DeAGOSTINI MODEL SPACE™

Red Bull Racing
FORMULA ONE TEAM

RB7

RADIO CONTROLLED • BUILD IT YOURSELF • NITRO ENGINE

Pack 23

Stages 89-92

Contents

Visit our website www.model-space.com

Editorial and design by Continuo Creative, 39-41 North Road, London N7 9DP

RC SIGNAL TRANSMISSION

THE CONTROL SIGNALS FROM AN RC REMOTE CONTROL ARE DELIVERED TO THE MODEL'S RECEIVER BY RADIO WAVES. HERE'S AN OVERVIEW OF HOW THIS WORKS AND OF THE VARIOUS TRANSMISSION METHODS THAT CAN BE USED.

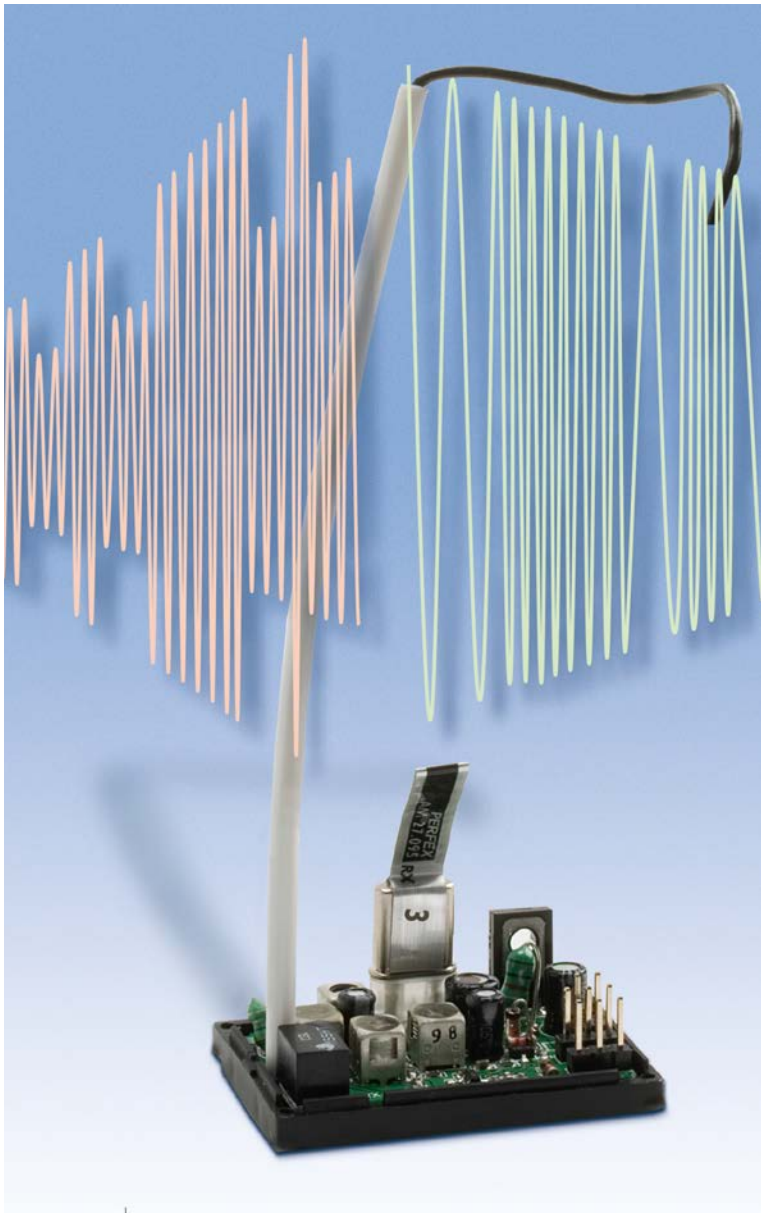
One of the decisions that someone buying or building a radio-controlled model may have to make is which control system to use – the traditional but still widely used 27MHz system or the more modern 2.4GHz.

27MHZ TECHNOLOGY

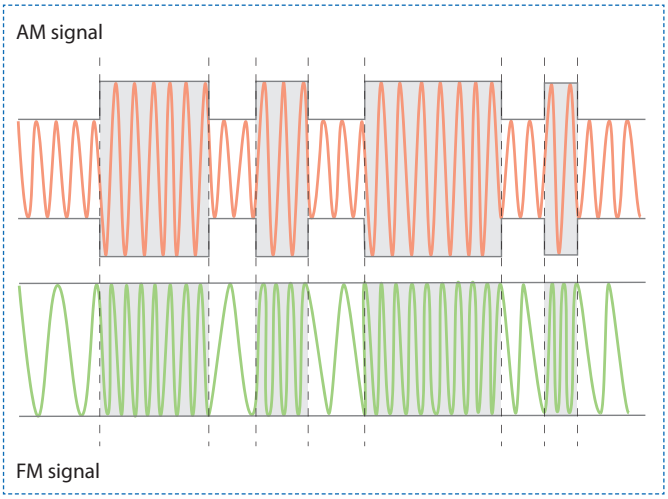
Tried and tested remote controls, such as those in the Kyosho Perfex range, transmit their signals on a channel in the 27MHz band. The frequency of the channel is determined by a quartz crystal in the transmitter (TX) of the remote control system, which must be used in conjunction with a matching crystal in the receiver (RX).

The quartz crystal in the receiver oscillates at precisely the same frequency as the crystal in the transmitter, so it receives only those signals within the 27MHz band that have the same frequency as those from the transmitter. It is these quartz crystals that enable several 27MHz radio control systems to operate together in the same place, on different frequencies without interfering with each other.

The signal picked up by the receiver contains all the control commands for the servo. To ensure that the receiver recognises the commands, the transmitter modifies the



The receiver of an RC system. The antenna picks up the signals from the transmitter and passes them to the circuit board, where they are decoded and passed on to the servos. Depending on the type, the receiver can receive either AM (red) or FM signals (green).



RC signals consist of a combination of control signals and a carrier signal. To combine them, the carrier signal is modulated, that is, changed, by the control signals. The modulation can take one of two forms: with amplitude modulation (AM), the control signals vary the amplitude of the carrier wave (red), while with frequency modulation (FM), the signals vary the wave's frequency (green).

transmitted signal at defined time intervals. This process is called modulation. The receiver first measures the time intervals between the changes in the signal to identify which command is intended for which servo. Then, as the second step, it measures the durations of the changes, which tell it in which direction the intended servo should be made to rotate.

The transmitter sends a uniform radio wave – the carrier signal – that is modulated so that it carries the command information as well. This modulation is performed in one of two ways.

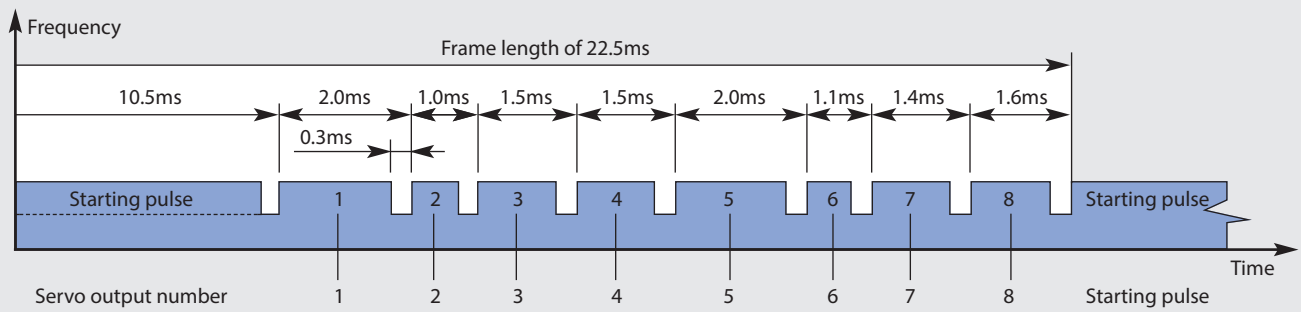
1. Amplitude modulation (AM). With this method, the commands for the servos are encoded by varying the amplitude (strength) of the carrier signal for different periods of time (see the upper part of the diagram on the left). The receiver decodes the signal and sends the commands to the servos.

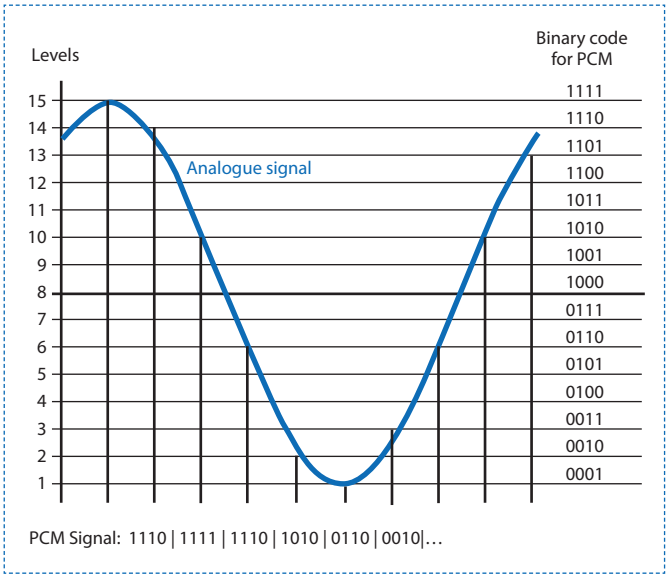
2. Frequency modulation (FM). With this type of modulation, the commands are encoded by varying the frequency of the carrier signal rather than its amplitude, which remains unchanged (see the lower part of the diagram above left).

