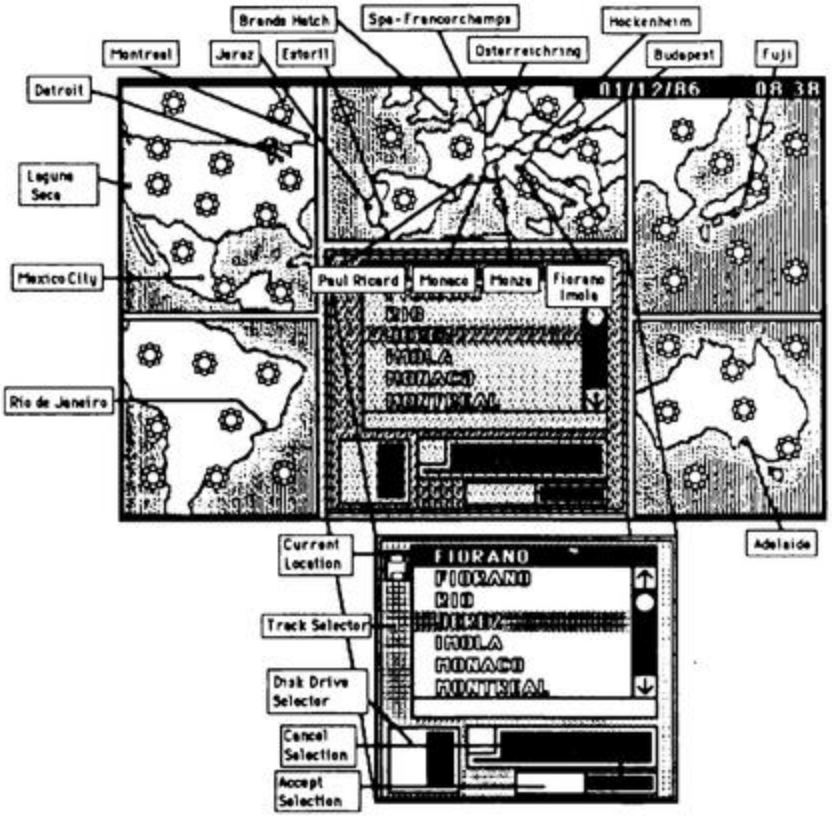
Transport

The transport trucks take you to the competition track of your choice, and advances the clock for the amount of time it takes to travel there.

The transport trucks let you travel to tracks early or between races during the season so you can log extra test time. For instance, if you select the transport trucks in January at Fiorano and choose Rio, then you'll arrive at Rio two months before the race, which begins on March 19th (see "Appendix A — 1986 Season Schedule"). You can still do practice laps even though the track is closed.

The Detroit Grand Prix
Circuit Name: Detroit, United States
Circuit Length: 4.020 km/2.497 miles

Figure 9:
The Transport



When you select the transport trucks, a world map appears that shows your current location and all the other track locations (see Figure 9 above). Weather icons appear near each track location to show you the weather conditions there. If you're just testing your car or practicing between races, you can use the weather icons to select the weather conditions of your choice.

The French Grand Prix
Circuit Name: Paul Ricard, France
Circuit Length: 3.816 km/2.371 miles

Select a track and you'll see the route marker appear as you travel. The weather conditions you see on the map are for that current day, and may change in the time it takes you to travel to your destination.

Setting Up Your Ferrari

Now that you've seen how to navigate through *Ferrari Formula One*, it's time for you to start thinking about getting your car ready for competition. Your Ferrari is basically composed of five major systems: engine, gearbox, tires, suspension, and wings. You should look at track conditions to determine the best way to adjust your car's systems. For instance, you'll pick rain tires for a wet track, and slicks for a dry track. You'll also need to adjust the gearing and wings differently if a track has a lot of curves, or a lot of straights.

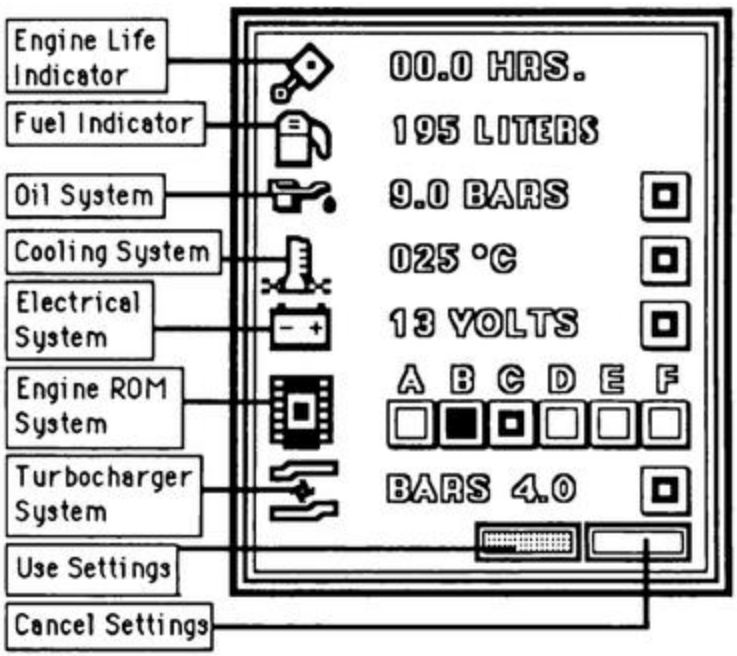
Figure 10: System Wear and Tear

You can tell when a system is worn, damaged, or completely destroyed by the amount of *filling* in the system's control box. A brand new system has a solid, completely filled control box, while a destroyed system has an empty control box (see Figure 10). The amount of time it takes you to repair one of your car's systems will be subtracted from your game time. The following sections explain how you adjust, repair, or replace these systems, and the theories and concepts you should be aware of as you work with them.

