

P63

Micro Diesel Sound Simulator Selectable Multi-Cylinder version



This innovative multi-cylinder "micro" diesel engine sound simulator is built around a tiny eight-pin microcomputer (PIC). It enables models running on just four pcell Nicads at 4.8 Volts to have an engine sound with a sensible volume level. Unlike all other engine sound simulators available, it follows the output of the radio control channel being used to control the speed controller (all others connect to the motor). It also has a connector to plug in the speed controller; this saves the use of a 'Y' lead. It accelerates the rev rate as you advance through the speeds in forward or reverse. The range is adjustable, as is sound level. The unit will require a digital proportional radio control system with a 1.5mS centre stick value, standard on all modern radio control. The "micro" diesel engine sound is designed to take its power from the receiver, allowing the smallest of models to have sound! Please note that, in common with all ACTION engine sound simulators, this unit is NOT based on a digital recording; the sound is synthesised and would not really be suitable for large models such as 1/12 scale lifeboats.

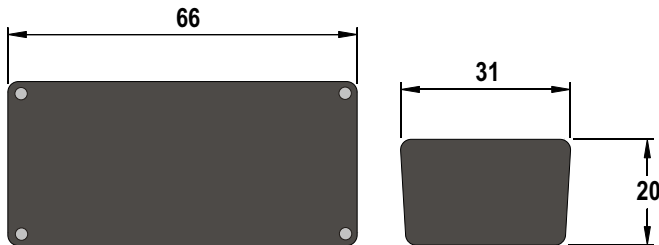
MICROCOMPUTER & IC DESIGN

Channels required	1
Number of cylinders	4,6,8,12 switch selected
Receiver voltage	4.8 to 6 VOLTS*
Maximum output (8 ohms only)	1 WATT
Speaker impedance required	8 OHMS
Speaker size recommended	2" Super Mylar for small models

*Do NOT use a 5-cell rechargeable pack or 6v Lead-acid battery to power the receiver *directly*; it will fatally damage the unit.

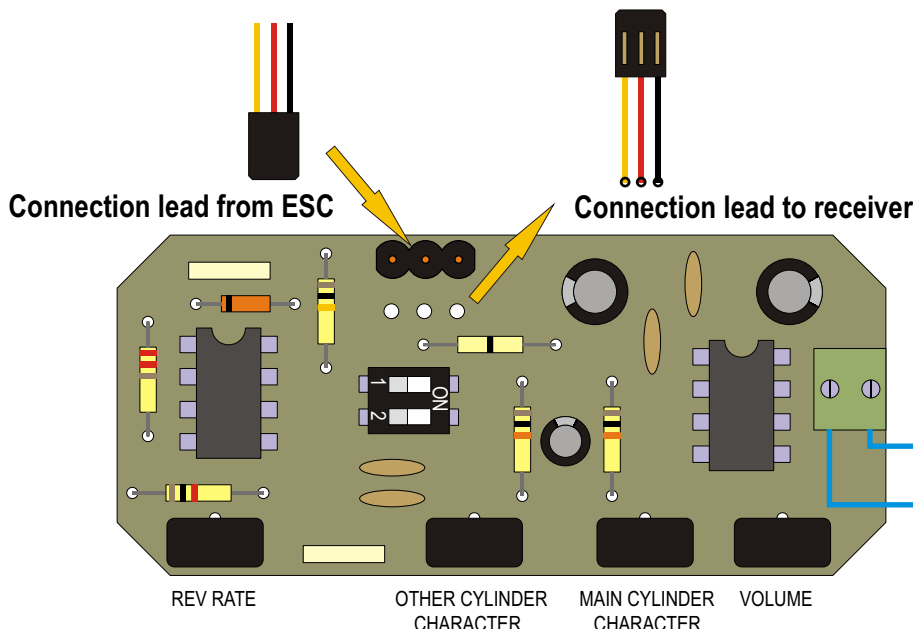
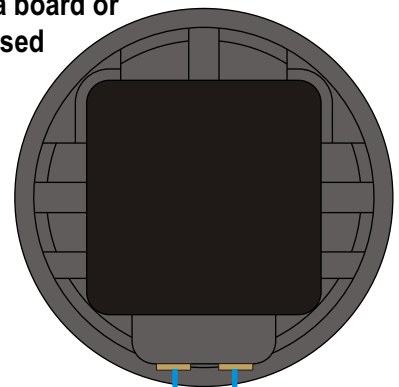
Power *via* a regulated 5v supply such as a BEC-equipped speed controller or ACTION power board will be fine.

