Formula 3 Driver's Handbook

DRIVING IS BELIEVING

Produced by Pilot Productions Limited

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Note that British Broadcasting Corporation has been abbreviated to BBC in this publication

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Second Edition

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Loading Instructions

Loading from cassette

If you have an Econet or Disc Filing System fitted, type the following:
*TAPE
and press the RETURN key.
If you have an Econet, type the following:
?&224=&A6
and press the RETURN key.

To race at Silverstone rewind side one of the cassette. Now type CHAIN "" and press the RETURN key. Press PLAY on your cassette recorder and wait for the program to load.

If you have loading problems:
Try adjusting the volume on your cassette recorder, If it has tone controls, they should be set to output the maximum treble. In the unlikely event of the cassette failing to load, return the cassette to us and we will immediately send a replacement.

The tracks on side two of the cassette are supplied in the following order:

Brands Hatch	CHAIN "BRANDS"
Donington Park	CHAIN "DONINGTON"
Oulton Park	CHAIN "OULTON"
Snetterton	CHAIN "SNETTERTON"

If you are loading the *4 Tracks* for the first time you are recommended to follow the loading instructions below. However, to speed up loading time you may fast forward the cassette to the approximate starting position of the particular track and CHAIN the relevant file as shown above.

1. To load and run the program place side two of the cassette (fully rewound) in the cassette recorder, type

   CHAIN "4TRACKS"

   and press RETURN. The S e a r c h i n g message should appear on the screen as you do this. Now press the PLAY button on the cassette recorder. The menu will take about one minute to load.

Loading from cassette (continued)

2. You will be presented with the following menu choice:
   1 BRANDS HATCH
   2 DONINGTON PARK
   3 OULTON PARK
   4 SNETTERTON
   (If your cassette recorder has no motor control, press STOP at this point.)
   Now select your track by typing the appropriate number and then press the Space Bar as prompted. (Restart cassette recorder if necessary.) The program will now search for the chosen track choice and the Revs banner will be displayed when loading has started.
3. Once the track has loaded you will be prompted to insert the *Revs* cassette. At this point turn over the cassette, rewind, and press the Space Bar.
4. When the S e a r c h i n g message appears you should press PLAY on the cassette recorder. Loading of the remainder of the game will begin after about 2 minutes. The main program will take a further 4 minutes to load.
   Note 1: until the file Revs2 on the *Revs* cassette starts loading, **please ignore the** r e w i n d t a p e **message.**
   Note 2: we recommend that, before starting the loading procedure, you fast forward the *Revs* cassette to the middle of the file named Revs1; this will reduce some of the subsequent loading time.

Loading from disc (5¼ ")

N.B. If you are using a 40 track disc drive insert the disc with side one facing upwards. 80 track disc drive users should insert the disc with side two facing upwards.

If you have an Econet, type the following:
?&224 = &A6
and press the RETURN key.

Press SHIFT-BREAK and wait for the program to load.

When loading is complete you will be presented with a menu, select a track by typing the appropriate number and wait for this to be loaded.

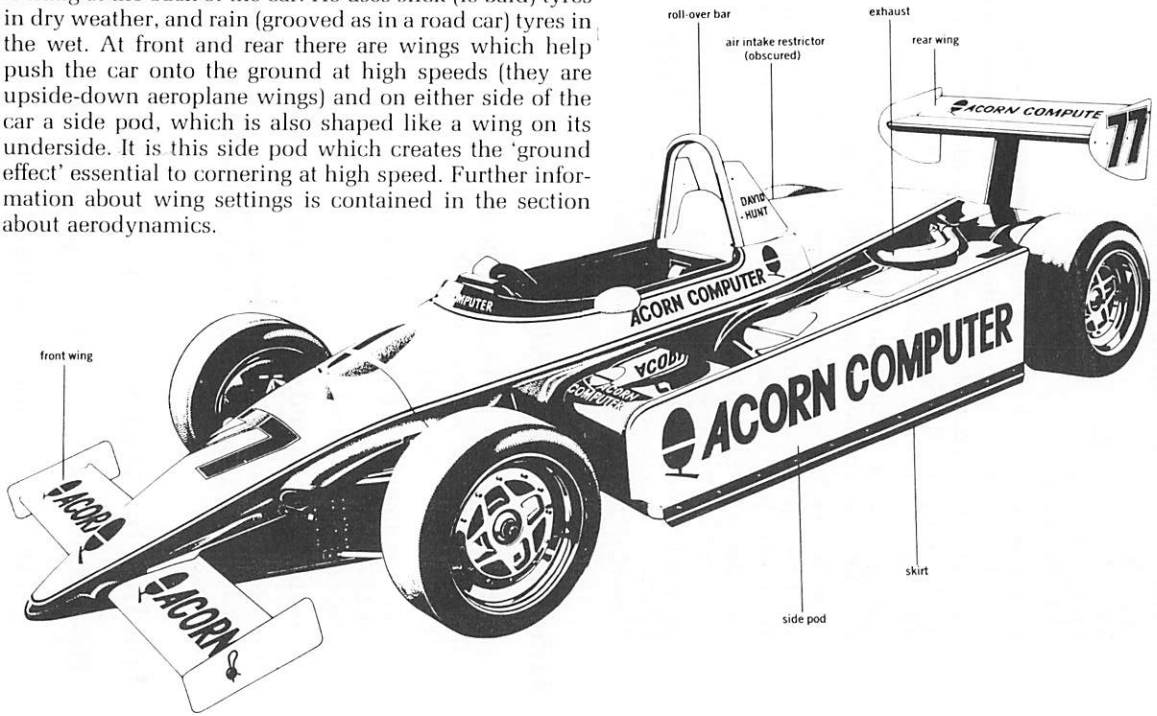
Loading from disc (3½ ")

Press SHIFT-BREAK and wait for the program to load.

When loading is complete you will be presented with a menu, select a track by typing the appropriate number and wait for this to be loaded.

The Ralt RT3 Toyota Novamotor

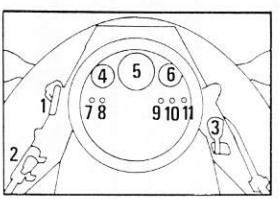
A Formula 3 car is a single-seat racing car powered by a 2 litre, normally aspirated (ie no turbo-chargers) production-based engine, limited to producing only about 160 brake horse power via an inlet restrictor. The driver sits in front of the fuel tank and engine, from which the gearbox is hung at the back of the car. He uses slick (ie bald) tyres in dry weather, and rain (grooved as in a road car) tyres in the wet. At front and rear there are wings which help push the car onto the ground at high speeds (they are upside-down aeroplane wings) and on either side of the car a side pod, which is also shaped like a wing on its underside. It is this side pod which creates the 'ground effect' essential to cornering at high speed. Further information about wing settings is contained in the section about aerodynamics.

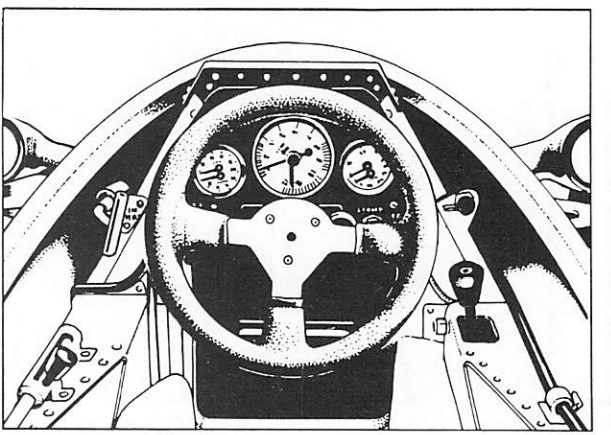


The Controls

'The pedals (as in a road car – clutch, brake and accelerator), steering wheel and gear lever (both shrunken versions of their road car relatives) are all in the ideal position for me,' says David Hunt. 'I have 5 forward gears and 1 reverse at my disposal.

1 cockpit adjustable anti-roll bar (front)
2 cockpit adjustable anti-roll bar (rear)
3 gear lever
4 fuel pressure/water temperature
5 rev counter
6 oil pressure/oil temperature
7 starter button
8 fuel pump
9 fire extinguisher
10 rear light
11 ignition



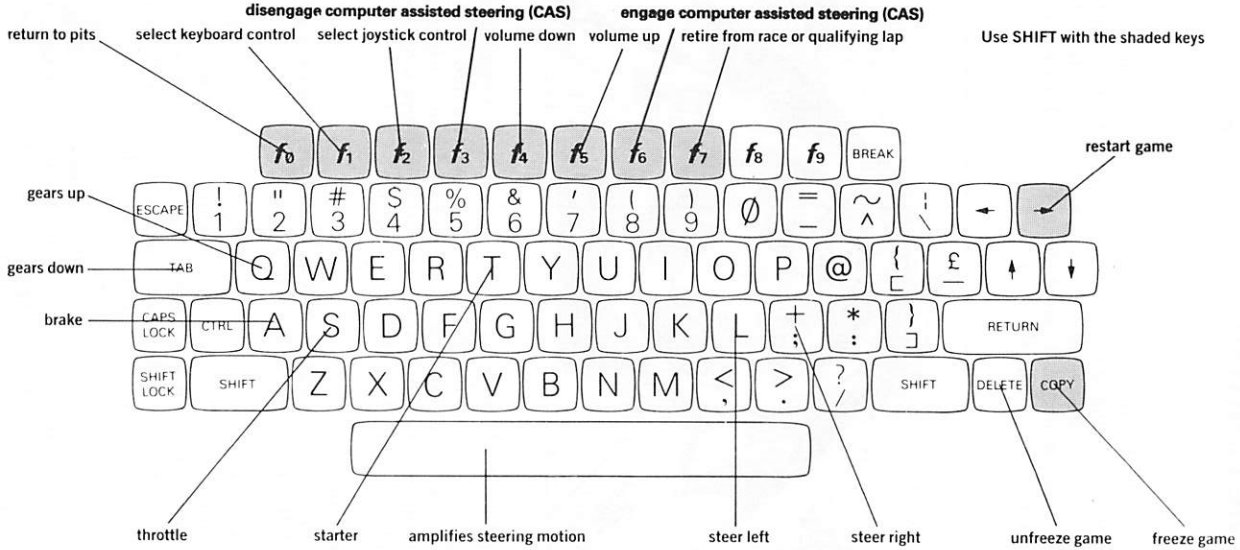


'Information about the real business going on behind me is relayed via 5 gauges, which are labelled in the illustration. But in a race most of my attention is focused on the rev counter and wing mirrors so these have been faithfully reproduced in the simulation.

Driving
You can drive your Ralt RT3 using either computer keys (SHIFT/f1) or a joystick (SHIFT/f2).

Steering
Steering using the joystick is outlined in the accompanying diagram. Key control is achieved by pressing L or + which cause the steering wheel to rotate left or right respectively. Holding both the keys down at the same time stops the rotation, thus maintaining the current lock. Releasing both keys is like letting go of the steering wheel, and the steering will self-centre according to the speed of the car. Use the Space Bar to amplify the effect of keys L/+ or joystick left/right.

Specification Update Sheet (Dec. 86)



This feature is designed to improve control of the car when using keys or a digital joystick.

It is switched on by SHIFT+f6

It is switched off by SHIFT+f3

A symbol appears on the rev counter when CAS is on.

CAS does not alter the characteristics of the simulator, but is merely a 'hand' on the steering wheel. So it's still up to you to get your speed and position correct as you approach each bend.

CAS provides steering demands to the simulator in response to your key or joystick movements and fills in the detail that you cannot provide very easily except with an analogue joystick. It does this by taking into account the severeity of oncoming bends and the position of the car relative to the side of the track and basically tries to get round the bend without coming off the track.

If no steering keys are pressed or the joystick is in the central position the steering will return to the centre.

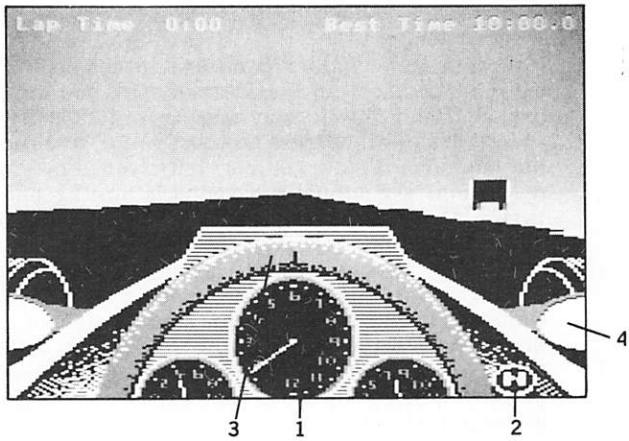
If the car spins and is pointing backwards relative to the track then CAS will disengage until the car is pointing in the right direction.

Example: Right Hand Bend.

