

# Scalextric Sport Digital Console



## User Manual

Version 4.0

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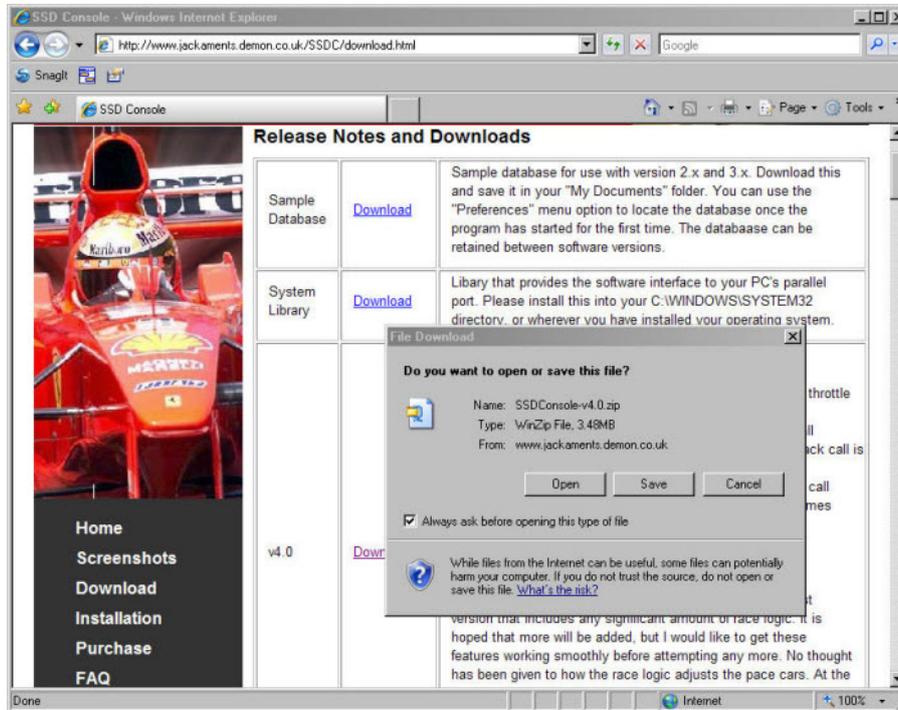
## Prerequisites

In order to install and use Scalextric Sport Digital Console (SSDC), you need to ensure that you have the following items in your setup:

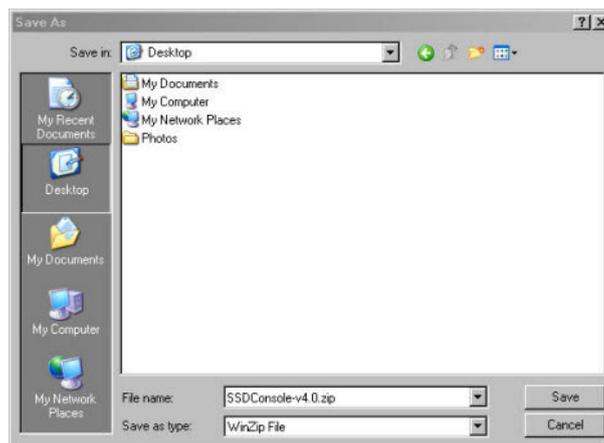
- A Scalextric sport digital powerbase. You can use a standard Scalextric v1.5 powerbase, or a modified PB-Pro powerbase. If you have PB-Pro system, then please ensure that you are running a firmware version of at least 1.7d. Ideally, contact the PB-Pro team and get hold of the very latest firmware.
- A cable that connects the powerbase to your computer. These can be obtained by contacting [richard@girling.net](mailto:richard@girling.net).
- A computer running Windows 98, Windows XP or Windows Vista. The PC must have the Microsoft .net framework (version 2.0 or higher) installed. The .net framework will normally be installed during the installation of SSDC if it is not already on your PC. On Windows 98, the .net framework needs to be installed manually. You will also need the Microsoft Jet database engine. This is normally part of the Windows XP and Vista operating systems. For Windows 98 you will probably need to install it from <http://support.microsoft.com/default.aspx?kbid=239114>
- If you want to monitor pit lane entry and exit, then you will also need a second modified powerbase. An article that details the process for creating a pit lane sensor is available at <http://www.slotforum.com/forums/index.php?showtopic=21968>.

## Installing the software

The software can be downloaded from <http://www.jackaments.demon.co.uk/SSDC>. The software, and necessary libraries, can be found on the download page. When you click on the download link for the current software version, a window will appear asking you to open or save the file.

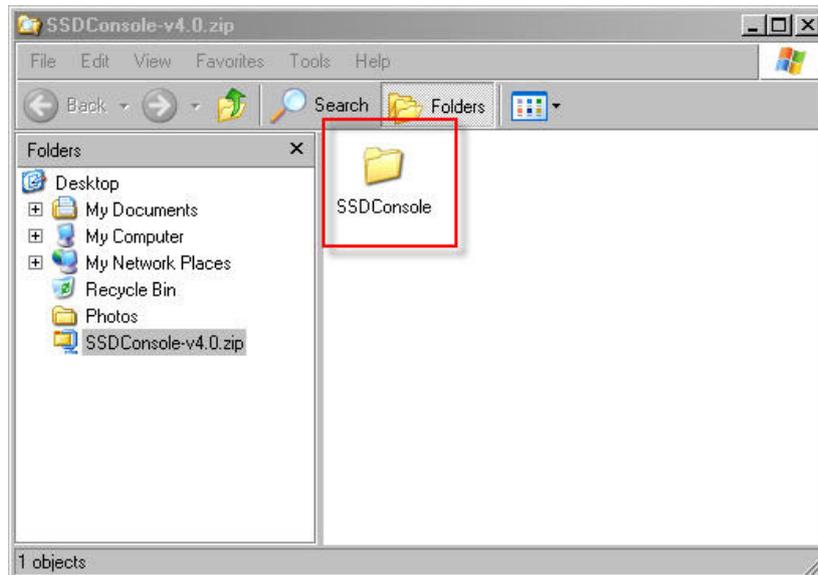


Click on the “Save” button, and save the file onto your desktop (you will delete it later).



When the download is complete, you should repeat the process for the sample database (ssdc.mdb) and the system library (io.dll). Download the database into your “My Documents” directory, and the system library into your “C:\WINDOWS\SYSTEM32” directory using the same approach as described above. Once these two files are installed in these locations, there is nothing more that you need to do with them.

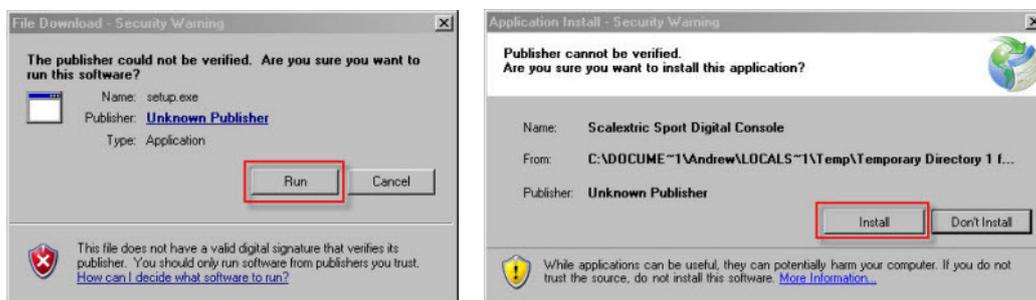
Having downloaded the software package onto your desktop, you now need to install it. First locate the ZIP file on your desktop, and right click on it with the mouse. A popup menu should appear. Select the menu option “Explore” and the following window will open.