The voltage of the main motor battery is not relevant to the operation of this unit.



Case Dimensions

Speaker MUST be mounted on a board or fully cased



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Channels required	1
Number of cylinders	4,6,8,12 switch selected
Maximum output (8 ohms only)	1 WATT
Speaker impedance required	8 OHMS
Speaker size recommended	2" Super Mylar for small models; 3"- 4" for larger models
Case size (external)	66mm x 31mm x 20.5mm

***Do NOT use a 5-cell rechargeable pack or 6v Lead-acid battery to power the receiver *directly*; it will fatally damage the unit. Power *via* a regulated 5v supply such as a BEC-equipped speed controller or ACTION power board will be fine. The voltage of the main motor battery is not important.**

CONNECTION & TEST (see DRAWING)

Ensure your receiver and transmitter are switched OFF before connection is made. Connect the Servo lead to your radio receiver speed/direction channel then connect the speed controller to the three-pin connector as per drawing. Connect the speaker wires to your speaker. Check that your transmitter stick is at neutral and that the trim is centred. Switch ON your transmitter and receiver. The unit should now follow the stick increasing and decreasing revs in forward and reverse. VR1 can be used to set the level of sound volume (high volume uses more current). VR2 & VR3 adjust the character of the engine sound. These adjustments can be made whilst running. The switch and VR4 adjustments must be made while the unit is switched off. At switch-on, they will be read before the unit starts. The switch functions as follows :-

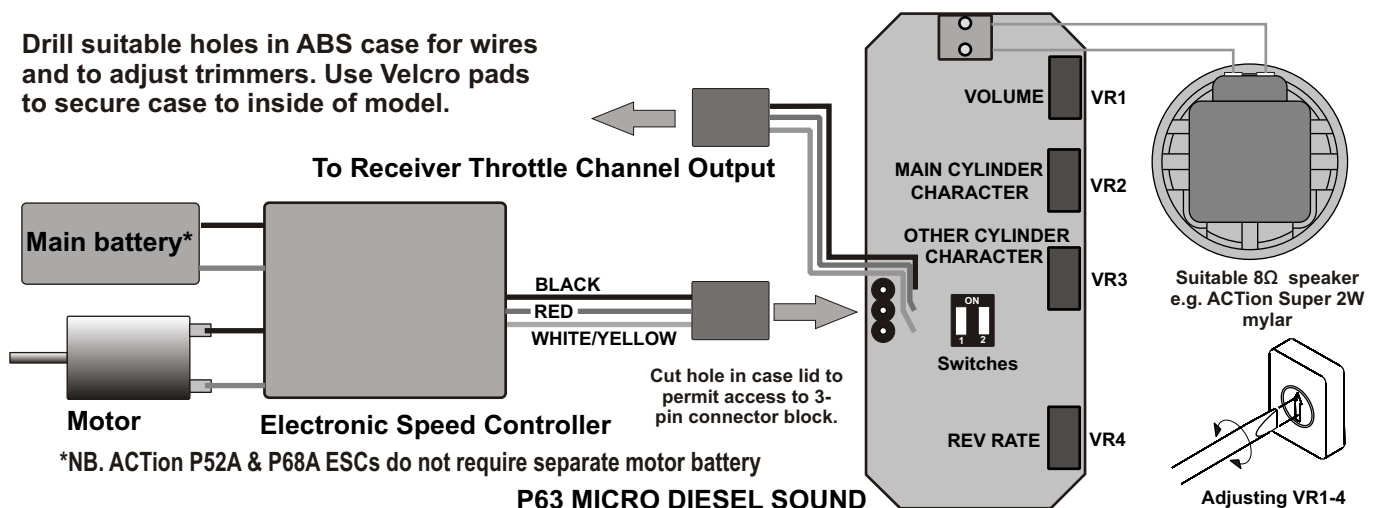
<u>SW1</u>	<u>SW2</u>	=	
OFF	OFF	=	Six cylinder
ON	ON	=	Twelve cylinder
OFF	ON	=	Four cylinder
ON	OFF	=	Eight cylinder

RECOVERY SERVICE

A recovery or repairs service ensures that you will not be left with a dead unit for any reason. The Service Charge for this kit is £13.00 including parts (including return shipping cost IN UK). All returns should include full Credit Card details (Name & Address of cardholder, Card Number, Expiry Date and Card Security Number)

ACTION R/C ELECTRONICS, 1 Llwyn Bleddyn, Llanllechid, Bangor LL57 3EF, United Kingdom

Drill suitable holes in ABS case for wires and to adjust trimmers. Use Velcro pads to secure case to inside of model.