Get the car on the left hand side of the road as you approach the bend. When you want to turn, press the right hand key or move the joystick right and HOLD that position until the bend is complete. Then release the key or centralise the joystick and the car will continue straight.

If you crash then you are probably going too fast!

Note: Analogue joysticks steer as digital sticks when CAS is on.



1. rev counter
2. gear indicator
3. steering position indicator
4. wing mirrors

Throttle and brake
Throttle is applied by depressing S on the keyboard or pushing forward on the joystick.

Brakes are applied by depressing A on the keyboard or pulling back on the joystick.

Gears and clutch
In your Ralt RT3, the Q key is used to change up a gear and the TAB key to change down. Holding down Q/TAB effectively draws in the clutch. If a gear is selected, then releasing Q/TAB will cause power to be transmitted to the drive wheels, provided of course that you have supplied some throttle. If the car is moving slowly or is stationary then the simulator will slip the clutch for you such that the revs are held constant until a certain speed has been achieved. It is therefore important when doing a racing start that you obtain optimum revs when Q/TAB is released (see The Start). The fire button on the joystick has a similar effect to Q/TAB, and the position of the joystick determines whether a higher or a lower gear is selected.

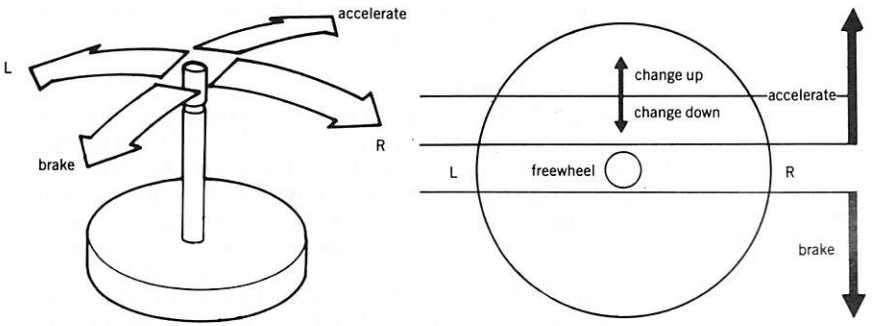
Starting the engine
Before putting your drive skill to the test you must of course start the engine. Press T when the car is in neutral or the clutch is drawn in (Q/TAB or fire button depressed) until the engine starts.

Wing settings
It is suggested that, to get going, you adopt wing settings of 40 rear and 32 front. To make full use of the wing settings to achieve the fastest lap times, read the chapter on The Aerodynamics of the Car.

Rev counter
How does a rev counter differ from a speedometer? Silly question, perhaps, but an important one if you are going to understand how to win races in your Ralt RT3. A speedometer will tell you how fast you're going across the ground. A rev counter tells you how many revolutions per minute the engine is turning, and the engine is most powerful when it is turning between 5000 and 5800 revolutions per minute. It follows that the gears should be changed so that the engine is constantly turning within this rev band. To avoid frustration the simulated engine has been made more tolerant of abuse than a real engine. It will run perfectly well at 2000, 3000, or 4000, or at 7000, but will not provide maximum power. So, change up at 5800 and expect the new gear to bite at around 5000.

Summary of Joystick Controls

The fire button effects the gear change.



Joystick controls

Joystick forward	:	accelerate
Joystick back	:	brake
Joystick left	:	steer left
Joystick right	:	steer right
Joystick forward + FIRE	:	change up a gear
Joystick back + FIRE	:	change down a gear

Practice Laps and Qualifying Times

Loading the game presents you with the option to practise as many laps as you like or to go for a timed lap which will determine your position on the grid.

Practice
You will need to practise a great deal in order to master the skills of a Formula 3 driver.

Before you are allowed onto the track you will have to select the angle of wings on front and rear of the car. Novice drivers will require maximum control over their cars as they strive for a workable line at bends; for them, speed along the straights is a secondary consideration to staying on the track. (We all remember the feeling!) It is advised, therefore, that you look for a heavily weighted rear wing and slightly lighter front wing to begin with. Later, as your confidence builds, experiment and see how new settings affect your speed and control. You may return to the pits and readjust your wing settings at any time, provided the car is stationary, by pressing SHIFT/f0.

On commencing practice or qualifying laps, you are some way before the starting flag. Your time does not begin until you have made it past the starting flag, which can be seen on the left of the track.

The practice facility offered to new drivers is a one-driver facility. This is an extremely expensive operation as it limits the whole of a circuit to one car at a time. So, make full use of it.

Don't be too ambitious at first. Crawl around the track in low gear, searching for the ideal lines at corners, getting a feel of what the car is all about. The racing programme features a guided tour around the track, but do not expect to be able to follow it at the outset.

Coming off the track – how to handle it
See how revs are lost when you hang one wheel over the grass verge. Once completely onto the grass, it is like driving on ice. So, remain in high gear, reduce throttle but don't brake, and make only very slight manoeuvres.

If in a slide, try opposite lock, using the Space Bar to amplify its effect.

If in a spin, try using the brake.

Having stalled on the grass, get into 3rd or 4th gear and with the clutch drawn in start the engine. Pulling away in these gears will help to prevent a spin developing on the slippery surface.

When you are consistently within the 1.40 time, press SHIFT/→ and opt for Competition.

Competition
Having elected to enter a competition, you will be offered a choice of three classes of race:

Novice
Amateur
Professional

There are graduation times for Amateur and Professional Classes. You will not be allowed to compete in a particular class unless you show yourself capable of the minimum qualifying time. If you fail to get a qualifying time, you will only be able to enter the Novice Class and you will be at the back of the grid.

Anyone is allowed into the Novice Class. The reason for this is that unlike Professional or Amateur Class races, Novice Class races cater for even the worst pile-ups. There are special emergency crews to take Novice Class cars, which have careered off the track following a mishap, and replace them in position. However, do not expect your car always to have escaped unscathed, and remember that you will never start your car while it's in gear.

You will be asked how long you wish the qualifying period to last. This allows you to ensure that there is sufficient time for you to attain a qualifying time before recall. You can emerge at any time from a qualifying period by pressing SHIFT/f7.

Having decided how long you wish the qualifying period to be, you will be asked to log the name of the driver – your name or any name you care to use (you may like to take on the persona of Jackie Stewart or some other hero from the hall of fame). Press RETURN and you will find

yourself back in the pits to set the car's wings for the qualifying lap(s).

Multi-player racing
Points system

Points	9	6	4	3	2	1
Position	1	2	3	4	5	6

1 point is awarded for the fastest lap time.

It is perfectly possible and the greatest fun to take turns with your friends to make qualifying times, and then all of you can enter a race. The way this works is for each driver to achieve a qualifying time and then one by one to drive in a race. The computer learns each player's skill from the qualifying round and simulates the other players' performance when each player races. The ingenious application of points ensures a fair result. The points system is modified so that a player's actual race accounts for half of the total points that the player can attain.

After a race, three score cards will show you the finishing positions and points, the best lap times and accumulated tournament points. You then have the option of pressing RETURN to see the score cards again or pressing the Space Bar to continue with the tournament.

The Start

Racing involves more consummate skills than qualifying.

Having opted to start a race, the standard or class of race will be confirmed and then you will move to a table of grid positions which has been determined by each driver's lap time.

You will then be left to choose the duration in laps (5, 10, 20) that you would like the race to be, and the name of the driver in the driving seat will be proclaimed.

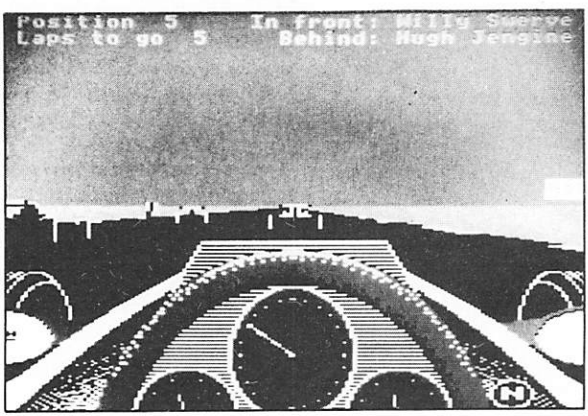
Next it is off to the pits for the wing settings, and thence to the starting grid.

On the grid you will be presented with:

1. your position in the field, which of course changes as you overtake cars or are yourself overtaken

2. the number of laps to go, which will be equal to the number of laps you have preselected

3. information as to which driver is behind you and which driver is in the position immediately in front of yours. If you are at the back of the field, the driver in pole position will be recorded as the driver behind you; if you are in pole position the driver in front of you will be recorded as the driver in 20th position.



Along the top of your screen you will be given important information, which will change as the race proceeds.

Turn your engine over. Do not attempt to move or your engine will stall. Look at the starting lights; as your engine turns over they'll light up blue. Rev the engine to required revs, move into first, holding down the clutch, anticipating that at any moment the indicator will display a green light confirming the start of the race. Let out the clutch (Q or firing button).

Wheel-spin start

In the section of this manual concerned with cornering,

we will discuss the importance of maintaining a balance between grip (tyres to road) and minimum resistance to your car's speed. As any racing driver knows, there is a point (near the 5000 revs mark) at which the tyres will spin momentarily to maximise forward momentum. Letting the clutch out in 1st with your revs at this exact point will get you away as fast as your car can manage. You'll know when you've found the balance by the sound of the tyres screaming across the tarmac.

Says David Hunt, 'I suppose the perfect start is a touch of wheel-spin. In a race I have two choices. Either I must spin the wheels or slip the clutch; it depends entirely on the conditions. (When it's wet you want to have a fair amount of revs on the engine and then let the clutch out slowly as you would in a road car to give the wheels all the help you can to get a grip.) Once or twice a season you get the perfect start, where you get everything right. I did it once last season: I was 12th on the grid and 5th on the first corner. Everything just clicked, and I went forward like a rocket.'

As you jostle for position, use your wing mirrors assiduously; otherwise a car, coming from behind and making for the same space as you, may knock you off the track.

'With the modern Formula 3 cars, most races are won or lost at the start because once you're behind another car it is difficult to run close, and very difficult to overtake.

'The start is also the most dangerous part in the real race. You certainly can't plan a start; you're driving on your instinct; it's back to the jungle. You've got to a. look for the gaps, and b. when you've found the gaps, make sure that no-one's going to fill them or you'll have an accident. You've got to have eyes in the back of your head because everyone behind you is trying to get in front of you. You've got to make sure that you're not leaving huge gaps for other people. Everything happens very quickly, and THEN, as you go round the first corner, there are 20 cars trying to fit onto a piece of tarmac that can hold only 3. You really do have to be sharp there; it's where most accidents happen – wheels touch or you run into someone . . .'

The Cockpit

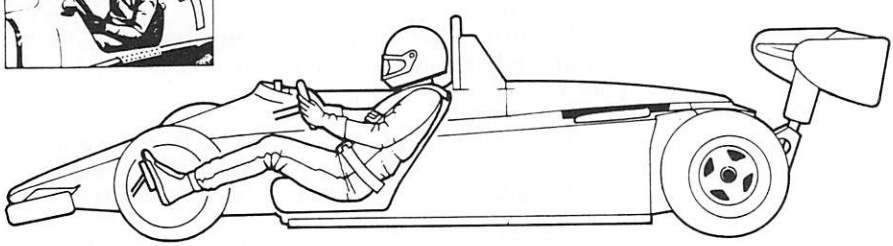
Driving position

As a racing driver you are either excess luggage or a snugly fitting constituent of the car itself; there is no in-between. If you are the former, it is of the utmost importance, both in real and simulated racing, that you convert yourself to the latter at the earliest possible moment.

While car-body unity is very much a mental state, it is facilitated by very basic, physical considerations. In the old days, drivers would be seated upright in their cars, elbows out over the bodywork as they struggled with the then heavy steering, but the cars developed.

'My office,' says David Hunt, 'is a very tight fit.' Today's seating position, more laid back than it used to be, demonstrates the designers' brief to make car and body as much a single entity as possible.

They made the steering lighter, which permitted a smaller steering wheel and therefore a more compact cockpit design. Gradually it became possible to assume more of a deckchair position, axes of body and car coming ever into one; the driver turning with the car rather than turning the car.



'People always say you're lying down in a racing car,' notes David Hunt. 'You're not actually lying down, you're simply more laid back than you are in a road car. You've got your arms nice and bent; you've got your legs bent. You're taken back for aerodynamic efficiency, but the ideal driving position is probably sitting more upright. I did some studies on it from a physical point of view, looking at the whole thing as a chiropractor would. We definitely do not sit in the perfect position, but as soon as you move into the perfect position, you destroy the aerodynamic properties of the car. The driver almost always comes second to the car.

