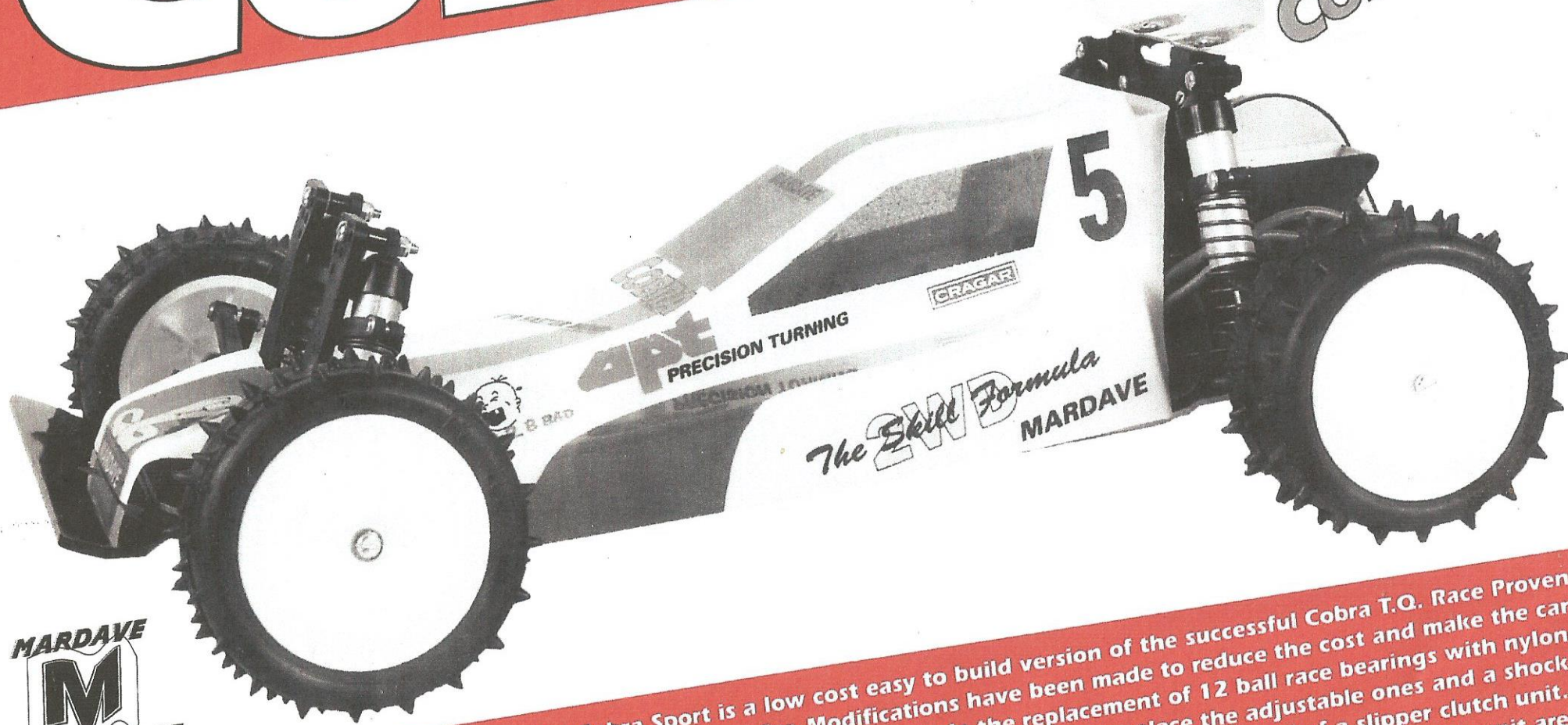


MARDAVE

COBRA SPORT



INSTRUCTION MANUAL

The Cobra Sport is a low cost easy to build version of the successful Cobra T.O. Race Proven Competition Off Road Car. Modifications have been made to reduce the cost and make the car easier for the novice to build. These include the replacement of 12 ball race bearings with nylon absorbing spur gear instead of a slipper clutch unit. Extra ball races, adjustable suspension top links which replace the adjustable ones and a shock or metal bushes, fixed length suspension top links which replace the adjustable ones and a shock absorber (see price list) to enable the Sport to be upgraded to full T.O. The kit also includes a speed controller, motor and motor pinion gear.

Additional Items Required.

Radio Control Equipment - Any good 2 channel proportional radio will be suitable. Most modern equipment will include a B.E.C. (Battery Eliminator Circuit) which will enable the receiver and the 2 servos to be powered from the 7.2 volt rechargeable car battery, thus eliminating the need for a separate 4.8 volt dry cell battery with a consequent saving in weight, space and cost.

Battery Pack - a 6 cell (7.2 volt) rechargeable battery fitted with a latching connector to suit the speed controller is required. Mardave produce suitable low cost packs, see spares list for current prices.

Battery Charger - Batteries are normally fast charged, i.e. between 15 and 30 minutes. There is no need or advantage in charging slowly. Most chargers operate from a 12 volt source such as a car battery. Mardave produce a low cost resistor based charger, see spares price list.

Paint - The Cobra bodyshell is moulded from polycarbonate. Special paints for this material are available from most model shops.

Assembly Instructions

Sprues and Flash on Mouldings

Plastic sprues should be removed as necessary with a sharp knife. Every effort is made to minimise flash on mouldings but should this be apparent, again remove as necessary.