You should then double-click on the “SSDConsole” folder in the right hand panel. The contents of the panel will change, and should include the following files.



To start the installation, double click with the mouse on the setup.exe program. The installation of the software will start.



A message will be displayed, stating that the publisher of the software could not be verified, and asking if you want to continue with the installation. Click on the “Run” button as shown above. Shortly after, another similar message will ask you to confirm that you want to install this software. Click on the “Install” button as shown. The installation will complete, and SSDC will start automatically.

When you have installed this software for the first time, you will be prompted to register the software. The following window will appear.



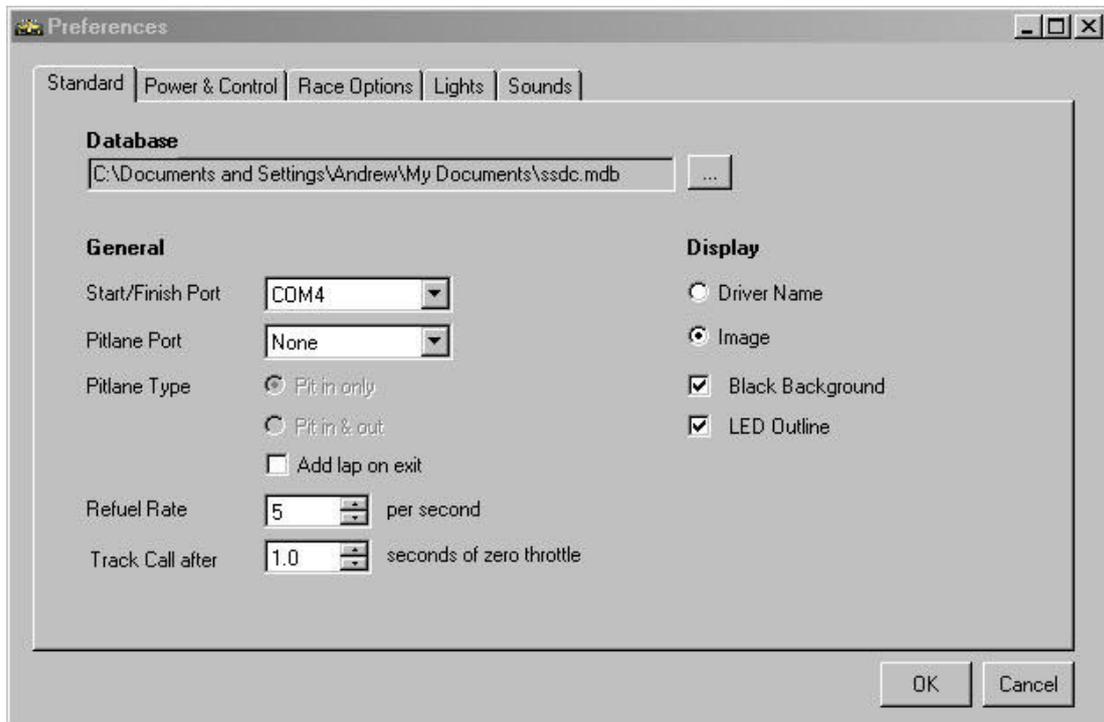
You can press the “Evaluate” button each time the program starts, and you will be able to use a fully functional version of the software for the 30 day period, which starts from the day that you first run the program.

When you are ready, you may purchase a license for the software from the SSDC website. You will be issued with a license key that matches your email address, which will then remove this window at the program start, and allow the program to continue running after the 30 day period has expired.

## Configuring the software preferences

The first thing that you need to do on starting SSDC is to configure the software preferences. The preferences window can be accessed by using the “File, Preferences” menu item. Each of the preferences pages is described in detail here.

### Standard



In this window you configure your main settings.

**Database:** Click on the “...” button to the right of the database field, and use the window that appears to locate and open the database that you downloaded into your “My Documents” directory earlier.

**Start/Finish Port:** Use the drop down list to select the COM port that is the interface to your powerbase. If you connect the powerbase to a USB port on your PC, then it is likely to be COM4 or COM5. The COM ports 1-3 are usually reserved for the old serial D-Type ports which still exist on the back of many computers. You may need to experiment with these to ensure that you have the right one selected.

**Pitlane Port:** Again, use the list to select the interface to the pit lane powerbase (if you have one). If you select “None” then the pit lane type options will be disabled.

**Pitlane Type:** If you have a pit lane powerbase, does it sense entry only or both entry and exit of the pit lane. Use the options to select the right type.

**Add lap on exit:** If you pit lane exists after the start/finish powerbase then you will want SSDC to add a lap for each car that enters and exits the pit lane. If your pit lane exists before the start/finish powerbase, then the start/finish powerbase will be used to register all laps, including those with pit stops.

**Refuel Rate:** How quickly should cars refuel? If you define a car with a tank of 50 units, and the refuel rate is 5 units per second, it will take 10 seconds to refuel from empty to full. This will actually be delivered at a rate of 0.5 units every 1/10th of a second.

**Track Call after:** SSDC can automatically generate a track call (flashing ambers lights, slowing of the leading cars for PB-Pro and no overtaking rule applied) if it detects that the throttle of a racing car is at zero for a period of time. You can set this to 0 to disable this feature. Alternatively, you can set the value from 0.5 to 5 seconds to enable the feature and define the period that zero throttle must exceed before a track call occurs. When the stopped car applies the throttle again, the race will resume as normal automatically.

**Display:** How would you like the main leader board display to appear? You can have the background as both black or white, display car images or driver names, and optionally have the LED numbers appear with the outline as they would in a real display.

Having setup the options in this screen, it is a good idea to now exit the preferences by clicking on the “OK” button and just test that you have the right ports selected for your powerbases. The best process for doing this is to ensure that your powerbase(s) are switched on, and then use the “File, Connection, Connect” menu item to establish the connection.

#### Checking the start/finish powerbase setting

If you have the right port setting, the title of the main window will change on connecting to indicate that you are connected to the powerbase. For PB-Pro users, the title will also include the firmware version of the powerbase. Run a car over the start/finish powerbase by hand a few times. It should register on the leader board.