Engine

Your Ferrari's engine is a V6 Turbo that delivers up to 1,100 horsepower at 11,000 rpm; it's one of the highest revving turbo-charged engines available. The engine itself is made up of five sub-systems that you repair or replace with the engine control shown in Figure 11. Just select the system you want to repair. The time it takes to repair the engine sub-system varies according to the amount of damage it has taken, and when and where you make the repair. The engine life and fuel level indicators display engine age and the amount of fuel only — you can't adjust their status with the engine control.

Figure 11:
Engine Control



Engine life is a strong determining factor in engine performance. An average time for engine life in the Grand Prix circuit is roughly six hours, with a maximum life of 12 hours. This is when you'll get the optimum performance out of the engine. Luckily, no race will ever last that long, but you'll use up some engine life by burning it in during a pre-race warm-up. You'll see how engine life affects performance when you learn to use the dyno room in the next section, *Testing Your Car.*

Formula One racing is one of the most expensive forms of motor racing in the world. Car chassis are constructed from exotic materials such as carbon fiber, and front line drivers can make more than three million dollars a year. Engines can cost in excess of $60,000.00 dollars apiece, and drivers will generally use three engines during a Grand Prix (one for each Practice/Qualifying day, and a third in race configuration).

The time on the engine increases the longer you run the engine. Using the engine crane in the garage (see Figure 5) resets your engine's life to 0 — the equivalent of replacing your old engine with a new one. The only time you can replace your engine is when your car is in the garage. This means that you can't replace an engine once a race has begun, because leaving the pit to return to the garage is the same as dropping out of the race. If you lose an engine during a race, you may as well head for the next race in the season.

Fuel level shows the amount of fuel left in your tank, in liters (195 maximum, according to 1986 rules). Your Ferrari's fuel consumption is affected by other factors such as engine life, engine ROMs, turboboost, and wing settings. For instance, the older an engine gets, the less efficiently it will use fuel. Read the section on engine ROMs and turboboost below for more information on those systems, see the "Tires" section for more information on tire compounds. Using the fuel can in the pit during testing, practice, or before qualifying fills your Ferrari's tank. The amount of fuel will usually be less during qualifying runs so your car will be lighter and faster.

The British Grand Prix

Circuit Name: Brands Hatch, Britain

Circuit Length: 4.206 km/2.6136 miles

The amount of fuel will also be less if you are running a race that is shorter than a regulation race. Because Grand Prix rules don't allow refueling during a race, the fuel can is removed from the pit during an actual race.

Oil System is affected by engine life, temperature, ROMs, and turboboost. Oil pressure is measured in *bars* (a bar is approximately 14.7 psi — pounds per square inch), and has a maximum level of 9.0. Pull into the pit and fix your oil system immediately if the oil or temperature indicators drop below half during a race (see the Driver's Reference Guide for cockpit controls and indicators). High oil pressure is good, low oil pressure is bad.

Cooling System and the oil system are closely interlinked. The lower you let your oil pressure get, the higher the water temperature will go. Engine temperature will also rise if you've been racing hard with a high turboboost setting, or running a very lean mixture (see "Engine ROMs System" below).

Electrical System provides the power which is essential to your Ferrari's ignition and fuel injection systems. Because these systems are drawing full current during a race, there is a continual drain on your electrical system. If your electrical system fails during a race, so will your engine.

Fuel Injection/Ignition Computer ROM System regulates your engine's fuel-air mixture and ignition timing. ROMs (Read Only Memory) are computer chips that are installed in the engine to tell it how to regulate the fuel to air ratio. The program contained in a ROM chip, and your turbocharger setting, determines the horsepower output, power curve, fuel economy, and wear characteristics of your engine. The ratio of fuel to air affects the temperature at which the fuel burns, and the energy it provides. A *rich* fuel to air ratio burns more fuel than a *lean* mixture.

The German Grand Prix
Circuit Name: Hockenheim, West Germany
Circuit Length: 6.798 km/4.224 miles

A leaner mixture provides more horse power, but makes the engine run hotter, work harder, and makes it more sensitive to excess turboboost. A richer mixture is more conservative on the engine, and lets you use more boost from the turbocharger, but consumes fuel more rapidly.

Typically, you'll want to run a lean mixture during a race to conserve fuel, and also because burning more fuel with a rich mixture doesn't necessarily increase horsepower. The A-ROM is the leanest mixture, while the F-ROM is the richest mixture. The Q-ROM is an extremely rich mixture that you should use only in qualifying races.