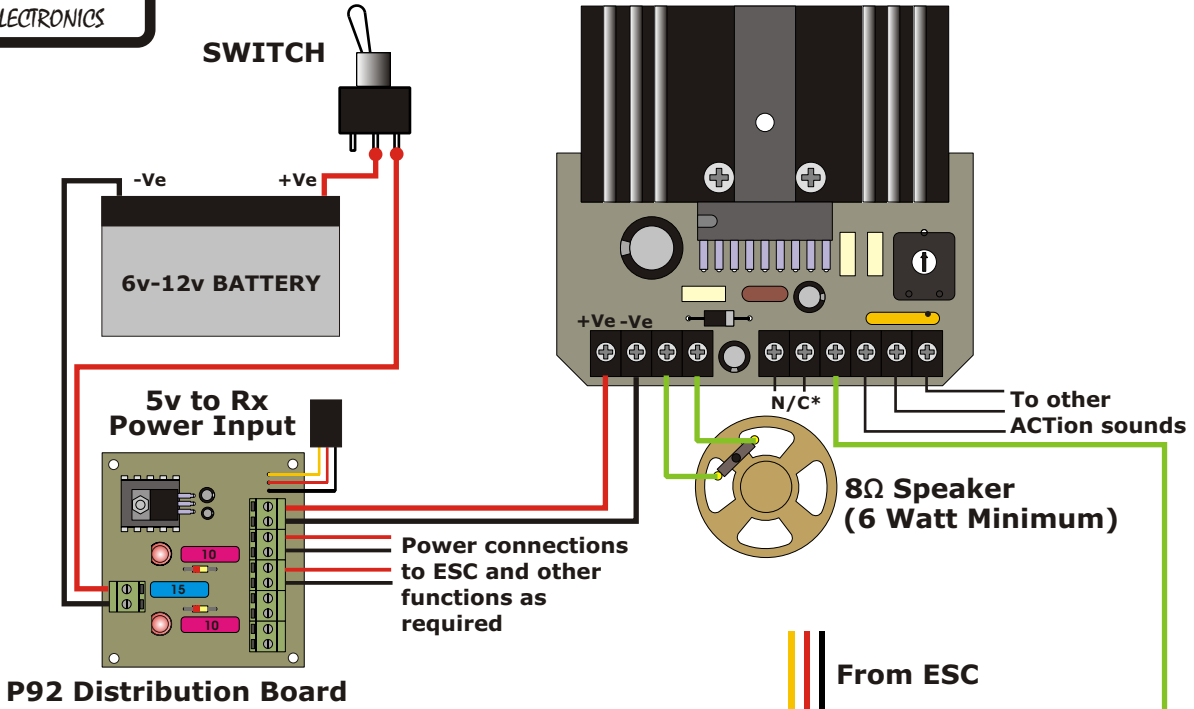


ACTION units shown are polarity-critical! Take care to connect them correctly!