In the field of RC models, amplitude modulation is used almost exclusively by systems operating in the 27MHz band, primarily those for RC cars. As such, 27MHz radio control systems are strongly represented in toys and entry-level models.

FRAME TRANSMISSION BY PULSE-PAUSE MODULATION (PPM)

The frame (time interval) of an eight-channel remote control. The control pulses for the servos, separated by pauses of 0.3ms, follow the 10.5ms starting pulse.





Pulse-code modulation: the blue line represents an electrical current that is proportional to the rotation of the steering wheel from extreme right to extreme left and back again. This analogue signal is sampled (the current is measured) at regular intervals (vertical black lines) by an analogue-to-digital converter, which produces binary signals that represent the sampled values and sends them to the transmitter.

ENCODING THE SIGNAL

For the control information (the positions of the steering wheel and the throttle lever) to modulate the 27MHz carrier signal, the sending unit first determines the current strengths of the two signals and summarises this information into two digital pulses of different duration. If the throttle is completely closed, for example, the transmitter unit emits a pulse of 0.5ms duration. When it is fully opened, the pulse lasts for 2.5ms. Based on these time intervals, the receiver calculates the direction in which the servo should move. The pulse can vary between the two values of 0.5 and 2.5ms.

Once the pulse duration has been determined and the signals have been created, the transmitter modulates them onto the carrier signal. In the case of AM, the modulation of the transmitter increases the amplitude of the carrier wave at predetermined time intervals. Such a time interval, referred to as a radio frame, has a duration of 20ms, so it is transmitted to the receiver about 50 times a second. To separate the intervals from one another, the remote control transmits a 10.5ms pulse at the beginning of each new time interval. This type of coding is referred to as pulse-pause modulation (or PPM, which is also the abbreviation for the related pulse-position modulation, or pulse-phase modulation).

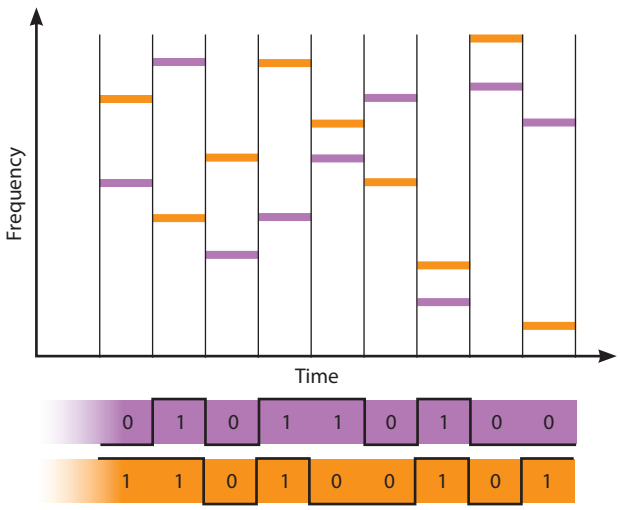
The time intervals are divided into several sections. This is done by the transmitter, with the individual pulses separated from one another by pauses with a duration of 0.3ms each. The number of sections included in an interval depends on the radio system. In the case of a two-channel system, such as the Kyosho Perfex, there are three. The start pulse is followed by two pauses with a length of 0.3ms, each followed by two other sections that contain the control information for the two servos on board the model.

2.4GHz TECHNOLOGY

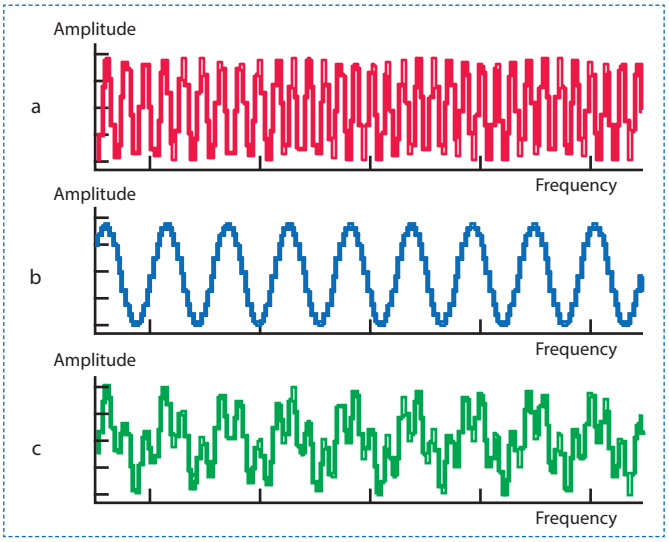
Modern remote control systems, such as the Kyosho Syncro series, use the 2.4GHz band for their radio transmissions. Transmission of signals is carried out using the same basic principle, that is, the control information is modulated onto a carrier signal and transmitted to the receiver, which decodes it – but for 2.4GHz remote controls, the transmission frequency and the type of signal conversion are different.

The first difference lies in the modulation method. While the 27MHz system uses pulse-pause modulation (PPM), conversion in the 2.4GHz system is carried out by pulse-code modulation (PCM). Here, the analogue signal for the servo is converted into a digital sequence of bits using an analogue-to-digital converter. The current strength (level) is measured at regular time intervals and assigned a corresponding value, from 1 to 15 in the case of the diagram above. Here, the number 8 on the left marks the neutral position of the servos. Numbers 1 to 7 indicate a turn to the left and numbers 9 to 15 a turn to the right. For example, a maximum steering angle to the left is indicated on the right side of the chart by the binary code 0001 (that is, OFF OFF OFF ON).

The carrier signal is then modulated by the control signal, which is transmitted in the frequency range of 2,400MHz to



Representation of an FHSS transmission on two channels. The transmission uses the whole frequency band. The jump sequences for channel 1 (purple) and channel 2 (orange) differ significantly.



The diagrams above show an encoded AM signal (a) and its two component parts – the carrier signal alone (b) and, at the bottom, the modulating signal that represents the control signals (c).

2,483.5MHz (2.4 to 2.4835GHz). This range is divided in turn into 80 channels. Unlike 'traditional' radio control systems, this carrier signal is not transmitted on only one channel, but switches to a different channel every 0.4 seconds.

FHSS TRANSMISSION

The method that the Kyosho Syncro uses to jump from one frequency to another, and to determine which frequency to use next, is called frequency-hopping spread spectrum (FHSS). In this system, the transmitter and receiver are synchronised as they switch between the various channels.

So how does the receiver know what channel the transmitter will jump to next? The receiver learns this during the so-called 'binding' process. After the transmitter and receiver are first powered up, both devices are made known to each other; this is done only once for a session. For example, after turning on the Kyosho KR-200 receiver, the procedure is to use a ballpoint pen or other pointed item to push the 'Bind set' button until the LED stops flashing. This transmits the 'hopping sequence' from the transmitter to the receiver, where it is stored.

Once the control signal is encoded and the hopping sequence is known, the control signal is modulated onto the carrier signal. This means that the frequency of the carrier signal for each '1' (that is, each ON signal) is increased or reduced by a predetermined amount and then transmitted to the receiver.

The receiver captures the signal and separates the control signal from the carrier signal. It follows the hopping sequence of the transmitter and filters the carrier frequency from each hopping frequency, leaving only the desired signal remaining as a sequence of ON and OFF signals. This is now divided into blocks a maximum of 0.4 seconds long, and the binary code it contains is extracted. A digital-to-analogue converter then generates a predetermined current based on each code value, and sends it to the servo.

REPLACING THE STARTER CORD

IN THE NEXT ARTICLE, WE'LL BE TELLING YOU HOW TO START UP YOUR MODEL'S GX21 ENGINE FOR THE FIRST TIME. BEFORE YOU DO THAT, THOUGH, IT'S WORTH LEARNING HOW TO REPLACE THE STARTER CORD SHOULD YOU ACCIDENTALLY BREAK IT BY PULLING IT TOO HARD OR OUT TOO FAR.