#### Checking the pit lane powerbase setting

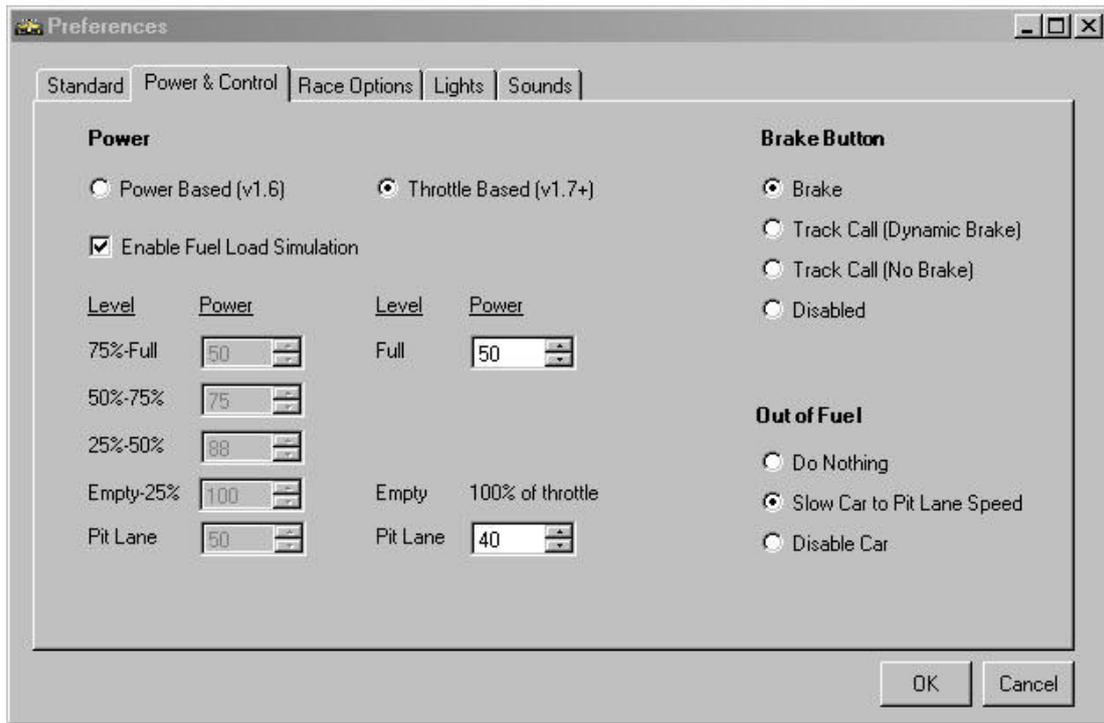
If you have a pit lane powerbase, run a car over the pit entry sensor. If your PC sound is on you should hear Murray Walker shout “And into the pits...” and a green LED will be displayed on the leader board next to the car’s fuel gauge.

If you don’t get these responses to the tests above, change the ports settings and try again. Once you have worked out the right settings, they will be saved in the program configuration, but it is also a good idea to make a note of them somewhere.

#### Troubleshooting

In the event that you still cannot get the responses above, after trying all the available settings, it may be that there is another program using the serial ports, and SSDC cannot open them. Examples may include Microsoft ActiveSync, which synchronises phones and PDAs with Outlook Email and Contacts. There is a useful tool available at <http://technet.microsoft.com/en-us/sysinternals/bb896644.aspx> that allows you to monitor the available ports on your PC to see which programs might be using them.

## Power and Control



The Power and Control screen is only applicable to PB-Pro users, so users of standard Scalextric powerbases can ignore this section

### Power Modes

Power can be controlled in two ways with the PB-Pro. The first is by using the powerbase power options for each car. These aren't very fine adjustments as there are only 4 settings (50%, 75%, 88% and 100%), but the advantage is that they are fast because of their simplicity, and don't use up much CPU time on your PC. They are also much simpler to setup for people starting out with SSDC.

The second approach for controlling power is by modifying a throttle map for each car based on certain rules. The advantage here is that it can be very fine adjustments, resulting in a smoother driving experience, but requires more setup time and more computing power during the race. This approach can also be used on powerbases that have a firmware version higher than v1.7d.

*IMPORTANT NOTE: If you use the throttle based power model, then you will need to define a throttle in the database screen, and each car will need a throttle defined in the race settings screen, otherwise no adjustments will be made to the car speed during a race.*

Choose which power model you would like to use by selecting the right radio button.

### Fuel Load Simulation

Having decided on the power model to use, you now need to decide if you want "Fuel Load Simulation". What this means is, do you want to slow down cars that are heavy with fuel, and speed up cars that have light fuel loads? Click on the checkbox if you do. You will then need to specify the power levels for the different levels of fuel load.

In the power based model you can define the power available to cars with 4 settings:

- 75% to full - how much power does the car have with a fuel level of between 75% and 100%
- 50% to 75% - as above for the a lower fuel level
- 25% to 50% - as above for a lower fuel level
- Empty to 25% - how much power does the car have with a nearly empty tank of fuel

As the car burns its fuel, the power settings will be adjusted to these levels

In the throttle based model, you only need to define one setting

- Full - how much power will a car have, as a % of the throttle that you have defined, when the car is full of fuel?

As the car burns its fuel, the power settings will be adjusted using a complex algorithm that ensures that power at low throttle settings is maintained, and power at high throttle settings is reduced to the appropriate level. So if you set the “Full” value to 50%, then when the car is full, the top end throttle value will be reduced by 50%, but the low end throttle value will be maintained. In essence, the throttle map will be flattened.

The car’s throttle and power settings are adjusted each time the car crosses the start/finish line.

### **Pit Lane Speeds**

Using the same principles as above, you can define pit lane speed limits for the cars. The speed will be enforced at the time the car enters the pit lane, and will be removed as the car exits the pit lane. For cars that do not have pit lane exit sensors there are two options:

- If the pit lane exits before the start/finish line, the start/finish line will be used as the pit lane exit
- If the pit lane exits after the start/finish line, indicated by the “Add Lap” option described earlier, the car will exit the pit lane as soon as it starts moving after refuelling

### **Brake Button Behaviour**

On some throttles, there is a brake button above the lane change button. The behaviour of this can be configured on the PB-Pro. The options here include:

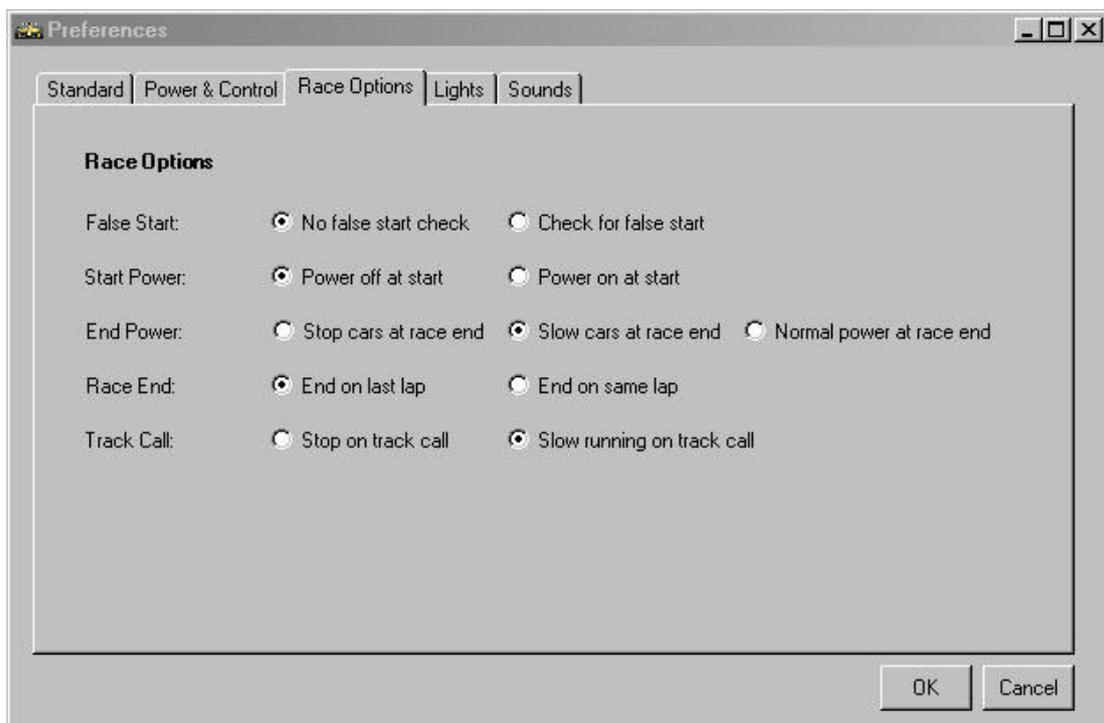
- Brake - the button will be used for manual braking, and powerbase dynamic braking will be disabled
- Track Call (Dynamic Brake) - the button will be used for the driver to initiate a track call manually, and the powerbase will enable dynamic braking
- Track Call (No Brake) - the button will be used for the driver to initiate a track call manually, and the powerbase will disable dynamic braking
- Disabled - the button will be disabled