You can see just how the various ROMs and turbocharger settings affect your engine's performance in the dyno room. See the "Testing Your Car" section for more information on using the dyno room.

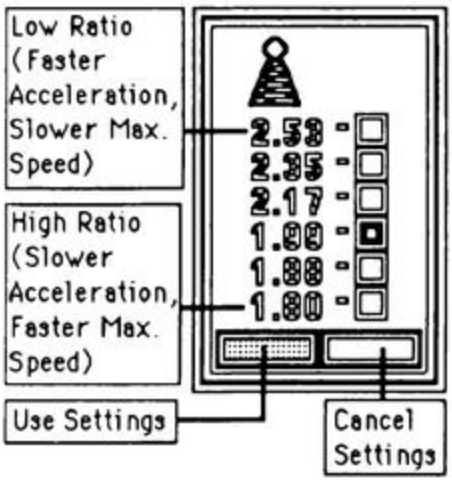
Turbocharger System is a collection of components that increases the engine's horsepower by literally stuffing more air and fuel into the engine. A small turbine, placed in the flow of the engine's exhaust, spins an impeller that pumps pressurized air into the engine. The extra air forces the fuel injection system to balance the mixture with more fuel, thus greatly increasing the potential energy in the cylinder. But, as you might imagine, an increase in turboboost also increases the engine's fuel consumption. An F186 in qualifying trim won't win any fuel economy awards.

Turboboost is measured in bars (a bar is approximately 14.7 psi — pounds per square inch). The higher you set your turboboost, the more pressure you're putting on your engine. Thus turboboost and engine wear have a direct correlation. If you run a high turboboost setting for long periods of time, you increase your chances of blowing the engine — especially at skill levels above F3. But the temptation to use full turboboost is always great because the turbocharger can boost your Ferrari's overall horsepower by 100%, thus increasing your top speed dramatically. If the turbocharger system sustains damage, use the control in the engine control panel to repair it (the amount of time it takes to repair will depend on the extent of the damage). If you should happen to blow your engine during a race, then you'll lose the race.

Gearbox

Use the gearbox control panel, shown in Figure 12 below, to adjust your Ferrari's gear ratio in response to track conditions.

Figure 12: Gear Ratio Control



Short gear ratios provide fast acceleration, but lower maximum speed. This means that you should use a short gear ratio for slower tracks with tight turns — so you can accelerate quickly out of the turns. Long gear ratios provide slow acceleration, but higher maximum speeds. This means that you should use a long gear ratio for straighter tracks where you can go fast for longer periods without slowing for curves.

Also be aware that shorter gears cause higher engine revs, and thus, greater fuel consumption. For some races you may want to use a longer gear to help conserve fuel.

The Hungarian Grand Prix

Circuit Name: Hungaroring, Budapest, Hungary
Circuit Length: 4.008 km/2.490 miles

Tires

Almost no other area has improved as much over the years as the performance of Grand Prix tires. Cornering forces can reach better than three Gs (forces of Gravity). Tires have become highly specialized for their specific duty, and are categorized by their *compound* (the rubber composition that gives the tire its performance characteristics) and *tread* design (the grooves cut into a tire based on track conditions). For instance, there are different tire compounds and tread configurations for wet and dry weather, or for hot and cold weather. Typically, wet weather tires are the only types that are treaded. Dry weather tires have no treads, and are referred to as *slicks*. The goal in picking tire compounds is to get the best grip, and thus, the best lap time. The basic rule of thumb is: the softer the tire compound, the faster the lap time; but the greater the wear on the tire. This means that you should attempt to find a happy balance between lap time and tire longevity.

Choosing the appropriate tire compound is extremely important to the success of your race. Each tire of the Formula One car is subjected to its own distinctive form of stress, so you may have to pick a different tire compound for each tire of the vehicle. Your choices should be based upon the layout of the track, the weather conditions, and the track session you're competing in. Your goal is to pick tires that will become just the right temperature during the race so you'll get good *grip* on the track. If a tire stays too cold, it won't get soft enough to grip. If it gets too hot, it will smear, become sticky, and deteriorate faster.

Let's say that you're racing on a track which has a lot of right-hand turns. You would probably want to select a hard front-left compound, a fairly soft front-right, and two medium-hard rear tires. The hard front-left compound will help the tire hold up under the punishment it will receive in all of those right turns, while the soft front-right compound will help provide additional grip. The medium-hard rear compounds will help the rear tires survive the fast acceleration out of all the

The Austrian Grand Prix
Circuit Name: Österreichring, Austria
Circuit Length: 5.940 km/3.690 miles

corners, but since the compound is only medium-hard, it will also provide better grip than a very hard compound.

Three completely different tire compounds on the same car are quite common in Formula One racing.

The tire control (see Figure 13) in the garage and the pit gives you six tire compound/tread combinations to choose from. The arrows at the top of the compound columns point to a tire on the car in the following order from left to right: right-front, left-front, right-rear, and left-rear. The temperature for that tire appears at the top of the tire control when you select one of the arrows. Table 1 lists the compounds, their types, and their degree of firmness.