Spare Items

Some extra items are included so there will be some screws, nuts etc remaining after assembly.

Self Tap Screws

Self tapping screws are used frequently during assembly. These are light, efficient and vibration proof but care should be taken not to overtighten them or the thread may strip.

Part Numbers

All basic kit part numbers are shown on the exploded diagram. The 'C' prefix is omitted for clarity. Accessory parts are listed on the price list. Parts are numbered as purchasable items. If different parts are shown with the same number, this is because they must be purchased together.

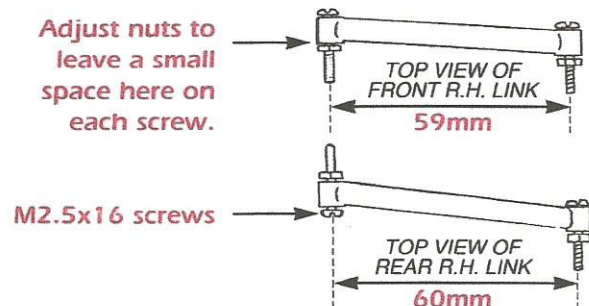
Assembly

The following is the suggested sequence of assembly.

Front Suspension

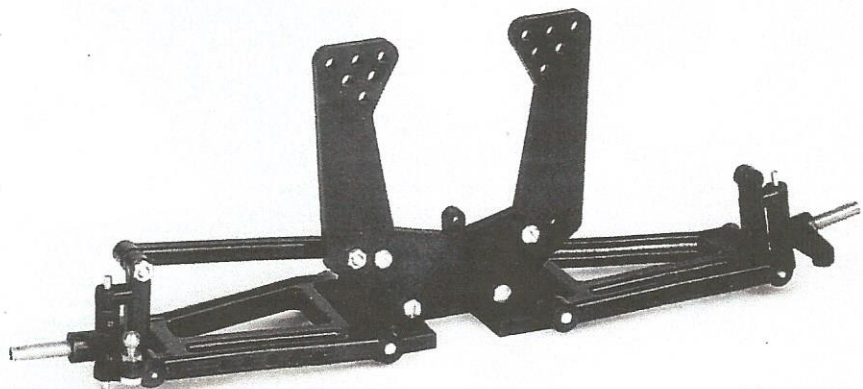
Open the front suspension pack. Cut steering arms and front uprights C9L and C9R from sprue. Press stub axles C10 into steering arms carefully aligning holes for king pins C19. Press king pins down through uprights and steering arms lightly tapping with a small hammer. Assemble uprights to wishbones C8 with C19 hinge pins also press fitted. Steering arms and

uprights should pivot freely. Assemble brackets C17L and C17R to damper mounting plate C7S using four 9mm self tapping screws. Fit wishbones to C17 brackets by press fitting hinge pins C18 from the front. Open the linkage and ball joint pack and cut the four suspension top links C11S from the sprue. The slightly shorter pair are for the front. Assemble the four M2.5 x 16 screws through the holes in the top links and fit 2.5 mm nuts to each. Do not tighten these nuts as the links must pivot freely on the screws when assembled to the car. Leave a small space between the nut and the link. Note that the holes in the ends of the links are at a slight angle (see diagram).



Assemble the two front links to the front suspension and secure with four 2.5 mm nuts.

Fit the front suspension and the bumper C25 to the chassis using two 9mm countersunk self tap screws and two 12.5 mm screws C69. Assemble two damper mounting screws C78 (M3 x 20) to plate with M3 plain nuts.



Steering Bellcrank and Track Rod Assembly

The steering bellcrank C23 is pre-assembled. It is a spring loaded device intended to protect the steering servo from damage due to shock loads. Assemble steel ball ends to the bellcrank and to the idler arm C25 with 2.5 mm nuts. Assemble the pivot to the chassis using the M3 x 6mm C.S.K. screw. Assemble the M3 x 20mm C.S.K. screw through the other hole with an M3 plain nut.

Thread the wire centre track rod C13 through the holes in the bellcrank and the idler arm. Fit these to the pin and the screw on the chassis. They should pivot freely. Fix in place with the 'E' clip and nyloc nut. Check again for free operation.

Cut four plastic ball sockets from sprue and screw onto the steel outer track rods C12. Hold in a vice, preferably one with soft jaws to avoid bruising the link. Note; one end is threaded R.H. and the other L.H. First find which is which by testing with a 3mm steel nut. Having located the R.H. thread, screw on one socket and then fit the other end screwing in the opposite direction. Adjust until the space between the plastic sockets is approx. 35mm. Equal thread should be showing at each end.

Assemble two more steel ball ends to steering arms and snap fit the track rods in place.