## Out of Fuel

When a car runs out of fuel, it is also out of the race or qualification, and no more laps will register. This option allows you to define what will actually happen to the car on the track when this occurs. The options include:

- Do nothing - allow the car to continue driving normally, even though it is out of the race
- Slow the car to pit lane speed - use the pit lane speed settings and slow the car to that power level
- Disable car - stop the car on the track. It's throttle will be disabled, and the car will need to be removed manually

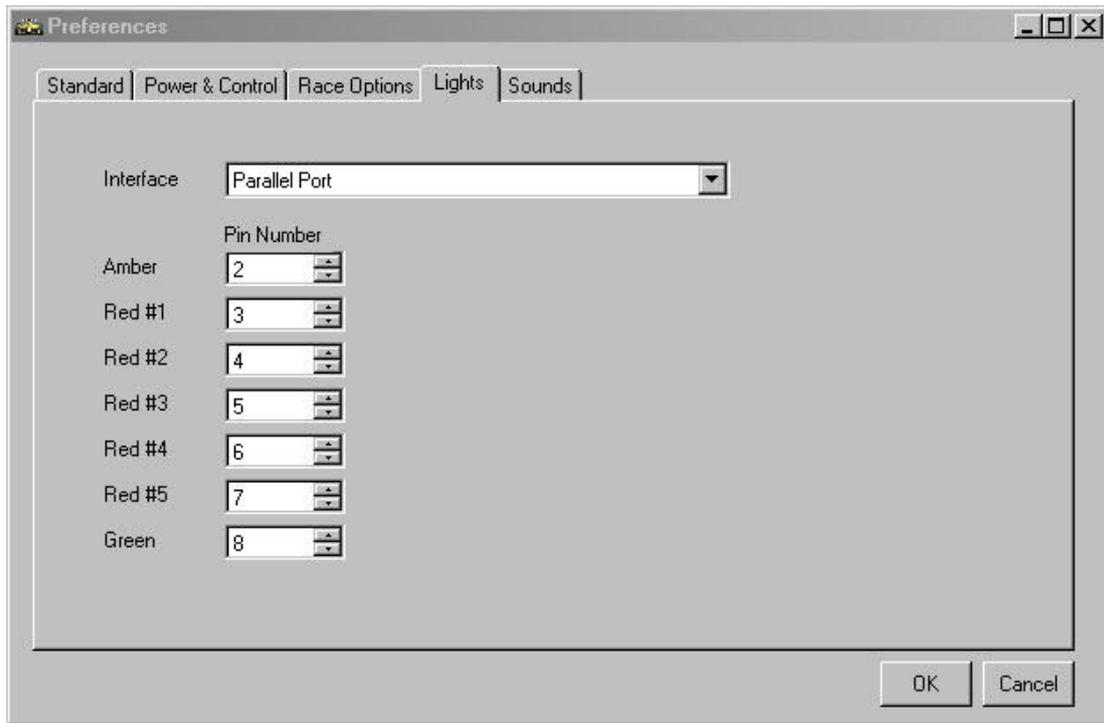
## Race Options



The race screen is again only applicable to PB-Pro users. This screen allows you to define the rules to be used when a race is run. They include:

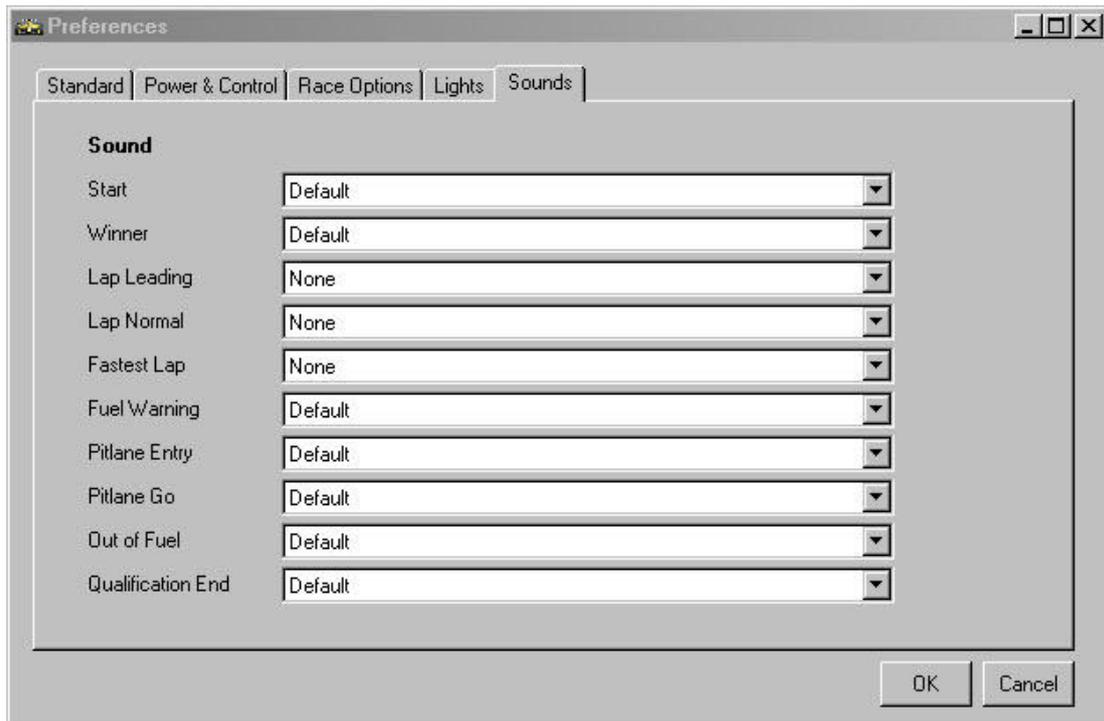
- False start: should the powerbase stop a race if a false start occurs?
- Start power: is the power cut at the start of a race or not? This can help with false starts.
- End power: what happens to the power for each car as they cross the finish line? The power will be cut for all cars at the race end.
- Race end: in a lap limited race, what happens when the winner crosses the finish line? Do the tail enders need to complete all laps or just their current lap?
- Track call: when a track call occurs, are all cars stopped or just slowed? This only applies to powerbase or controller initiated track calls. Automatically generated track calls only slow the leading car.