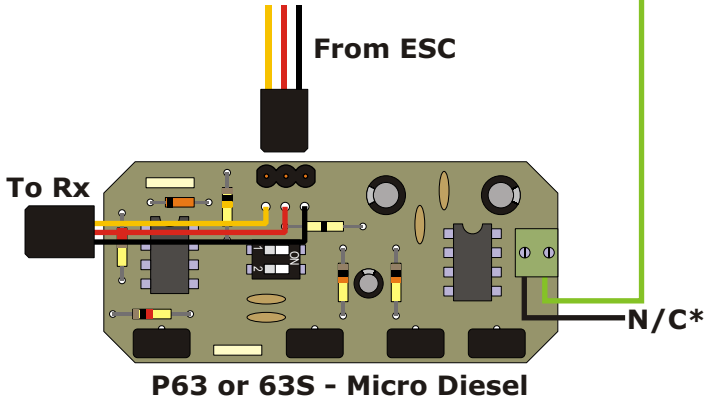
The small print.....
ACTION R/C Electronics guarantee all products to be free from manufacturing defects for 12 months from date of purchase. This does not cover suitability for specific applications; components worn or damaged by use, tampering or incorrect connection; alteration to original components; damage to batteries or other equipment through use; misuse, or shipping damage. Where goods are found to be faulty, the customer shall return them to ACTION R/C Electronics in their original condition and with their original instructions, packaging etc. Our liability is limited to repairing or replacing goods to their original specification and will not exceed the cost of the goods. By using the product the user accepts all liability. Where a fixed repair charge is applicable, ACTION R/C Electronics shall undertake repairs to the extent that they are judged economically viable. Where such is not the case then the customer will be offered the option of crediting the repair charge towards the cost of a new unit or having the faulty unit returned and the charge refunded (less the cost of return carriage). We reserve the right to modify this guarantee without notice.



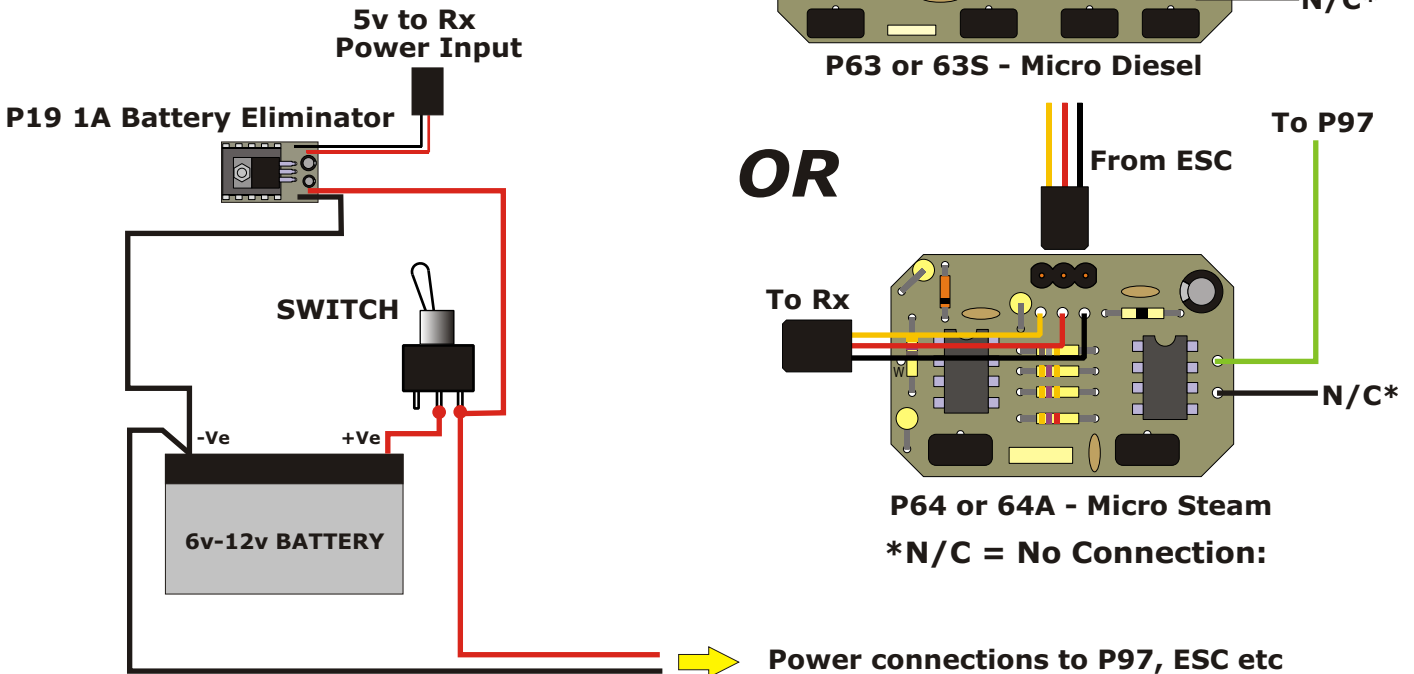
P97 6W Booster Amplifier (N/C* = No connection to these terminals)