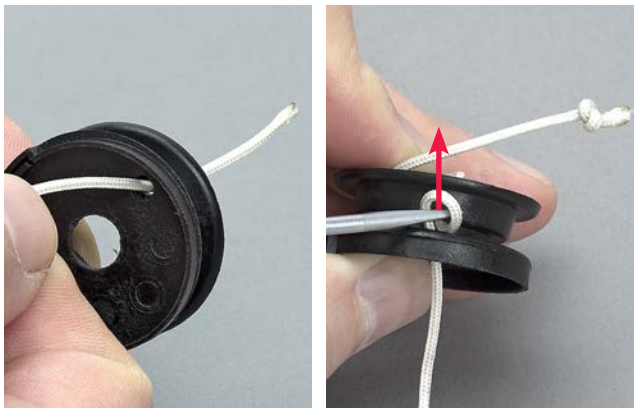
If the recoil starter cord breaks, the spring-loaded rewind mechanism will pull the cord's free end back into the starter housing. If this happens, you have no choice but to remove the engine from the chassis and take off the recoil starter assembly. When you've done that, first remove the plastic retainer that holds the cord reel in the housing, and then take out the reel itself – the spring will pop out from the back of the reel, so please note the warning in the box above right. Next, lift the starter clutch out of the reel (see photo below), so that you can remove the broken cord.

To reach the end of the starter cord, you must open the starter housing, remove the coil spring and then pry the starter clutch (the hexagonal one-way bearing) out of the reel. This is best done with a flat-headed screwdriver, as shown here.

ATTENTION!

When you dismantle the starter mechanism, you will be releasing the rewind spring, which may unwind suddenly and uncontrollably and hit you in the eye. To avoid injury, open the starter housing extremely carefully, holding it at arm's length, and wear safety glasses. You should also wear the glasses when you reassemble the mechanism.

A broken starter cord, the result of pulling it too hard when trying to start the engine. For more information on the GX21's recoil starter mechanism, please refer to the introductory articles on the component in Packs 17 and 18.



Stage 1: Thread the new cord in from the rear through both side walls of the reel. Knot the end at the front, then use a crochet hook to pull the other end through so that the cord can be wound onto the reel.

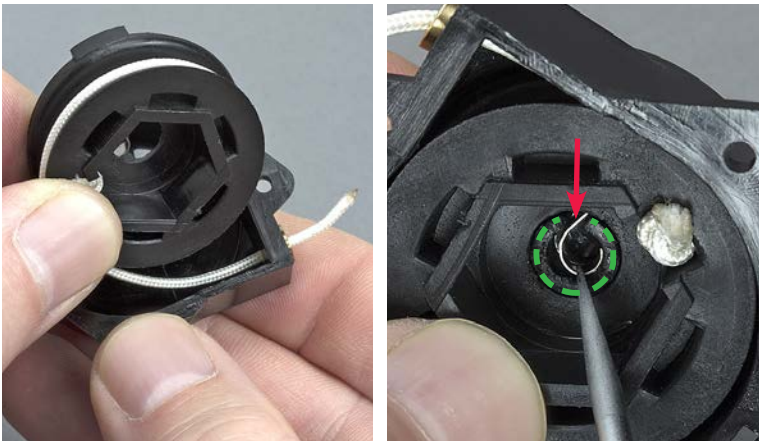
Stage 2: Fix the outer end of the spring to the slot in the edge of the rear side of the reel, as shown. Then wind the spring slowly anticlockwise, holding it against the rear side of the reel.

Now cut a 45cm length from the remaining piece of cord, and, taking this along as a sample, go to a hardware store and buy a replacement cord. Choose one made of braided nylon, of equal strength and similar diameter to the original, and buy an adequate length – about 60cm.

Attach the new cord as shown in Stage 1, above. Before threading the cord, it is best to heat the cut ends carefully with a lighter to 'weld' the strands together so that they don't unravel. When the cord is in place, refit the spring as shown in Stage 2, above right, wearing safety glasses to protect your eyes in case the end flies out. When the spring is in position, its curved inner end should be positioned over the central hole of the reel.

Rotate the reel carefully to wind on the new cord in seven anticlockwise turns in the central groove, as in Stage 3, below left, and thread the free end out through the eye of the housing. Now you can put the reel back into the housing and refit the clutch, holding the spring against the back with its end anchored in the slot in the rear wall. When you have done this, secure the reel with the retainer you removed at the start, and finish the repair as shown in Stage 4, below.

Stage 3: The new cord, as seen from the front, is wound anticlockwise around the reel. When the reel is fitted into the housing, the inner end of the spring (red arrow) should be anchored in the slot in the centre of the rear wall, indicated by the dotted green circle.



Stage 4: Thread the new cord through the end of the starter handle. Before you knot the end, pull out a length of at least one turn of the reel (8 to 10cm), so that the spring is tensioned and will hold the handle in place when the car is running. Trim off any excess cord.

STARTING UP FOR THE FIRST TIME

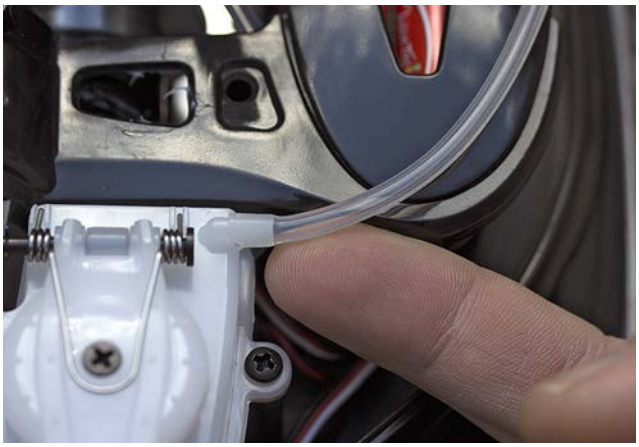
YOUR RB7 RC RACER IS NOW READY TO BE STARTED UP FOR THE FIRST TIME. HERE'S HOW TO BRING ITS GX21 ENGINE TO LIFE AND RUN IT IN AS GENTLY AND EFFECTIVELY AS POSSIBLE, AND HOW TO BRING IT GRADUALLY UP TO SPEED.

After zeroing the servos, as explained in Pack 22, your RB7 racer has, technically, been ready to roll. But in practice, it still needs some further preparation to ready it for its maiden drive: internal combustion engines, such as the GX21, must be run in, so that all their moving parts work smoothly together. After your engine has burned up three or four tanks of fuel, the running-in process will be complete. Only when this is done properly will the engine be able to deliver its full potential.

To start with, carry out a general safety check. Make sure that all screws and nuts are tight, so that nothing will be shaken apart by the vibration of the running engine. In particular, check that the exhaust system is attached tightly to the engine. Now check that all the moving parts of the

Right: A car stand – the blue anodised aluminium model on the right has non-slip rubber pads – provides the necessary stability for starting your RB7 car.
To start the engine, you need a charged glow plug starter, a supply of fuel, a fuel bottle, your remote control and a flat-headed screwdriver.

Apply a little grease to the main gear of the transmission, and distribute the lubricant by turning the drive train by hand.



The fuel lines must be firmly anchored to their respective ports and must not have any kinks.

drive train are able to rotate freely. If the main gear and pinion were not lubricated when they were assembled, apply some grease to them now. The wheel shafts and the ends of the driveshafts will also benefit from a little universal or silicone grease.

Next, check the fuel line between the tank and the carburettor and the pressure line between the exhaust system and the fuel tank. Are the tubes secure and properly positioned? Are there any kinks?

READY TO RUN

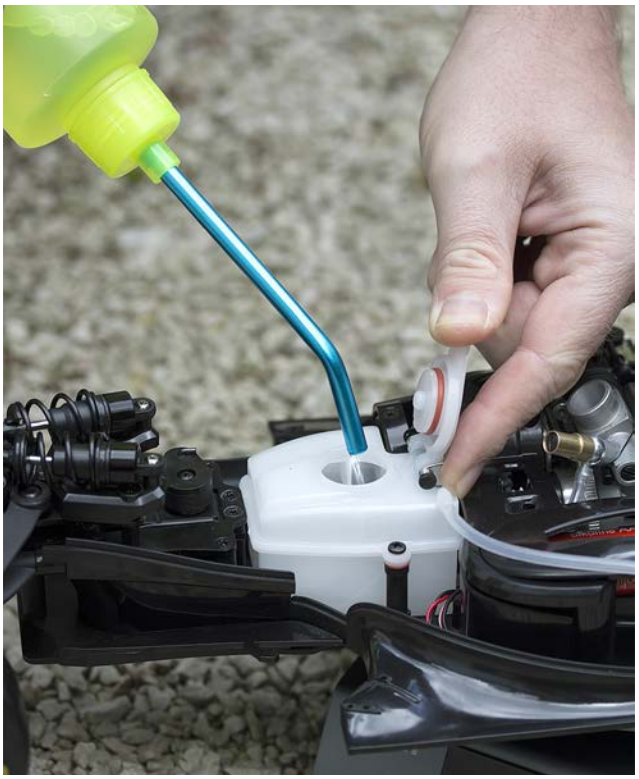
For safety reasons, model nitro engines must only be run outdoors. For the first run, choose a site where you won't endanger anyone or irritate them with the noise of the engine. As well as the model and remote control, your 'starter kit' should include a stand or base compatible with your RB7, fresh batteries and a fuel bottle filled with a suitable nitro fuel. The GX21 is so ruggedly built that it can stand a 'hot mix' with 20 per cent nitro content for the

Remove the air filter from the inlet port of the carburettor and keep it safely in your hand until it's time to refit it.