## Lights



This screen allows you to define any light interfaces that you may have. During the race, SSDC runs a light display (which can be shown by selecting the “View, Lights” menu item). The status of these software lights can be relayed to physical hardware lights through a number of interfaces. The most common is a PC’s parallel port (sometimes used for printers). The screen allows you to define which pin numbers correspond to which lights, so that SSDC knows how to interact with the hardware lights.

## Sounds



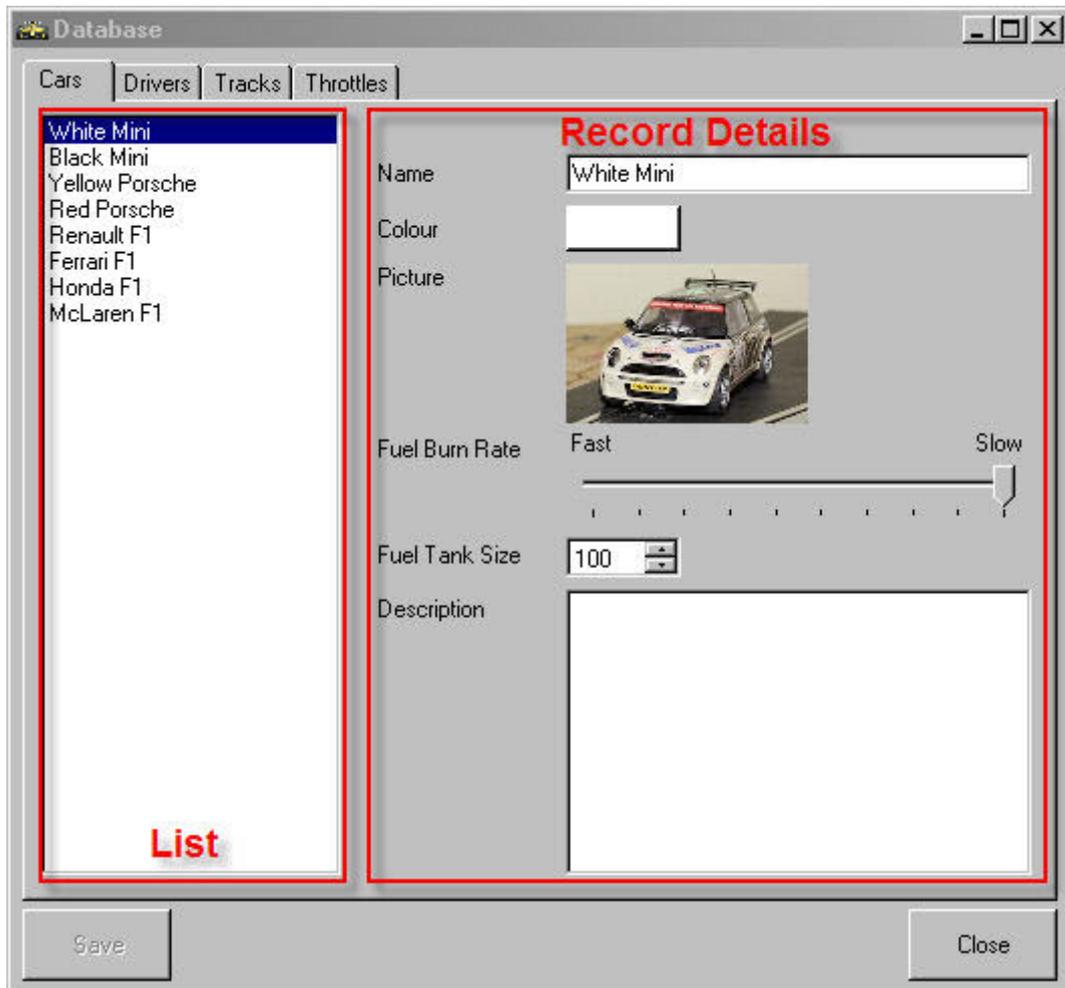
The sounds screen can be used to define which sounds you would like to play when particular events occur during the race or qualification period. For each option, you can choose the default sound, disable the sound by selecting “None”, or locate your own sound file (.mp3 or .wav files are both supported) by selecting the custom option. The events are:

- Start: the sound at the start can either be enabled or disabled. You cannot use a custom sound for this due to the fact that it is specifically linked to the timing of the start sequence
- Winner: the sound that is played when the winner crosses the finish line in a race
- Lap Leading: the sound that is played when the leader of a race crosses the start/finish line
- Lap Normal: the sound that is played when any other car crosses the start/finish line
- Fastest Lap: the sound that is played when a new fastest lap is set in the qualification period
- Fuel Warning: the sound that is played when the fuel level for a car goes below 25%
- Pitlane Entry: the sound that is played when a car enters the pit lane
- Pitlane Go: the sound that is played when a car’s fuel tank reaches 100% full during refuelling
- Out of Fuel: the sound that is played when a car runs out of fuel and exits the race
- Qualification End: the sound that is played when the qualification period expires

It is worth noting that some of these sounds are more important than others, and there are rules in SSDC to ensure that the high priority sounds are played and not interrupted by other less important sounds.

## Defining cars, drivers tracks and throttles

Having set up your preferences the next step is create records for the cars, drivers, tracks and throttles that you might use during your racing. You can do this by using the “File, Database...” menu item. If this menu item isn’t enabled, then it means that there was a problem opening the database. Please refer to the earlier section the describes how to download a starter database, and then locate the database file in your preferences settings.



Each of the tabs of the database screen work in the same way. There is a list on the left hand side, and the record details on the right hand side for the selected item in the list.

If you click in the list with the right mouse button, a popup menu will appear that allows you to create a new empty record, delete the currently selected record or duplicate the currently selected record.

### Car Details

Name: A description of the car that will be used to identify it in the race settings screen

Colour: The colour that the times and other information will be displayed in on the leader board when this car is racing

Picture: A picture of the car that will be displayed on the leader board when this car is racing, and when the preference settings are for pictures rather than driver names

**Fuel Burn Rate:** A slider scale that goes from slow to fast, and determines how quickly the car burns fuel.

**Fuel Tank Size:** The size of the fuel tank on this car, which will determine how long it can run for. In conjunction with the refuel rate, it also determines how long it takes to refuel.

**Description:** A free text field that describes the car. Useful for keeping note of the various settings that you may have tried.

### Tips for fuel levelling

The fuel usage is directly linked to the throttle usage. The more the throttle is squeezed, the more fuel gets used. For some cars, more throttle is needed to achieve the same speed. This is where the fuel burn rate comes in. The best way to "level" the fuel usage for two cars is to set the fuel burn rate to a "slow" value. Then run the cars in qualification mode for approximately 10 laps and look at the fuel usage results graph. If the cars are not using the same amount of fuel, increase the fuel burn rate for the car that uses the least fuel and go through the process again.

For the more technical among you, the fuel usage is calculated every 1/10th of a second for each car. So for a 10 second lap, that equates to 100 measurements. Full throttle produces a value of 63. Therefore full throttle for 10 seconds = 6300. The fuel burn rate is a value of 500 (fastest) to 5000 (slowest) in increments of 500 and the amount of fuel used at any 1/10th of a second period equals the throttle position divided by the burn rate. That means that with the slowest burn rate (i.e. 5000), a car on full throttle for 10 seconds will use 1.26 litres of fuel. This should help you calculate the best burn rate for your cars.

Once you have levelled the burn rates, use the tank size to determine how far the cars can run before they run out of fuel.