OR



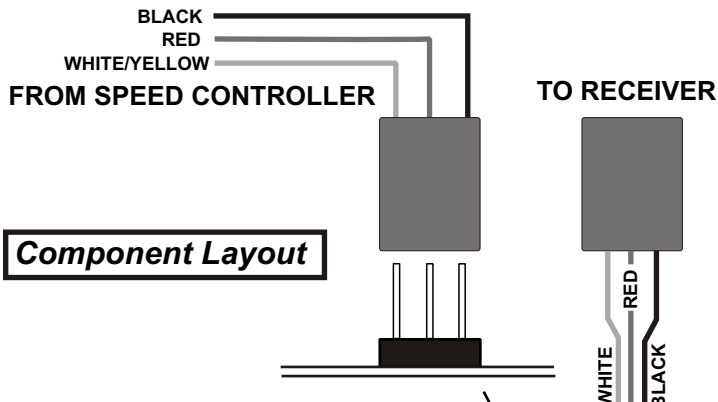
OR



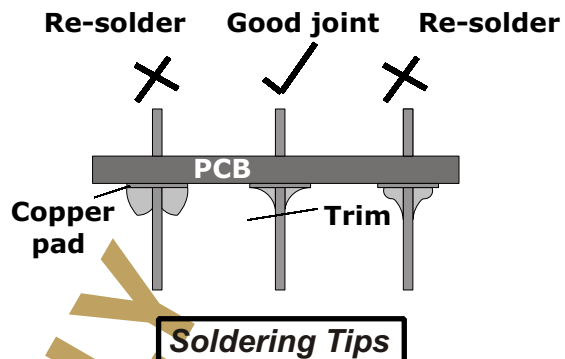
When using micro sound units P63, P63S, P64 or P64A with a P97 (or P34) Mixer/Amplifier you **MUST** have a common power supply for both the Rx and the P97, such as a P92 Distribution Board or P19 Battery Eliminator as shown. Note that only **ONE** of the speaker output connections of P63/P64 is connected to P97. The other connection to P97 is made via the existing common negative rail.



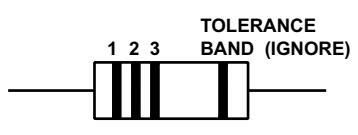
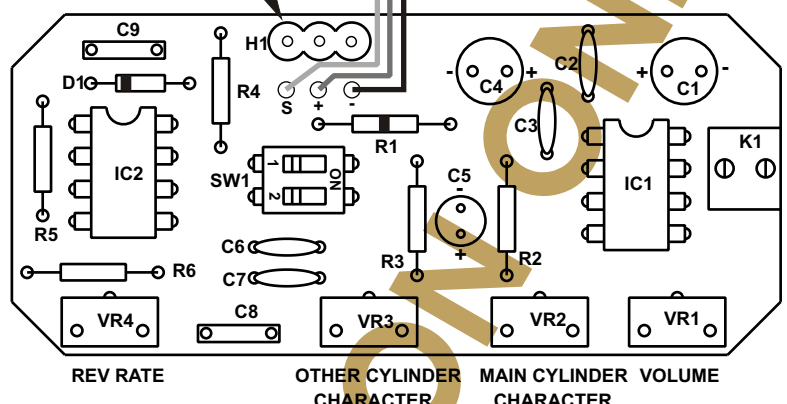
P63 "micro" DIESEL ENGINE SOUND
Instructions for Kit version