Remember, letting your tires get too hot makes them deteriorate faster and reduces their grip. You can monitor tire wear during a race by watching the *movement patterns* on the tires — they'll change pattern as they get hotter. (You can watch the rear tires in the corners of your rear-view mirrors.) If you see that the tire(s) are wearing too fast, slow down to conserve them. You'll lose some lap time, but it's sometimes better than pulling into the pit for a complete tire change.

Figure 13:
Tire Control

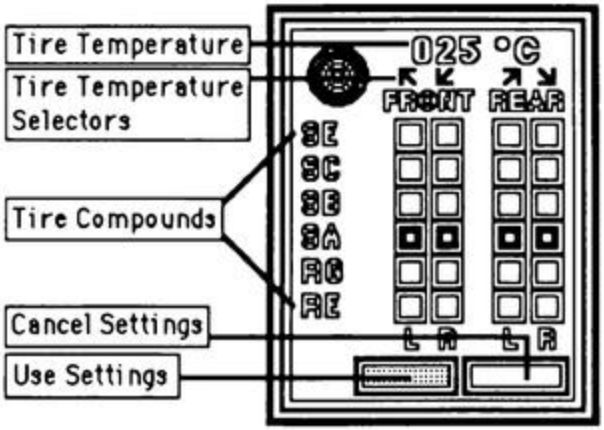


Table 2: Compounds, Types, and Firmness

Compound	Type	Firmness
SE	Qualifying	Very Soft
SA	Race A	Hard
SB	Race B	Medium
SC	Race C	Soft
RG	Rain Qual.	Very Soft/Tread
RE	Rain Race	Soft/Tread

Rain tires are the softest compound, are water compatible, and they are treaded to help prevent hydroplaning. The rain compound lasts only so long as rainwater acts as a coolant for the tires during the race. This means that they'll deteriorate rapidly on a drying track.

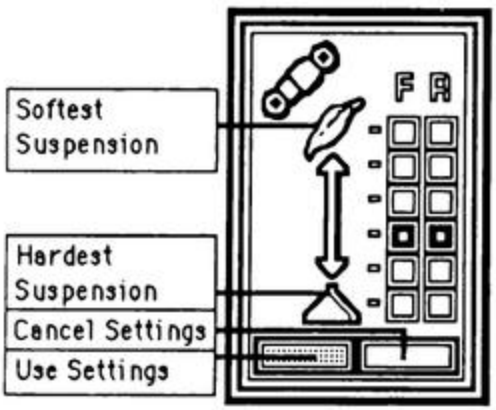
The ideal situation is to have all four tires reach their best gripping temperature at full speed. Although you can reduce tire temperature by varying your driving tactics, remember that this usually means slower lap times. Of course, losing a little time to let the tires cool off is better than losing your first place slot if you have a narrow lead. It takes less than 15 seconds to change the tires in the pit, but when you add the time it takes to decelerate into and accelerate out of the pit, you'll lose about a minute.

Qualifying tires provide great grip because they are so soft, but they deteriorate fast. They're designed to be destroyed because you need fast lap times while qualifying, and you can usually afford the time it takes for a tire change during qualifying runs.

Suspension

Your Ferrari's suspension system works in tandem with the wings and tires to help provide the best handling characteristics. You should adjust the suspension system in response to your own driving habits as well as to track conditions.

Figure 14: Suspension Control

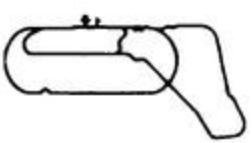


The suspension system has a drastic effect on whether your car under or oversteers. Understeering is when you go into a turn and the front tires break traction first, causing them to *wash-out* (continue straight even though they're turned). Oversteering is when the rear tires break traction first and make the car fishtail or, in the worst cases, spin-out.

Firm suspension provides less sway, but is less forgiving of road inconsistencies and will break traction faster. Soft suspension has the exact opposite effect. For instance, firm rear suspension and soft front may make the car more likely to oversteer; i.e., the rear tires may break traction first and the car may fishtail or spin-out

When you're adjusting your car's suspension, take into account whether the track is twisty or fairly straight, and whether it's wet or dry.

The Italian Grand Prix
Circuit Name: Monza, Italy
Circuit Length: 5.802 km/3.605 miles



Also, the F186 has a natural tendency to understeer, so calculate this into your adjustments. Finally, you must also consider your own driving habits. For instance, if you like to take corners at high-speeds with little or no braking, then you'll probably want to use firmer rear suspension to make the car oversteer slightly.

But keep in mind that the car is more likely to break traction and go into a skid if you have to use the brakes too heavily into a turn. You should also take your tire and wing settings into account when adjusting the suspension. If you're using a soft tire compound, and wing settings that provide lots of downforce (see "Wings" below), then you can probably afford to use a firmer suspension system.