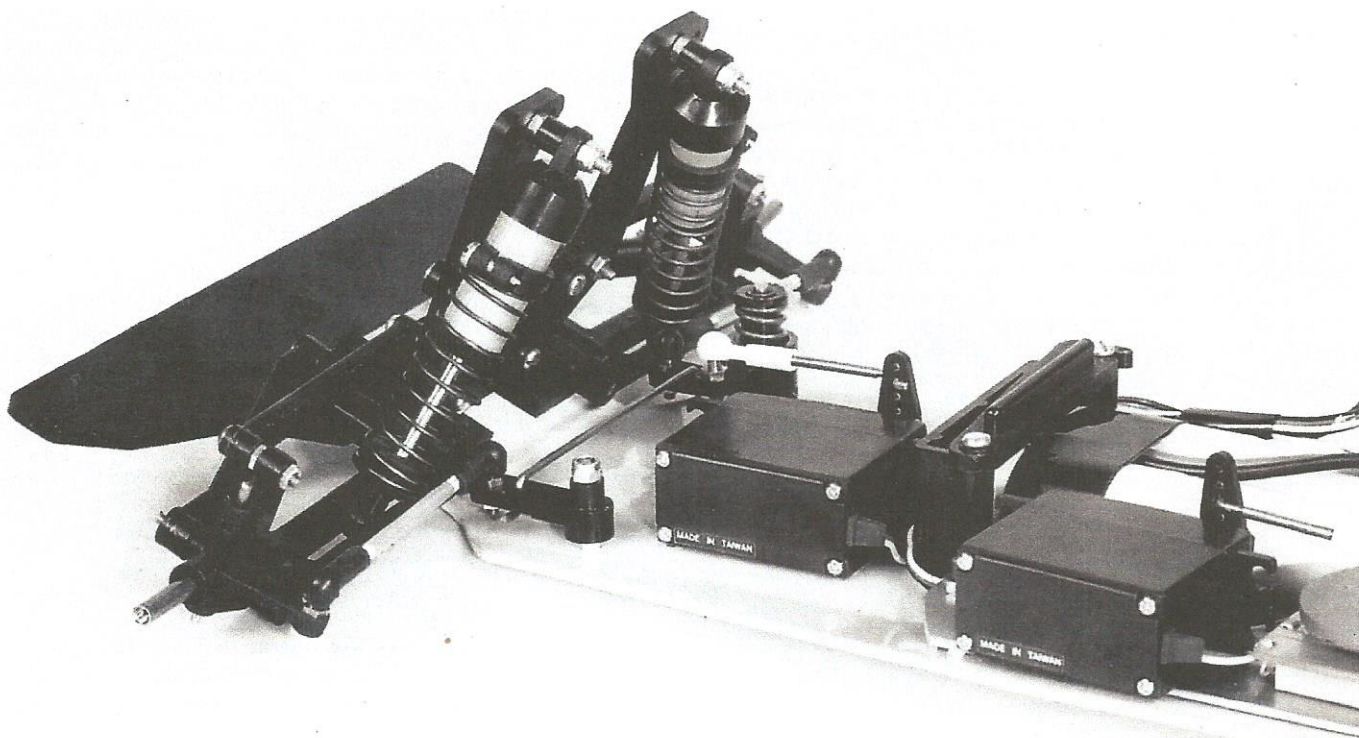
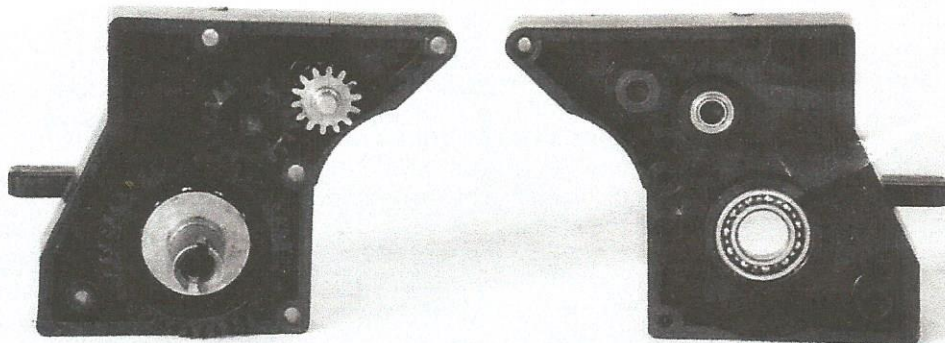
Screw the white ball socket to the servo linkage arm C24 and snap fit to the bellcrank. All moving parts must move freely. ▼

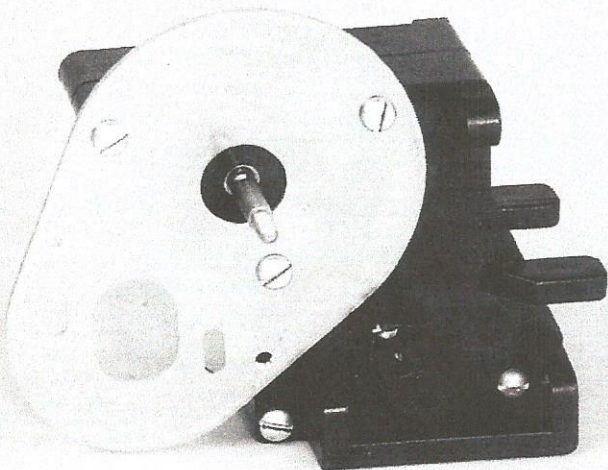
Gearbox

Open the gearbox pack and remove sprue from gearbox halves. Open the bearing pack and cut plastic bushes from sprue carefully removing all surplus material. Press fit two plastic bushes, two brass bushes and two ball raced bearings into housings as shown. Note: Bearings must be fully pressed home otherwise gears will have no end float and gearbox will not run freely.

Fit pre-assembled differential unit C40, idler gear C31 and steel layshaft gear C32 to one half (trim sprue cleanly from ends of C31 idler gear).

Lubricate gears lightly with thin oil or low friction lubricant and assemble other gearbox half. Position motor plate C33 and fix with 3 x 25 mm and 2 x 19 mm self tap screws; do not overtighten. There should be noticeable slight end float with both the differential unit and the layshaft gear. If not, the bearings are not fully pressed home and the gears will not run freely. ▼





▲ Fit the spur gear drive pin C56 into the layshaft hole and assemble the spur gear C65 and nyloc nut C80.