The Aerodynamics of the Car

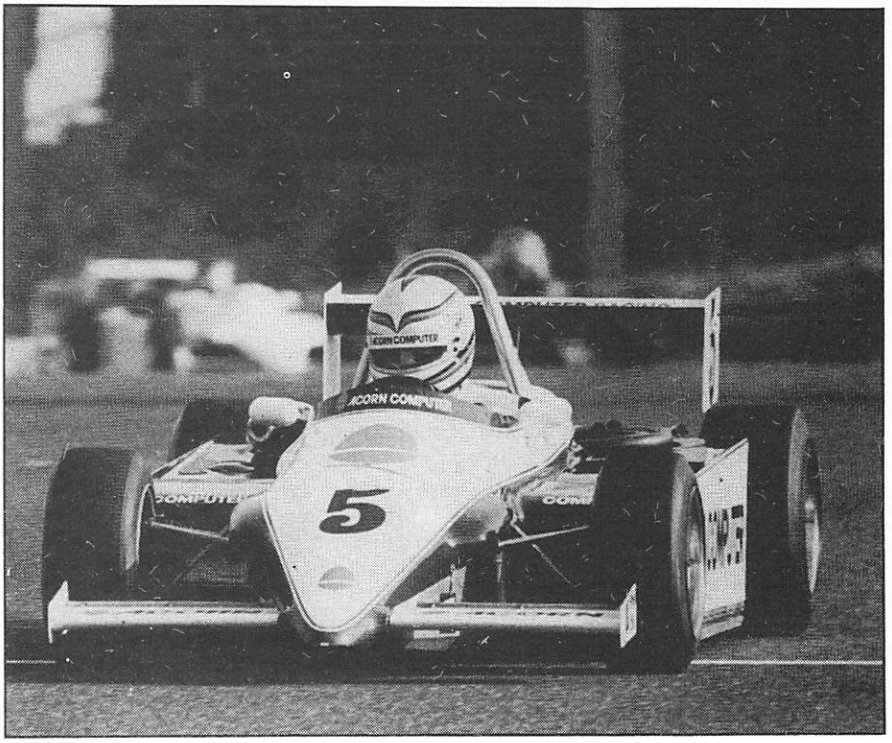
The chief purpose of the RT3's aerodynamic design is not simply to let the air slip by in as unimpeded a fashion as possible, but to increase dramatically the car's grip and road-holding capability.

Wing adjustment

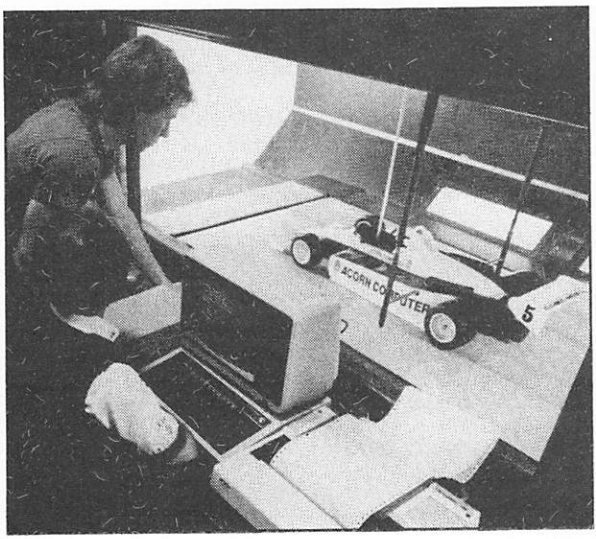
The more downforce required, the greater surface area of wing must be presented to the air; consequently the more speed resistance (or drag) is set up. In other words, the nearer 10° are your wing settings, the less speedy along the straights is your car.

The wings, back and front, and the car's pods, which it carries on its sides, are the vital elements. All are illustrated here. You cannot adjust the side pods, but you can the wings; indeed the wing adjustments will prove critical to your performance on the track.

The wings are similarly shaped to those on an aeroplane, but fixed – as it were – upside down, so as to push the car down on the road and increase grip at high cornering speeds.



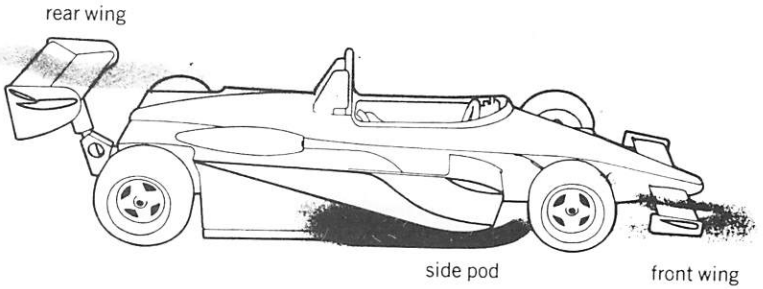
How much downforce, and where precisely it is directed onto your car is the substance of the fine aerodynamical balance which may win or lose you a race. In the simulation, each rear and front wing is adjustable on a scale of 0 to 40, corresponding to 10 degrees of wing movement; a setting of 40 gives you maximum downforce.



David Hunt wind-tunnel testing a third-size model with the help of a BBC Microcomputer.

David Hunt explains the practical importance of making these adjustments: 'A high wing setting will give you good cornering performance due to increased downforce, but bad straight line speed due to increased wind resistance; equally a low wing setting will give you good straight line speed (less wind resistance) but poorer cornering performance (less downforce). A lap of Silverstone is made up of a series of straights and bends and to obtain a fast lap time, the discerning driver must find a compromise between optimum straight line speed and optimum cornering performance when selecting wing settings.

'It is also very important to obtain a good balance between front and rear wing settings to make the car



As the diagrams show, both front and back wings redirect airflow above and below the wing surfaces. The air travelling below the wing has to travel farther, and therefore faster, than the air passing across the upper wing surfaces. This feature causes lower than atmospheric pressure on the lower surfaces because, clearly, there is a less dense concentration of air molecules on the lower surfaces at any one time. The effect creates downwards pressure on the car. This 'downforce', as it is known, is essential for cornering fast; it helps keep your car on the track.

handle correctly. The nature of the modern racing car design dictates that one should run less front wing in relation to the rear wing to achieve this balance. If you run too much front wing in relation to the rear, you will find that the car has a tendency to spin on the corners. If you run too little front wing in relation to the rear you will find that the front of the car will slide away at the corners.

'Different driving styles require slightly different wing settings. As your driving skills improve, you might well find that you require a change in your wing settings to reduce your lap times further.'

Increased downforce aids tyre grip but also increases drag. Experiment with different settings – SHIFT/f0 returns you to the pits at any time so long as your car is stationary.

The aerodynamics of the side pods

The side pods of the RT3 are permanently fixed and not adjustable in the way that wings are.

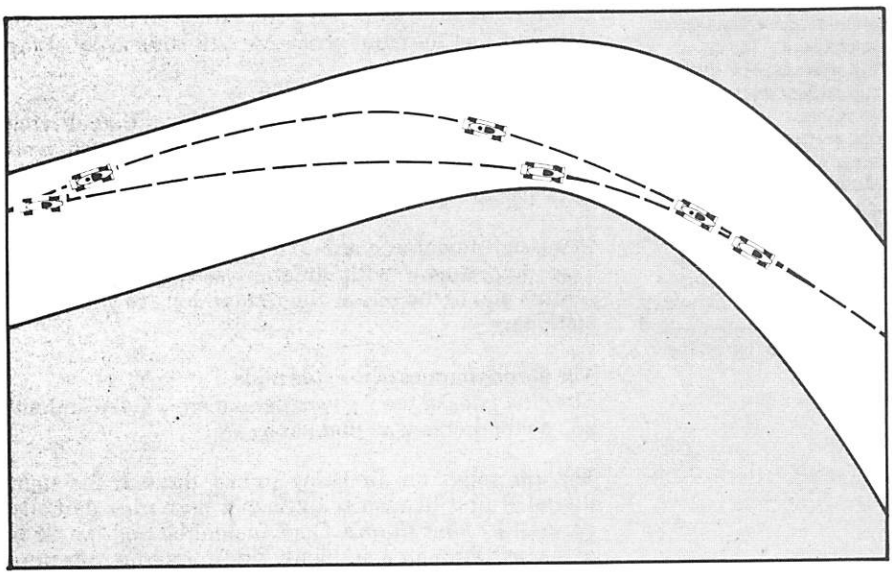
The car relies on air being forced through the tight funnel – a bit like water through a hose pipe partially covered by your thumb. Once inside the pod the air is dispersed through a suddenly wider interior, effecting an artificially low pressure – creating a partial vacuum, if you like – and pushing the car onto the ground.

In an attempt to have the best of both worlds – maximum downforce at tight bends, minimum downforce on straights – Formula 1 drivers once experimented with sliding skirts. 'Unfortunately,' explains David Hunt, 'occasionally a skirt would stick in its groove, stay up, and the driver would go into a corner . . . it would be like an aircraft accident.'

The Art of Overtaking

Overtaking is easiest at the start of a race, where a driver's art will depend to a great extent on his ability to think fast, judge opportunities and act upon them at once. (See The Start)

'You're never actually sitting, cruising behind someone, unless it's early in the race and you've got rid of everyone behind, and you're just so confident that you're going to pass him later on in the race. The point is that while you sit behind him, there's always the chance he may make a mistake and you may collect him. If he has a spin, you'll hit him. So the sooner you're in the clear, the better. You never really cruise.



Exit previous corner fast; close up on the straight; come alongside before brake area; brake at last moment; dive down the inside into the corner.

'Overtaking is done largely into corners. You come out of the previous exit a little faster than the guy in front, and close up on him down the straight; try and get alongside him before the brake area; then dive down the inside, and into the corner. If you brake too late, you'll go wide on the exit. Furthermore, it's very easy to say you've got to come out of the corner faster than the guy in front, but in reality it's very difficult because he's running in clean air and you're running in turbulence created by his car.'

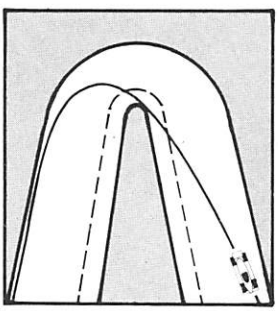
The Principles of Cornering

In the hands of the novice, every corner is a deathtrap and appears to demand foot off the throttle, brake and gear-change down within split seconds. The novice keyboard driver is likely to begin all fingers and thumbs; the novice joystick racer may make his car sing all the right tunes, but he still won't win if he doesn't understand how to bring his car onto the ideal line.

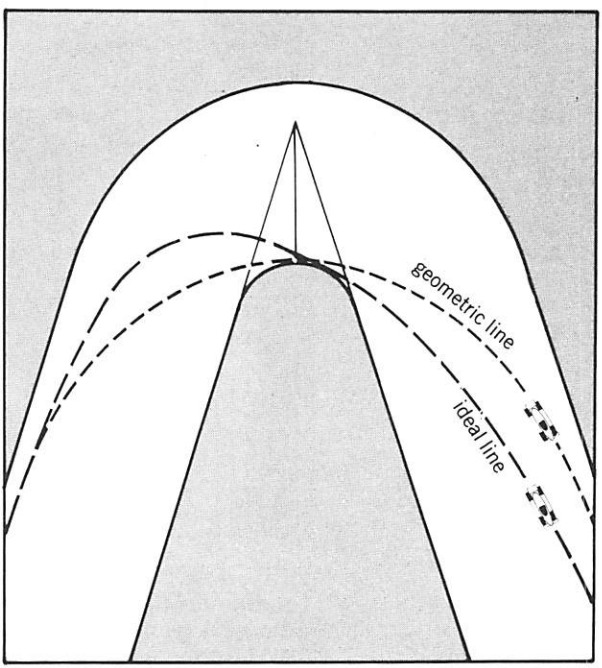
First decide the best line to follow. There's a big difference between the line you might choose on the road – 'the granny line', as it's known – and the line you must attack to take a bend on a racetrack at speeds often in excess of 100 mph.

The 'granny line' may be the shortest distance, but drastic braking would be required, which would lose valuable seconds.

Equally, the outside of the track is also slower.



The 'granny line' may suit the road but is very much slower than the wider arc of the ideal racing line.



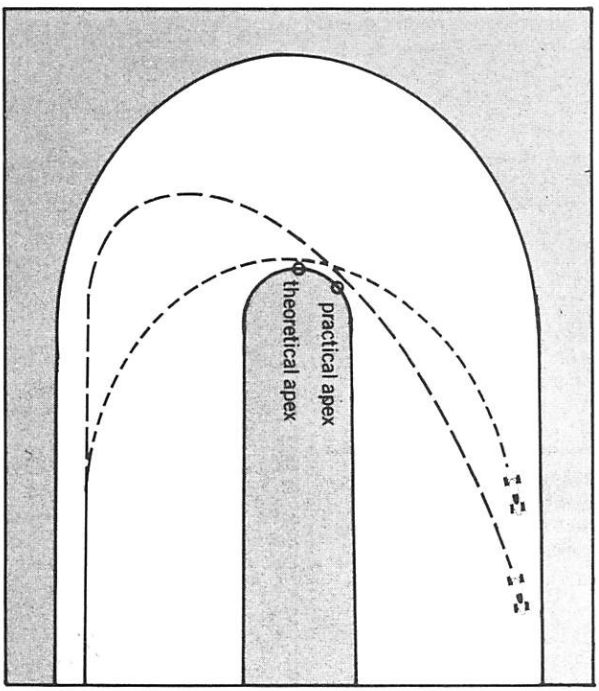
Between inner and outer lines is the geometric line, drawn with a compass. But none of these is ideal.