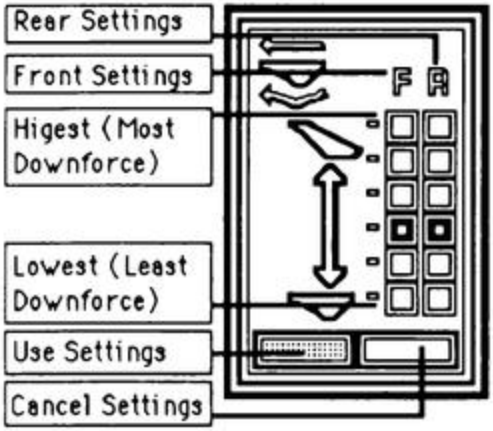
Wings

Next to proper tires, your car's wings are the next most important factor affecting how the car handles on the track. Your Ferrari's front and rear wings operate exactly like an inverted airplane wing. While an airplane's wing provides *lift*, your Ferrari's wings are turned upside-down so they provide *downforce*. Essentially, they push your car down onto the track to provide better grip around corners and other areas where you might lose ground. The wings also help compensate for under/oversteer which was discussed in the last section, "Suspension."

The higher you put the rear edge of the wing (or the greater the *angle of attack*), the more downforce it provides when the car moves forward. But this also creates more *drag*, which hinders the car's forward motion, and thus, its acceleration. Your job is to find a happy medium between downforce and drag. But remember that the effect is exponential with speed; that is, the faster you go, the less wing you'll need to create the same amount of downforce. The basic trade off is drag versus downforce, and straight line acceleration versus cornering speeds. Figure 15 shows the wing control you'll use to adjust your car's front and rear wings.

The Portugese Grand Prix
Circuit Name: Estoril, Portugal
Circuit Length: 4.344 km/2.699 miles

Figure 15:
Wing Control



Like all the other components of your Ferrari, the way you adjust your wings depends upon track conditions. On a very twisty track, you might have to sacrifice some top speed (because of increased drag) in order to get a lot of cornering performance (because of increased downforce).

On a track with a lot of straights, you might sacrifice some cornering performance (because of decreased downforce) to increase speed (because of decreased drag). You can see the way wing adjustment affects downforce and drag by testing your car in the wind tunnel (see "Wind Tunnel").

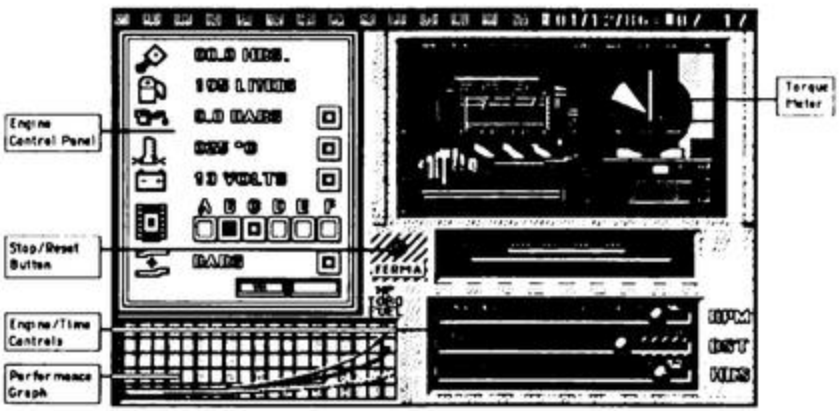
Testing Your Car

Before you leave Fiorano for your first race, you should test your car using Fiorano's test lab facilities to learn exactly how your adjustments affect your car. The following sections describe each of Fiorano's test labs and how you should use them.

Dyno Room

By adjusting the various controls in the dyno room (Figure 16), you can quickly see how engine performance is affected at various speeds (RPM) by the age of the engine (HRS), turbocharger settings (BST), and the ROM type. In all likelihood, the fuel efficiency in an older engine won't be nearly as good, and other factors such as the cooling and electrical systems will be less efficient also.

Figure 16: The Dyno Room



The performance graph below the engine control shows the way in which increasing the output of one engine factor decreases or increases the efficiency of another. For instance when you increase turboboost (the BST control), horsepower (HP) and engine torque (TORQ) increases but fuel efficiency (FUEL) drops.

Try increasing the engine age with the HRS control and see what happens to the engine's performance (once you age an engine with the HRS control, you cannot make it young again; you must use the engine crane in the garage to install a new engine). Note also, the RPMs at which your engine reaches peak performance in its current tune. You should try to shift at this this RPM if you use the same engine tune on the track.

Wind Tunnel

The wind tunnel (see Figure 6) is where you see how your Ferrari's wings affect downforce and drag. Use the wing control panel to adjust the angle of attack of the car's wings, then use the airspeed control to increase the speed of airflow across the wings. The performance graph below the wing control shows you how downforce on the front and rear wings, and the overall drag will increase as the speed of your car increases.

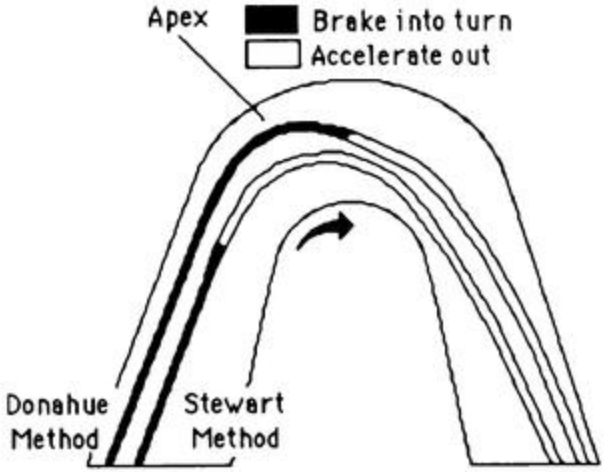
Your goal is to find the greatest increase of downforce with the least drag at the highest wind speed. Naturally, this all depends on race track conditions — your wing settings will probably be different for every track.