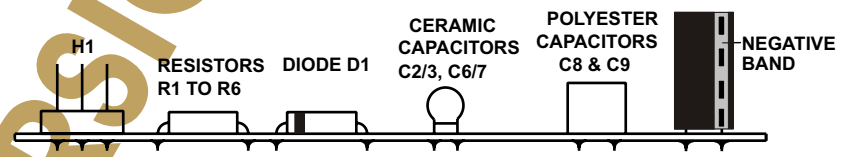
Component Layout



Soldering Tips



Resistor colour bands



Component mounting details

PARTS LIST

- IC1 TDA7052 IC + 8 PIN IC SOCKET
- IC2 PICC508A + 8 PIN IC SOCKET (TAKE CARE WHEN HANDLING)
- D1 1N4148 SILICON DIODE (small glass component)
- R1 ZERO OHM RESISTOR (SINGLE CENTRE BLACK BAND)
- R2,3 10K 1/4 WATT RESISTOR (BROWN/BLACK/ORANGE)
- R4 100K 1/4 WATT RESISTOR (BROWN/BLACK/YELLOW)
- R5 220 Ohms 1/4 WATT RESISTOR (RED/RED/BROWN)
- R6 1K Ohms 1/4 WATT RESISTOR (BROWN/BLACK/RED)
- VR1,4 4K7 MINIATURE VERTICAL PRESET (marked 4K7)
- VR2,3 100K MINIATURE VERTICAL PRESET (marked 100K)
- C1,4 100 uF ELECTROLYTIC CAPACITOR (marked 100 uF)
- C2,3,6,7 0.1uF CERAMIC CAPACITOR (marked 104)
- C5 1uF ELECTROLYTIC CAPACITOR (marked 1 uF)
- C8,9 0.22uF MINITURE POLY CAPACITOR (marked .22 K 63)
- SW1 TWIN MINATURE PCB SWITCH
- PCB TYPE P63
- H1 3 WAY GOLD PLATED HEADER
- K1 2 WAY MINIATURE PCB SCREW CONNECTOR
- CASE TYPE RX2KL07
- SERVO LEAD Futaba generic type supplied, also alternative HiTec/JR plug
- SPEAKER Not supplied - see ACTION lists for suitable type (8Ω impedance required)
- WIRE Not supplied with kit - ANY FINE FLEXIBLE WIRE IS SUITABLE FOR SPEAKER

P63 KIT INSTRUCTIONS

PCB

The PCB has an insulated (Component Side) and a tinned track side. Components are mounted on the insulated side and soldered on the track side. The PCB for this Project is fully prepared and requires no additional work. Look carefully at the area of the PCB you are working on when soldering to ensure that you do not apply an extra connection with a splash of solder during the operation.

TOOLS

For construction you will require a soldering iron with a fine pointed bit and flux cored solder (22 SWG recommended); a small pair of wire cutters and, of course, a good level of light.

PARTS

DO NOT HANDLE ITEMS IN BLACK CONDUCTIVE FOAM UNTIL INSTRUCTED. (MOS DEVICES) THEY ARE SENSITIVE TO STATIC ELECTRICITY FROM YOUR BODY.

- The short bars with colour bands and a wire at each end are resistors. They are colour coded, see drawing and the Parts List.
 - Only R1 is different. This is one with a single black bar at its centre. It is in fact a zero ohm resistor which acts as a wire link.
 - The tubular electrolytic capacitors (C1, C4 & C5) are marked with the value and working voltage, they also have a band down one side of the plastic sleeve with (-) Negative signs on it which signifies which leg goes to the negative. The opposite leg of the capacitor, of course, go to the positive. Capacitor polarisations (+ and -) are clearly shown on the drawing. The small monolithic ceramic capacitors C2, C3, C6 & C7 (usually coated blue or tan and marked 104) with two wires, are not polarised and can be fitted either way round. The square white ones C8 & C9 (marked .22 K 63) are poly capacitors and can also be fitted either way round.
 - The tiny glass component with a dark bar and a wire at each end is a diode (D1; 1N4148). It must be connected the right way round. The bar, which is shown as a black line on the drawing, indicates which way round to fit it.
 - The three legged vertical adjustment trimmers (variable resistors VR1, VR2, VR3 & VR4) with a screwdriver slot at the centre are, as their name suggests, to enable adjustment of the circuit. VR1 and VR4 are marked 4K7; VR2 & VR3 100K.
 - The 8-pin integrated circuits (IC1 & IC2) are marked with a type code. They are delivered in conductive foam and should be left in the foam until you are about to fit them. IC1 (TDA7052) is a fairly robust little device but IC2 (PIC), being a MOS device, can be damaged by static electricity and care must be exercised when handling. Both are supplied with a socket. This will enable the builder to solder in the sockets during construction, then fit the ICs at the end of construction.
 - NOTES ON CMOS DEVICE HANDLING. USE A SHEET OF ALUMINIUM, COOKING METAL FOIL WILL DO.
 - Place it on the work surface. Place the PCB, solder side down on it. Place the black conductive foam on it and then rest your hands on it, holding them there while you read through this part of the instructions. The PCB, MOS I/C and you are now all at the same potential, i.e. static neutralised. When the ICs are fitted they will be safe from the effects of static with the components connected.