### **Driver Details**

**Name:** A description of the driver that will be used to identify them in the race settings screen, and also displayed on the leader board when this driver is racing. Again this depends on the preference settings

### **Track Details**

**Name:** A description on the track that will be used to identify the track in the race settings screen.

### **Defining Throttles**

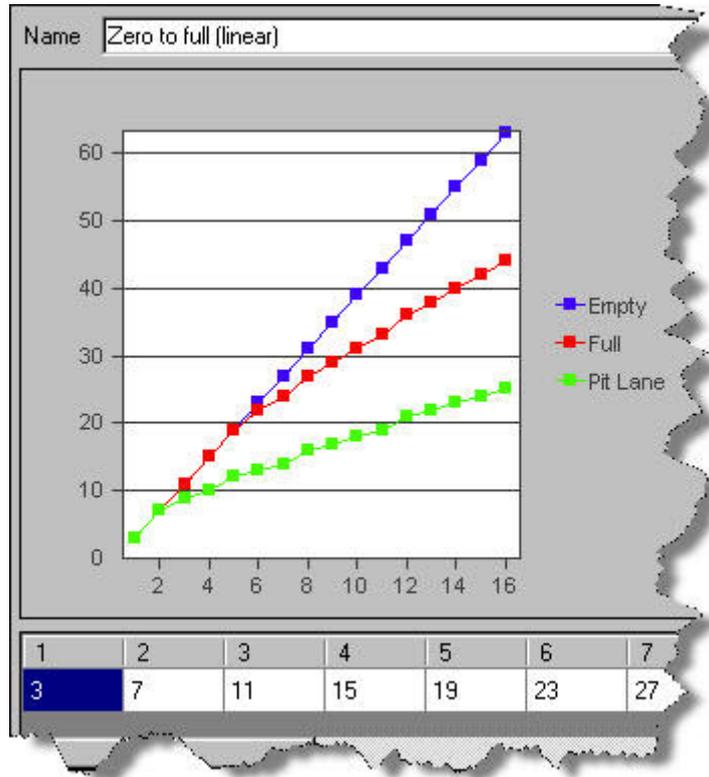
Throttles (or throttle maps) are used to define the behaviour of a car's controller. With the introduction of the PB-Pro, these are now user definable, and can help make a car more responsive and controllable. It may take some time to establish the right throttle map for you, and it is likely that you may need different throttle maps for different cars.

With this screen, you can define and adjust throttle maps as necessary, and experiment with all sorts of settings.

The details that you need to provide are the throttle map name (used to identify the throttle map in the race settings screen) and the throttle map values.

There are 16 positions in a throttle map, which correspond to the controller trigger being slightly all the way to fully depressed. Bear in mind that some of the older Scalextric throttles

did not reach the fully depressed value of 63 (Hex 3F). These throttles stopped at 48 (Hex 30), which equates to throttle position 12.



In the grid at the bottom of the throttle screen, you can define the decimal values (0= stopped through to 63=full throttle) for each of the throttle positions.

S curves appear to be the most popular, with a quick acceleration from zero to a steady low speed, flattening off to provide a sensitive and controllable middle section, and rapidly climbing to reach full throttle at the top end for the long straights.

Bear in mind that if you have an older Scalextric throttle, and you want the ability to reach full throttle, you will need a flat section in the graph from position 12 onwards with the maximum value of 63.

You can use the throttles screen (described later in this document) to test the behaviour of the throttle once it has been loaded.

The chart shows the main curve in blue, and if you have selected throttle based fuel load simulation, it will also show a red curve indicating how the car will perform when full, and a green curve for when the car is in the pit lane.

## Setting up a race

Having setup your preferences and defined your cars, drivers, tracks and throttles, it is now time to race. To define your race you first need to connect to your powerbase. Use the “File, Connection, Connect” menu item to establish the connection to your start/finish powerbase, and your pit lane sensor (if you have one). Once the connection is established, the “Race” menu will be enabled. Select the “Race, Race Settings...” menu item, and the following window will appear.

	Driver	Car	Throttle	Start Fuel (%)	Pace Car
Lane 1	Pace1	Yellow Porsche	Zero to full (linear)	100	<input type="checkbox"/>
Lane 2	Dad	Red Porsche	Zero to full (linear)	100	<input type="checkbox"/>
Lane 3				100	<input type="checkbox"/>
Lane 4				100	<input type="checkbox"/>
Lane 5				100	<input type="checkbox"/>
Lane 6				100	<input type="checkbox"/>

Use this screen to define the settings for:

**Track** - Which track you are running on - this is used to save pace car settings (described later) and results.

**Qualification duration** - in minutes. During qualification, a countdown timer will appear in the top right of the screen. The qualification period will end when this timer expires.

**Race type** - you can have either lap limited (grand prix style) or time limited (endurance style) racing, and for each type, you should specify either the number of laps or the race duration

### Lanes

Use the drop down lists to specify:

**Car/Driver/Throttle** - In each lane (which corresponds to a digital ID from 1 to 6), which combination of car, driver and throttle (from the ones that you have defined) do you want to use. *NOTE: if you are using throttle based power, make sure that you select a throttle for each car otherwise the power adjustments throughout the race won't vary the car speed.*

**Starting Fuel** - What starting fuel level to you want to have at the beginning of the race. This will allow you to start fast and perhaps have an early pit stop

**Pace Car** - The pace car setting is used to indicate that this car is a pace car, and the pace car settings window will appear that allows you to define the pace car settings for the specified car on the specified track. These features are described more in a later section of the manual.

When you are finished, click on the OK button. For PB-Pro users, the race settings will automatically be sent to the start/finish powerbase. You are now ready to race.

## Starting and running a race

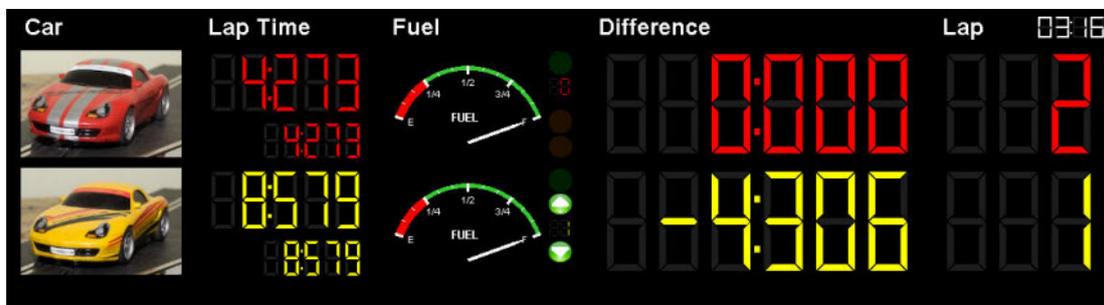
Once your race is defined, you can start racing.

### Qualification Period

If you want to, you can run a qualification period. This period starts automatically as soon as you close the race settings screen. It can be restarted at any stage by selecting the “Race, Reset Qualification” menu item, by pressing the F1 shortcut key, or by clicking with the mouse on the countdown timer in the top right hand side of the leader board screen.

During the qualification period, cars will start with their starting fuel levels, and are free to put in laps, pit stop and refuel, or stop altogether. The whole purpose of the qualification period is to get the fastest lap, and the leader board will be displayed in order of fastest lap.

Here is an example.