We are looking for the ideal line between these two extremes.

Working out the ideal line

You could draw a scale drawing of a corner, and with a compass and protractor work out the apex of the inner line, but it wouldn't help you in practice because no corner is perfect. In fact if you did use geometry to work out a point at which the car should attack the inner line, you would discover that the tighter the bend, the greater the difference between geometrical theory and racing practice. This can be clearly seen in the illustration of the hairpin.

Slow in; fast out; turn as much of the corner into a straight as possible.



Like everything else in racing, fast cornering is a question of fine balance, in this case a balance between distance, speed, and the resistance which is set up by tyres turning on the track.

Finding the path of least resistance

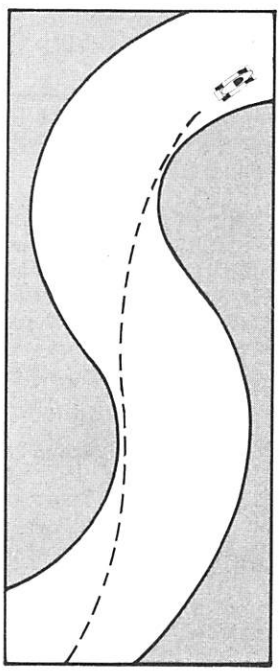
Think of turning each corner into a straight. We know that the straighter the line we drive, the higher the speed attainable, but let's spell out the reason why: turning the tyres obliquely to the road sets up resistance to speed.

One vital principle, therefore, is that the ideal line is the line of least resistance.

That cornering tyres resist speed is well illustrated by an example: Stowe at Silverstone is flat out for a good driver, but if you hammer down Hangar in 5th at 6000 revs, and go into Stowe with your foot still flat on the boards, you'll exit at only about 5200 revs. The reduced power is not due to increased air resistance; it's the tyres doing the work and taking their toll on both power and speed.

Every time you turn the wheel, you're slowing the car down.

Turn in at a point where you can virtually see through to the other side.



Whichever corner it is, turn in at a point where you can virtually see through it. The first turning-in point at Silverstone's Woodcote is a good example; to ensure maximum speed, you'll find yourself having to turn in really quite late . . . at a point from which you can almost see right through Woodcote to the other side. A whisker – first left then right – on the joystick, or a finger-tip touch of L/+ on the keyboard, simply wiggles you through in 4th.

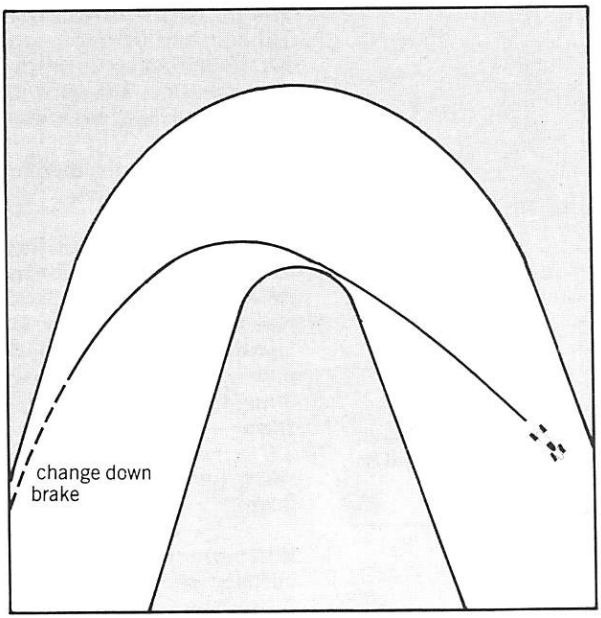
If you misjudge which line to take and come in too tight, you'll lose precious time stabbing at the controls in an effort to get back on course. If you come in too late, you'll either overshoot altogether or – if there's still time – brake and lose speed accordingly.

So we can go further and say that the ideal line is one which allows minimum resistance and maximum grip. There is some more useful information on this in the section about aerodynamics.

Look for a fast exit

The illustrations show different corners and how to take them. Whether you are taking a wide-arc bend in 5th with your foot hard down, or a tight hairpin which will

In tight corners, the timing of the brake-gear change scenario is crucial and should be completed comfortably before turning in.



require you to brake and change down, the essential principles of cornering remain true.

The art of taking any corner is to judge the point to turn in which allows you to begin accelerating out as soon as possible. For fast exiting is what high-speed cornering is all about. You have got to begin by thinking, 'What line will allow me to accelerate out soonest?' The problem each corner poses is how to get your foot back down on the throttle and the car back up through the gears, at the earliest possible moment.

Remember, it takes about twice as long to accelerate as it does to decelerate.

Going into a corner

How fast to make an approach? 'Look at it in terms of a spectrum of what is possible,' advises David Hunt. 'Let's say that in perfect conditions a corner can be exited at 103mph – top speed – still permitting maximum grip and minimum resistance (no sliding) from tyres. It is

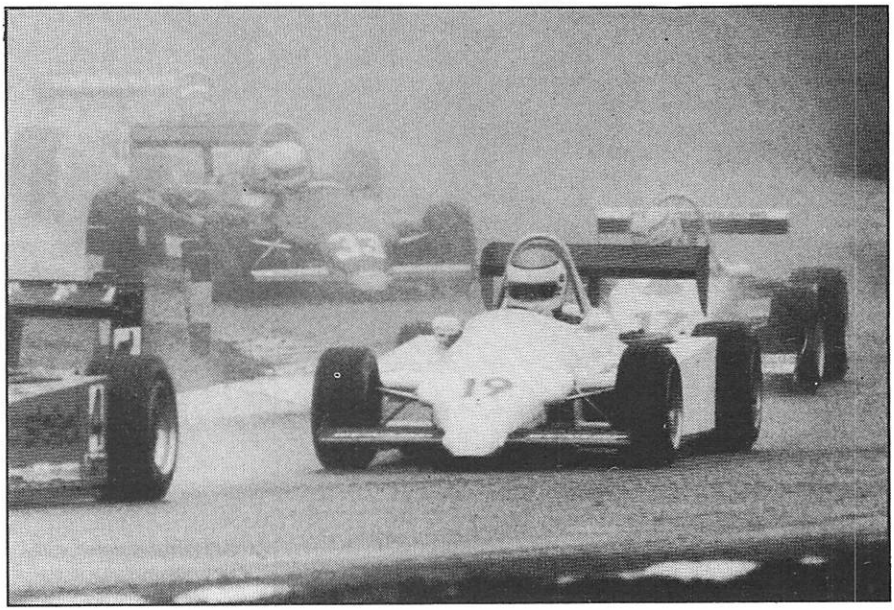
physically impossible in perfect conditions to exit that corner faster than 103 mph. 103 mph is the aim.

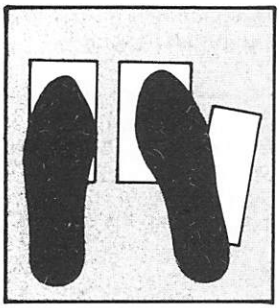
'If you're giving it 100 mph, obviously you're not going fast enough; you're not using the tyres. You'll notice it, you'll feel the difference. Equally if you start approaching too fast you'll start sliding, and scrub off speed. You'll delay your exit and then never get back up to 103. Judge your speed by the rev counter; always keep the revs up.'

Braking and keeping the revs up

On an ideal line, the most important thing is to keep the power on as hard as you feel is safe, remembering always that when the revs are too low or too high your car is racing less efficiently. Your car bites at between 5000 and 5800. Keep the revs between these figures.

On a tight corner, or any bend which involves a reduction in speed, keep within the ideal rev band by changing down. David Hunt explains the almost balletic





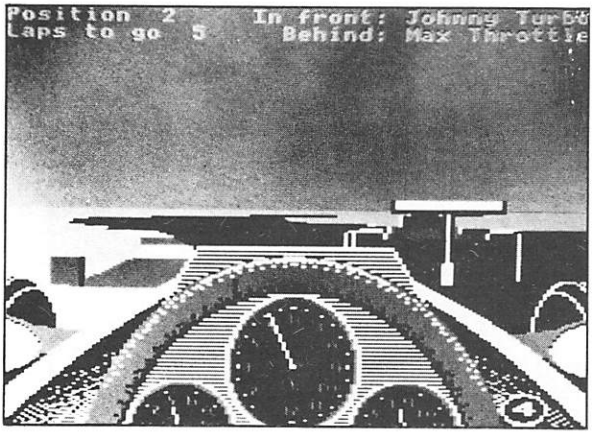
Keep the revs up at all costs; in a real car, it's a skilful rolling of your foot from brake to accelerator. Heeling and toeing, it is called.

skill required from the real racing driver: 'You've got the brake pedal on the left and the throttle pedal next to it on the right. Most of the ball of your right foot covers the brake pedal, and the rest of it manipulates the throttle every time you move through neutral and change down. It's a skilful rolling of your foot.'

When to brake

The precise timing of the brake/gear change scenario on the approach is of crucial importance. Make the most of speed built up on the straight by easing up at the very last possible moment. Losses of even one tenth of a second on each lap can add up to places at the finish.

Equally, braking too late can be suicidal. Braking (as opposed to accelerating which has an opposite, stabilising effect) pulls the weight of the car onto its front, and as you turn into a bend the car pivots around the front wheels.

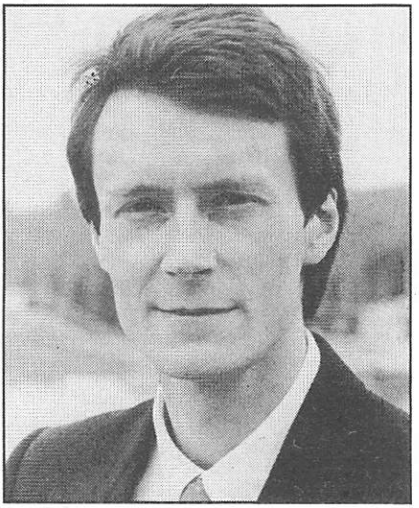


There are three markers at intervals of 100 feet before each bend, and one on the apex.

Use markers for brake and gear points, turning points, and practical apexes. 'Use anything that you can lay eyes on, but DON'T use anything that can be moved. You get novice drivers saying, "Oh, I was using the third hay bale," and while they were round the back of the circuit some joker has come along and moved the bale! They come screaming down the straight – no bale, just the corner.'

Silverstone

SPECIAL REVS
RACING PROGRAMME
ACORNSOFT OPEN DAY



Welcome to Silverstone

Welcome to Silverstone and the Acornsoft REVS raceday.

There have been many attempts to simulate the real excitement of racing; some indeed have proved very popular. When Acornsoft decided to commission REVS, it was clear from the start that it would have to be the best racing simulation package ever. There was no doubt that in Geoff Crammond we already had the best simulation game programmer – to prove it, his 'Aviator' was flying high in the BBC Micro charts – but could we be sure that Geoff, who had never even sat in a racing car, let alone had access to real racing minutiae, could guarantee absolute authenticity?

So often the best games programs come out of a collaboration between expert programmers and someone expert in the program's 'application'. As regular Formula 3 racegoers will know, Acorn's involvement in the sport began with the announcement of their sponsorship of David Hunt in the 1983 Marlboro British Formula Three Championship series.

The team of Geoff Crammond and David Hunt, as technical consultant, has assured us of the authenticity we sought. They join with everyone at Acornsoft, in wishing you an enjoyable time at Silverstone.