Rear Suspension

Open rear suspension bag and cut two rear uprights C51 from sprue. Cut four plastic bushes C84 from sprue and press fit into each side of the uprights using the plastic tool provided. Test fit a rear stub axle C54 through each upright. The stub axle should run freely. If not, the bushes are not aligned properly.

Assemble the rear uprights to the rear wishbones C50 using press fitted outer hinge pins C19. Note L.H. and R.H. uprights (see exploded diagram). Assemble wishbones to gearbox using inner hinge pins C52. These are ultimately held in place by the battery holder moulding when assembled to the car.

Cut the damper mounting beam and aerial clamp from the damper mounting plate C55. Attach plate to gearbox using 2 x 9mm self tap screws.

Take the two rear top links C11 left over from the front suspension pack and assemble M2.5 screws and nuts as shown in the diagram. Note: one screw faces forwards.

Fit links to the mounting plate with 2.5 mm nuts. Assemble rear stub axles C54 and drive shafts C53 and fit links to uprights with 2.5 mm nuts.

Attach dampër mount beam to plate with 9mm self tap screws (try the second hole from the top initially). Fit gearbox assembly to chassis with 9mm C.S.K. self tap screws.

Battery Holder Mouldings C2

Cut from sprue and fix to chassis with 4 x 9mm C.S.K. self tap screws. Fit swinging clamp arm with 2 x 9mm self tap screws.

Speed Controller

The speed controller supplied is a simple resistor switch unit which is easy and cheap to repair if damaged. Three speeds are available for forwards and reverse, the current being diverted through both resistors for the slowest speed and through one resistor for the second speed. The resistors will get hot in use so wires should not touch them. Fit two screws M3 x 12 C.S.K. through the chassis with two nuts on each screw. Assemble the speed controller with two more M3 nuts. The two thin wires from the speed control board are for connection to the radio switch later. Screw the plastic ball socket onto the servo link C24 leaving approx. 5mm thread showing and snap fit to the ball on the wiper disc C58.

Wheels and Tyres

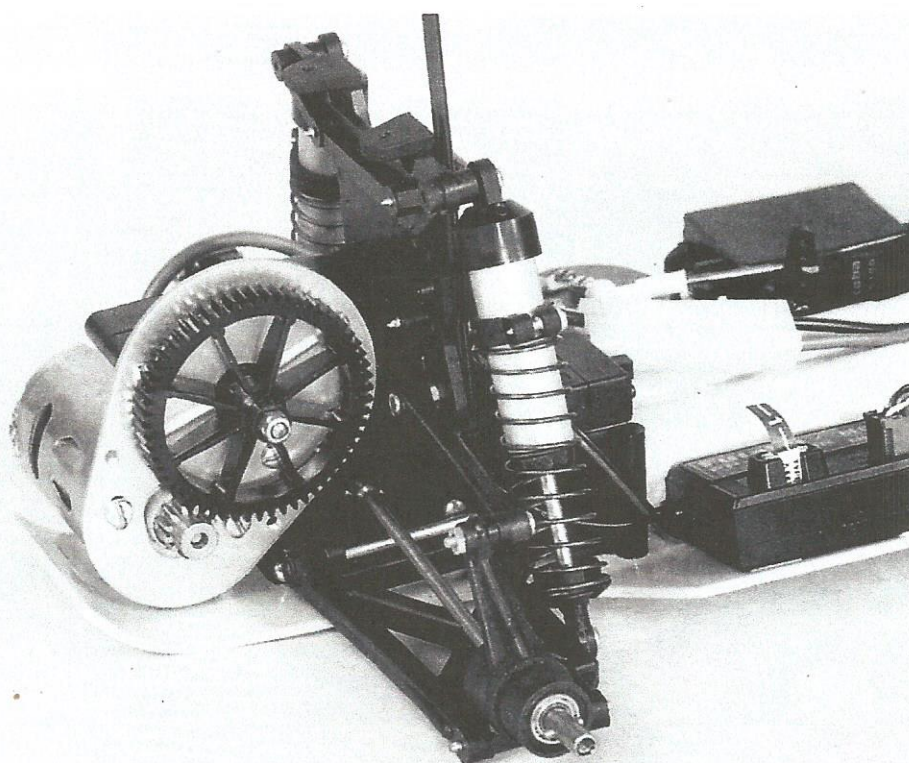
Fit tyres to wheels. Fit 2 x M4 plastic bushes to each front wheel and drive pins C56 to the rear stub axles. Fit wheels to the car using M3 x 6mm pan head screws.

Shock Absorbers and Springs

Assemble the shock absorbers and springs in accordance with the separate instructions. Fit to car using 6 x 12mm self tap screws, 2 x 20mm machine screws, 2 x 3mm nyloc nuts and plastic spacers as shown in the diagram. The shock absorbers must pivot freely at each mounting point.

Motor

Fit the motor to the gearbox using two M3 x 8 screws. Solder the wires from the speed controller to the motor terminals. It does not matter which lead goes to which terminal. Fit the motor pinion C111 with the gear nearest to the motor and tighten the grub screw with the 1.5 mm key C113. Loosen motor fixing screws and adjust the mesh. It should be possible to feel a little backlash between the two gears.