CONSTRUCTION

Construction is very straight forward and can be completed with just the layout drawing and the PARTS LIST. For those who would prefer a set of written instructions, the recommended construction sequence is as follows:

- Fit the two 8-pin IC sockets noting the direction of the 'notch'; they should be as per the drawing. The ICs will be fitted into these sockets as a later operation.
 - Fit the resistors in any order, ensuring that the correct value goes into the right position with reference to the drawings and the colour codes in the Parts List. Each component when fitted and soldered, should have its spare lead length cut off. You may find the Soldering Tips sketch useful.
 - D1 comes next; note the dark bar on the component and that when fitted, it coincides with the dark bar shown on the drawing.
 - C2, C3, C6, C7, C8 & C9 can now be fitted either way round; just ensure that C8 & C9 are the .22 square components. Solder in each capacitor then clip off the spare wire.
 - Fit the electrolytic capacitors C1, C4 (100uF) & C5 (1uF), noting their polarity (see drawings) and taking care that it complies with the + & - shown. Once again, cutting off the spare wire after soldering.
 - Fit and solder the three-legged trimmers VR1 (4K7) VR2 (100K) VR3 (100K) & VR4 (4K7) now; they only fit one way.
 - The 3-pin header H1 can now be fitted. Make sure that the short ends are soldered, leaving the long ends of the pins above the PCB. This is the connection for the speed controller lead, which will save you using a 'Y' lead (always to be avoided as they are very costly and take up valuable space).
 - The miniature switch SW1 can now be soldered in. Make sure that the 'ON' '1' & '2' are exactly as per drawing.
 - The speaker screw-connector comes next (K1). It can be fitted with holes to the left or right as you wish. The space to the right is a little larger. You require an 8 ohm speaker. A mylar speaker of almost any size will do the job.
 - 8/ A 3-wire lead is supplied for the connection to the receiver. Connect the Positive + lead (Red) and Negative - lead (Black) to the + and - holes as per the drawing. The third lead is the signal lead (White).
 - The final job is to fit the two ICs into their sockets. Observe that the 'notch' or moulded dot is at the correct end.

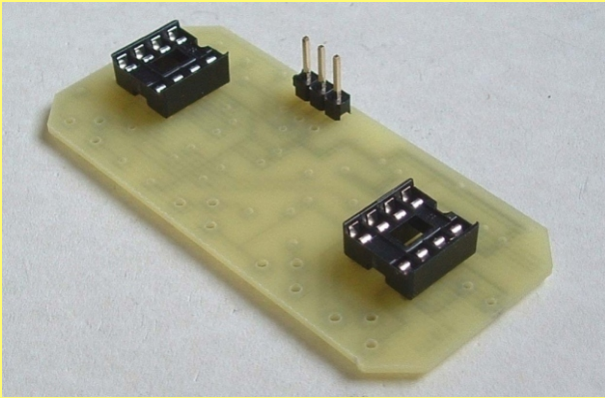
CASE

Slots can be made with a small file to take the wires to the speaker; similarly for the input servo lead and output H1 pins. The case is moulded in ABS and is supplied with four self-tapping screws and is easy to cut with normal modelling tools. Holes can be drilled in the case to enable adjustment of VR1, VR2, VR3 & VR4 if you wish; that is down to personal choice

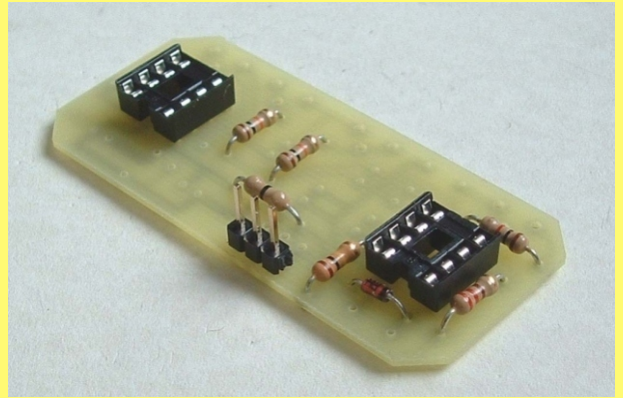
WARNING - DO NOT use the black foam as a packing foam in the finished unit, it is CONDUCTIVE.