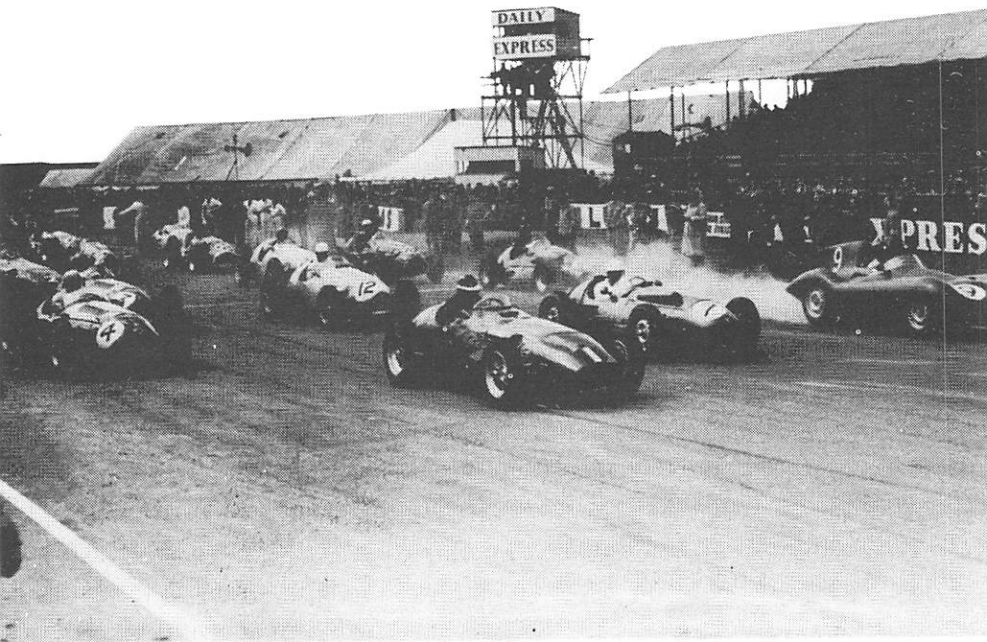
David Johnson-Davies,
Acornsoft Limited

Introducing the Circuit

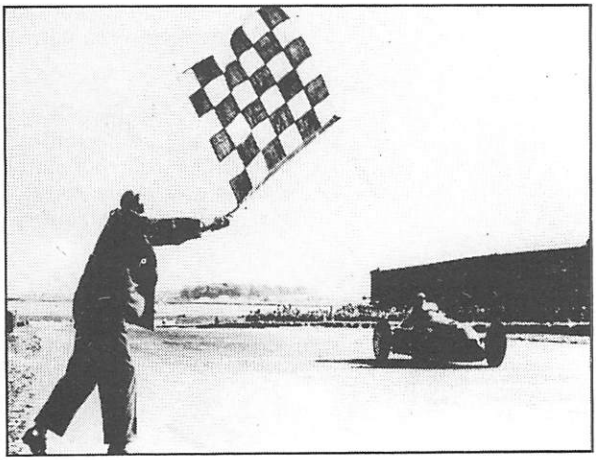
Silverstone Circuit, nestling near Towcester in the Northamptonshire countryside, is considered by most to be the home of British motor racing, having hosted everything from British Grand Prix to the smallest of club events, ever since the Second World War. The world's top drivers attacking the fastest Grand Prix circuit in the world at average lap speeds of 150 mph is a breathtaking spectacle! All the great international drivers are attracted not only by the unique atmosphere of racing in England, but also the challenge of mastering the dauntingly fast corners that make up the 2.93 miles of track.

For the modern Grand Prix driver, this means keeping a projectile weighing considerably less than a Ford Fiesta, but with perhaps fifteen times the engine power available, on the limit of adhesion through bends which he is approaching at up to 200 mph, and negotiating at anything from 90-150 mph. He also has to cope with an accelerator pedal that will take him from a standstill to 100 mph in about 3.2 seconds – compare that with a 0-60 mph time for your family road car!

International Trophy at Silverstone, 1954, won by Peter Colins in a Maserati.



Farina wins Grand Prix D'Europa, March 13th, 1950.

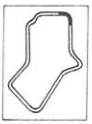


Formula 3 cars are considerably tamer animals, of course, but, due to the assistance of ground-effect aerodynamics, F3 drivers are actually cornering at about the same speed as Grand Prix cars. To give you some idea of the experience of driving an F3 car, accompany David Hunt around a lap of the Silverstone Grand Prix Circuit.

July 16th, 1977, World Champion James Hunt wins the British Grand Prix at Silverstone.

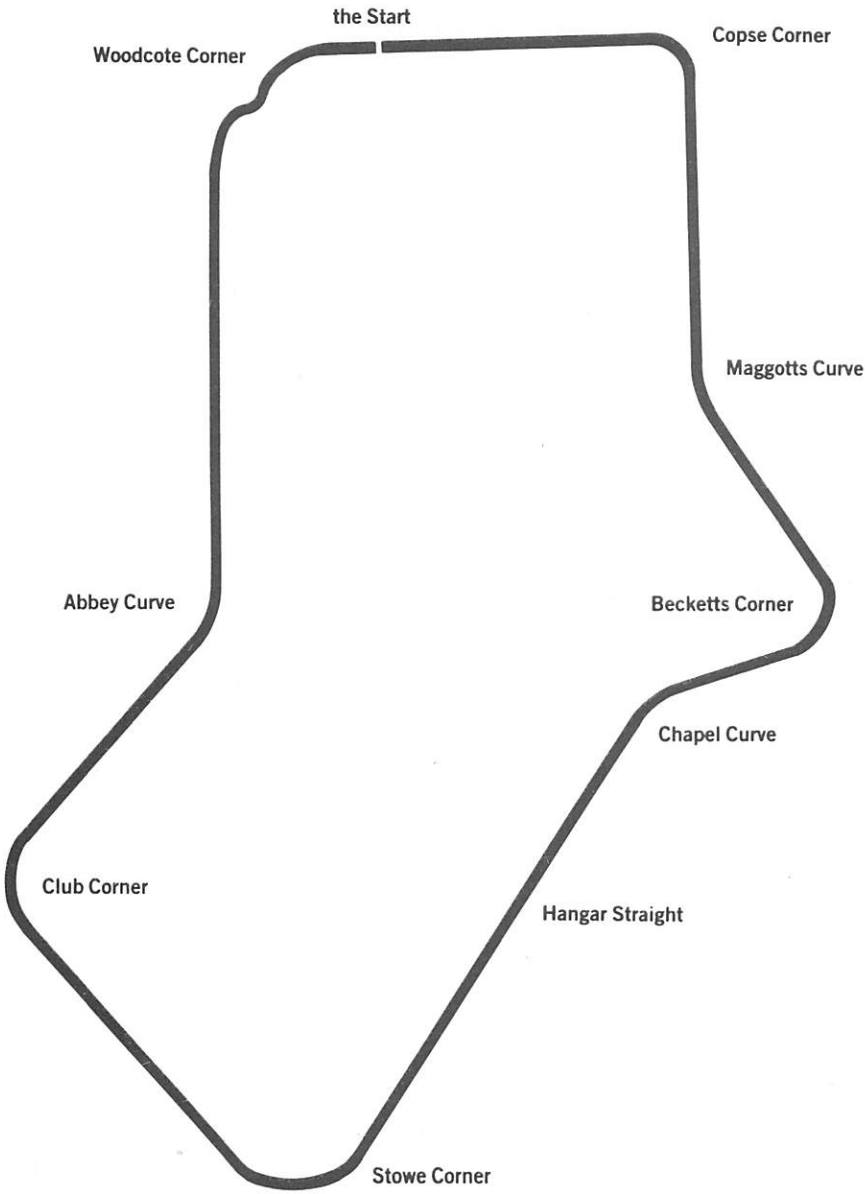
A Lap of Silverstone with David Hunt

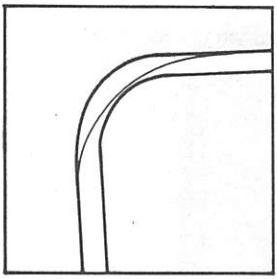
I must do three or four laps to warm up the engine and slick tyres before we start my first 'hot' lap in anger.

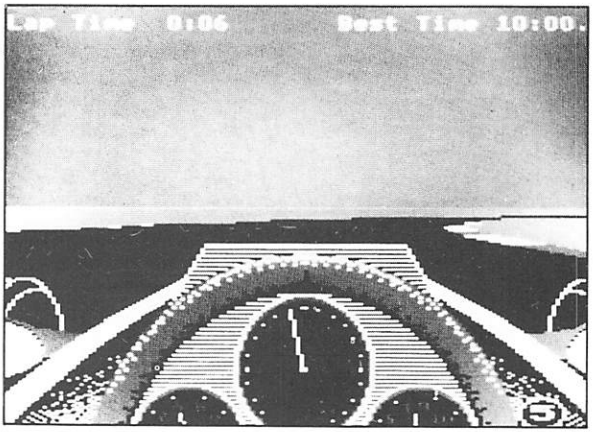


Copse

I exit the chicane and select 5th gear looking right to glimpse my pit signalling board. Via the pit board my mechanics will tell me my previous lap time during testing, and in a race my position and the laps left to run, among other sundry bits of information. I reach


the Start
Woodcote Corner
Copse Corner
Maggotts Curve
Becketts Corner
Chapel Curve
Hangar Straight
Stowe Corner
Club Corner
Abbey Curve





Copse Corner

about 5600 rpm in 5th gear (134 mph) on the approach to the first bend – Copse Corner – which will be taken in 4th gear. I go past the 100 metre board on the left-hand side of the track, and a split second later brake and change down to 4th as quickly as possible. Then I turn in and get back onto the accelerator as hard as I can, as soon as the car has changed direction. From beginning to brake to accelerating again I am very busy, all the above having to be done in a very short space of time, and the entry speed to the corner being quite high (about 122 mph). My turn-in must be confident and aggressive, a certain amount of courage being required to keep the entry speed high.

This point is very much the key to the corner. Having got the power on correctly, the car will slide past the apex and continue to slide out to the corner exit. I will make the corner as 'straight' as possible by allowing the car to ride out over the high exit kerb, which presents no problem if one ensures that one hits the kerb squarely and not at an angle. In wet weather this kerb becomes very slippery due to its painted surface, and it must be treated with the greatest respect because of the difference in grip available from the painted kerb and the normal track surface.

As I ride over this kerb I have about 5400 rpm showing on the rev counter, in 4th gear (116 mph). The power in a F3

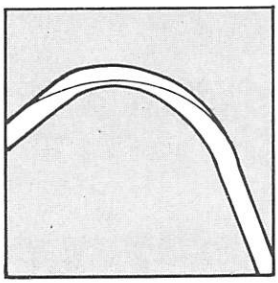
car is at its most prolific between 5000 and 5600 rpm, although it is still useable up to 6000 rpm, and it is therefore pointless running the engine at revs other than those in this narrow range. Additionally, because we must use 4-star petrol in a race-tuned engine (the rules say we must), if I put my foot down hard at any revs below 5000 rpm (and therefore put too much load on the engine), it will detonate (called pinking) and blow up. So it is essential always for both these reasons to keep the revs between 5-6000, hence the importance of correct gear ratios.

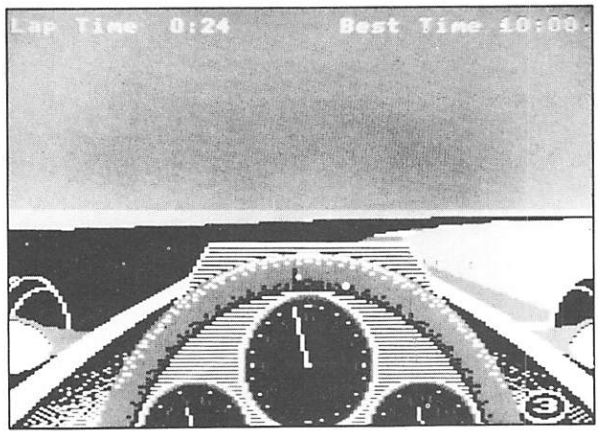
Maggotts

I accelerate up to 5800 rpm in 4th and change to 5th gear. The next bend, Maggotts, is a left-hand kink which is easily taken flat out in any conditions. However, I still use some semblance of racing line so that I do not make the car corner too hard and scrub off speed. At the same time, I do not use the entire width of the circuit at this point, because I would be driving a longer distance than necessary, and spoiling my all-important lap time.

Becketts

It is now a short run down to Becketts, the slowest but perhaps the most important bend on the circuit. I have to keep reminding myself of this because it is, in fact, not as difficult as the other bends; it is a 3rd gear, 105 mph bend with no particular hazards to negotiate.





Becketts Corner

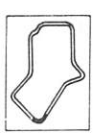
I approach Becketts at about 5700 rpm in 5th gear (137 mph), keeping to the left of the circuit, braking hard at about 60 yards away from the turn-in point, and shifting down from 5th to 4th to 3rd rapidly. The reason why Becketts is important, is that it is followed by the longest straight on the Silverstone track, a 'straight' which could go on to the last corner on the circuit – the chicane. Therefore, any time I can gain here will be with me for the rest of the lap; equally any time lost will never be regained.

It is extremely important to turn in here very accurately, and not make the car slide and scrub off too much speed. Then it's back onto the loud pedal as hard as possible, as early as possible, keeping the car as tidy and neat as possible, and using every inch of road and kerb (often a bit of grass as well), feeling and searching throughout for revs.