From the left, the columns show:

- The driver name of car picture
- The most recent lap time (larger at the top) with the fastest lap time (smaller at the bottom)
- The current fuel level
- LEDES and counters that vary for driven or pace cars. For driven cars, there is a pit lane indicator at the top that is illuminated while the car is in the pit lane; a counter that shows the number of pit stops for this car; and two penalty lights that show when up to 2 penalties have been incurred. For pace cars, there is a pit lane indicator as before; a manual speed up button which can be clicked on to speed the pace car up; a speed variance indicator used to show how much faster the pace car is going than the settings that were defined; and a speed down button that can be clicked on to slow the pace car down.
- The race difference which shows how many seconds your car is behind the car in front of you. During qualification, this shows the difference between fastest laps, and during racing, this shows the race difference
- The current lap count

In the top right hand corner of the screen, a countdown timer is displayed. This shows how much time remains for both the qualification period and endurance race.

## **Refuelling**

During the race or qualification period you may need to refuel. This can be accomplished by driving into your pit lane (or stopping on the track if you don't have a pit lane), releasing the trigger on your controller so that you are at zero throttle, and pressing and holding the lane change button. Refuelling will start 0.5 seconds after you have stopped and started pressing the lane change, and will continue until you either start moving off, or release the lane change button. When the fuel tank is full, you will hear the sound "Go, Go, Go..." and you can continue.

Obviously, there is no need to completely fill the tank. By moving off sooner, you will have a shorter pit stop, and your car will perform better because it is lighter. Only take on the fuel that you need.

## **Racing**

You can start a race at any stage from the powerbase, by pressing the "Start" button. Alternatively, for PB-Pro users, you can start a race by using the "Race, Start" menu item of by pressing the F2 shortcut key.

The start lights will appear automatically, and the countdown sequence will begin. There are 5 red lights, followed by a random period, and then the green lights will illuminate. Then you can start. The green lights will remain on for the duration of the race, unless there is a track call. At the end of the race, the 5 red lights will illuminate for a 10 second period, and then go out.

During the race, the leader board will be continually updated to reflect the current situation. At the end of the race, the results screen will be displayed to show you lap times, fuel usage and race difference. These results are also saved into your database for future historical analysis.

When the race has completed, you need to press the "Reset" button on the powerbase to return to qualification mode and start a new qualification period.

## **Track Calls**

During a race, if a car de-slots, a track call can be initiated either automatically by SSDC (by recognising zero throttle positions for racing cars) or by a track call being started by a driver or a track marshal via the controllers or powerbase buttons.

If your car de-slots, the easiest and fastest way to start a track call is to release your controller. SSDC will do the rest for you.

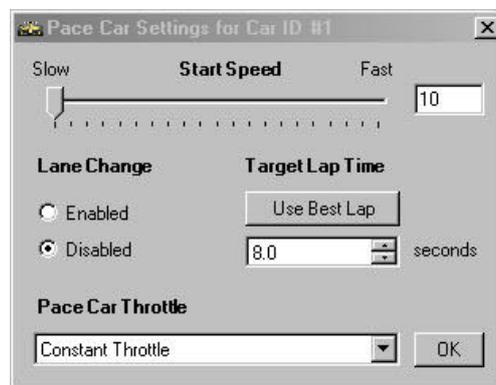
During a track call, there must be no overtaking of cars that are on the track. If a car de-slots, then overtaking the de-slotted car is allowed. You are also allowed to overtake cars that enter the pits, but once they are back on the track, they should not be overtaken. On any other occasion, overtaking will be penalised, and a penalty light will be illuminated automatically.

At present, penalties do not affect the outcome of the race. If you want to adjust race results, you must do that manually using your own rules.

## Constant throttle pace cars

Now that you understand how to setup and run a race with drivers, lets expand a little and include the concept of pace cars. Pace cars are a feature of the PB-Pro, and allow you to configure a car with an ID, and essentially let it drive itself. You have to ensure that there isn't a controller plugged into the powerbase socket for that ID though, otherwise the PB-Pro will assume that there will be a real person driving the car at some stage.

The easiest type of pace car to setup is a constant throttle car. These are simple because they drive an entire lap at a single throttle position, and any adjustments in that throttle position only ever occur at a crossing of the start/finish line. Setting up a constant throttle pace car is very simple. From the "Race Settings" screen, described earlier, click on the "Pace Car" check box. The "Pace Car Settings" screen will appear.



### Start Speed

In this screen, you can adjust the throttle position for this car (the "start speed") using the slider or the text box at the right hand end of the slider. The minimum is 10 and the maximum is 50. This corresponds directly to the car's throttle position. If the car is on the track, its speed will be adjusted in real-time as the slider is moved. This will allow you to determine what speed is best.

### Lane Change

You can also enabled or disable lane changes by the pace car. If lane changes are enabled, the pace car will change lanes at random as it travels around the track

### Target Lap Time

Let the pace car complete a few laps at your selected throttle position, and then press the "Use Best Lap" button. This will set the target lap time to the best lap that the car completed during the testing. Alternatively, if you have a target lap time in mind, simply type it into the box provided. During the race, or qualification period, the pace car speed will be adjusted up and down in order to try and achieve the target time. You can manually adjust the speed up or down by using the pace car buttons on the leader board. *NOTE: if the target time is very different from the time that the car can achieve at the starting speed, its ability to stay on the track might be significantly reduced!*

Once you have defined the settings, place the car on the track, and ensure that its controller is disconnected from the powerbase. The pace car will start in a race as the lights turn green, and will run during qualification as soon as another (driven) car has started recording laps.

## Variable throttle pace cars

Variable throttle pace cars, although being harder to setup, do allow you run your pace cars faster. The reason is that they are able to vary their throttle position during their lap, and as a result slow down for the corners and speed up for the straights.

### Recording a variable throttle pace car

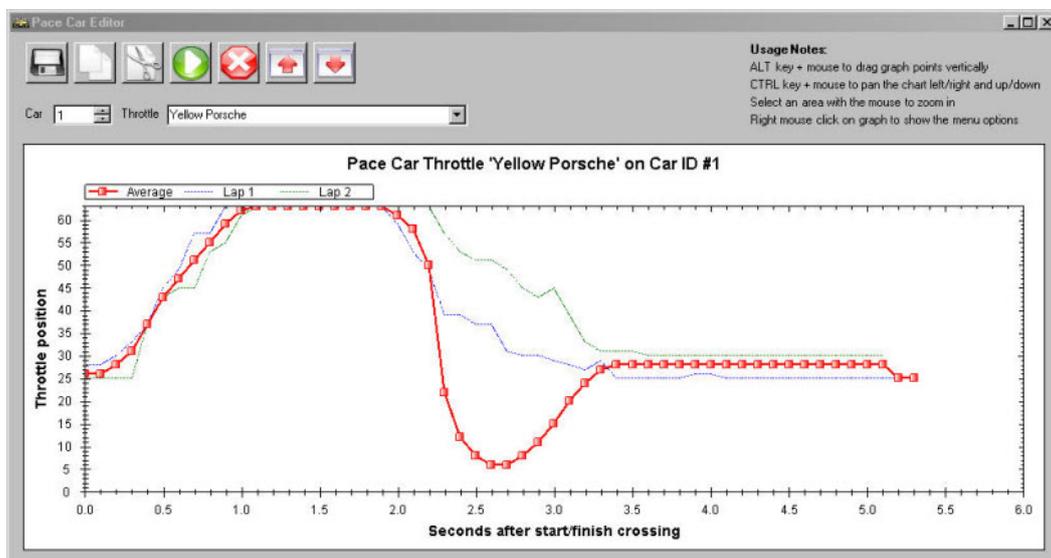
A variable throttle pace car is constructed by first recording an actual car. For best results, get the track to yourself, and have a few practice laps. Make sure that the car that you are recording is the one (or similar to) that you will use as the pace car. When you are ready to start recording, select the “File, Record car...” menu item. The recording window will appear.