Choose an appropriate place in the open air and place your RB7 in position on a suitable raised stand.

Above: Fill the fuel bottle by pressing the sides together and sucking the fuel from the spout of the fuel container.

Below: Using a fuel bottle, it's easy to control the amount of fuel you put into the tank and the speed of filling. Fill the tank to just below the bottom of the opening, and be careful not to spill any fuel.



IMPORTANT!

REASSEMBLING THE ENGINE

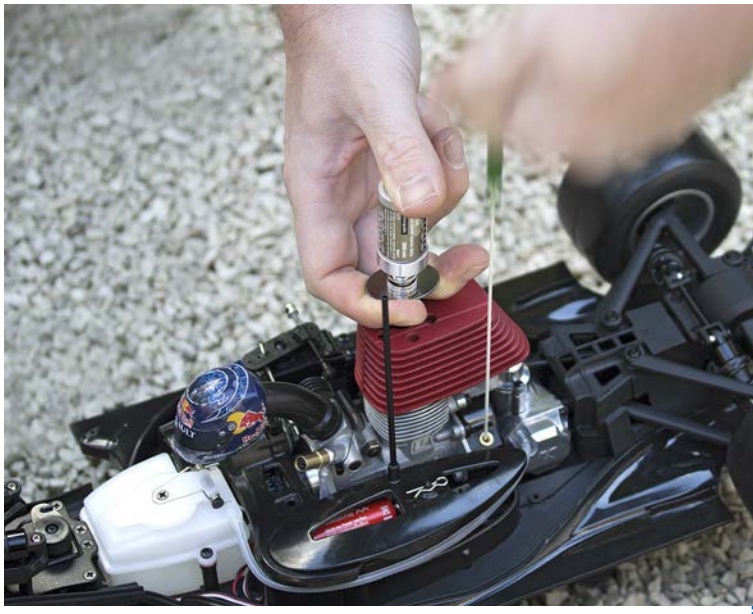
The Assembly Guides of the previous two packs showed you how to assemble and fit your RB7's display body, and to do this, you had to remove the engine's cylinder head, in Stage 88. If you have done this, then before you can start the engine for the first time, you must reassemble it by following the steps below (see also the Assembly Guides of Stages 66 and 67):

- Check that the cylinder liner is correctly aligned
- Fit the cylinder head back onto the engine block, together with its two gaskets and six retaining screws
- Remove all parts of the display body, including the rear wing, so that they don't get damaged

Above: Fit both the transmitter and receiver with fresh batteries and switch them on (first the transmitter, then the receiver). Check that the throttle and brake rods are operating correctly by moving the trigger of the transmitter back and forth. Then adjust the carburettor.

Right: Open the throttle and put two or three drops of fuel directly into the inlet port. Then close the throttle and reattach the air filter.

Attach the air filter to the carburettor again, then firmly push the glow starter onto the glow plug with one hand while the other holds the handle of the starter, as shown.



Let the glow plug glow for about three seconds, then pull the starter cord three or four times in quick succession with moderate force. Here, the glow starter is still in place.

first start without suffering any damage. The high-nitro fuel makes it easier to get the engine started for the very first time. For information on suitable fuels and how to handle them safely, see the article on fuels for RC cars in Pack 21.

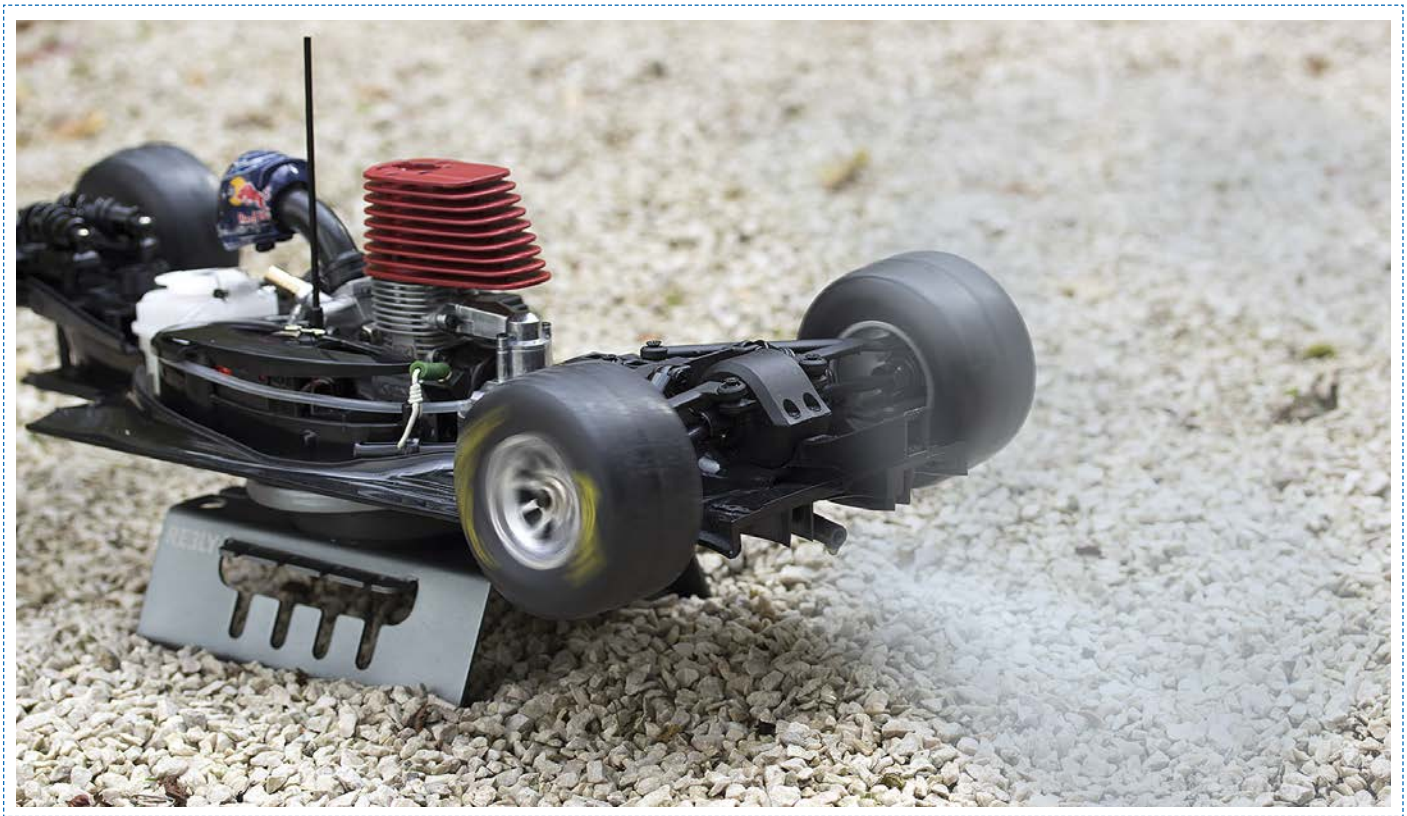
When your model is mounted on the stand and ready to run, the first job is to adjust the carburettor (as explained in Pack 18). Screw the main needle valve clockwise as far as it will go, then unscrew it again four turns. Likewise, set the idle mixture screw. Check this by eye: at the basic setting, the head of the screw should be sunk into its housing by about 0.5mm.

For the first start, the optimum adjustment of the throttle slide gap via the idle stop (the idle adjustment screw) may depend on the weather conditions, such as the atmospheric pressure. To keep your options open so that you can adjust the setting quickly when starting, set the idle stop to the recommended factory minimum of 0.3mm, and then increase it if necessary (optionally up to about 2mm, see the lower two photos on page 470) by turning the throttle servo trim control slightly clockwise.

THE STARTING PROCESS

After filling the tank and priming the carburettor with a few drops of fuel (see bottom right photograph on page 468), you are ready to go. Note that the moving parts of the engine may stick a little at first, so never use excessive force when pulling the starter cord, or it may break, or the starter itself may be damaged. Never pull out more than 25 to

The adjustment screw for the idle stop is fitted at the base of the main needle valve. Rotating it clockwise opens the carburettor slide and raises the idling speed.



Above: After a few attempts, the engine will start. The bluish smoke is evidence that the mixture is rich enough.

30cm of the cord, and only make three or four moderately strong pulls in quick succession.

If the starter doesn't turn the engine when moderate force is applied, it's likely that some fuel has accumulated in the combustion chamber. In that case, you should remove the glow plug and pull the starter cord once more, to flush the fuel from the cylinder. Then replace the glow plug and repeat the starting procedure. If the problem occurs again (that is, if the engine won't fire up when the starter cord is pulled with moderate force), close the main needle valve by about a quarter of a turn. Other common causes of not starting are:

- No fuel in the carburettor – put 2 to 3 drops of fuel directly into the inlet port
- Throttle slide gap is smaller than 0.3mm – turn the idle stop further or adjust the throttle servo trimmer
- Glow plug is not heating – remove it and check the heating process. If necessary, recharge the glow starter or replace the glow plug (see Pack 18)

If none of these measures is successful, experiment with

Below: To increase the carburettor's idle stop setting when the engine is running, you turn the throttle servo trim control slightly clockwise.