P63 MICRO DIESEL ENGINE SOUND

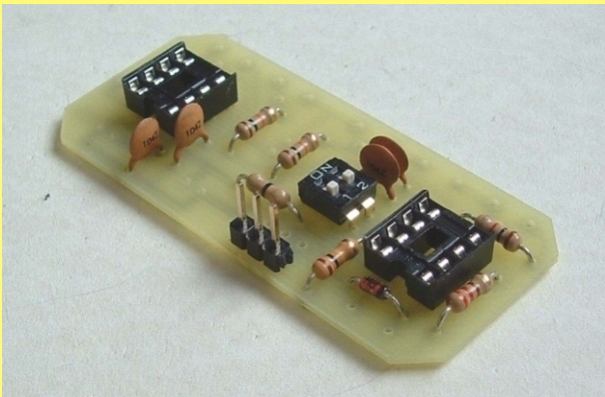
PHOTOGRAPHIC BUILD SEQUENCE FOR KIT VERSION ONLY



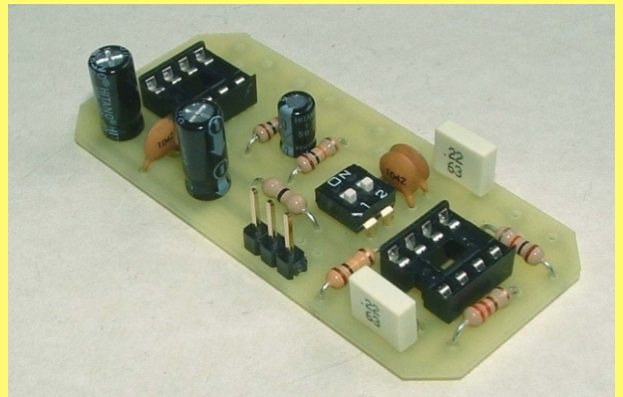
PICTURE 1: PCB with I/C sockets and header pins fitted



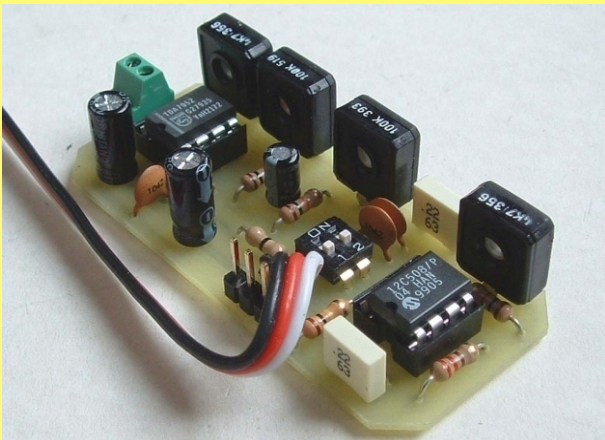
PICTURE 2: Resistors and diode added



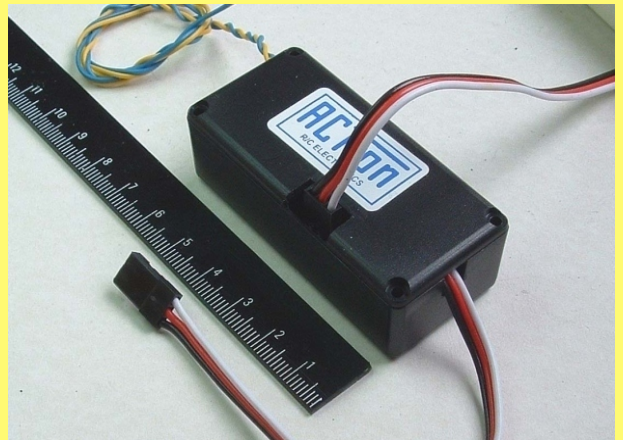
PICTURE 3: Ceramic capacitors & switch added



PICTURE 4: Remaining capacitors fitted



PICTURE 5: Receiver lead, presets & speaker miniature screw terminal block fitted. Plug I/C chips into sockets last. NOTE! ANTI-STATIC PRECAUTIONS REQUIRED



PICTURE 6: File slots in case for leads. Cut away lid as shown to allow connection to ESC.