Upgrading The Cobra Sport to Full TQ Specification

Several modifications are available to improve the performance of your Cobra Sport. The first step is usually to replace the plastic and metal bushes with ball raced bearings. These are available individually or in a pack at a quantity price (see price list).

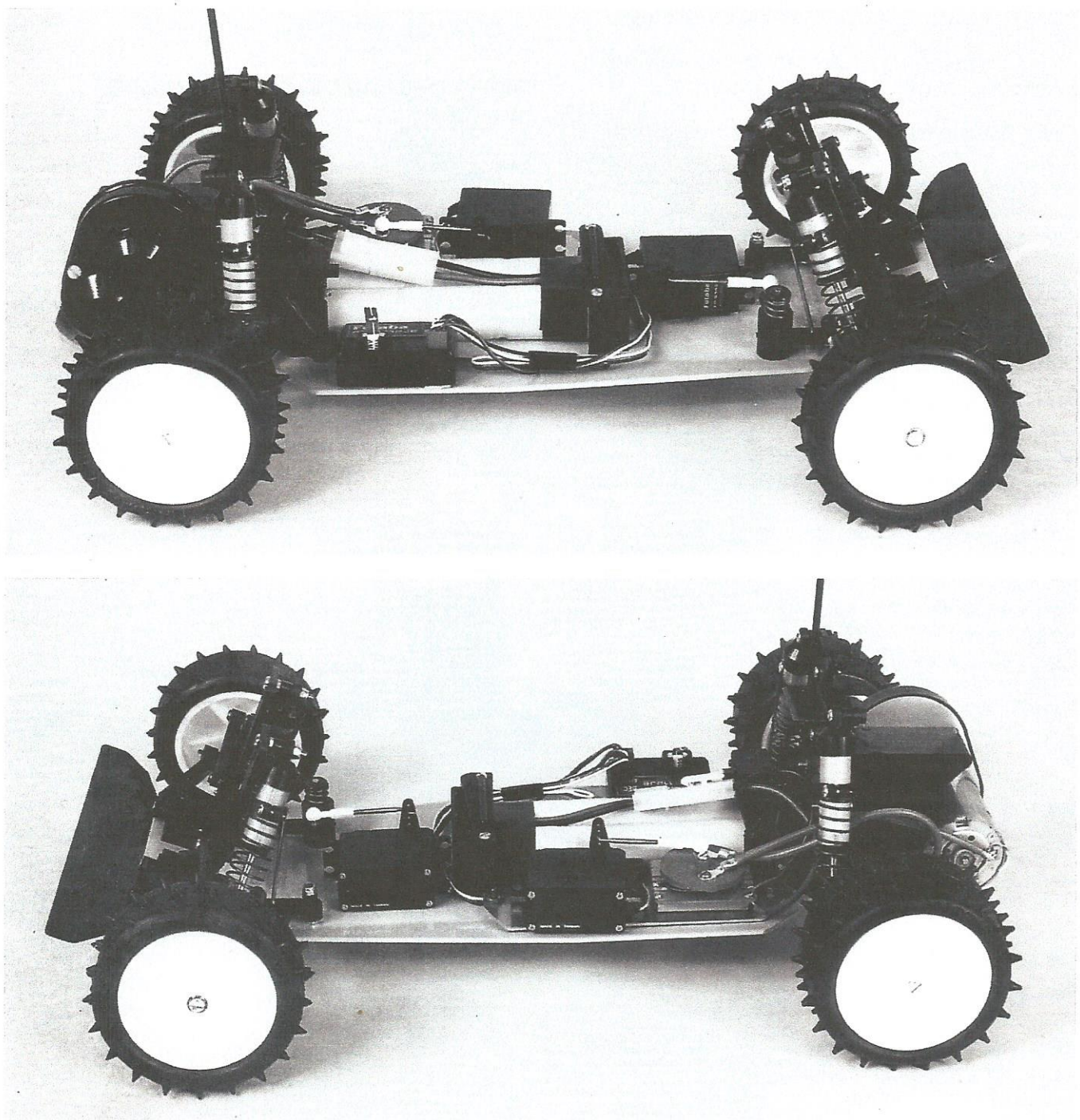
The suspension top links C11S can be replaced with adjustable threaded links and ball joints similar to the track rods. These are available as a pack (C120 on price list).

A slightly stronger and stiffer front damper mount plate C7 is available to replace the moulded C7S.

If you wish to replace the speed controller with an electronic type, this can be easily done by removing the C57 controller and fixing screws and fitting the electronic controller in place with D/S servo tape. Note: the Sport chassis C1S differs slightly from the T.Q. chassis in that the battery is positioned slightly to one side to allow more space for the speed controller.

A slipper clutch unit C121 can be fitted in place of the spur gear C65. The main use of this device is to take the edge off the initial acceleration so that the car does not lift its front wheels on the startline. It is also useful in easing shock loads transmitted to the gearbox from the wheels. If track surfaces are very slippery, the clutch can be loosened to reduce wheelspin under acceleration and make the car easier to drive. This clutch is more useful however if more powerful modified motors are to be used. The spur gear has smaller teeth of 48DP for greater efficiency and so a range of 48DP motor pinions will also be necessary.

We wish you much enjoyment from your Cobra and would encourage you to locate and join your local club (or even start your own) as organised racing is the ultimate way to appreciate this exciting hobby.



Radio Installation

The car is designed for control by two channel radio with two servos. One servo operates the steering and the other operates the speed controller.