Set the idle stop to a minimum value of 0.3mm. Then you can adjust the gap as needed using the trimmer on the transmitter.

slightly different carburettor settings. Open the slide a little further, or turn the mixture screw half a turn in or out. When you have found the right combination of carburettor settings, the engine should start without any trouble. In some rare instances, this may not be the case, so to help you resolve additional situations in which starting the engine for the first time proves particularly difficult, we have put together a few expert tips that will appear in a future pack.

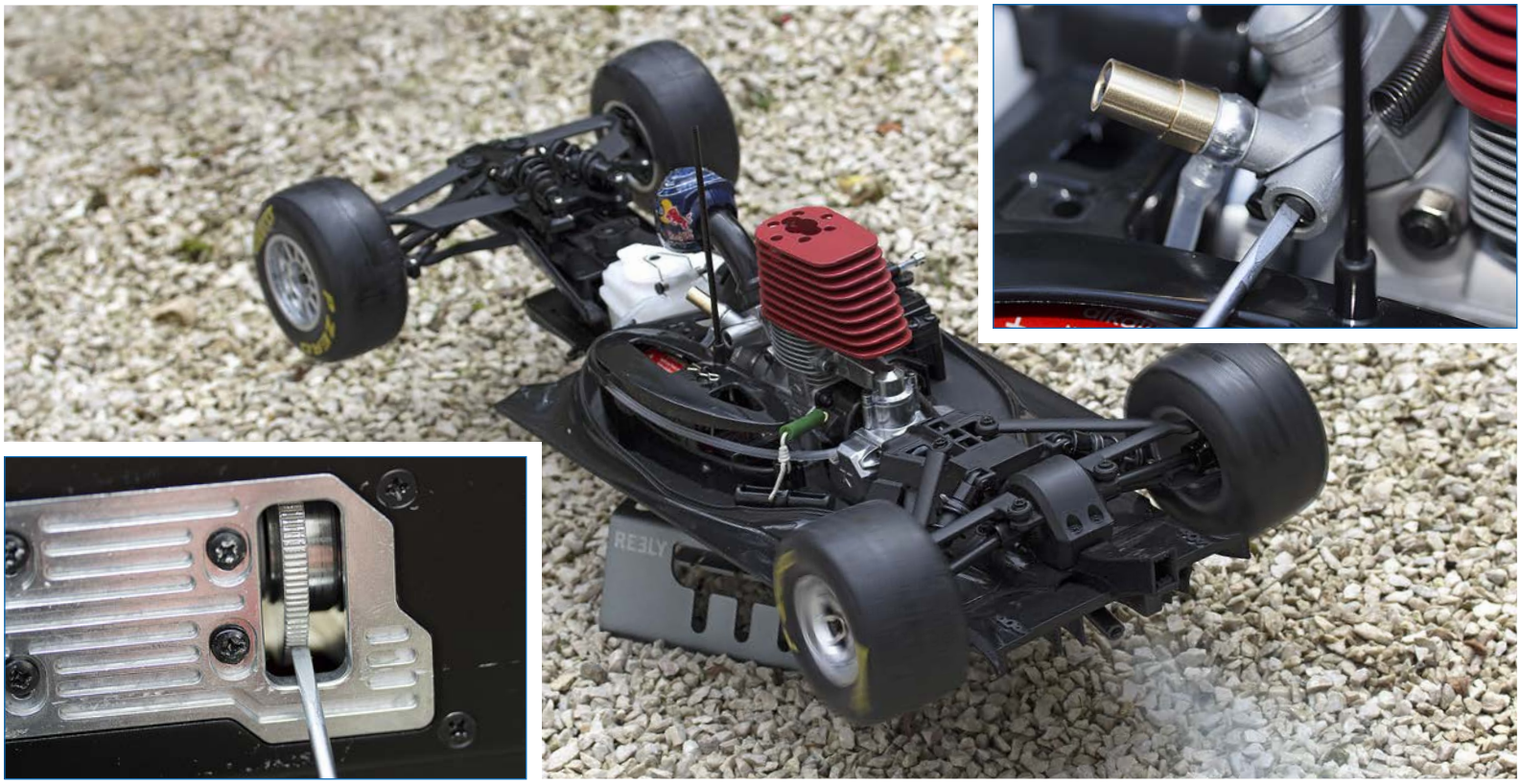
THE RUNNING-IN PHASE

When the engine is running, the first thing to do is to set the speed and mixture so that the engine turns at as fast an idling speed as possible without engaging the clutch. To achieve this, reduce the throttle trimmer of the remote control and close the carburettor slide until the wheels of your RB7 no longer rotate. To make the running-in process as gentle as possible, the engine should at first be run fairly rich rather than too lean. A thin, slightly bluish smoke from the exhaust shows that the mixture is correct. If there is no smoke, turn the mixture screw out another quarter turn.

Once you've adjusted the idling speed, you can gently open the throttle by pulling the trigger on the transmitter until the wheels start to turn. If the engine stops when this is done, the mixture is too rich. On the other hand, if there is a plume of smoke when accelerating, the mixture is too lean. Adjust the mixture screw accordingly until the engine runs smoothly when accelerating. Never pull the trigger more than halfway.

Continue running the engine until the first tank of fuel is finished. Then stop the engine and lock the flywheel with a screwdriver (see the inset photograph below left). Let the engine cool down completely before you continue running it. You can use the next tanks of fuel for trying out your first driving manoeuvres.

Adjust the mixture screw (inset photo below right) so that the wheels are just turning when the engine is idling, there is a slightly bluish plume of smoke and the engine responds when the throttle is opened. When the fuel tank is empty, stop the engine and lock the flywheel with a screwdriver (inset photo below left).



DRIVING YOUR RB7 – PART ONE

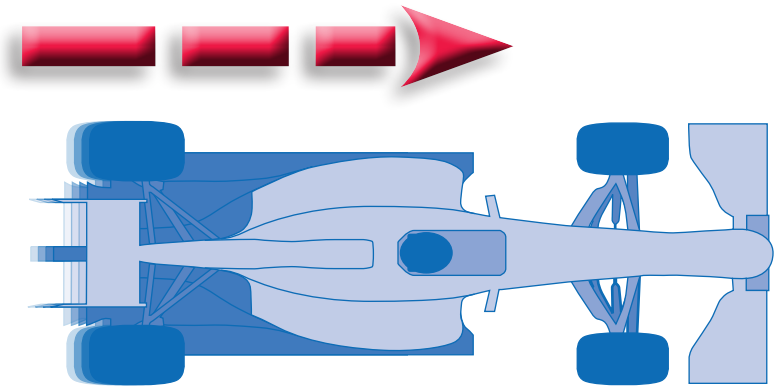
BEFORE YOU TAKE YOUR RB7 RACER OUT ON THE TRACK, YOU SHOULD FAMILIARISE YOURSELF WITH SOME BASIC DRIVING MANOEUVRES. LEARN TO CONTROL YOUR MODEL GRADUALLY, TAKING IT ONE STEP AT A TIME AND DRIVING SLOWLY TO START WITH.

For the maiden run of your RB7, you must first find a suitable outdoor site. Choose a tarmac or concrete area of at least eight metres by four, such as a domestic garage driveway or parking area, but one where you will not put anyone at risk or bother them. As well as your RC car and remote control, you will need a full fuel bottle, a glow plug starter and a screwdriver for adjusting the carburettor. Prepare your RB7 racer as described in the previous article, and check the operation of the steering. Set the Steering Dual Rate knob to the middle position between 0 and 10.