Enter a description (that you will use to identify this variable throttle pace car later) in the box, and select the ID of the car that you wish to record. Place your car forward of the start/finish line and press the record button (highlighted in red). It is best to record the car doing a “flying lap”, or in other words crossing the start/finish line at speed, as this is the way that it will normally be replayed.

The status of the recording will be displayed in the window in the bottom left hand corner. As you drive around the track, your throttle positions will be recorded every 1/10th of a second and saved in the database. When you have completed two laps, SSDC will take the average throttle position and the average lap time and create a 3rd throttle trace which can then be manipulated using the pace car editor. The editor screen will be opened for you automatically at the end of the recording.

### Editing a variable throttle pace car



The pace car editor allows you to view, edit, replay, save and delete pace car recordings. Bear in mind that a recording is made up of three traces. The first two are the original recorded laps, which cannot be changed. The third is the average of these two. The average takes the duration of the longest recording, and the average throttle position of the two recordings.

When the editor is opened, make sure that you select the correct ID for your pace car, and load the correct recording. You can then start to manipulate the recording. The buttons along the top of the editor (from left to right) allow you to:

- Save the recording - you can change the name of the recording by typing over the value in the “Throttle” list
- Duplicate the recording - SSDC will create an identical copy of the variable throttle that you are currently editing
- Delete the recording - a confirmation window will popup to make sure that you meant to do this
- Play the recording - make sure that your car has the right ID and is on the track with the controller disconnected
- Stop the recording
- Shift the graph up - SSDC will move the entire graph up by 1 throttle position (useful if your track is getting dirty)
- Shift the graph down - SSDC will move the entire graph up by 1 throttle position (useful if you just cleaned your track)

You can edit each individual point on the graph by holding down the “Alt” key on your keyboard and clicking and dragging the point on the red curve. You can only move the point up or down. If you have a long recording, you can zoom in by selecting an area of the curve with the mouse. Panning around in the graph is achieved by holding down the “CTRL” key on your keyboard and clicking and dragging with the mouse. Finally, you can zoom out by right-clicking on the graph with the mouse, and selecting the “Undo all zoom/pan” from the menu that appears.

*NOTE: During replay, SSDC only sends changes in throttle position to the powerbase. It is therefore more efficient to have periods of constant throttle than changes in throttle position every 1/10th of a second. Also, if you change the throttle values significantly, then it means that your pace car will arrive at the corners earlier or later, and the curve will effectively need to shift left or right. You will have to experiment with this manually.*

### **Racing with a variable throttle pace car**

In essence, setting up a variable throttle pace car is very similar to a constant throttle one. The start speed is used to get the car going, until it crosses the start/finish line, at which point the variable throttle replay is started. As a result, a high start speed is useful, as it gets the car moving and effectively creates the flying lap conditions at the start/finish that the variable throttle is expecting. You will need to experiment with this.

During the race, or qualification, SSDC will try and achieve the target lap time that you set by shifting the variable throttle curve up and down (like the shift buttons in the pace car editor). Bear in mind that the target lap time should be close to the recorded lap time, otherwise the cars behaviour may be a little unpredictable.

Finally, if a car takes longer than expected to complete a lap, the replay engine will continue with the last throttle value until the car crosses the start/finish line, at which point, the replay starts again.

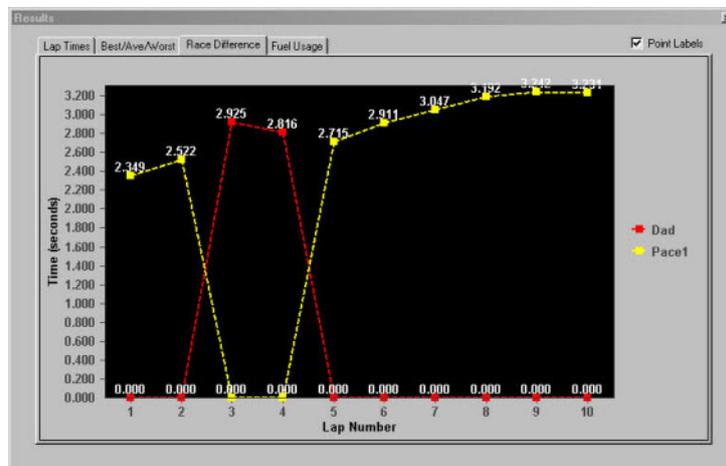
## Lights, throttles and results

There are three windows that you can open and position on the display whilst racing. They are the lights, throttles and results windows.



The lights window shows the status of the race lights at any stage in the race. They are only illuminated during races. During the start sequence, the window is maximised automatically, but then restored to its original location if you had it open. During the start, the five reds light from left to right, and then the green lights come on during the race. If a track call occurs, the amber lights will start to flash. At the end of the race, the 5 reds come on for a period of 10 seconds, and then go out.

The throttles window shows the status of the throttles for each car (including pace cars). The gauge shows a scale from 0 to 9, which corresponds to the throttle positions 0 to 63. The two LEDs show the state of the brake button (red) and lane change button (yellow). The throttles are also ordered from left to right. So in the case above, it is the throttle for Car ID#2 that is active with both the brake and lane change buttons depressed. *NOTE: do not leave the throttles window open unnecessarily. The constant updating of the controls will use up a significant amount of CPU power, and may impact any racing that you do.*



The results window is automatically opened at the end of a race, but can be opened and left open during a race or qualification period. It shows 4 graphs:

- Lap times for each car for each lap
- Best/Average/Worst lap times for each car
- The race difference between the leader and each car at the end of each lap
- Fuel usage for each car for each lap

You can display the actual values on the chart by clicking on the “Point Labels” box in the top right hand corner of the results window.

## Troubleshooting

In the event that you experience problems with this software, there are a number of places that you can turn.

Email [ssdc@jackaments.com](mailto:ssdc@jackaments.com). I will do my best to help, but please bear in mind that this is a hobby of mine too, and I am not “on call” to provide everyone with support.

Use the Scalextric Sport Digital forum at <http://www.slotforum.com/forums/index.php?showforum=63>. There is a thread there (<http://www.slotforum.com/forums/index.php?showtopic=23108>), rather long, that has a huge amount of information relating to how people are using this software in conjunction with the PB-Pro system.

When sending requests for help, it is always useful to attach a trace of the communication between SSDC and the powerbase. This can almost always provide the reason for the problems that you are experiencing. You can take a trace very simply by using the “File, Trace connection...” menu option. You will be asked to specify the location of the trace file to create. Once the trace is running (indicated by a check mark against the menu option) try and repeat the problem that you experienced. When complete, close the trace file by selecting the “File, Trace connection...” menu option again. The menu item check mark will disappear. Attach the text file that you just created to any email that you send. It is always helpful.