Most transmitters have two joysticks. The right hand stick moves from side to side and is used for steering whilst the left hand stick, which moves forwards and backwards, is used for speed and forward and reverse control. It is usual to connect the linkages so that when the steering joystick is moved to the right, the car turns to the right (when moving away from the driver) and when the speed control stick is moved forwards, the car goes forwards. When the speed control stick is moved back, the car goes into reverse.

The two servos in your radio set are the same so it does not matter which is used for steering and which is used for speed control. Select one for steering and fit a suitable output arm (supplied with your radio. It may be necessary to cut off the other arms to leave one only). Connect to the bellcrank linkage and check fit in place. With the wheels straight ahead, the output arm should be vertical. (You can turn the servo output arms slowly by hand). Fix in place on the chassis with double sided tape. Both the chassis and the servo must be clean to ensure a good bond. Two strips of tape approx. 10mm wide across each end of the servo should be sufficient.

Similarly fit an output arm to the speed control servo, connect the link and check fit on the speed control plate. Note the slight angle of the speed controller. The servo should be similarly angled. Fit a battery pack to ensure that the servo arm does not touch the battery and check that the speed control wiper disc is in the off position and the servo arm is vertical before fixing the servo to the plate with double sided tape.

Fix the receiver in position shown with a small piece of double sided tape. Feed the aerial through the tube provided. Remove the rubber cap, allow approx. 20mm of aerial to project through, bend it over and trap it with the cap. Fix the aerial tube to the damper mount plate using the clamp and 9mm self tap screw. Any surplus aerial wire should be neatly coiled and taped at the bottom of the aerial tube.

Fit the radio switch in the position shown with double sided tape. A separate battery for the radio is not used in the Cobra. Instead, the radio is powered from the car battery. This saves weight and cost. Two wires are fitted to the speed controller for this purpose.

Cut the battery connector from the switch lead (careful, do not cut off the receiver plug!). Separate the wires, strip approx. 4mm covering from the ends and tin with solder. Then solder to the speed control wires, black to black and red to red and cover the joints with insulation tape or similar. Fit the two servo plugs and the switch plug into the receiver (RX) neatly positioning and taping up the surplus wire.

Put a short charge into the battery pack, fit the necessary batteries into the transmitter (TX), fit crystals into the RX and TX and you are ready to test the radio. Always switch the TX on first, then the RX. Both servos should move. Next, set the two trim levers at the side of the TX sticks to central, remove the output arms from the servos if necessary and replace them in a vertical position. Remember, the R.H. stick should be operating the steering. If it is not, swap the plugs over in the receiver. Also, if necessary, change the direction switches on the TX so that the car will turn right when the stick is moved to the right and will move forward when the L.H. stick is moved forward.

Bodyshell and Wing

Trim the bodyshell to lines etched on it using shears, scissors, knives, files etc. Drill one hole 6mm diameter (or produce a slot) to fit front mounting peg. Clean inside of body with detergent and water, thoroughly dry, mask windows etc and spray on the inside using paint suitable for polycarbonate (LEXAN).

Trim rear wing to shape and drill two holes 3.2mm diameter where marked. The body is attached to the chassis with an 'R' clip at the front, and a piece of 'velcro' fastener bonded to the body and mounting plate at the rear. The wing is attached with 9mm self tap screws with large washers.

Charging Instructions

The charging lead is intended for charging from a 12 volt car battery. The RED lead must always be connected to the Positive+ terminal of the battery and the BLACK lead to the negative - terminal. When the plug on the lead is connected to the battery socket, the red lead should mate together and the black leads together. An indication that the current is flowing can be gained from the aluminium resistor cover plate which will become quite hot. On no account charge for more than 25 minutes from flat or the battery may be damaged. If the battery is not fully flat or discharged, then the charge time must be less than 25 minutes. More sophisticated chargers are available which will automatically time and cut off the charge. These are more expensive but reduce the chance of overcharging and ruining the battery pack.

The endurance of running time of off-road cars such as the Cobra depends considerably on the surface on which the car is raced. On smooth tarmac, up to ten minutes can be expected but on rough surfaces or long grass the running time will be somewhat reduced. The first runs may be quite short because the nickle cadmium cells require cycling (charging and discharging) several times before reaching their full capacity.

Final Adjustments and Operating

The steering track rods should be adjustable for length so that the front wheels toe in slightly.

The adjustment for ride height (i.e. the distance of the chassis from the ground) will depend on the surface being raced on. The smoother the surface, the lower the car can be run which reduces the possibility of overturning.

When driving the car, the transmitter trims should be adjusted so that the car will run in a straight line 'hands off' and to centralise the speed controller. Try to avoid stalling the motor. If the car does not respond to the throttle, switch off immediately and locate the trouble.