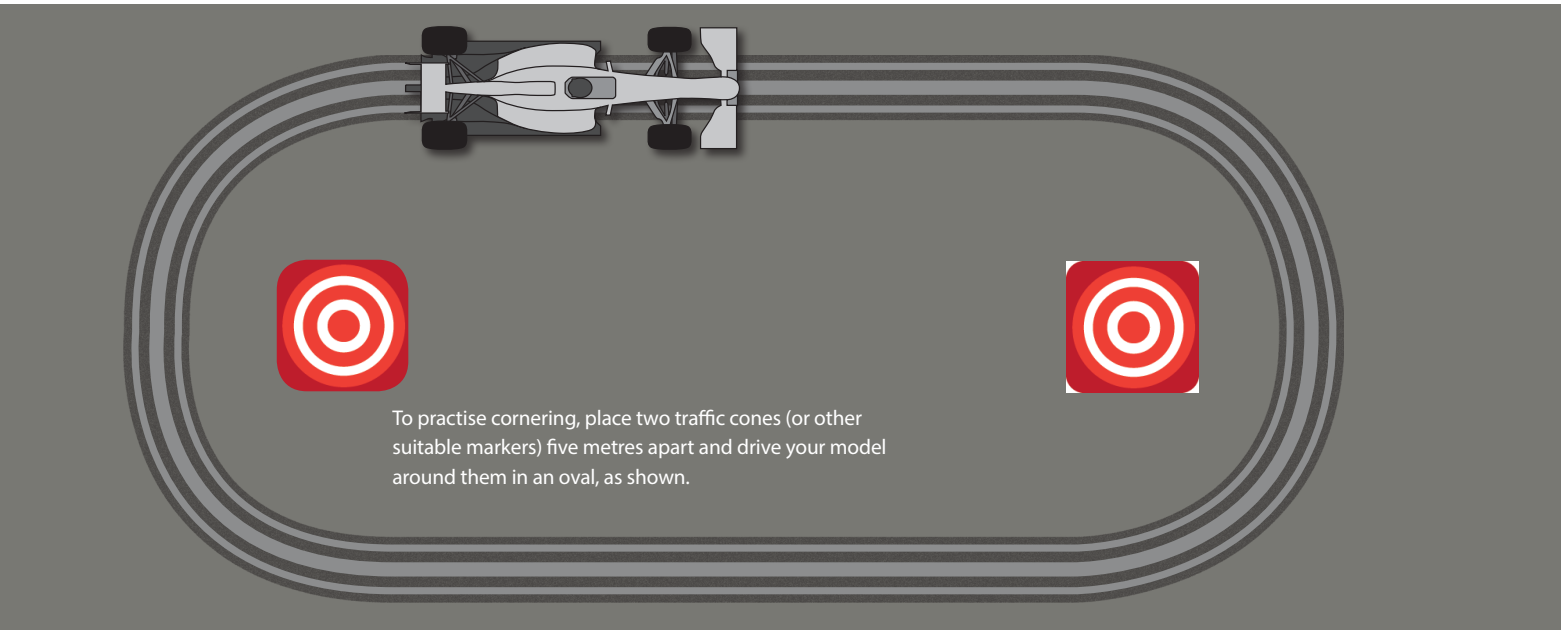
THE FIRST START ON WHEELS

The first time you started up your RB7, it was on a stand, but this time your model will be on the ground. Again, follow the steps described in the previous article to start the engine – it should now be running at idling speed and not moving the car. Remember that the engine is not yet fully run in, so do not give it full throttle.

To start moving the car, pull the remote control trigger back about a third of the way. The car will start moving forward. Then stop the car again by pushing the trigger



The first runs will get you used to the behaviour of the accelerator and brake. Pull the trigger back about a third of the way (blue line) to accelerate the car, then push it forwards to apply the brake. Repeat this several times, opening the throttle progressively more each time until you reach about three-quarters of the full throttle position (dotted red line).



To practise cornering, place two traffic cones (or other suitable markers) five metres apart and drive your model around them in an oval, as shown.

forwards. Repeat this process several times, applying a little more throttle each time. When you are confident with accelerating and braking the car, you can let it run straight over a longer distance (five to eight metres) to see if it holds its line accurately. If it deviates to one side or the other, use the Steering Trim knob to adjust the angle of your RB7's front wheels.

YOUR FIRST CIRCUIT

Set up two traffic cones about five metres apart (two paper towel rolls are also suitable). Drive slowly around these obstacles, first in a clockwise oval – note that when the model is driving towards you, the effect of the steering control appears reversed – and gradually increase the speed. Next, drive anticlockwise around the obstacles to learn to how to handle left-hand corners. Again, start slowly and increase the speed little by little as you become more confident. Soon, you will be ready to learn some more complicated manoeuvres, which will be described in the next pack.

You can also use this first practice drive to optimise the carburettor adjustment. Watch the exhaust smoke and always ensure that the mixture is rich enough when accelerating. When the fuel tank is nearly empty, screw the main needle valve in by half a turn to optimise the fuel flow through the carburettor.

Controlling the car when it is coming towards you may take a little getting used to. The steering direction of the car (blue arrow) appears to be in the opposite direction to what was asked for by the rotation of the steering control (orange arrow) – you steer right, and the oncoming car goes to your left.

Stage 89

ADDING THE UNDERBODY

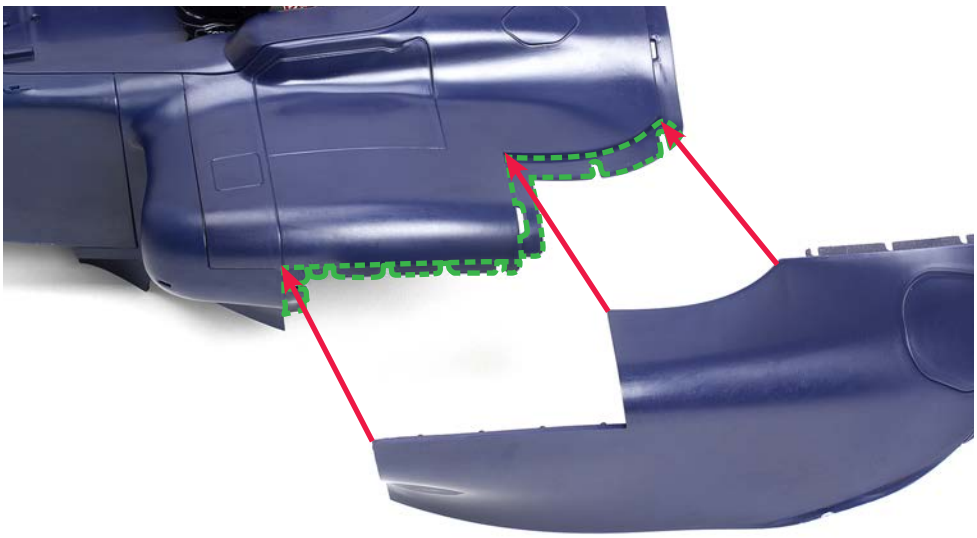
IN THIS SESSION, YOU WILL ATTACH THE LEFT AND RIGHT UNDERBODY PARTS TO YOUR RB7 MODEL'S DISPLAY BODY.

Tools & Materials

Modelling adhesive

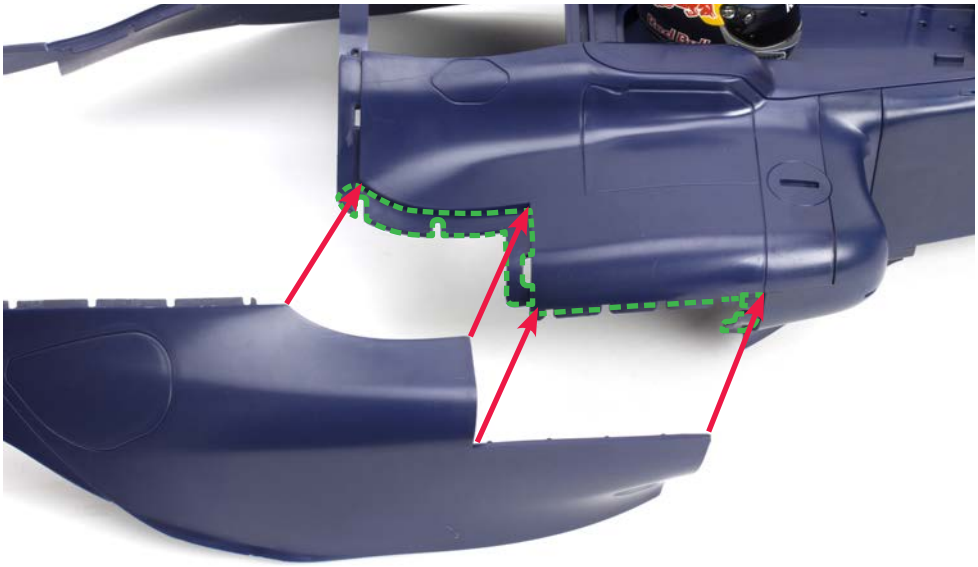
1 Right underbody

2 Left underbody



01 Place your display body assembly on your work surface with the nose facing to the left. Apply modelling adhesive to the area outlined by the green dotted lines, then position the left underbody so that it rests against the ridge on the left side of the display body (red arrows). Hold it in position for around three minutes to allow the adhesive to set, making sure there are no gaps between the parts.

02 Your assembly should now look like this.



03 Repeat Step 01 to attach the right underbody to the right side of the display body.

04 This stage is now complete, and you will see your RB7's display body beginning to take shape.

Stage 90

DISPLAY BODY INDUCTION POD

YOUR MODEL'S DISPLAY BODY FEATURES AN AIR INDUCTION (INTAKE) POD, SET BEHIND AND ABOVE THE DRIVER'S HELMET. ON THE REAL RB7, THIS POD CHANNELS AIR TO THE ENGINE.