Chapel

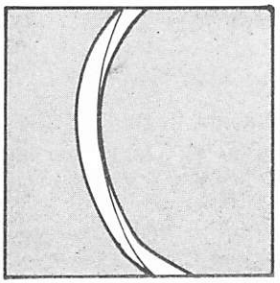
I am now on the very left (outside) of the circuit pulling about 5700 rpm in third gear (108 mph), and I steer back to the centre of the track, taking 4th gear and then swinging left through Chapel flat out (the same principles that applied at Maggotts apply here), and arriving at Hangar Straight on the right-hand side of the circuit. I now point the car down the hill towards the spot where I can pick out my turn-in point for Stowe Corner in the distance on the left of the circuit. Thus I am driving diagonally down the straight, again ensuring that I make each lap as short a distance as possible.

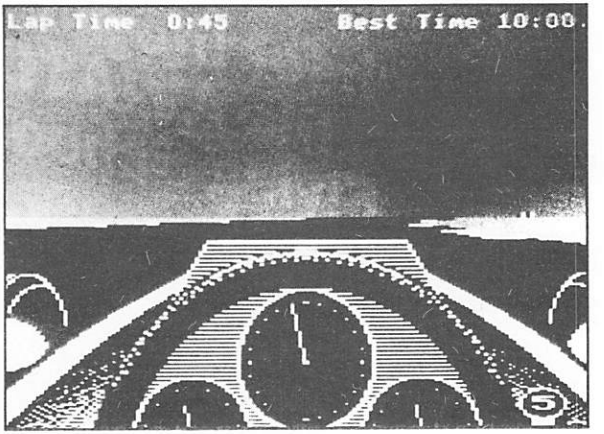
I take 5th gear after a few yards on Hangar Straight, and then take the opportunity of checking my instruments to ensure that oil and water temperatures and pressures are all running within their tolerances.



Stowe

Just before Stowe Corner, the downhill section bottoms out and the road starts to climb again very gradually, but this reversal of gradient is not sufficiently close to the entry point of the bend to upset the balance of the car. However, at this stage my mind is on other things, for Stowe can be a real test of courage, being a corner that can – if car and conditions are right – just be taken flat out in 5th gear, but only just. More often the bend is taken

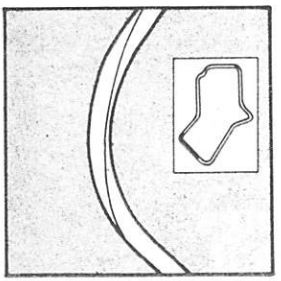




Stowe Corner

with a slight lift from the 'go' pedal.

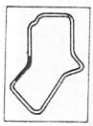
I have about 5800 rpm in 5th gear (139 mph) when I reach the entry point for Stowe, and I have to concentrate hard to convince myself to keep my foot absolutely flat down for as long as possible into the corner. I may find I have to ease back off the throttle a small amount about a third of the way through the turn, and then squeeze back on as soon as the sliding and attitude of the car allows. Furthermore, it is important here to get across to the inside kerb quite early in the bend and hug it for a while, rather than take the ideal racing line. There is a 'groove' around this corner, and if I don't stay in it I'll find myself off the road and into the hedge very quickly, and at this speed it'll be quite a bump! Stowe is critical because it joins the two longest sections of flat-out motoring. I'm doing myself a big favour if I can scramble through here, flat out.



Club

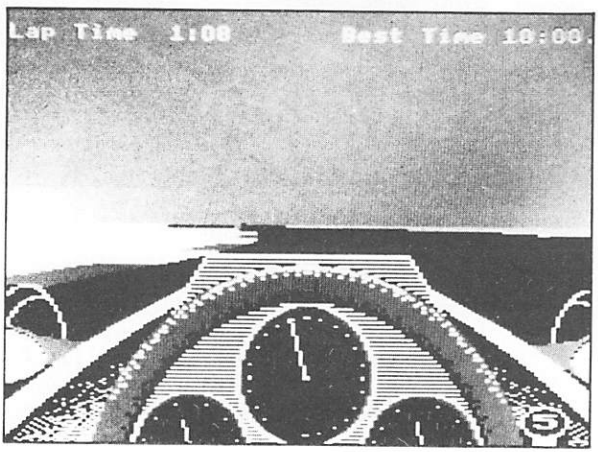
I obviously use the entire exit kerb on the way out of Stowe, scrabbling back onto the circuit with 5200 rpm on the clock (125 mph). I stay on the left-hand side of the track to Club Corner and arrive with 5700 rpm (137 mph), staying relaxed as I work up the courage to turn into and through this 5th-gear bend, staying absolutely on full noise throughout. The exit kerb is wide, and although not

always necessary, it is very relieving to have it there in reserve when a slide takes you slightly wide.



Abbey

Out of Club I set off towards Abbey Curve on a slight uphill gradient with 5500 rpm (132 mph). Abbey is easily taken flat out in 5th gear and, as with Maggotts and Chapel, it is not necessary to use absolutely all the width of the circuit.

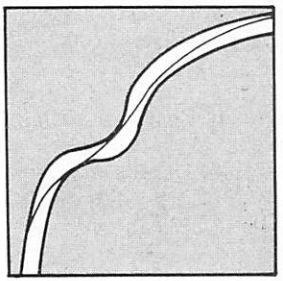


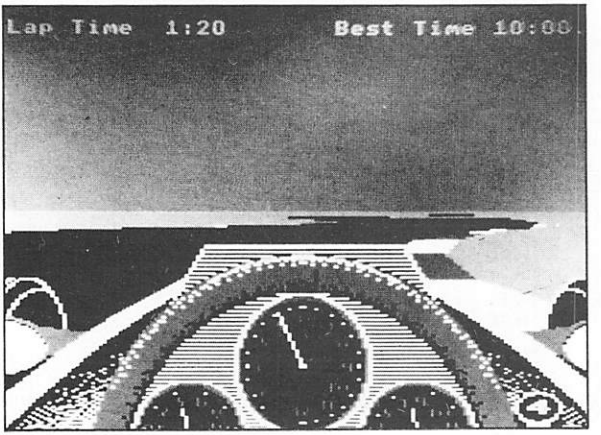
Abbey Curve

Woodcote

I take another chance to inspect the gauges and with the engine pulling 5800 rpm (139 mph) I line up the car on the left of the track ready for the chicane. I throw out the anchors as late as I dare, change down to 4th, throw the car right, and press go again as quickly as I can; I then flick left and right before appearing on the pit straight again with 5500 rpm in 4th gear (117 mph).

The chicane may sound quite straightforward, but it can only be so if my initial turn-in angle was correct – any mistake here and the severity of that mistake gets magnified each time I have to change direction thereafter. A good lap can be ruined by a lot of rushed salvage work and corrections at this point. The high kerbs must also be treated with respect, but if I have got the first section of the chicane right I can flick through the next





Woodcote Corner

left and right sections with just the merest kiss on each kerb – a super feeling when you get it absolutely right.

Passing my pit my mechanics will click their stopwatches to record my lap time, hoping that I have driven an error-free and quick lap. If I have encountered any difficulties with the handling of the car then I will confirm my findings on the next lap, try and make a diagnosis, and stop at my pit at the end of that lap to discuss the problem with my engineer. We'll rectify them if possible, and then run another few laps to prove that the changes made to the car have improved my lap times – and that is the only proof, a racing team's entire life and work always being ruled by the stopwatch, with major improvements being quantified in 10ths of seconds.

I hope you have enjoyed hearing from the 'nut behind the wheel' some of what goes on in a racing car during a lap of the Silverstone Circuit. However, please bear in mind that I can never describe exactly what it feels like to be on the track – to experience this you will either have to go motor racing yourself, or play the new Acornsoft racing game; it's exactly like the real thing, only you have the option of a softer armchair to sit in!

Lap Time Table

Read the following lap table, and work out how much your average lap speeds improve.

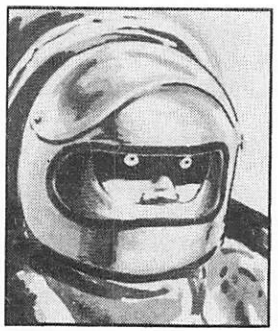
TIME m.s.	SPEED m.p.h.	TIME m.s.	SPEED m.p.h.	TIME m.s.	SPEED m.p.h.	TIME m.s.	SPEED m.p.h.
1.24.0	125.65	1.29.0	118.59	1.34.0	112.28	1.39.0	106.61
1.24.1	125.50	1.29.1	118.46	1.34.1	112.17	1.39.1	106.51
1.24.2	125.35	1.29.2	118.33	1.34.2	112.05	1.39.2	106.40
1.24.3	125.20	1.29.3	118.19	1.34.3	111.93	1.39.3	106.29
1.24.4	125.06	1.29.4	118.06	1.34.4	111.81	1.39.4	106.18
1.24.5	124.91	1.29.5	117.93	1.34.5	111.69	1.39.5	106.08
1.24.6	124.76	1.29.6	117.80	1.34.6	111.57	1.39.6	105.97
1.24.7	124.61	1.29.7	117.67	1.34.7	111.45	1.39.7	105.86
1.24.8	124.47	1.29.8	117.54	1.34.8	111.34	1.39.8	105.76
1.24.9	124.32	1.29.9	117.41	1.34.9	111.22	1.39.9	105.65
1.25.0	124.17	1.30.0	117.28	1.35.0	111.10	1.40.0	105.55
1.25.1	124.03	1.30.1	117.14	1.25.1	110.99	1.40.1	105.44
1.25.2	123.88	1.30.2	117.01	1.35.2	110.87	1.40.2	105.34
1.25.3	123.74	1.30.3	116.89	1.35.3	110.75	1.40.3	105.23
1.25.4	123.59	1.30.4	116.76	1.35.4	110.64	1.40.4	105.13
1.25.5	123.45	1.30.5	116.63	1.35.5	110.52	1.40.5	105.02
1.25.6	123.30	1.30.6	116.50	1.35.6	110.41	1.40.6	104.92
1.25.7	123.16	1.30.7	116.37	1.35.7	110.29	1.40.7	104.81
1.25.8	123.02	1.30.8	116.24	1.35.8	110.17	1.40.8	104.71
1.25.9	122.87	1.30.9	116.11	1.35.9	110.06	1.40.9	104.61
1.26.0	122.73	1.31.0	115.99	1.36.0	109.95	1.41.0	104.50
1.26.1	122.59	1.31.1	115.86	1.36.1	109.83	1.41.1	104.40
1.26.2	122.45	1.31.2	115.73	1.36.2	109.72	1.41.2	104.30
1.26.3	122.30	1.31.3	115.61	1.36.3	109.60	1.41.3	104.19
1.26.4	122.16	1.31.4	115.48	1.36.4	109.49	1.41.4	104.09
1.26.5	122.02	1.31.5	115.35	1.36.5	109.38	1.41.5	103.99
1.26.6	121.88	1.31.6	115.23	1.36.6	109.26	1.41.6	103.88
1.26.7	121.74	1.31.7	115.10	1.36.7	109.15	1.41.7	103.78
1.26.8	121.60	1.31.8	114.98	1.36.8	109.04	1.41.8	103.68
1.26.9	121.46	1.31.9	114.85	1.36.9	108.92	1.41.9	103.58
1.27.0	121.32	1.32.0	114.73	1.37.0	108.81	1.42.0	103.48
1.27.1	121.18	1.32.1	114.60	1.37.1	108.70	1.42.1	103.38
1.27.2	121.04	1.32.2	114.48	1.37.2	108.59	1.42.2	103.27
1.27.3	120.90	1.32.3	114.35	1.37.3	108.48	1.42.3	103.17
1.27.4	120.76	1.32.4	114.23	1.37.4	108.36	1.42.4	103.07
1.27.5	120.63	1.32.5	114.11	1.37.5	108.25	1.42.5	102.97
1.27.6	120.49	1.32.6	113.98	1.37.6	108.14	1.42.6	102.87
1.27.7	120.35	1.32.7	113.86	1.37.7	108.03	1.42.7	102.77
1.27.8	120.21	1.32.8	113.74	1.37.8	107.92	1.42.8	102.67
1.27.9	120.08	1.32.9	113.61	1.37.9	107.81	1.42.9	102.57
1.28.0	119.94	1.33.0	113.49	1.38.0	107.70	1.43.0	102.47
1.28.1	119.80	1.33.1	113.37	1.38.1	107.59	1.43.1	102.37
1.28.2	119.67	1.33.2	113.25	1.38.2	107.48	1.43.2	102.27
1.28.3	119.53	1.33.3	113.13	1.38.3	107.37	1.43.3	102.18
1.28.4	119.40	1.33.4	113.01	1.38.4	107.26	1.43.4	102.08
1.28.5	119.26	1.33.5	112.88	1.38.5	107.15	1.43.5	101.98
1.28.6	119.13	1.33.6	112.76	1.38.6	107.05	1.43.6	101.88
1.28.7	118.99	1.33.7	112.64	1.38.7	106.94	1.43.7	101.78
1.28.8	118.86	1.33.8	112.52	1.38.8	106.83	1.43.8	101.68
1.28.9	118.73	1.33.9	112.40	1.38.9	106.72	1.43.9	101.58

Times better than 1.44.0 mean that you are good enough to enter a race. Top drivers can achieve times between 1.24.0 and 1.25.0.