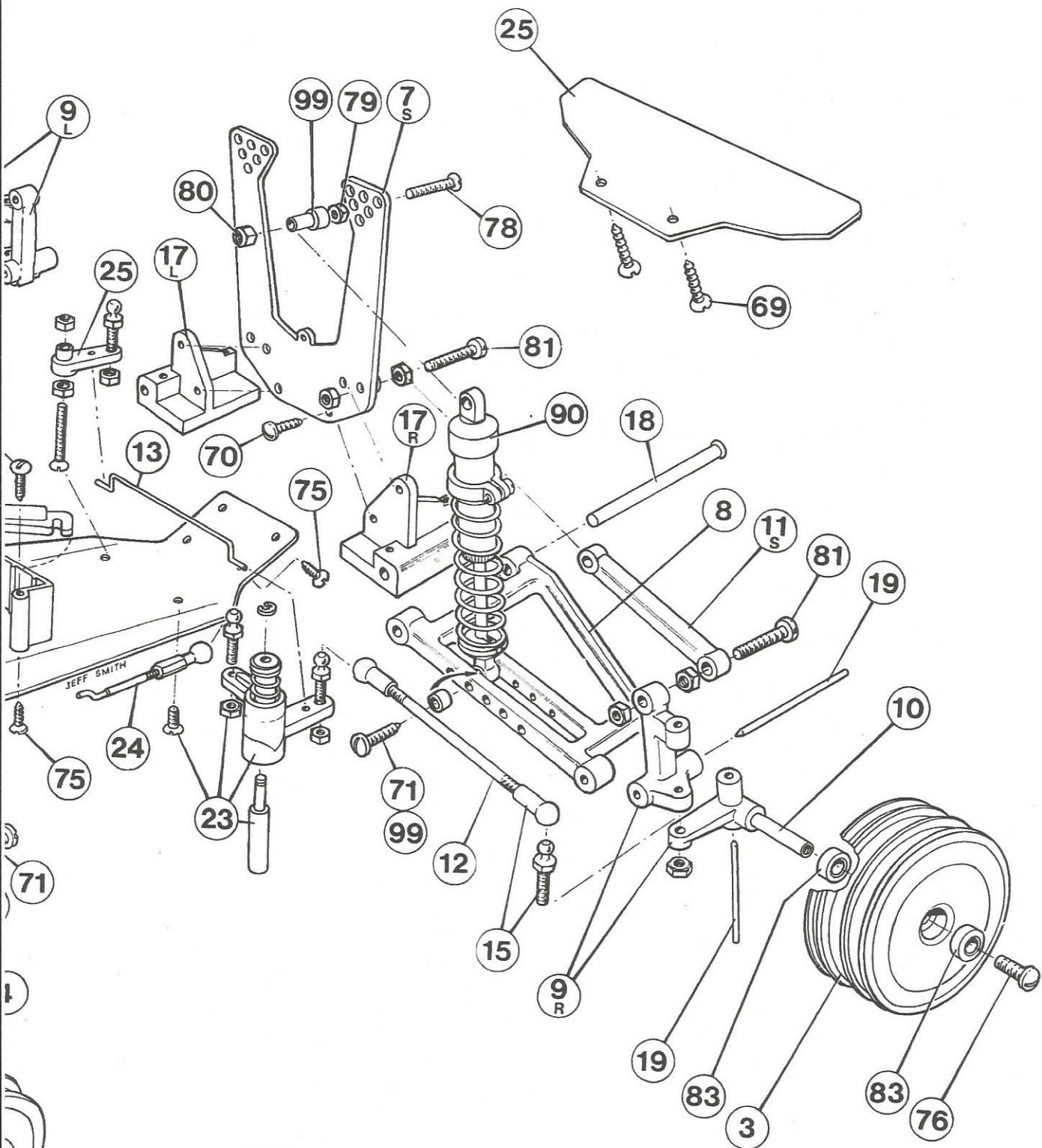
Differential Unit

The diff. can be adjusted by removing one driveshaft (depending which way round you have fitted the diff!) and using a small x-head screwdriver on the centre screw. There is a nylon washer pressed into the other side of the diff. half which stops the screw vibrating loose. The diff. is pre-set and should not need adjustment initially but may do so later when run in. The aim is to have the diff. as free as possible without it slipping under acceleration.

Gear Ratios

The Cobra Sport is supplied with a small pinion gear which will produce a slower speed suitable for beginners. A larger pinion will increase the speed slightly. The use of more expensive motors and battery packs will increase both speed and duration of run and affect the gear ratio. For racing purposes, the choice of ratio is very important. A higher gear ratio, achieved by fitting a large motor pinion, will usually increase top speed at the expense of acceleration and endurance whereas a lower gear ratio (smaller pinion) will improve acceleration and length of run. Most races are of 5 minutes duration and if your car will not run for 5 minutes, it is usual to try smaller motor pinions until 5 minutes is achieved.

The choice of pinion will also be affected by the type of motor used i.e. by the number of turns of wire on the armature., in general, motors with more turns, say up to 30, will rev more slowly and require a larger pinion whilst motors with fewer turns, say down to 14, will rev faster and require a smaller pinion.