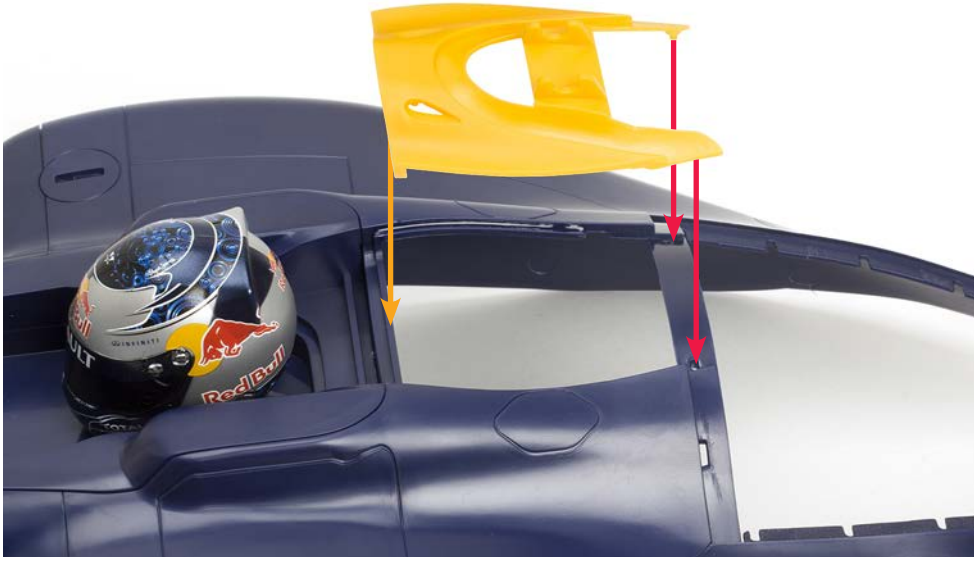
Tools & Materials

Modelling adhesive
Needle-nose pliers

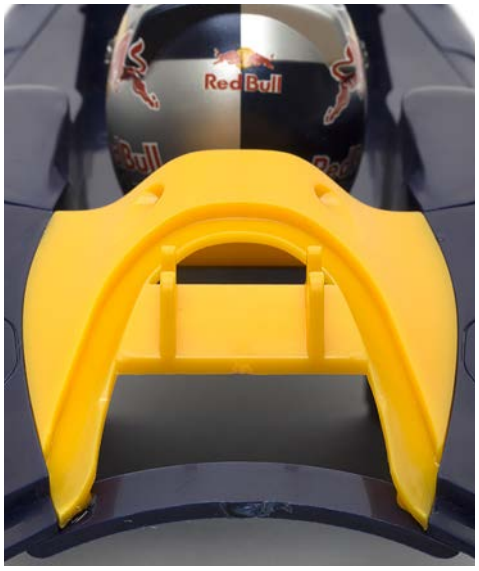
1. Left induction pod side
2. Right induction pod side
3. Left and right induction pod pillars
4. Induction pod mount
5. Headrest

01 The induction pod mount will cover the space in the display body directly behind the driver's helmet. Carefully spread a thin layer of modelling adhesive along the edges marked by the dotted green line.

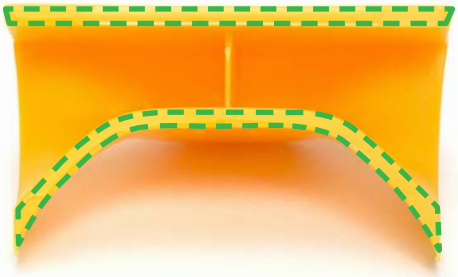
02 Now dot some adhesive onto the pins on the undersides of the induction pod mount's U-shaped ends.



03 Lower the induction pod mount onto the space behind the driver's helmet, so that the two pins dabbed with glue in Step 02 sit in the holes in the bodywork (red arrows), and the front edge of the mount is flush with the ridge behind the helmet (orange arrow).



04 Press the parts together to secure them, making sure there are no gaps between their edges.

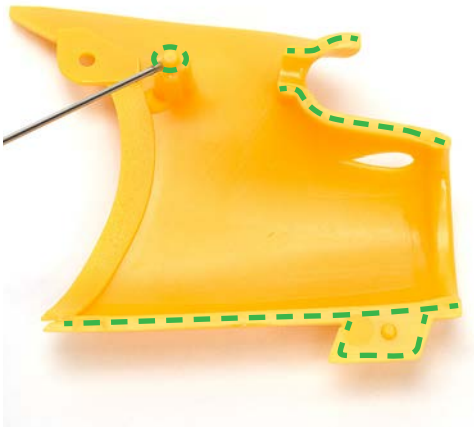


05 Next, spread adhesive along the lower edges of the headrest, outlined here by the dotted green lines.

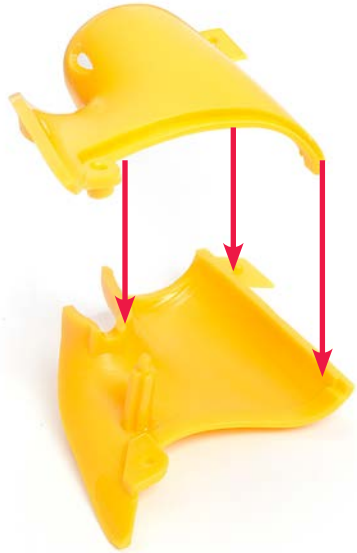
06 Spread adhesive onto the back of the headrest. Using a brush will help you get an even application.

07 Put a little adhesive on the side edges of the headrest (the left-hand edge is indicated here by the dotted green line). Then lower the headrest into the space between the induction pod mount and the back of the driver's helmet.

08 Press the headrest down into the space and against the front edge of the induction pod mount.



09 The two halves of the induction pod are glued together before being mounted on the display body. Lay the right side of the pod on your work surface and dab adhesive onto the edges marked here with the dotted green lines.



10 Lower the left side of the induction pod onto the right side, so that the edges meet neatly and the two pins on the right side fit into the corresponding holes on the left.

11 The assembled induction pod will be glued to the top of the induction pod mount fitted in Step 03. Prepare for this by dabbing some adhesive onto the area marked by the dotted green line.

12 Lower the induction pod onto the mount, and press it down so that it sticks firmly in place.

13 The two teardrop-shaped holes on each side of the front of the induction pod are where the pillars will fit. Before applying any adhesive to the pillars, test-fit them to identify which is left and which is right.

14 Dab the small pins at the ends of the right induction pod pillar with a little adhesive. Then, using needle-nose pliers, push the pillar firmly into place with the pins inside the holes on the pod. Repeat for the left-hand pillar.

15 This stage is now complete, and the finished induction pod should look like this, with minimal gaps in the joins between the assembled parts.

Stage 91

THE UPPER BODY SECTIONS

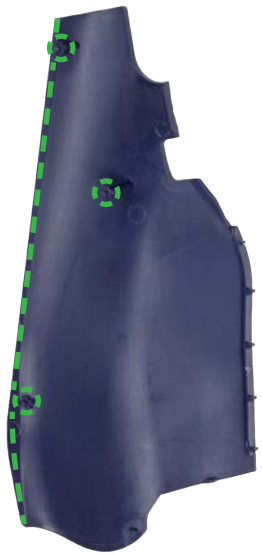
IN THIS SESSION, YOU FIT THE LEFT AND RIGHT UPPER SECTIONS TO YOUR RB7'S DISPLAY BODY. THESE MAKE UP THE ENGINE COVER THAT FORMS THE UPPER REAR PART OF THE MODEL'S BODYWORK.

Tools & Materials

Modelling adhesive

1 Right upper body

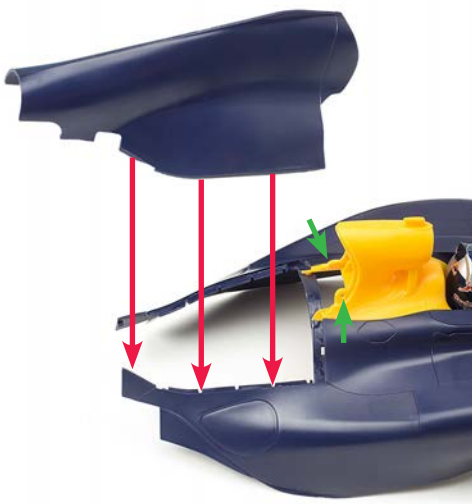
2 Left upper body



01 Look at the inside of the right upper body to locate the three small pins, each circled in green. Dab each of these with modelling adhesive, and spread adhesive carefully along the edge marked here by the dotted line.

02 Join the two upper body sections together along the edge spread with adhesive in Step 01, with the three pins on the right side fitting into the corresponding holes on the left. Hold for at least a minute, making sure no gaps appear (red arrows), then leave for a few minutes for the glue to dry.

03 When the glue holding the upper body sections together is dry, they will be fitted into position on the display body, directly behind the yellow induction pod. Prepare for this by applying adhesive to the display body edges marked with the dotted line.