The Field

Johnny Turbo

Gloria Slap



Max Throttle

Drivers in order of skill based on last season's performances:

MAX THROTTLE
JOHNNY TURBO
DAVEY ROCKET
GLORIA SLAP
HUGH JENGINE
DESMOND DASH
PERCY VEER
GARY CLIPPER
WILLY SWERVE
SID SPOILER
BILLY BUMPER
SLIM CHANCE
HARRY FUME
DAN DIPSTICK
WILMA CARGO
MILES BEHIND
ROLAND SLIDE
RICK SHAW
PETER OUT

Never before have there been so many drivers of promise at Silverstone. In no small way can this be credited to imaginative thinking on the part of the organisers in allowing racing by proxy. Suddenly you and your friends can get together and race each other at all levels of skill. This has occasioned a gigantic increase in audience figures; we hope not due to the high incidence of spills in the Novice Class.

Driving today for the sponsors, Acornsoft, is likeable leading contender, JOHNNY 'Boy' TURBO and glamorous GLORIA SLAP, snidely rumoured to be sporting different rubber next season, but ever ready to strike fear into the heart of anyone who threatens to beat her into pole position. Both drive the Ralt RT3 Geoffrey Crammomotor, and if things go well, Slap and Turbo could prove to be an unbeatable duo.

So much is going to depend, however, on the unpredictable performance of 'Mad' MAX THROTTLE, last season's all-comers champ. For some time discarded by everyone as too soft for the game, suddenly last season, Max – home-loving father of four – pulled out all the stops and achieved an all-time lap record, became

Hugh Jengine

Formula 3 Champion of Europe, and was seriously courted by Marlboro for their Formula 1 team. Success, he assures us, hasn't changed him a bit – in his own words: 'the skull and cross bones on my Ralt RT3 Dracomotor is a private joke between me and my psychiatrist.'

Lady Luck smiles down on those who help themselves, but the locally based talent of driver HUGH JENGINE just does not seem enough to make him a true winner. Hugh has the consistency necessary to become a true front runner, but it might be argued that sandwiched between Gloria and 'Dynamic' DESMOND DASH is no starting place for any would-be Formula 3 champ.

Technician and track character, DAVEY ROCKET is a seasoned performer, and has a firm place in most regular racegoers' hearts. This season, Davey's car, expertly tuned within the confines of his own garage, promises to cross new frontiers of efficiency, and show to this technician's closest rivals that in the end, success involves 'hands-on experience'.

Davey Rocket

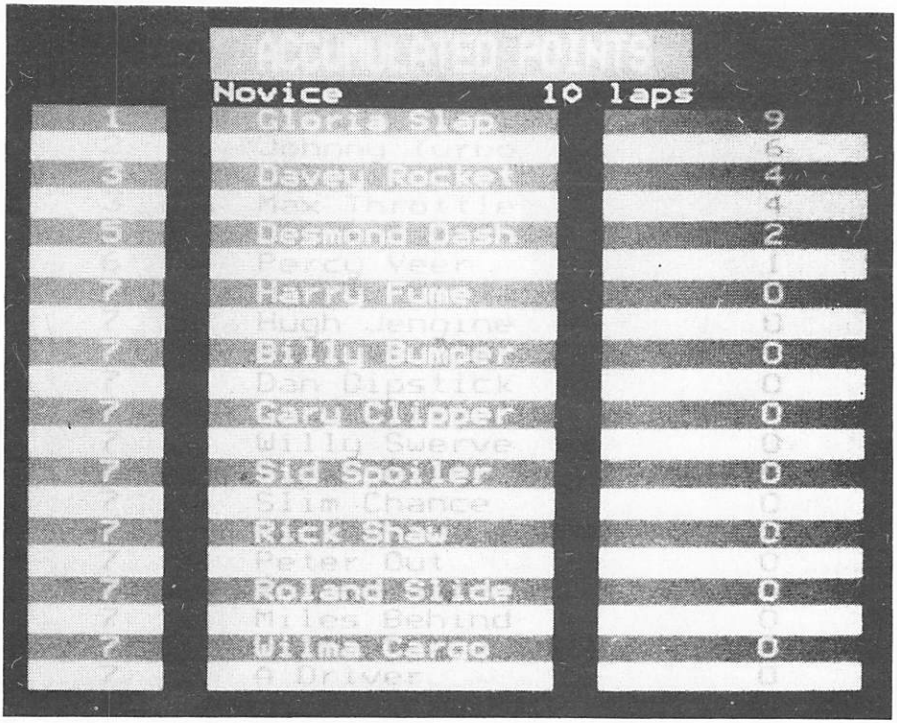
Indeed the presence of Davey and his off-the-circuit buddy, PERCY VEER, both driving for McDouglas – Ready Mix Division – forces the question: will the meeting see the well-knit qualities of these seasoned drivers finally overcome the impetuosity of youth? For if Davey has Johnny Turbo set firmly in his sights, then Percy's future is bound to depend on a single-minded dual with independent driver, 'Dynamic' DESMOND DASH – the man no sponsor will touch.

Nineteen competitors make up the full complement of drivers. Questions hang over the names of the remaining 12, questions which are only likely to receive answers by the end of this weekend's racing.

Driving by proxy

As has been explained, so much of the revitalised interest in Formula 3 racing is due to Open Day, which includes special provision for racing by proxy. While we welcome all those capable of proving themselves at least in Novice Class (you've got to be well into the 1.30s), it must be clearly understood that hands-on racing earns more points than racing by proxy.

If you and three friends get together to race, there will clearly need to be four races to decide the winner. Initially, qualifying times set the level at which proxy races will be scored, but the scoring system offers each person the opportunity, in the race in which he drives, to increase his overall score and produce a fair result.

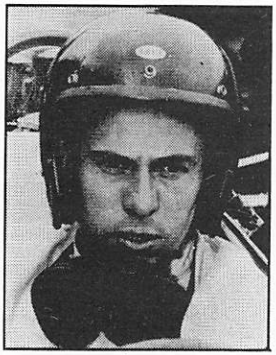


Silverstone Champions

The Silverstone circuit now runs the British Grand Prix on alternate years with Brands Hatch. All the great drivers have raced here over the decades. David Hunt looks at what it takes to become a Silverstone champion, and the qualities you will need to compete at professional level.

Risk and courage

The guy who has courage is the guy who knows he's not good as a racing driver, and yet keeps burrowing into the corner too quickly and beyond his capabilities.



Jim Clark, argued by some to have been the best driver ever.

There are two types of good driver, but they're actually very similar. There's only a slight difference, but it's a difference the public notices. They both have to drive a car the same way round a circuit; one type does it in a slightly more flamboyant style. But 90% of their swing is the same; it has to be. Still, that little bit, here and there, is what makes some drivers more exciting to watch.

To describe what it takes to drive through a corner fast is very difficult. I think it's mainly balance and feel, and some courage. It's balance, and it's sensitivity; it's feeling what the car's doing. There is a driver who started at the same time as me and is now in Grand Prix racing. He's just signed with Lotus and is probably the most natural driver since Jim Clark. His natural driving flair is unbelievable. I've always watched him because we started at the same time in motor racing, though he'd been racing karts since he was 4. To start with I thought it's just because the guy's been racing a lot longer, that he's got a lifetime's experience...

He had a medical quite recently because he'd been having some problems finishing races. They discovered that he's got super vision, super reactions, etc. One problem he has got – but they didn't consider it one – is that he's got an incredibly low threshold of pain. And I think that that is why he is so quick. He is able, because of this feature, to tell you more about what the car is doing – a little movement in the suspension, you or I wouldn't do anything about; he would feel it and act upon it. So, bad news if he has an accident; super news to be a top driver. It's all built on sensitivity.

If you've got that amount of sensitivity, that amount of control, you don't need courage.

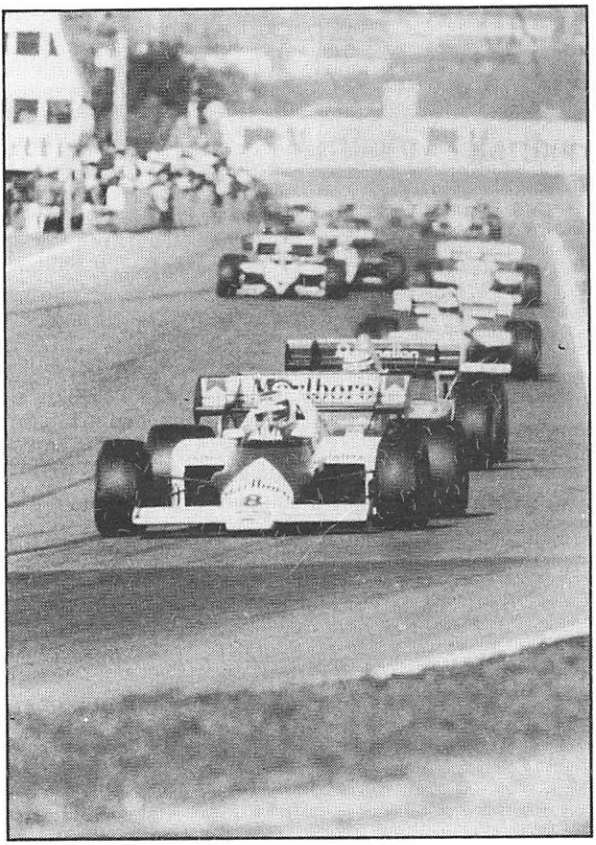
Fitness in motor racing is also very, very important.

Qualities necessary to succeed

But the qualities that will have to come out most in the game must include concentration; reaction is going to help too; and anticipation will be a lot of help. As in a real race when you're following another car you know who's in it and a certain amount about his character.

Jackie Stewart (3-times World Champion) wins the Grand Prix at Silverstone on July 17th, 1971, and is congratulated by Jack Brabham.

Niki Lauda in a McLaren: the most courageous driver of all time?



Like any sport, the really brilliant artists make you want to say, 'I could do that,' and you don't realise you're watching the very best because they make it look so damn easy. If I took you to a motor race, and we watched people like Lauda, and I asked you who is going quickest, I guarantee you'd say the people sliding into corners and banging the throttle a lot. But I would point to someone poodling around – never any drama, never any noise. They make it look so easy. Genius is at work.

Driver's Log

Qualifying times and grid position

Entrant	Results	Time	Speed	Points
1	1st			
2	2nd			
3	3rd			
4	4th			
5	5th			
6	6th			
7	7th			
8	8th			
9	9th			
10	10th			
11	11th			
12	12th			
13	13th			
14	14th			
15	15th			
16	16th			
17	17th			
18	18th			
19	19th			
20	20th			

Fastest lap

Driver	Time	Speed

This Driver's Log has been provided for you to photocopy and use as many times as you like.

REVS 4 TRACKS

The Tracks: Brands Hatch
Donington Park
Oulton Park
Snetterton

BRANDS HATCH

Paddock Bend
Approached in 5th gear, braking is difficult because you need to stay on the left of the circuit and make a straight line so that you maintain the balance of the car for an accurate turn in. The turn-in point itself must be determined by practice and experiment because you cannot see the apex or exit of the corner. Change down to 4th gear while braking, then get back on the power quickly to get a good exit speed up the hill towards the hairpin at Druids. If you can exit Paddock with 5,500 rpm or more in 4th gear you are doing well.

Druids
Another difficult one which requires a lot of practice. Points to remember are that the corner is blind, exit speed is more important than entry speed, and letting your revs drop too low in mid-corner will ruin your exit speed. You will approach in 4th gear at nearly 6,000 rpm — don't brake too late, and get down to 2nd quickly and cleanly. Power steering has been built into the 'Revs' joystick for this corner, so you will also need to get used to the different amount of lock required to negotiate the bend. Try to maintain momentum by virtually free wheeling into and around the first half of the corner, then start to apply gentle throttle from the apex marker onwards, increasing to full throttle just before you have straightened up for the exit. Keep turning right as you exit so that you are prepared for the entry to the next left-hander at Graham Hill bend.

Graham Hill Bend
This corner is quite straightforward in an F3 car and can be taken flat out easily if you stick to the right line. Use 3rd gear, or perhaps 4th if you have a really good exit from Druids. Get into the bend early and make use of the ample amount of road on the exit to minimise the drain on revs that cornering generates. Get up to 5th if you can before braking for the next left-hander.

Surtees
Another difficult bend for late braking because the road is curving (similar to Paddock), so try to make a straight line on which to apply the brakes very smoothly. Use 3rd gear and turn in very late applying the power gently and smoothly to ensure a fast exit because this bend is followed by a long straight for which you want as much speed as possible. Aim to be pulling about 6,000 rpm in 3rd at the exit kerb. Then take 4th and 5th and proceed along the straight making it as short a distance as possible, but take the opportunity to relax slightly before Hawthorns Bend.