Test Track

The Fiorano test track is where you measure the F186's performance after making all your adjustments in the garage and pit. You should also work to hone your driving skills here before an actual race. In particular, practice braking into corners from high speed since this is typically where new drivers are overtaken by experienced Grand Prix race drivers. Figure 17 illustrates how you should handle corners in your Ferrari.

The Mexican Grand Prix
Circuit Name: Mexico City, Mexico
Circuit Length: 4.656 km/2.893 miles

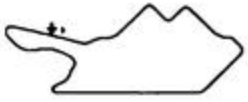
Figure 17:
How to Corner



The most common tactic is to configure your car so it understeers into the corner, and oversteers out. You achieve this with a fine balance of wing and suspension settings. There are two schools of thought on the best way to negotiate a corner: the traditional method, recommended by Jackie Stewart and others; and the friction circle method, pioneered by Mark Donahue. See Figure 17.

Using the friction circle method, you brake to the apex of the turn, and accelerate out. Using the traditional method, you brake into the beginning of the turn, then accelerate all the way through the apex and out of the turn. Use whichever method feels right for you.

Your main objective on the test track should be to increase your lap time and your car's performance. Pull into the pit after every few laps and check your car's systems for wear and tear, and check the race monitor for your lap times. If it looks like some of your car's systems are really taking a beating after only two or three laps, try driving more conservatively. Be prepared for longer lap times though.



The Australian Grand Prix
Circuit Name: Adelaide, South Australia
Circuit Length: 3.780 km/2.348 miles

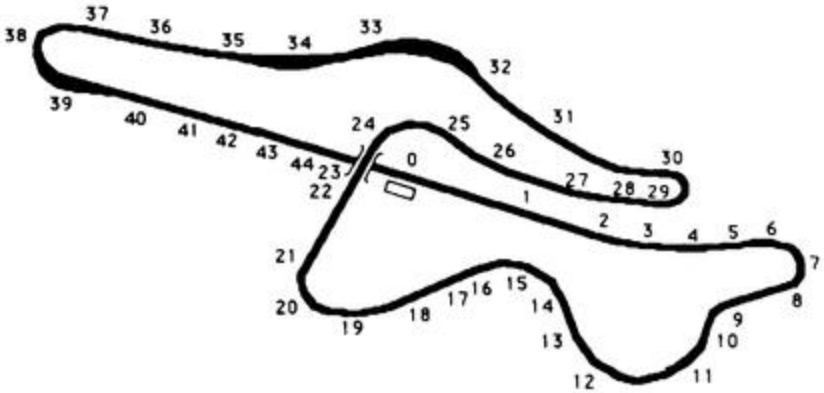
If after two or three more laps your car is still taking a beating, you should make some adjustments to those systems that aren't holding up well.

Scoring Monitor

The scoring monitor in the pit at Fiorano shows a lot more than just your lap times. There are sensors at every turn of the test track that record exactly how you performed during a given lap. Click the button next to the lap time you want to analyze, and the scoring monitor will show you the times recorded at each sensor. Using the information gathered by the sensors around the test track, you can isolate and work on the areas of your driving that need improvement. Figure 18 shows the layout of Fiorano and where photocells have been placed around the test track.

The scoring monitor during a race shows the current status of all race participants, ranked by position. You can see what lap the other drivers are on, their times, and whether they're on the track or in the pit (a "P" appears next to the name of drivers who are currently in the pit).

Figure 18: Fiorano Test Track and Sensor Placement



The time shown for each sensor location on the race monitor indicates the time it took you to reach that sensor from the last, and the total lap time up to that point. Compare the numbers with previous laps to note your improvement (or lack of improvement).

Smoothness and consistency are the keys to turning fast lap times. The greatest cornering forces occur during the transition from braking to acceleration as the weight of the car is magnified by momentum. If you can make a smooth transition, you can reduce the impact of the transistion. Consistency lets you avoid problems and execute the most important of all racing strategies — *finishing*. The more control you maintain, the closer you can drive to the car's limits.

Transport

When you feel confident in your car and your capabilities as a driver, it's time to head for your first race of the season (see "Appendix A — 1986 Season Schedule" for race dates). The first race is held at Rio, on March 23rd. If you have spent enough time testing and practicing at Fiorano for the game date to almost reach the date of the first race, you can take the transport trucks there. Using the transport trucks to get to another track sets the game clock ahead only for the amount of travel time it takes to get there from your current location. This means that to get from Fiorano to Rio in time for the race you should leave Fiorano no later than March 19th.

The difference between using the transport trucks and the race control panel to go to races is that the transport trucks simulate real-time in the game, while the race control panel lets you advance the game clock and skip ahead to where you want to be. You can use the race control to skip over all the sessions except the race itself (but you forfeit a good starting position), or you can even use it to skip over entire races. But remember, you forfeit the races that you skip.