MARDAVE
COBRA SPORT

MARDAVE COBRA SPORT SPARES PRICE LIST OCT 1993

C1/S	Chassis	£7.50	C76	M3 Pan slotted machine screws x 6mm	£.60
C2	Battery holder mouldings	.90	C77	" 12mm (plastic) pk of 6	.60
C3	Front wheel, white	.90	C78	" 20mm pk of 20	.60
C4	Rear wheel, white	.90	C79	M3 nuts pk of 20	.60
C5	Front tyre, I.S.F.	£2.00	C80	M3 nyloc nuts pk of 10	.60
C6	Rear tyre, V.S.R.	£2.50	C81	M2.5 screws and nuts pack	.60
C7/S	Front damper mount plate	.90	<u>BEARINGS</u>		
C8	Front wishbone	.90	C82	M4 x 8 Brass bush, pair	.60
C9	Front upright, steering arm set	.90	C83	M4 x 8 nylon brush, set of 6	.60
C10	Front stub axle	.60	C84	M5 x 10 nylon brush, set of 6	.60
C11/S	Front and rear upper link set	.60	C87	M9 x 17 bearing, ball raced, ea.	£2.00
C12	Track rod	.60	<u>SHOCK ABSORBERS AND SPRINGS</u>		
C13	Centre track rod	.60	C90	Front coil spring and damper unit complete (pr)	£6.95
C15	Steel ball end, nut and plastic socket, pack of 6	£2.00	C91	Rear " " (pr)	£6.95
C17	Mounting blocks, front w'bones (pr)	.90	C92	Front piston rod (pr)	£1.05
C18	Inner hinge pin, front (pr)	.60	C93	Rear piston rod (pr)	£1.05
C19	Outer hinge pin/king pin/rear outer hinge pin (pr)	.60	C94	Front coil spring (pr)	.60
C23	Servo saver bellcrank assy complete inc. C25	£2.00	C95	Rear coil spring (pr)	.60
C24	Steering servo linkage, ball socket and nut	.90	C96	'O' Ring set (8 small and 4 large rings)	.90
C25	Front bumper	.90	C99	Plastic components (plug, pistons, spacers etc)	.90
<u>GEAR BOX</u>			<u>MISCELLANEOUS</u>		
C30	Gear box mouldings (pr)	£1.60	C100	Bodyshell and wing	£6.95
C31	Idler gear	.60	C101	Body fastening clip (pk of 6)	.60
C32	Steel gear and layshaft	£2.00	C102	'Cobra' decal sheet	.90
C33	Motor mounting plate	£1.60	C103	'Velcro' fastener, self adhesive 30cm	.90
C34	Gear cover moulding	.90	C104	Aerial tube with cap	.60
<u>DIFFERENTIAL UNIT</u>			C105	Double sided tape (2 pcs)	.60
C40	Diff. unit complete	£6.95	<u>ADDITIONAL ITEMS</u>		
C41	Diff. gear	.90	C106	Undertray moulding, in clear Lexan, fits on top of chassis	£3.00
C42	Diff. flanged bosses (pr)	£3.00	C107	Assorted fastener pack, includes some of all fasteners used in the car	£1.40
C43	3.5mm Balls, set	.90	C110	Mabuchi 25T motor	£5.50
C44	1/16inch Balls, set plus Thrust washers C45	£1.60	C111	12T 32DP pinion gear	£2.00
C46	Diff. screw and disc spring washer set	.90	C112	Grub screw, pack of 6	.60
<u>REAR SUSPENSION</u>			C113	with 1.5mm key	.60
C50	Rear wishbone	.90	C115	6 cell rechargeable battery pack with connector	£15.95
C51	Rear uprights (pr)	.90	C116	Fast charge lead	£5.95
C52	Rear inner hinge pin (pr)	.60	C117	Connector for battery	.70
	Rear outer pin - see C19		C118	Connector for charge lead	.70
C53	Drive shaft	£1.60	C119	Assembly instructions	.60
C54	Rear stub axle	£1.60	C120	Set of 4 threaded adjustable top links with 8 steel balls, plastic sockets and nuts	£3.20
C55	Rear shock mounting plates	.90	C121	Slipper clutch unit complete	£7.95
C56	Drive pin (pack of 5)	.60	C122	20T 48DP Motor pinion gear	£2.00
	Rear upper link - see C11/S		C123	22T 48DP "	£2.00
<u>SPEED CONTROLLER</u>			C124	24T 48DP "	£2.00
C57	Speed controller, complete	£7.50	C125	28T 48DP "	£2.00
C58	Wiper contacts (pair) with plastic disc	.90	C85	M4 x 8 Ball raced bearing	£2.00
C59	Printed circuit board	£1.60	C86	M5 x 10 " "	£2.00
C64	Screw, spacer and nut set	.60	C88	Full ball race kit to convert Sport to T.Q. (12 bearings)	£20.00
<u>SPUR GEAR</u>			C7	Front damper mount plate in fibreglass	£2.50
C65	Spur gear 32 DP	£1.05	C130	14T 32DP Pinion gear	£2.00
<u>FASTENINGS</u>			C131	16T 32DP Pinion gear	£2.00
C69	Self tap screw (SK12.5mm pk of 20	.60	C140	Damper oil	£1.60
C70	Self tap screw 9mm "	.60			
C71	Self tap screw 12.5mm "	.60			
C72	Self tap screw 16mm "	.60			
C73	Self tap screw 19mm "	.60			
C74	Self tap screw 25mm pk of 20	.60			
C75	Self tap screw (SK9mm "	.60			

CUSTOMERS PLEASE NOTE: Your local retailer should stock the most commonly needed spares and accessories. In case of difficulty however, and especially for small items, it may be quicker and more convenient for everyone if you send payment direct to:

MARDAVE R/C RACING, 7 HEANOR STREET, LEICESTER LE1 4DB - Telephone: (0533) 624701

See orders under £10, please add 10% for post and packing (Minimum 30p, bodyshells £1 minimum)

NEW ITEMS: C3/S 6 SPOKE LIGHTWEIGHT FRONT WHEEL, WHITE £1.10 EA. C5/F FRONT FOAM RUBBER TYRE £1.20 EA. C4/S 6 SPOKE LIGHTWEIGHT REAR WHEEL, WHITE £1.10 EA. C6/F REAR FOAM RUBBER TYRE £1.50 EA.