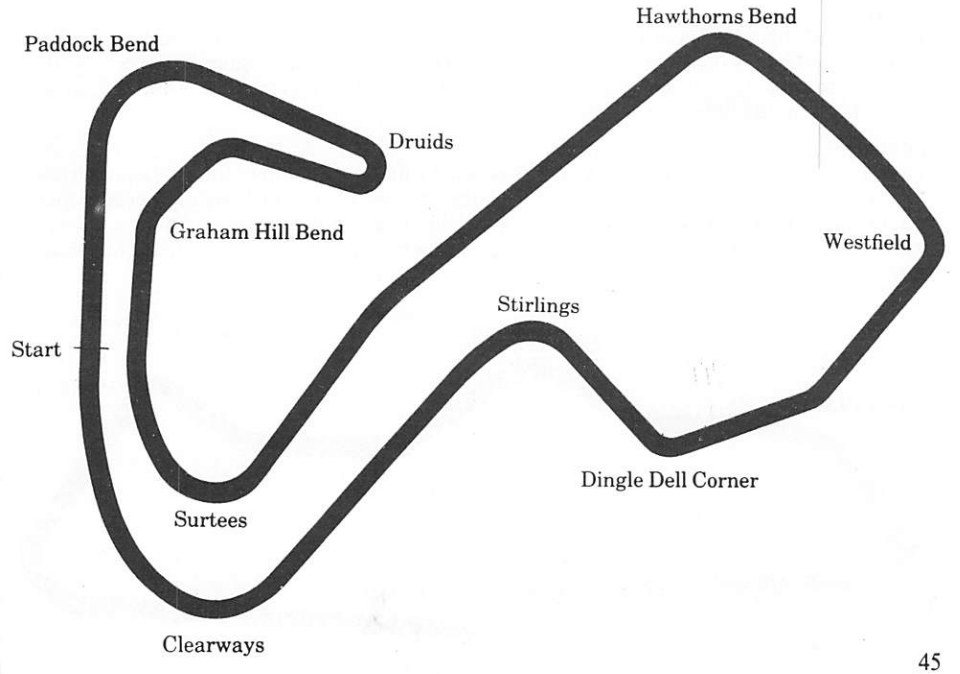
Hawthorns Bend
A demanding corner, but if your car is set up correctly it should be flat out in 5th gear (use 4th while learning the circuit). Turn in quite late because the exit kerb appears as soon as you have rounded the apex of the corner.

Westfield
A relatively simple-looking 4th gear bend, but one which is difficult to get absolutely right. Brake gently and change to 4th, and make a wide arc into a late apex, staying hard on the gas-pedal — if done correctly you will be taking 5th almost as soon as you have completed the bend.

Dingle Dell Corner
You need a gentle brake application while slotting down to 4th, and an early turn-in to use the large amount of road available on exit. It sounds easy but it is not because you cannot see any of the corner before you get to it! Keep turning right after the exit to prepare for Stirlings, but stay in 4th gear.

Stirlings
Brake quite hard and drop down to 3rd gear, turn in positively and get back onto the loud pedal with a firm squeeze as early as you can. A good run will give you about 5,700 rpm at the exit.

Clearways
Smoothness is very important here to ensure a good run past the start/finish line, so try to keep momentum by not braking too hard while you change down to 4th gear. Turn in early and do not miss your apex point otherwise you will definitely run out of road on the exit. Aim for about 5,800 rpm at the exit kerb in 4th gear, and then take 5th for the run back to Paddock Bend.



DONINGTON PARK

Redgate
Approached in the 5th gear, you will need to brake and downshift to 3rd (maybe 2nd while learning the track) for the turn-in, which should start you on a smooth rounded arc past the apex and out to the exit kerb with 5,600 on the clock. It looks straightforward, but it is remarkably difficult to ever do well enough to be satisfied.

Craner Curves
Easily taken flat out in 4th and 5th gears, but you will need to choose a smooth economical line and make sure you are well positioned for the braking area for the Old Hairpin.

The Old Hairpin
Not a hairpin at all, but a bloodcurdling 4th or even 5th gear bend which is approached downhill and bottoms out at the apex. This is the quickest bend on the circuit and very important to get right.

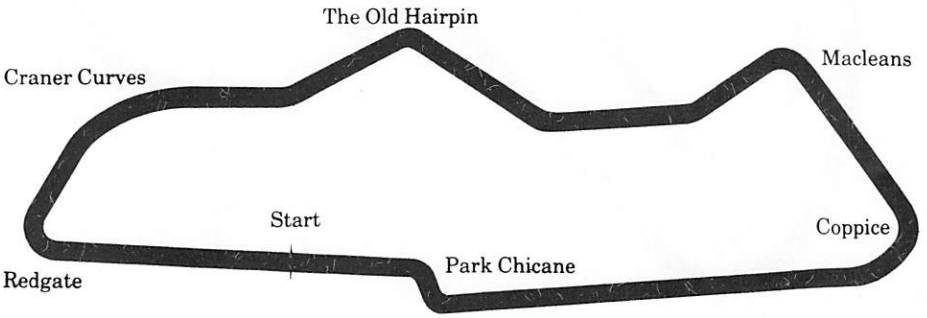
Braking must be short-lived but smooth and gentle — no sharp stabs, and a quick downchange to 4th. Be careful of positioning because the road bends inwards around the turn-in point.

Get on the power really early and hard, and attack the apex, keeping the car turning right so you don't run out of road on the exit. 5,900 rpm on the clock in 4th or 5,000 in 5th and your're doing very well. The swoops that follow are easily flat, but make sure you are correctly positioned to approach Macleans.

Macleans
Brake, change down to 3rd and turn in using a gentle arc keeping the power on hard — expect to see 5,900 rpm if you get it right.

Coppice.
Very difficult because it's not possible to see anything of the corner until you turn in, and therefore you have to learn by experience when to turn and by what degree. However, you do not need to brake heavily and it can be taken in 4th gear when you are fully confident; make use of all the road on the exit.

Park Chicane
The chicane is 2nd gear and quite straightforward if you remember the 'slow in, fast out' rule. It also pays to cut the apex kerbs a little here, although beware of overdoing this because they can throw you off the track into a spin. If you get the whole thing right you will leave the exit kerbs with 6,000 rpm. Bear in mind that this is another section where you are using the 'Revs' power-steering.



OULTON PARK

Old Hall
This corner is quite quick in 4th gear despite the fact that it looks slower because of its wide entry and narrow exit, and there is no particular trick to it apart from ensuring that you do not brake too hard — a quick dab will do as you snick down to 4th from 5th, and then get back on the power as soon as you can, hoping to see about 5,700 rpm in 4th at the exit.

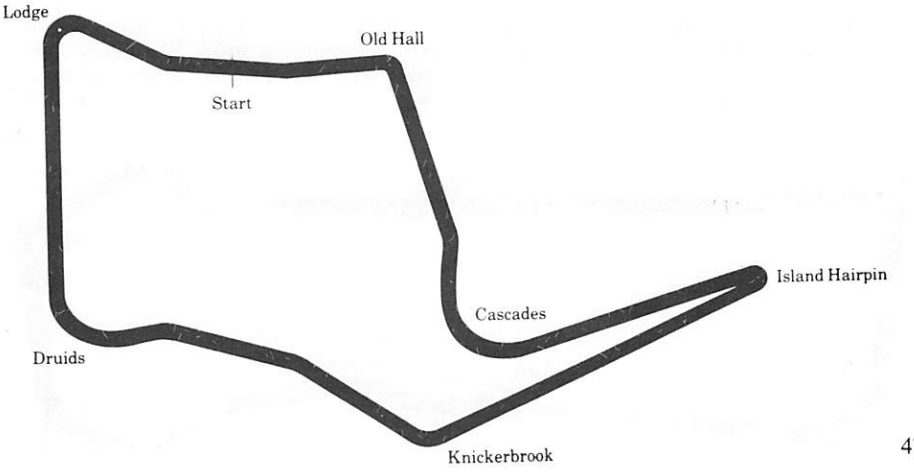
Cascades
Make sure, as you approach the right-hand downhill sweep at the end of The Avenue, that you go through it from left to right so that you are well positioned on the right-hand side of the track for the entry to Cascades, which can be taken in 5th gear (but only just) but 4th will do for learning. After that small amount of braking run in quite late but quite hard and keep as much power on as you can, ensuring that you keep to a good solid apex. If you do the corner well you should see 6,000 in 4th or 5,000 in top before you set off for the hairpin.

Island Hairpin
Brake late and get down through the 'box to 1st gear quickly. Allow your momentum to turn you in and take you round the the first part of the turn, and then apply power as you begin to come out. Be careful not to put too much power on too soon or you will understeer off the outside of the circuit. You should take 2nd gear almost as soon as you straighten up on exit, and bear in mind that the 'Revs' power-steering is in use for this corner.

Knickerbrook
You will be in 5th gear when you approach the very fast and blind right-hander which should be taken flat out. It is important to make a good apex or you will run out of road on the exit, at which point you sould see about 5,500 rpm on a good lap.

Druids
Approach Druids on the left hand side of the track and a quick brush on the brakes is all you need before you turn in quite hard in 5th gear. Get back on the power and make your first apex (this is a double apex corner) early, then let the car slide out towards the middle of the track before you make your second apex which should see you over the brow and on the exit kerbing strip with about 5,400 rpm on the tacho.

Lodge
This is taken in 3rd gear after heavy braking, and remember that the corner is tighter than a right angle, so turn in quite late, make a good apex on the blind brow and accelerate over the exit kerbing with 5,400 rpm showing before you come back onto the start/finish straight.



SNETTERTON

1·10·5
1·05·0

Riches
Riches is approached in 5th gear and (depending on wing settings) can be taken flat out or nearly so. It is a double apex corner and it is therefore important to make a good first apex, after which the remainder of the turn should flow easily. 5,400 rpm should be a good target for the exit.

Sear
Hard braking is required and a change down to 2nd gear for this right-angled bend onto an important straight. Don't let your revs die too much in mid-corner, and aim to have about 5,700 rpm at the exit in 2nd gear.

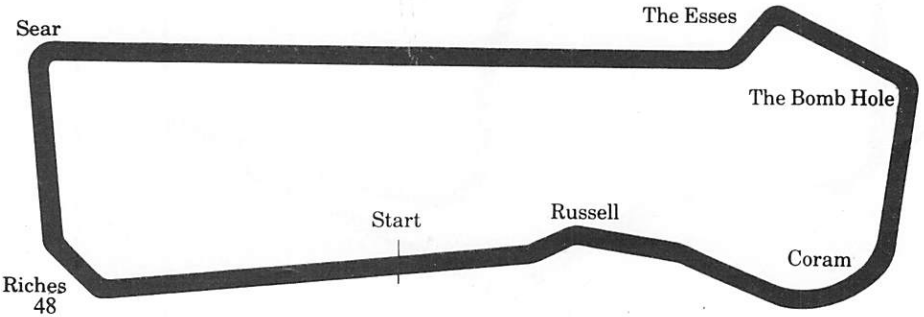
The Esses
There are two different approaches to the first part of the Esses, and it seems to be a matter of personal preference amongst drivers as to which one is best. The first method is to brake and change down to 3rd staying on the right hand side of the track and then power across on a normal racing line to an apex on the left, staying on the left of the track for the turn into the second section. The alternative is to approach on the right as normal, and then go diagonally left across the track on the brakes aiming directly for the apex while using the gearbox (down to 2nd in this instance) to help slow you down, then from the apex give the car a quick squirt before braking gently for the second section. Experiment with both techniques to see which is quicker on the stopwatch and, as a second consideration, which is more comfortable.

The second part of the Esses, taken in 2nd gear, is the most important bend on the circuit because you will have a long flat-out section of nearly a mile after it, so every rev gained here will stay with you for half of the circuit and your lap time will be correspondingly quicker. Make sure you are smooth and get the power on early through the bend, and don't let your revs die at any point otherwise a good lap time goes out of the window. 5,500 rpm would be a good exit speed.

The Bomb Hole
A really fun corner which should be flat out in 3rd gear. Turn in hard and get to your apex and it should not prove too difficult.

Coram
A long flat-out right-hander during which you should try to take 5th gear as soon as your revs in 4th will allow. It's not difficult to take flat, but a good smooth line is essential to ensure that you do not scrub off any hard-earned revs — a lot of tyre screeching is a sure sign that you are not being smooth enough!

Russell
One of the most challenging corners anywhere in terms of bottle! It is approached downhill with revs picking up quickly in 5th, and it is essential to get through here flat. You will need the car well balanced on the wings, and try not to make jerky movements on the steering — smoothness is eveything here, and good revs to see as you cross the start/finish line are a genuine 5,500.



132·4 qual 131·1 1:28·5 127·3
127·0

129·5 race 125·6 126·4
1:28·4 race 35-32 126·1 35-30
126·0 35-3

126·2

Bars
1:48·7