You can still take the transport trucks to competition tracks even if it's before or after the date of the actual race, but you can only test on the track when you get there. The travel times are as follows:

- One day to travel to another track in the same *country* as your current location.
- Two days to travel to another track on the same *continent* as your current location.
- Three days to travel to another track on a *different continent* from your current location.

If you want to go to the actual race, but the game clock hasn't yet reached the date of the race, then use the race control panel (Figure 4), located in the race control building of the paddock, to select the track you want to go to. Race control automatically sets the game clock ahead to the track's opening.

YOUR FIRST RACE

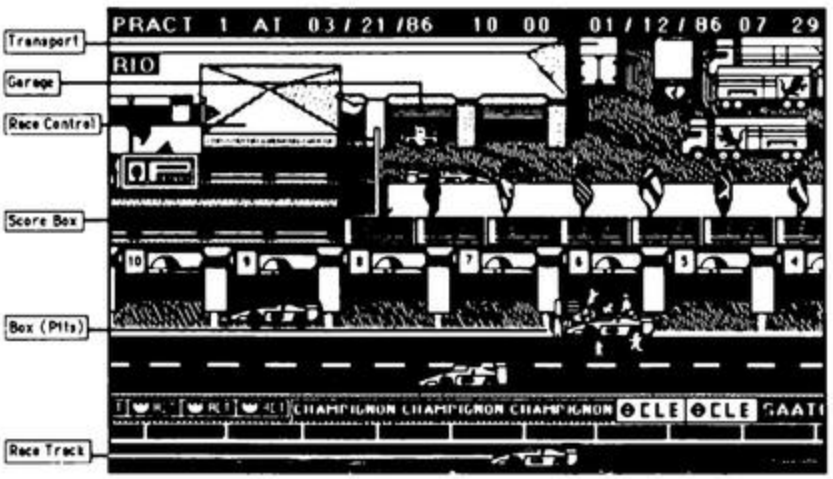
It's March 19, 1986. You know your Ferrari like the back of your hand and you could drive Fiorano in your sleep. Now it's time to get your car and crew packed up in the transport trucks and head for your first race of the season — Rio.

Held at Rio de Janeiro in March, the Brazilian Grand Prix is 5.013 km/3.126 mile course that features one very long straight away, and a lot of challenging left-hand turns. The weather is typically hot and dry.

Competition Track Layout

Like Fiorano, each competition track has a paddock area that contains the transport trucks, garage, race control, scoring, pit, and race track access (see Figure 19).

Figure 19: Competition Track Paddock



However, the competition tracks do not have wind tunnel or dyno room facilities. The first thing you should do when you arrive at a competition race track is to note the date, time, and weather conditions, which are shown as an icon near the upper-left corner of the paddock screen. If you're early for the race, you'll have time to take some practice laps around the track and get some first impressions. Then you should put your car in the garage and make your adjustments based on the track conditions and the current track session.

The Grand Prix

A Grand Prix race is broken into various *track sessions* that make up the entire race. There are a total of six track sessions, including the race itself, which are spread across a three day period. On each day, the first session is always at ten in the morning, and the second session is at one in the afternoon. You can check the main paddock to see what time it is and when the next session begins. The track sessions follow one another logically as you complete them, or you can select the session you want to race from the race control panel in the race control building of the paddock.

You can use the race control panel to skip the sessions before the actual race, but you'll have to settle for a grid position at the back of the pack if you skip both qualifying sessions.

Day One

There are two sessions on the first day of the Grand Prix: the first practice session (P1) and the first qualifying session (Q1). P1 is a practice session in the morning that gets you acquainted with the track. Although you'll meet the other drivers on the track, don't expect to see them show all their capabilities during this session. You should hold back and take it easy during the practice as well. Get to know the layout and trouble spots of the track, and don't risk damaging your car.

- A green flag means the race is on at full speed.
- A white flag means there is one lap remaining.
- A checkered flag means the end of the race.
- A red flag means the course is closed, proceed to the pit.

Q1, in the afternoon, is the first *real* competition of the race. In this session you are trying to qualify for the best *grid position*; that is, the position your car occupies in the pack at the start of the race. The driver with the best flying lap (like a running start) time gets the *pole position*.

You'll need to find a free stretch of road in order to find your fastest qualifying time. As you start your second lap, make sure you have some traffic-free distance in front of you. Remember that there are other drivers also trying to get fast times. All will be running at different speeds, many in excess of 100 mph. This is one of the two most dangerous times in Formula One racing (the other is Q2).

Use the Q engine ROM, lots of turboboost, and qualifying tires to try and get the best lap time. You will also lighten your car's load by using less fuel because you can refuel at any time during the qualifying and practice races. This means you can reach faster speeds and you don't need to worry about fuel efficiency. Do the best you can to get the best lap time you can, but don't risk damaging your car — you still have two more practices and another qualifying session to get through before the real thing. And watch the other drivers as well. Although they won't show you all their tricks during qualifying, some of their strategy and tactics may become apparent.

Pay attention to tire wear during the practice and qualifying sessions. If your tires are wearing unevenly, try to select a better balance of compounds to use in the race.

Day Two

Day two of a Grand Prix is also composed of two sessions: Practice Two and Qualifying Two. Like P1, P2 is intended to help you familiarize yourself with every inch of the track. The goal is to make your P2 times better than your P1 times of the day before. It also gives you a chance to tweek your car for peak performance.