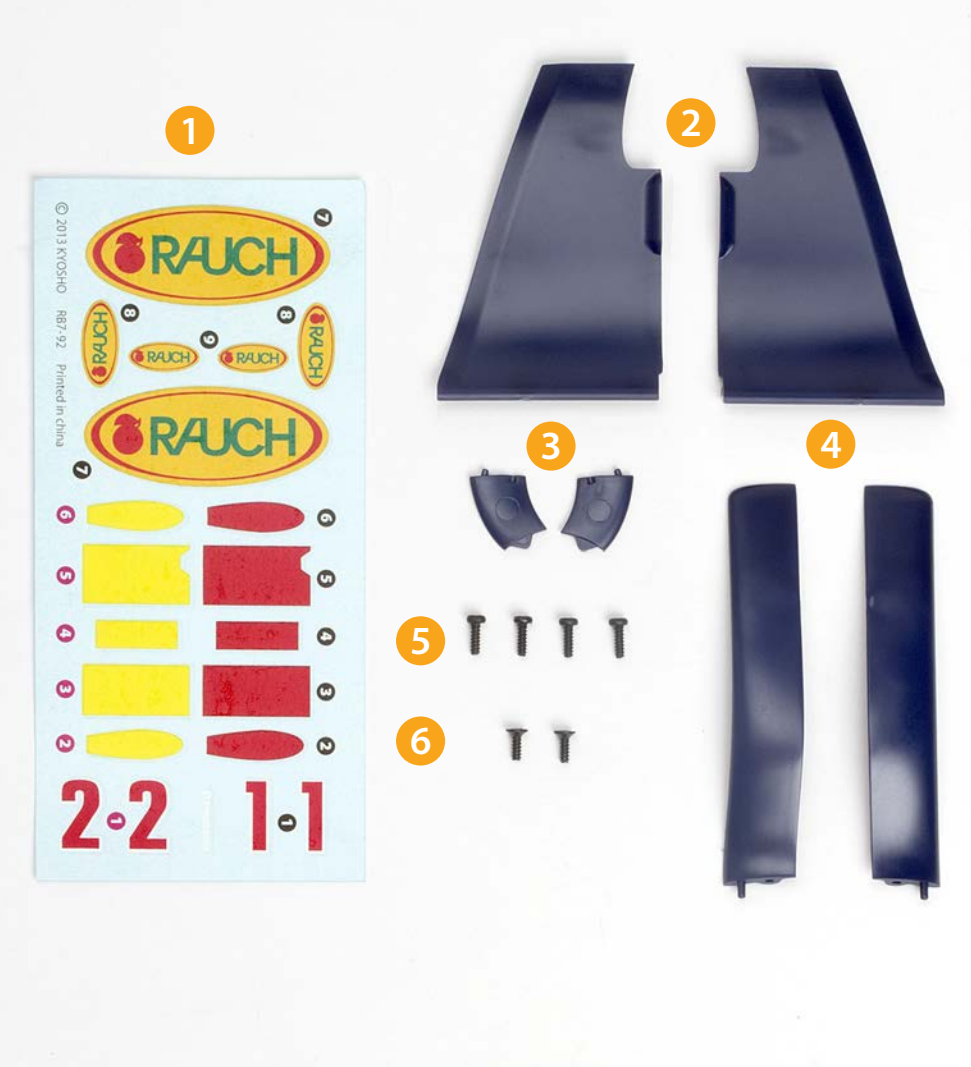
04 Lower the upper body assembly into position. The pins along the edges of the assembly should fit into the holes in the display body (red arrows). Carefully fit the front of the assembly over the rear of the induction pod, so that the two small pins can fit into the holes in the pod (green arrows).

05 Take a look at the underside of the induction pod to ensure that the pins on the upper body assembly have entered the holes correctly, as marked by the green arrows (inset photo). Then hold the upper body sides firmly in place on the display body for around a minute while the glue dries, making sure no gaps form along any joins. This stage is now complete, and your assembly should look like the one in the main photo above.

Stage 92

TURNING VANES AND BARGEBOARDS

IN THIS SESSION, YOU DECORATE AND ASSEMBLE THE LEFT AND RIGHT TURNING VANES AND BARGEBOARDS – IMPORTANT AERODYNAMIC FEATURES OF THE REAL RB7 – BEFORE FITTING THEM TO YOUR MODEL'S CHASSIS.



Tools & Materials

- Phillips screwdriver (size 0)
- Modelling adhesive
- Knife
- Tweezers
- Needle-nose pliers

1. Decal sheet
2. Front bargeboards (left and right)
3. Turning vane stays (left and right)
4. Turning vanes (left and right)
5. 4 flat-head screws 2 x 6mm
6. 2 countersunk screws 2 x 6mm

01 Before you begin assembling the bargeboards and turning vanes, you will need to apply the official decals supplied with this stage. First, use a knife to cut carefully around one of the RAUCH logos (numbers 7) and remove its protective film.

02 Soak the RAUCH logo in a little water for about a minute, using tweezers to handle it.

03 Lay the left bargeboard flat on your work surface, as shown, then carefully apply the decal and allow it to dry. Repeat Steps 01-03 to apply the second RAUCH decal to the right bargeboard.

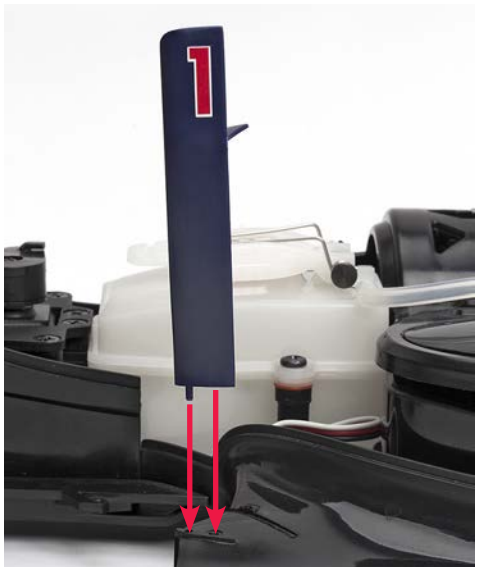
04 As you did for the RAUCH logos, cut around the Number 1 on the decal sheet. Remove the protective film and soak the decal in water for around one minute.

05 Place the left turning vane on your work surface with the smooth side facing up. Carefully apply the decal to the top of the part, as shown, and allow it to dry before proceeding.

06 Once the decal is dry, turn the vane over and apply a little glue to the shaped ridge and its pin and hole.

07 Using needle-nose pliers, lower the left turning vane stay, positioned as shown, onto the vane so that the notch and pin on its underside fit the pin and hole dabbed with adhesive in the previous step (red arrows). Make sure the parts are orientated exactly as shown.

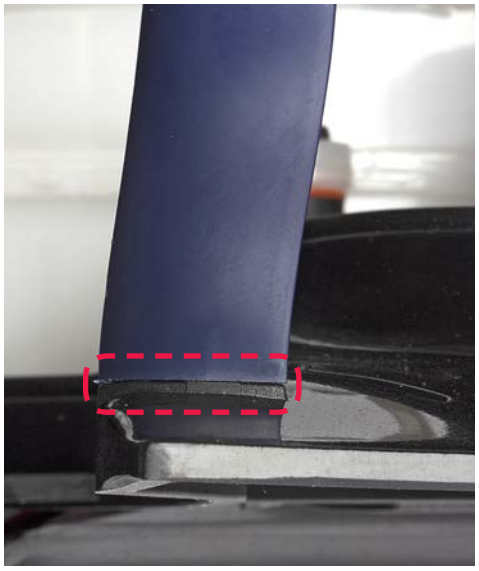
08 Make sure that the notch in the turning vane stay (dotted red circle) fits snugly over and against the pin on the vane, and hold the parts in place for three minutes until the glue has dried.



09 Holding the left turning vane exactly as shown, lower it into the arrowed section of the left side chassis. The pin in the vane's base fits into the hole in the chassis indicated by the left arrow, and the hole in its base lines up with the hole in the chassis indicated by the right arrow.

10 Holding the parts in position, insert a 2 x 6mm countersunk screw up through the hole in the chassis and into the turning vane, then carefully tighten it with a screwdriver. Make sure you don't overtighten it.

11 Repeat Steps 05 to 10 to prepare and attach the right turning vane to the right side chassis, as indicated by the red arrows.



12 Caution: do not overtighten these screws, because this will damage the plastic parts into which they are fixed. They should be tightened just enough to eliminate any gaps in the area indicated by the dotted red line.

13 Next, use needle-nose pliers to lower the left bargeboard into position between the left bargeboard stay (fitted in Stage 30) and the left side chassis, following the red arrows in the photo to align the part correctly.

14 Holding the parts in place, insert a 2 x 6mm flat-head screw up through the hole in the underside of the left bargeboard stay and into the bargeboard. Tighten it with a screwdriver, taking care not to overtighten it.

15 Insert another 2 x 6mm flat-head screw up through the vacant hole in the left side chassis and screw it into the bargeboard, making sure not to overtighten it.

16 Repeat Steps 13-15 to mount the right bargeboard. This session is now complete, and your assembly should look like this. Store your model safely until next time.