Outside of the Ferrari factory in Maranello, Italy, there is a bust of Gilles Villeneuve. Gilles was a Canadian Grand Prix driver for the Ferrari team in the late 70's and early 80's. Gilles was well liked for his competitive spirit, and his success. He placed second in the 1979 World Championship, and won six races in four years for Ferrari. Gilles was killed in the early 80's while trying to overtake another car during a qualifying session. The Canadian Grand Prix circuit was named in his honor.

Q2 is likely to be even crazier than Q1 as the drivers try to improve on their qualifying times from the previous day, and beat everyone else's times in the process. If your lap times happen to match another driver's from the previous day, the other driver receives that pole position (because he reached it first) and you get the next in line. Again, get radical with your car adjustments. Don't worry about fuel efficiency and tire wear, just try to get your best time. And don't forget to keep your eye on the competition.

Many Grand Prix drivers like to replace their engines after Q1 and Q2 so they'll have a brand new engine for the sessions of the next day.

Day Three — The Race

Day three starts with a 30-minute warm-up session in the morning, followed by the race itself in that afternoon. The warm-up session is your final chance to overcome any problem areas the track may present for you. It's also a last chance to tune your car one last time. Take it easy during the warm-up, burn-in that new engine gently, and conserve yourself and your car for the race.

Your place at the start of the race in the afternoon is based upon how well you performed in qualification. If you did well in Q1 and Q2, then you'll have a place at, or near, the front of the pack. If you didn't do so well during qualifying, you'll be at the back of the pack.

The standing start is one of the most spectacular moments in all motor sport. Especially since turbo cars have found their way into Formula One. Cars often overtake six to eight spots on the grid before the first turn. Others may stall on the grid, causing gridlock at over 100 mph!

Drive aggressively, but remember, you *can't* refuel during the race, and a tire change is the most time-costly of the *standard* problems. By "standard" we mean a problem that probably won't cost you the race, only a lap or so. If you encounter a *non-standard* problem during the race — like having to change your turbo charger system — then you will lose the race.

A regulation Grand Prix is two hours or 310 kilometers (200 miles), whichever comes first. You can set a shorter distance using the race control panel in the race control building at the paddock if you want (this also scales down the time limit and fuel capacity). If the time limit is exceeded and you haven't run the full length of the race, then the lead car is declared the winner as he crosses the finish line and the race ends. After the race, you can save the season standings to disk (see your Driver's Reference Guide).

If you did not finish the race, the reason will be listed in the race results screen. For instance, the word "SHUNT" means that you had an accident. "DNF" is short for Did Not Finish and appears when you deliberately leave the race. If a component from your car is listed (i.e., "WINGS", "ENGINE", and so on), then there was a mechanical failure in your car that prevented you from placing.

Returning to Fiorano

Hopefully you did well in your first race, but if you didn't, then maybe it's time to return to Fiorano and practice some more. Use the transport trucks to return to Fiorano in the same way you used them to get to the first race. You can also go to other competition tracks to test if you want, but it won't register in your season standings if the track is closed.

WHERE TO GO FROM HERE

If you enjoy *Ferrari Formula One* and want to learn more about real Grand Prix racing, Ferraris, and Formula One driving, here's some suggested reading:

- Abodaher, David. *Fantastic Formula One Racing Cars.*
- Borgenson, G. *Grand Prix Championship Courses.*
- Formula One Constructors Asscociation (FOCA). *Formula One: FOCA Yearbook 1987*
- Henry, Alan. *Ferrari: The Grand Prix Cars.*
- Lauda, Niki. *My Years With Ferrari.*
- Lauda, Niki. *The Art & Science of Grand Prix Driving.*
- Lauda, Niki. *The New Formula One: A Turbo Age.*
- Olney, Ross R. *Super Champs of Auto Racing;*
- Orr, Frank. *World's Great Race Drivers.*
- Roebuck, Nigel and Townsend, John. *Grand Prix: World Formula One Championship 1986/87.*
- Wilkinson, Sylvia. *Formula One.*

APPENDIX A — 1986 SEASON SCHEDULE

Race	Date	Location
Rio	3/21-3/23/86	Jacarepagua, Rio de Janeiro
Jerez	4/11-4/13/86	Jerez, Spain
Imola	4/25-4/27/86	Imola, Italy
Monaco	5/9-5/11/86	Monaco
Spa	5/23-5/25/86	Spa, Belgium
Montreal	6/13-6/15/86	Montreal, Canada
Detroit	6/20-6/22/86	Detroit, United States
Ricard	7/4-7/6/86	Paul Ricard, France
Hatch	7/11-7/13/86	Brands Hatch, England
Hockenheim	7/25-7/27/86	Hockenheim, Germany
Budapest	8/8-8/10/86	Hungaroring, Budapest, Hungary
Österreich	8/15-8/17/86	Österreichring, Austria
Monza	9/5-9/7/86	Monza, Italy
Estoril	9/19-9/21/86	Estoril, Portugal
Mexico	10/10-10/12/86	Mexico City, Mexico
Adelaide	10/24-10/26/86	Adelaide, South Australia

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